

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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In this issue:

1. Kigali Amendment latest ratifications
2. Climate Change 2022: Mitigation of Climate Change
3. Meeting arrangements for 89th and 90th meetings of the Executive Committee
4. Key International Associations and UN Team Up to Provide More Opportunities for Women in the Cooling Sector
5. The Green Customs Guide to Multilateral Environmental Agreements
6. Ozone may be heating the planet more than we realize
7. Barbados Gov't working towards reducing use of refrigerants
8. US EPA Reaches Settlement with JTR Heating and Air Conditioning, Inc. in Monee, Illinois Regarding Regulations to Protect Ozone Layer
9. GreenChill Webinar: Deconstructing Flammable Refrigerants
10. Green Deal: Phasing down fluorinated greenhouse gases and ozone depleting substances
11. Déjà vu as European Commission proposal to tackle climate harming Hydrochlorofluorocarbons falls short in critical sectors
12. Refrigerants, Naturally! for LIFE (RefNat4LIFE) Interview with Thomas Trevisan from Belgian ATMosphere
13. Refrigerants in Building Services - Guide
14. How to use natural refrigerants? Learn more at the upcoming Cool Trainings!

GLOBAL



1. Kigali Amendment latest ratifications

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

[United Republic of Tanzania, 25 March 2022](#)

[Spain, Provisional application under Article V, 20 January 2022](#)

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

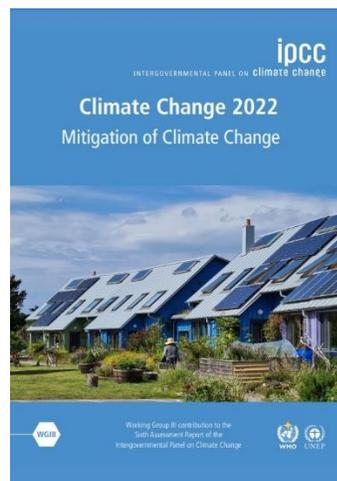
Image: UN Treaty Collection website

2. Climate Change 2022: Mitigation of Climate Change

The IPCC Working Group III report provides an updated global assessment of climate change mitigation progress and pledges and examines the sources of global emissions. It explains developments in emission reduction and mitigation efforts, assessing the impact of national climate pledges in relation to long-term emissions goals.

The latest Intergovernmental Panel on Climate Change (IPCC) report 2022 on climate change mitigation was released on 4 April 2022.

“It’s now or never, if we want to limit global warming to 1.5°C (2.7°F),” said [IPCC Working Group III Co-Chair Jim Skea]. “Without immediate and deep emissions reductions across all sectors, it will be impossible.” See the full [IPCC press release](#).



The report indicates the contribution of the Montreal Protocol, the Kigali Amendment, and the refrigeration, air conditioning, and heat pump sector to achieving this goal, including the following excerpts:

1.4.10 International cooperation (page 1-33)

[...] International collaboration works best if an agreement can be made self-reinforcing with incentives for mutual gains and joint action (Keohane and Victor 2016; Barrett 2016), but the structure of the climate challenge makes this hard to achieve. The evidence from the Montreal Protocol on ozone depleting substances and from the Kyoto Protocol on GHGs, is that legally binding targets have been effective in that participating Parties complied with them (Albrecht and Parker 2019; Shishlov et al. 2016), and (for Kyoto) these account for most of the countries that have sustained emission reductions for at least the past 10-15 years (Section 1.3.2; Section 2.2 in Chapter 2). However, such binding commitments may deter participation if there are no clear incentives to sustain participation and especially if other growing emitters are omitted by design, as with the Kyoto Protocol.

4.2.5.6 Efficient cooling, SLCFs and co-benefits (pages 4-46-7)

[...] In warmer climate regions undergoing economic transitions, improving the energy efficiency of cooling and refrigeration equipment is often important for managing peak electricity demand and can have co-benefits for climate mitigation as well as SLCF reduction, as expected in India, Africa, and Southeast Asia in the future.

Air conditioner adoption is rising significantly in low- and middle-income countries as incomes rise and average temperatures increase, including in Southeast Asian countries such as Thailand, Indonesia, Vietnam, and the Philippines, as well as Brazil, Pakistan, Bangladesh, and Nigeria (Biardeau et al. 2020). Cooling appliances are expected to increase from 3.6 billion to 9.5 billion by 2050, though up to 14 billion could be required to provide adequate cooling for all (Birmingham Energy Institute 2018). Current technology pathways are not sufficient to deliver universal access to cooling or meet the 2030 targets under the SDGs, but energy efficiency, including in equipment efficiency like air conditioners, can reduce this demand and help limit additional emissions that would further exacerbate climate change (UNEP and IEA 2020; Dreyfus et al. 2020; Biardeau et al. 2020). Some countries (India, South Africa) have started to recognise the need for more efficient equipment in their mitigation strategies (Paladugula et al. 2018; Altieri et al. 2016; Ouedraogo 2017).

One possible synergy between SLCF and climate change mitigation is the simultaneous improvement in energy efficiency in refrigeration and air-conditioning equipment during the hydrofluorocarbon (HFC) phase-down, as recognised in the Kigali Amendment to the Montreal Protocol. The Kigali Amendment and related national and regional regulations are projected to reduce future radiative forcing from HFCs by about half in 2050 compared to a scenario without any HFC controls, and to reduce future global average warming in 2100 from a baseline of 0.3-0.5°C to less than 0.1°C, according to a recent scientific assessment of a wide literature (World Meteorological Organization 2018). If ratified by signatories, the rapid phase-down of HFCs under the Kigali Amendment is possible because of extensive replacement of high-global warming potential (GWP) HFCs with commercially available low-GWP alternatives in refrigeration and air-conditioning equipment. Each country's choices of alternative refrigerants will likely be determined by energy efficiency, costs, and refrigerant toxicity and flammability. National and regional regulations will be needed to drive technological innovation and development (Polonara et al. 2017).

4.2.5.7 Efficient buildings, cooler in summer, warmer in winter, towards net zero energy

[...] Most accelerated mitigation pathway scenarios include significant increase in building energy efficiency. Countries in cold regions, in particular, often focus more on building sector GHG emissions mitigation measures such as improving building envelopes and home appliances, and electrifying space heating and water heating. For example, scenarios for Japan project continued electrification of residential and commercial buildings to 65% and 79% respectively by 2050 to reach 70-90% CO₂ reduction from 2013 levels (Kato 44 and Kurosawa 2019). Similarly, a mitigation pathway for China compatible with 1.5°C would require 58% to 70% electrification of buildings according to (Jiang et al. 2018; Energy Transitions Commission and Rocky Mountain Institute 2019; China National Renewable Energy Centre 2019). For the EU-28 to reach net carbon neutrality, complete substitution of fossil fuels with electricity (up to 65% share), district heating, and direct use of solar and ambient heat are projected to be needed for buildings, along with increased use of solar thermal and heat pumps for heating (Duscha et al. 2019). In the UK and Canada, improved insulation to reduce energy demand and efficient building appliances and heating systems are important building strategies needed to reduce emissions to zero by 2050 (Roberts et

al. 2018a; Vaillancourt et al. 2017; Chilvers et al. 2017). In Ireland, achieving 80%-95% emissions reduction below 1990 levels by 2050 also requires changes in building energy technology and efficiency, including improving building envelopes, fuel switching for residential buildings, and replacing service-sector coal use with gas and renewables according to (Chiodi et al. 2013). In South Africa, improving industry and building energy efficiency is also considered a key part of mitigation strategies (Ouedraogo 2017; Altieri et al. 2016). In addition, an increasing number of countries have set up Net Zero Energy Building targets (Table 4.8) (Höhne et al. 2020). Twenty-seven countries have developed roadmap documents for NZEBs, mostly in developed countries in Europe, North America, and Asia-Pacific, focusing on energy efficiency and improved insulation and design, renewable and smart technologies (Mata et al. 2020). The EU, Japan and the U.S. (the latter for public buildings only) have set targets for shifting new buildings to 100% near-zero energy buildings by 2030, with earlier targets for public buildings. Scotland has a similar target for 2050 (Höhne et al. 2020). Technologies identified as needed for achieving near-zero energy buildings vary by region, but include energy-efficient envelope components, natural ventilation, passive cooling and heating, high performance building systems, air heat recovery, smart and information and communication technologies, and changing future heating and cooling supply fuel mixes towards solar, 23 geothermal, and biomass (Mata et al. 2020). Subnational regions in Spain, U.S., Germany, and Mexico have set local commitments to achieving net zero carbon new buildings by 2050, with California having the most ambitious aspirational target of zero net energy buildings for all new buildings by 2030 (Höhne et al. 2020). The EU is also targeting the retrofitting of 3% of existing public buildings to zero-energy, with emphasis on greater thermal insulation of building envelopes (Mata et al. 2020; Höhne et al. 2020). China's roadmaps have emphasised insulation of building envelope, heat recovery systems in combination with renewable energy, including solar, shallow geothermal, and air source heat pumps (Mata et al. 2020).

Cooling energy demand (pages 9-30-1)

[...] In a warming world (IPCC 2021) with a growing population and expanding middle-class, the demand for cooling is likely to increase leading to increased emissions if cooling solutions implemented are carbon intensive (Kian Jon et al. 2021; Dreyfus et al. 2020b; Santamouris 2016; Sustainable Energy for All 2018; United Nations Environment Programme (UNEP) International Energy Agency (IEA) 2020). Sufficiency measures such as building design and forms, which allow balancing the size of openings, the volume, the wall and window area, the thermal properties, shading, and orientation are all non-cost solutions, which should be considered first to reduce cooling demand. Air conditioning systems using halocarbons are the most common solutions used to cool buildings. Up to 4 billion cooling appliances are already installed and this could increase to up 14 billion by 2050 (Peters 2018; Dreyfus et al. 2020b). Energy efficiency of air conditioning systems is of a paramount importance to ensuring that the increased demand for cooling will be satisfied without contributing to global warming through halocarbon emissions (Shah et al. 2019, 2015; Campbell 2018; United Nations Environment Programme (UNEP) International Energy Agency (IEA) 2020). The installation of highly efficient technological solutions with low Global Warming Potential (GWP), as part of the implementation of the Kigali amendment to the Montreal Protocol, is the second step towards reducing GHG emissions from cooling. Developing renewable energy solutions integrated to buildings is another track to follow to reduce GHG emissions from cooling.

12.4.2.1 Sectoral contribution of GHG emissions from food systems (page 12-68)

[...] Refrigeration uses an estimated 43% of energy in the retail sector (Behfar et al. 2018) and significantly increases fuel consumption during distribution. Besides being energy intensive, supermarket refrigeration also contributes to GHG emissions through leakage of refrigerants (F-gases), although their contribution to food system GHG emissions is estimated to be minor (Crippa et al. 2021b). The cold chain accounts for approximately 1% of global GHG emissions, but as the number of refrigerators per capita in developing countries is reported to be one order of magnitude lower than the number in developed countries (19 m³ versus 200 m³ refrigerated storage capacity per 1000 inhabitants), the importance of refrigeration to total GHG emissions is expected to increase (James and James 2010). Although refrigeration gives rise to GHG emissions, both household refrigeration and effective cold chains could contribute to a substantial reduction in losses of perishable food and thus in emissions associated with food provision (University of Birmingham 2018; James and James 2010). A trade-off exists between reducing food waste and increased refrigeration emissions, with the benefits depending on type of produce, location and technologies used (Wu et al. 2019; Sustainable Cooling for All 2018).

12.4.3.5 Storage and distribution (page 12-85)

[...] As one of the highest contributors to energy demand at this stage in the food value chain, refrigeration has received a strong focus in mitigation. Efficient refrigeration options include advanced refrigeration temperature control systems, and installation of more efficient refrigerators, air curtains and closed display fridges (Chaomuang et al. 2017). Also related to reducing emissions from cooling and refrigeration is the replacement of hydrofluorocarbons which have very high GWPs with lower GWP alternatives (Niles et al. 2018). The use of propane, isobutane, ammonia, hydrofluoroolefins and CO₂ (refrigerant R744) are among those that are being explored, with varying success (McLinden et al. 2017). In recent years, due to restrictions on high GWP-refrigerants, a considerable growth in the market availability of appliances and systems with non-fluorinated refrigerants has been seen (Eckert et al. 2021)

Energy efficiency alternatives generic to buildings more broadly are also relevant here, including efficient lighting, HVAC systems and building management, with ventilation being a particularly high energy user in retail, that warrants attention (Kolokotroni et al. 2015).

HFCs (page 13-51)

[...] Most HFCs are used as substitutes for ozone depleting substances. The Kigali Amendment (KA) to the Montreal Protocol will reduce HFC use by 85% by 2047 (UN Environment 2018). To help meet their KA commitments developed country parties have been implementing regulations to limit imports, production and exports of HFCs and to limit specific uses of HFCs. The EU, for example, issues tradable quota for imports, production and exports of HFCs. Prices of HFCs have increased as expected (Kleinschmidt 2020) which has led to smuggling of HFCs into the EU (European Commission 2019b). HFC use has been slightly (1 to 6%) below the limit each year from 2015 through 2018 (EEA 2019). China and India released national cooling action plans in 2019, laying out detailed, cross sectoral plans to provide sustainable, climate friendly, safe and affordable cooling (Dean et al. 2020).

14.2.3 Assessment criteria (page 14-2)

[...] This section identifies a set of criteria for assessing the effectiveness of international cooperation, which is applied later in the chapter. Lessons from the implementation of other

multilateral environmental agreements (MEAs) can provide some guidance.... Many have pointed to the Montreal Protocol, addressing stratospheric ozone loss, as an example of a successful treaty because of its ultimate environmental effectiveness, and relevance for solving climate change. Scholarship emerging since AR5 emphasises that the Paris Agreement has a greater 'bottom up' character than many other MEAs, including the Montreal or Kyoto Protocols, allowing for more decentralised 'polycentric' forms of governance that engage diverse actors at the regional, national and sub-national levels (Ostrom 2010; Jordan et al. 2015; Falkner 2016b; Victor 2016). Given the differences in architecture, lessons drawn from studies of MEA regimes need to be supplemented with assessments of the effectiveness of cooperative efforts at other governance levels and in other forums. Emerging research in this area proposes methodologies for this task (Hsu et al. 2019a). Findings highlight the persistence of similar imbalances between developed and developing countries as at the global level, as well as the need for more effective ways to incentivise private sector engagement in transnational climate governance (Chan et al. 2018).

14.5.1.1 Role of other environmental agreements (page 14-66-7)

[...] International cooperation on climate change mitigation takes place at multiple governance levels, including under a range of multilateral environmental agreements (MEAs) beyond those of the international climate regime.

The 1987 Montreal Ozone Protocol is the leading example of a non-climate MEA with significant implications for mitigating climate change (Barrett 2008). The Montreal Protocol regulates a number of substances that are both ozone depleting substances (ODS) and GHGs with a significant global warming potential (GWP), including chlorofluorocarbons, halons and hydrochlorofluorocarbons (HCFCs). As a result, implementation of phase-out requirements for these substances under the Montreal Protocol has made a significant contribution to mitigating climate change (Molina et al. 2009) (See also Section 9.9.7.1). Velders et al. (2007) found that over the period from 1990 to 2010, the reduction in GWP100-weighted ODS emissions expected with compliance to the provisions of the Montreal Protocol was 8 GtCO₂eq yr⁻¹, an amount substantially greater than the first commitment period Kyoto reduction target. Young et al. (2021) suggest that the Montreal Protocol may also be helping to mitigate climate change through avoided decreases in the land carbon sink.

The 2016 Kigali Amendment to the Montreal Protocol applies to the production and consumption of hydrofluorocarbons (HFCs). HFCs, which are widely used as refrigerants (Abas et al. 2018), have a high GWP100 of 14600 for HFC-23, and are not ODS (See also Section 9.9.7.1). The Kigali Amendment addresses the risk that the phase-out of HCFCs under the Montreal Protocol and their replacement with HFCs could exacerbate global warming (Akanle 2010; Hurwitz et al. 2016), especially with the predicted growth in HFC usage for applications like air conditioners (Velders et al. 2015). In this way it creates a cooperative rather than a conflictual relationship between addressing ozone depletion and the climate protection goals of the UNFCCC regime (Hoch et al. 2019). The Kigali Amendment requires developed country parties to phase down HFCs by 85% from 2011-2013 levels by 2036. Developing country parties are permitted longer phase-down periods (out to 2045 and 2047), but must freeze production and consumption between 2024 and 2028 (Ripley and Verkuil 2016; UN 2016). A ban on trade in HFCs with non-parties will come into effect from 1 January 2033. For HFC 23, which is a by-product of HCFC production rather than an ODS, parties are required to report production and consumption data, and to

destroy all emissions of HFC-23 occurring as part of HCFCs or HFCs to the extent practicable from 2020 onwards using approved technologies (Ripley and Verkuijl 2016).

Full compliance with the Kigali Amendment is predicted to reduce HFC emissions by 61% of the global baseline by 2050 (Höglund-Isaksson et al. 2017), with avoided global warming in 2100 due to HFCs from a baseline of 0.3-0.5°C to less than 0.1°C (WMO 2018). Examining the interplay of the Kigali Amendment with the Paris Agreement, Hoch et al. (2019) show how the Article 6 mechanisms under the Paris Agreement could generate financial incentives for HFC mitigation and related energy efficiency improvements. Early action under Article 6 of the Paris Agreement could drive down baseline levels of HFCs for developing countries (calculated in light of future production and consumption in the early and mid-2020s) thus generating long-term mitigation benefits under the Kigali Amendment (Hoch et al. 2019). However, achievement of the objectives of the Kigali Amendment is dependent on its ratification by key developed countries, such as the United States, and the provision of funds by developed countries through the Protocol's Multilateral Fund to meet developing countries agreed incremental costs of implementation (Roberts 2017). The Kigali Amendment came into force on 1 January 2019 and has been ratified by 118 of the 198 parties to the Montreal Protocol.

15.2.4 Climate Finance and Just Transition (page 15-20)

[...] A review of past crisis episodes suggests that collective actions to avoid large global or multi-country risks work well primarily when the problems are well-defined, a small number of actors are involved, solutions are relatively well-established scientifically, and public costs to address them are relatively small (Sandler 1998, 2015) (for example, dealing with early pandemic outbreaks such as Ebola, TB, and cholera; extending global vaccination programs such as smallpox, measles and polio; early warning systems and actions such as tsunamis, hurricanes/cyclones and volcanic disasters; Montreal Protocol for ozone depleting refrigerants, and renewables wind and solar energy development). They but do not appear to work as well for more complex global collective action problems which concern a number of economic actors, sectors, without inexpensive and mature technological options, and where political and institutional governance is fragmented. Greater political coordination is needed because the impacts are often not near-term or imminent, but diffuse, slow moving and long-term, and where preventive disaster avoidance is costly even when these costs are low compared to the longer-term damages—till tipping points are reached of the need for reduced 'stressors' and increasing 'facilitators' (Jagers et al. 2020). But by then, it may be too late.

Full report is available [here](#)

[The Intergovernmental Panel on Climate Change, 4 April 2022](#)

Image: IPCC website

See Also >>>

[Wake up call for humanity: Q&A with climate expert on IPCC report](#). A discussion with Niklas Hagelberg, a climate change expert with the United Nations Environment Programme, about the report, what it means for the planet and whether the world can muster the political will to tackle the climate crisis.

[IPCC Cites Low-GWP Refrigerants as Key to Rapid Kigali Phase Down](#), The latest report by the International Panel on Climate Change (IPCC) – the UN body that assesses the science

related to climate change – emphasizes the critical role of low-GWP refrigerants, such as CO₂ (R744), in the rapid phase down of HFCs under the Kigali Amendment.

3. Meeting arrangements for 89th and 90th meetings of the Executive Committee



Meeting arrangements for 89th and 90th meetings of the Executive Committee
In view of the global COVID-19 situation and the relevant directives released by the Governments of Canada and Quebec in response to the pandemic, on 18 January 2022 the Secretariat informed the Executive Committee that the in-person 89th meeting, planned for 7 to 11 March 2022, in line with decision 87/60(a) would not take place.
Following discussions with the Executive Committee, the following contingency plan was approved:
(a) The 89th meeting will be held in two parts:
(i) Part I: Virtually, on 16, 18 and 20 May 2022, to consider items listed in the agenda of part I of the 89th meeting contained in document UNEP/OzL.Pro/ExCom/89/Add.1;
(ii) Part II: In-person, from 16 to 18 June 2022, in Montreal, Canada, at the International Civil Aviation Organization (ICAO);
(b) A "refresher" informal session for Executive Committee members will be organized on agenda item 7(a) of the 89th meeting, development of the cost guidelines for the phase-down of HFCs in Article 5 countries: draft criteria for funding (decision 83/65(d)), on 15 June 2022 from 4 p.m. to 6 p.m., in Montreal, Canada, at Le 1000, Conference Centre; and
(c) The 90th meeting will be held from 20 to 23 June 2022, in Montreal, Canada at ICAO.
In light of the Canadian Grand Prix being held the weekend of 17 to 19 June, all attendees are advised to make lodging arrangements as soon as possible.

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[The Multilateral Fund for the Implementation of the Montreal Protocol, March 2022](#)

Image: UNMLF website



4. Key International Associations and UN Team Up to Provide More Opportunities for Women in the Cooling Sector

PARIS, 11 April 2022 – The cooling sector delivers a tremendous number of benefits ranging from public health to food security to productive and comfortable workplaces and homes. It is a truly vital, dynamic, and rapidly growing field that represents a significant source of high-quality employment worldwide. However, this sector has the potential to contribute even more by increasing the number of women in its ranks at all levels and types of jobs, which include diverse professions ranging from CEOs to professors, from engineers to servicing technicians, just to name a few.



To help accelerate this process, a new initiative called the **International Network for Women in Cooling (INWIC)** has been launched to advance the engagement of women, promote career opportunities, and increase their overall participation in the sector, which includes refrigeration, air-conditioning, and heat pumps (RACHP). INWIC is led by the World Refrigeration Day (WRD) Secretariat and the United Nations Environment Programme (UNEP) OzonAction in cooperation with a highly-reputed group of founding partners, all of whom are active in this area – AIRAH (Australia), AREA (Europe), ASHRAE (Global), CAR (China), FAIAR (Latin America), IIR (Global), IOR (UK), ISHRAE (India), JSRAE (Japan), U-3ARC (Africa), and Women in HVAC&R (North America).

Although women make up half of the world’s population, they are significantly and visibly under-represented in the RACHP sector in all roles. INWIC seeks to reverse that trend. It is doing so while recognising that there are many excellent initiatives and structures established by different partners that are promoting women’s engagement in the RACHP field. However, more cooperation and information exchange at the global level is needed to link these individual efforts and make them even more meaningful and impactful, especially in developing countries.

There are over 300 national, regional, and international associations, organisations, and institutions in the RACHP sector, however initial research indicates that fewer than 20 (5%) of these have sections specifically for women. Corresponding data indicates that where these women’s sections do exist, there is a greater number of women who are actively involved in the committees and structures of these bodies, which in turn increases the opportunities to raise the visibility of women in the sector.

“You can’t be what you can’t see! There are not enough visible ‘women in cooling’ role models. We want to change that,” said Stephen Gill – Head of WRD Secretariat. “We will create a resource for girls and young women to see bite-size videos and read real-life stories from a diverse range of women in different roles within the cooling sector. This will also serve to connect and inspire women currently working in the cooling sector.”

INWIC will connect women in this predominantly male sector, empowering them to succeed through networking opportunities, mentoring, education, to shine as visible role models to change outdated perceptions to leave a lasting legacy to inspire the next generation of women innovators and problem-solvers. It will also offer an opportunity to individual women, especially from developing countries, to get access to experiences and career development opportunities in the field that would otherwise be inaccessible to them.

This initiative contributes to the achievement of the Sustainable Development Goals: Gender equality for women, including equality of opportunity. Improving livelihoods through job creation and employment. Making cities and people’s lives more sustainable. Climate adaptation and mitigation. Regarding the latter, one of INWIC’s important roles is to serve as a platform to promote environmental stewardship as part of the cooling profession. This includes, among other issues, proper and safe management of refrigerants like HFCs, HCFCs, hydrocarbons and new alternatives.

*“The cooling sector is critical for achieving environmental objectives, including the continued success of the Montreal Protocol and for addressing climate change. If they are to meet their compliance obligations, countries need a strong, vibrant, and inclusive cooling sector,” said **James Curlin – Head of UNEP OzonAction**. “Women represent a tremendous, largely untapped source of innovation and skills for this sector, and they need to be actively engaged if we are to solve the great environmental challenges of our time. INWIC seeks to do just that.”*

In the next few months, INWIC founding partners will introduce several programs that directly support individual women and young girls to further engage and find opportunities that can support the advancement of their careers, the attraction to cooling education disciplines, and active engagement with the cooling community.

Contact: [Ayman Etlouny](#), Coordinator International Partnerships, [OzonAction](#), Law Division, UN Environment Programme

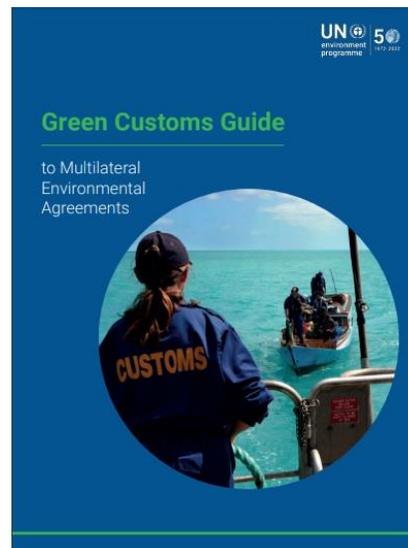
Image: UNEP OzonAction website

5. The Green Customs Guide to Multilateral Environmental Agreements

The Green Customs Guide to Multilateral Environmental Agreements was designed to promote sustainable trade and encourage customs and border control officers to take on a proactive role in protecting the environment. The guide provides customs and border control officers, as well as anyone interested, with useful information and guidance about relevant trade-related multilateral environmental agreements (MEAs), thus facilitating legitimate trade in environmentally sensitive items while preventing illicit trade in such items and contributing to the achievement of the [Sustainable Development Goals](#).

This updated version of the guide reflects several new developments that have taken place in recent years, such as the entry into force of the Minamata Convention on Mercury, the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, and the plastic wastes amendments to the Basel Convention. The guide also considers the gender perspective of the daily work of customs and border control officers.

The [Green Customs Initiative](#), launched in 2004, is a [partnership of international entities](#) cooperating to prevent the illegal trade in environmentally sensitive commodities and



substances and to facilitate their legal trade. Its objective is to enhance the capacity of customs and other relevant border control officers to monitor and facilitate the legal trade and to detect and prevent illegal trade in environmentally sensitive commodities covered by relevant trade related MEAs and the Chemical Weapons Convention. In addition to UNEP, several MEAs secretariats and OPCW, Interpol and the World Customs Organization are also partners.

Read/Download the [full report](#).

See pages 91-98 on "How the Montreal Protocol regulates trade", and "Montreal Protocol-specific training materials for customs officers."

[United Nations Environment Programme \(UNEP\) - Law Division, 11 APRIL 2022](#)

Image: UNEP-Law Division website

6. Ozone may be heating the planet more than we realize

Ozone may be weakening one of the Earth's most important cooling mechanisms, making it a more significant greenhouse gas than previously thought, research has found.



A new study has revealed that changes to ozone levels in the upper and lower atmosphere were responsible for almost a third of the warming seen in ocean waters bordering Antarctica in the second half of the 20th century.

The deep and rapid warming in the Southern Ocean affects its role as one of the main regions for soaking up excess heat as the planet warms.

The majority of this warming was the result of ozone increases in the lower atmosphere. Ozone—one of the main components of smog—is already hazardous as a pollutant, but the research shows it may also play a significant role in driving climate change in the coming years.

Dr. Michaela Hegglin, an Associate Professor in atmospheric chemistry and one of the study's authors, said: "Ozone close to Earth's surface is harmful to people and the environment, but this study reveals it also has a big impact on the ocean's ability to absorb excess heat from the atmosphere.

"These findings are an eye-opener and hammer home the importance of regulating air pollution to prevent increased ozone levels and global temperatures rising further still."

The new research by an international team of scientists, and led by the University of California Riverside, is published in *Nature Climate Change*.

The team used models to simulate changes in ozone levels in the upper and lower atmosphere between 1955 and 2000, to isolate them from other influences and increase the currently poor understanding of their impact on the Southern Ocean heat uptake.

These simulations showed that a decrease in ozone in the upper atmosphere and increase in the lower atmosphere both contributed to warming seen in the upper 2km of the ocean waters in the high latitudes by overall greenhouse gas increases.

They revealed that the increased ozone in the lower atmosphere caused 60% of the overall ozone-induced warming seen in the Southern Ocean over the period studied—far more than previously thought. This was surprising because tropospheric ozone increases are mainly thought of as a climate forcing in the Northern hemisphere since that is where the main pollution occurs.

Ozone hit the headlines in the 1980s when a hole was discovered in the ozone layer high in the atmosphere over the South Pole, due to damage caused by chlorofluorocarbons (CFCs), a gas used in industry and consumer products.

The ozone layer is vital as it filters dangerous ultraviolet radiation from reaching Earth's surface. This discovery led to the Montreal Protocol, an international agreement to halt the production of CFCs.

Dr. Hegglin said: "We have known for a while that ozone depletion high in the atmosphere has affected surface climate in the Southern Hemisphere. Our research has shown that ozone increases in the lower atmosphere due to air pollution, which occurs primarily in the Northern Hemisphere and 'leaks' into the Southern Hemisphere, is a serious problem as well.

"There is hope to find solutions, and the success of the Montreal Protocol at cutting CFC use shows that international action is possible to prevent damage to the planet."

Ozone is created in the upper atmosphere by interaction between oxygen molecules and UV radiation from the sun. In the lower atmosphere, it forms due to chemical reactions between pollutants like vehicle exhaust fumes and other emissions.

Changes in ozone concentrations in the atmosphere affect westerly winds in the Southern Hemisphere as well as causing contrasting levels of salt and temperature close to the surface in the Southern Ocean. Both affect ocean currents in distinct ways, thereby affecting ocean heat uptake.

[PhysOrg, 31 March 2022](#)

Image: PhysOrg website / Credit: CC0 Public Domain

"Cooling Matters": World Refrigeration Day 2022 Theme

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. “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 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”](#)
Contact info@worldrefrigerationday.org

[World Refrigeration Day is celebrated on and around June 26](#)

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 26th IIR International Congress of Refrigeration. In anticipation of the 26th 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

[Find out how to apply](#)

Application deadline: April 30, 2022

[International Institute of Refrigeration \(IIR\), 11 February 2022](#) - Image: IIR website

LATIN AMERICA AND CARIBBEAN

7. Barbados Gov't working towards reducing use of refrigerants

As Government continues to put measures in place to phase out ozone-depleting substances, Permanent Secretary in the Ministry of the Environment and Beautification Charley Browne is urging all stakeholders to play their part in helping the country to meet its goals.



Gov't working towards reducing use of refrigerants

Browne pledged that the Mia Mottley administration would continue to do what it could to ensure the island meets its obligation of phasing out the ozone depleting substances, which are mainly found in refrigerators, air conditioners and fire extinguishers.

As such, Browne said Government would continue to ensure that young people were given the opportunity to carry out studies in the necessary fields.

He made the comments while speaking at a special ceremony at the Samuel Jackman Prescod Institute of Technology on Friday, where five students were presented with certificates of achievement and cheques for the National Ozone Depleting Substances Phased-Out Support Scholarship for the 2021/2022 academic year.

Browne said the scholarships were an additional avenue to safeguarding the environment, supporting the development of youth in Barbados, and positively influencing change in the refrigerator and air conditioning industry.

"In response to our international obligations, my ministry has utilised a multi-sectoral and multi-discipline approach to developing and implementing the plans, programmes, and activities necessary to sequentially phase out the consumption of certain refrigerants such as R22 and R4068 (a form of propellant and refrigerant) by January 1, 2030," said Browne.

"While we pursue the transformation of the local refrigerator and air conditioning sector by using a combination of policies and legislation, capacity-building and education and awareness raising activities, it remains imperative that stakeholders operating in the sector play their part as well.

"Therefore, attributes such as the broad-base adoption of good service practices among the refrigeration and air conditioning technicians, particularly the recovery of refrigerant from the equipment and transition to the use of environmentally friendly and energy efficient alternatives, are of vital importance," he warned.

Barbados has set a 2024 date for a national freeze on hydrofluorocarbon (HFC) refrigerants and a 2030 ban on imports and exports of hydrochlorofluorocarbon (HCFC) refrigerants.

Browne urged stakeholders to continue to be mindful and practical in the way they choose refrigerants and service equipment.

He said in addition to policies, the Ministry of the Environment and Beautification would continue to place emphasis on the youth as Barbados strives towards its goals.

"The youth remain key to creating a cleaner and greener environment. We therefore recognise the importance of targeting the students of the refrigerator and air conditioning profession who are at the vanguard of the refrigerator and air conditioning technician field. We see your development as a critical component to achieving and sustaining the success

of local, and by extension global measures, to protect the ozone layer and reduce the impact of climate change,” said Browne.

The partnership between the ministry and the SJPI, which has been in place since 2014, has so far resulted in the awarding of some 13 scholarships.

[Barbados Today, 2 April 2022. by Marlon Madden](#)

Image: Barbados Today website

NORTH AMERICA

8. US EPA Reaches Settlement with JTR Heating and Air Conditioning, Inc. in Monee, Illinois Regarding Regulations to Protect Ozone Layer

Chicago (April 7, 2022) --Today, U.S. Environmental Protection Agency announced a settlement with JTR Heating and Air Conditioning, Inc. in Monee, Illinois, to resolve alleged violations of Clean Air Act stratospheric ozone regulations.



EPA’s consent agreement and final order with JTR resolves alleged violations of regulations regarding the protection of the stratospheric ozone layer. JTR handles the maintenance, service, repair, and disposal of appliances containing ozone-depleting refrigerants and their substitutes. EPA regulations prohibit anyone from knowingly venting or otherwise releasing refrigerant to the environment during work on appliances. EPA alleged that on at least two separate occasions, JTR knowingly vented R-22 and R-410a refrigerant during servicing of those appliances. Under the settlement, JTR will pay a \$28,919 civil penalty and resolve the alleged violations.

Releases of refrigerants like R-22 deplete stratospheric ozone and violate requirements under the Clean Air Act National Recycling and Emission Reduction Program. The National Recycling and Emission Reduction Program governs the management of ozone-depleting substances and substitutes and implements the United States’ mandates under the 1991 *Montreal Protocol on Substances that Deplete the Ozone Layer*. R-410a is a substitute refrigerant, and, while not ozone-depleting, has a global warming potential of 2,090 times carbon dioxide and is prohibited from being directly released to the atmosphere.

The ozone layer protects the earth from the adverse effects of ultra-violet radiation which is known to cause cancers, immune system suppression, and cataracts. In addition, excessive UV radiation can harm crops, plankton production, and the marine food chain.

[Learn more information about EPA’s enforcement of the U.S. obligations under the Montreal Protocol.](#)

The US EPA, 7 April 2022

Image: USEPA website

9. GreenChill Webinar: Deconstructing Flammable Refrigerants

Invitation to join GreenChill webinar on May 3 from 2 – 3 PM Eastern. Learn more about the who, what, why, and how of flammable refrigerants! Presenters from Chemours will cover safety classifications, best practices for managing flammable refrigerants, codes, and standards, and more.



To join:

- on your computer or mobile app [Click here to join the meeting](#)
- with a video conferencing device

sip:teams@video.epa.gov

Video Conference ID: 116 880 563 9

[Alternate VTC instructions](#)

Or call in (audio only)

[+1 202-991-0477, 850473130#](tel:+12029910477) United States, Washington DC

Phone Conference ID: 850 473 130#

[Find a local number](#)

The US EPA GreenChill, May 2022

Image: GreenChill website

EUROPE & CENTRAL ASIA

10. Green Deal: Phasing down fluorinated greenhouse gases and ozone depleting substances

The European Commission has today [5 April 2022] proposed two new Regulations to more tightly control fluorinated greenhouse gases (F-gases) and ozone depleting substances (ODS). The adoption of these regulations would represent a significant step towards limiting global temperature rise in line with the Paris Agreement. The F-gas proposal will also contribute to reducing emissions by at least 55% by 2030 and making Europe climate-neutral by 2050. Both proposals together could bring about a total reduction in the EU's greenhouse gas emissions (GHG) of 490 Mt (CO₂ equivalent) by 2050. For comparison, this is slightly higher than the total annual greenhouse gas emissions of France in 2019.

Frans Timmermans, Executive Vice-President for the European Green Deal said: *"For decades the European Union has had the world's most ambitious policy on fluorinated gases and Ozone Depleting Substances. While existing laws have been successful, science urges us to go further and faster now. Making climate-friendly technologies more widely available will*



help us reach the EU's long-term climate goals and encourage countries outside Europe to reduce their F-gas and use of Ozone Depleting Substances too."

F-gases and ODS are highly potent, human-made greenhouse gases that contribute to global warming when released into the atmosphere, often several thousand times stronger than carbon dioxide (CO₂). ODS damage the ozone layer that protects the Earth against dangerous ultraviolet radiation from the sun. Both types of substance groups have or used to have practical applications in everyday life, for example in refrigeration, air conditioning, insulation, fire protection, power lines and as aerosol propellants. While existing EU legislation has already limited the use and emissions of these gases significantly, the regulations proposed today will reduce emissions even further and provide incentives to use climate-friendly alternatives.

Proposal for a new F-gas Regulation

At EU level, F-gases currently account for 2.5 % of total GHG emissions. The strengthened [F-gas proposal](#) will save the equivalent of 40 million tons of carbon dioxide (CO₂) emissions by 2030, beyond the expected reduction under current legislation, reaching total additional savings equivalent to 310 million tons of CO₂ by 2050.

- **Delivering higher ambition:** The proposal would tighten the quota system for hydrofluorocarbons (HFC phase-down), reducing the potential climate impact of new HFCs coming onto the EU market by 98% between 2015 and 2050. It also introduces new restrictions to make sure that F-gases would only be used in new equipment where no suitable alternatives are available. For example, SF₆, the most potent greenhouse gas, will be phased out in all new equipment for electrical transmission ("switchgear") by 2031.
- **Improved enforcement and implementation:** The proposal would make it easier for customs and surveillance authorities to control imports and exports, cracking down on trade of illegal F-gases and equipment. In addition, penalties will become harsher and more standardized. The quota system will be limited to genuine gas traders through stricter registration rules and the introduction of a fixed quota price. The number of engineers qualified to handle climate-friendly equipment in Europe would increase as Member States would be required to expand their certification and training programs to cover climate-friendly technologies replacing or reducing F-gas use.
- **More comprehensive monitoring:** A broader range of substances and activities would be covered and the procedures for reporting and verifying data would be improved.
- **Ensuring compliance with the Montreal Protocol:** The F-gas proposal would abolish certain exemptions and bring the EU's HFC phase-down fully into line with the Montreal Protocol.

Proposal for a new ODS Regulation

By introducing [new measures](#) targeting products in which ODS were legally used in the past, the EU wants to prevent the equivalent of 180 million tonnes of CO₂ and 32,000 tonnes of ozone depleting potential (ODP) emissions by 2050.

- **Higher ambition:** Most additional emission savings would be achieved by requiring ODS to be recovered or destroyed from insulation foams when buildings are renovated or demolished.
-

- **Streamlining:** Industry and authorities would benefit from cost savings due to a modernised licensing system and the end of obsolete quota and registration requirements.
- **Improved enforcement and monitoring:** Measures would be introduced to fight illegal activities similar to those proposed in the F-gas Regulation. The reporting would be extended to cover more substances and activities to better understand the remaining trade of ODS, their emissions and any future risks. [...]

[The European Commission \(EC\), Press release, 5 April 2022](#)

Image: EC website

See Also >>>

[Questions and Answers: New rules proposed on fluorinated greenhouse gases and ozone depleting substances](#)

11. Déjà vu as European Commission proposal to tackle climate harming Hydrochlorofluorocarbons falls short in critical sectors

Proposed new rules unveiled yesterday (5 April) by the European Commission to restrict climate-damaging fluorinated gases (F-gases) fall short of what is needed and could result in another lost decade in the increasingly urgent fight against climate change.



F-gases are a category of super potent climate pollutants which include hydrofluorocarbons (HFCs) and Sulphur hexafluoride (SF6).

The Commission's long-awaited proposal to revise the EU F-Gas Regulation was originally expected in 2021 and seeks to avoid additional greenhouse gas emissions as part of the European Union's 'Fit for 55' package – a commitment to cut emissions by at least 55 per cent by 2030 – while also ensuring compliance with international obligations under the Montreal Protocol, which was amended in 2016 via the Kigali Amendment to include an HFC phase-down.

The flagship measure in the new proposals is an acceleration of the HFC phase-down from 2024 onward, which would reduce HFC use to 2.4 per cent of 2015 levels by 2048.

But conspicuously absent are vital bans on new HFC-based refrigeration, heat pump and air-conditioning equipment; according to Commission analysis undertaken more than a decade ago, these sectors should have already transitioned to climate-friendly alternatives.

Clare Perry, Climate Campaigns Leader at the London-based Environmental Investigation Agency (EIA), said: "It's been more than 10 years since the last review and the wealth of missed opportunities here inspires a sinking feeling of déjà vu.

"This proposal doesn't go far enough to eliminate the use of HFCs and unless it's significantly amended, it will result in yet another lost decade of climate change action at a time when the world can least afford it."

F-gases are the fastest growing greenhouse gases, representing 2.3 per cent of global emissions. Given their short lifespan in the atmosphere, they are considered a critical lever to limit warming to 1.5°C and avoid dangerous climate tipping points.

The EU has traditionally been a global leader on F-gases, phasing out ozone-depleting substances 10 years ahead of international obligations and adopting its own HFC phase-down in 2014, two years before the Kigali Amendment. But recent efforts have been plagued by significant illegal HFC trade and the continued use of new HFC-based equipment.

Perry warned: “In this critical decade of ever-increasing climate ambition to avoid passing 1.5°C, the Commission’s plan lacks conviction. This proposal, along with the recent plan to restrict methane emissions, begs the question as to how effective its leadership really is.”

In December 2021, the Commission published a proposal for an EU Methane Regulation. Currently under consideration by the European Parliament and the Council, it failed to include any meaningful measures on imports – despite broad support by civil society and industry – due to unsubstantiated concerns that it might restrict Russian gas.

Following the invasion of Ukraine, the Commission’s REPowerEU plan now targets the installation of 30 million new heat pumps by 2030 to reduce reliance on Russian gas.

Perry added: “Given this much-needed and overdue roll-out of heat pumps, it is critical that the revised F-Gas Regulation includes robust measures to ensure these heat pumps do not lock in the use of HFC refrigerants, effectively pitting one piece of climate legislation against another.

“Climate-friendly natural refrigerants can cover a significant proportion of the heat pump market, so a double climate win is possible – if the Parliament and Council have the vision to make it happen. Waiting until 2027 for bans to take effect is not an option.”

“The [latest IPCC report](#) was released this week and made clear that it’s now or never if we want to limit global warming to 1.5°C.

“Given that every fraction of a degree of warming could have devastating and irreversible effects, it is disappointing that this landmark European climate legislation once again fails to seize the full climate mitigation opportunities available.”

The new proposal does contain some welcome revisions to accelerate the HFC phase-down and address illegal HFC trade, although questions remain about the efficacy of the F-Gas Regulation to close transit loopholes currently being exploited by black market smugglers.

[The Environmental Investigation Agency \(EIA\), 6 April 2022](#)

Image: EIA website

12. Refrigerants, Naturally! for LIFE (RefNat4LIFE) Interview with Thomas Trevisan from Belgian ATMOSphere



Interview with Thomas Trevisan from Belgian ATMOSphere (formerly shecco) – a global, independent market accelerator with a mission to clean up cooling

4 April 2022



In this series, RefNat4LIFE project partners give insight into their motivation to engage in sustainable RACHP. This time, we talked to Thomas Trevisan of the Belgian-headquartered ATMOSphere – a global market accelerator with a mission to promote the transition to more sustainable, natural refrigerant cooling technologies.

In this series, RefNat4LIFE project partners give insight into their motivation to engage in sustainable RACHP. This time, we talked to Thomas Trevisan of the Belgian-headquartered ATMOSphere – a global market accelerator with a mission to promote the transition to more sustainable, natural refrigerant cooling technologies.

Claudia Becker (HEAT GmbH): Thomas, how can relevant actors such as investors, end-users and manufacturers be best supported in the transition to more sustainable cooling technologies?

Thomas Trevisan (ATMOSphere, Belgium): Thanks for this very important question, Claudia. There is a great need globally to transition away from fluorinated substances in the RACHP sector, as well as to improve the energy performance of equipment. This is crucial for addressing the climate emergency and ensuring a more sustainable future. Luckily, energy-efficient technologies charged with natural refrigerants are already mature and commercially available on the market, so it is really a matter of spreading the word and making interested stakeholders aware of the possibilities and advantages of sustainable cooling.

Choosing sustainable cooling technologies not only supports the fight against climate change and environmental pollution, but also makes economic sense in terms of electricity bill cost savings, amongst other benefits. Considering the particularly high volatility of energy markets today, I believe addressing this problem concerns everyone, especially stakeholders in the RACHP sector, whose appliances are amongst the largest energy consumers in our modern economies.

Additionally, on a more big-picture level, policy measures such as restrictions (sectoral bans) and incentives (subsidies) can also support the transition to a more sustainable future by driving the market in the right direction.

Claudia: What are the main challenges?

Thomas: With specific concern to the main target groups of this LIFE project, we have found that awareness of sustainable cooling solutions was consistently pinpointed as a decisive challenge to overcome. Specifically, small organic store owners, and even many RACHP technicians too, are often unaware of sustainable cooling alternatives. Unfortunately, these end users often lack the resources to embark on this transition. Here I mention resources as both economic means as well as time/personnel to dedicate to these issues; on top of that, COVID has definitely not helped in supporting this transition. On the other hand, technicians, who are supposed to advise the end users, can lack proper education on sustainable cooling options. With this project, we aim to address these compelling challenges.

Claudia: Which policies support the switch to friendly cooling in Europe?

Thomas: At the policy level, cooling appliances have been addressed for many years, both at EU and national levels. Generally, these appliances are targeted by energy- and refrigerants-related measures.

The first aspect is related to the amount of energy these appliances consume, which is quite significant, as the sector is one of the most energy intensive ones in our economies. At the EU level, the Ecodesign Directive and Energy Labelling Framework Regulation mainly target this aspect, seeking to establish minimum energy performances level to drive inefficient appliances out of the market.

On the refrigerant side, it is worth highlighting the EU F-Gas Regulation, a piece of legislation tackling the market of fluorinated gases in an effort to reduce their use. Two main regulatory measures used in this regulation are the HFC phase down schedule, which steadily reduces the allowable amount of HFCs produced and consumed on the European market, and sectoral bans on fluorinated refrigerants on the basis of GWP thresholds for specific appliances where alternatives exist.

Another regulatory effort at the EU level that is bound to affect the use of fluorinated refrigerants is building momentum. The Netherlands, Germany, Denmark, Sweden and Norway are jointly preparing a dossier to propose further regulatory measures on per- and polyfluoroalkyl substances (PFAS). These chemicals, also called “forever chemicals”, have been proven harmful to the environment and human health. Fluorinated refrigerants have been included in the scope of this regulatory process, and a first indication of the future regulation is expected by January 2023. International entities are trying to shed some light on the complicated world of PFAS, not least their definition. The OECD/UNEP Global Perfluorinated Chemicals (PFC) Group working on the issue recently released some fact cards on refrigerants considered PFAS, listing some very well-known HFC refrigerants such as R134a and R1234yf. At ATMOSphere, we expect this upcoming regulation to be decisive in the transition towards sustainable cooling solutions with natural refrigerants.

Claudia: Why has ATMOSphere become a partner in the RefNat4LIFE project?

Thomas: ATMOSphere’s mission is to clean up cooling through the accelerated global uptake of natural refrigerants. We truly believe we can support this EU-wide project which shows great synergies with our mission. In fact, the uptake of natural refrigerants in smaller retail installations is still relatively slow despite their comprising a significant portion of the cooling market. As such, we saw the potential of this project for enhancing the awareness around sustainable cooling solutions already on the market for this sector.

In the fight against climate change and environmental pollution, shared efforts are required, as these are issues affecting us all. Sharing awareness of energy-efficient appliances charged with naturally occurring gases has always been at the core of ATMOSphere’s mission.

[Refrigerants, Naturally! for LIFE \(RefNat4LIFE\), 4 April 2022](#)

Image: RefNat4LIFE website

13. Refrigerants in Building Services – Guide

The UK Government has set a target of achieving net zero carbon emissions by 2050 as part of their attempt to address the climate change emergency and the associated impact. The built environment is responsible for around 40% of total carbon emissions, and an environmental audit committee report highlighted that 3% of UK greenhouse gas emissions are of HFCs. It is clear that radical change is needed in the sector in order to meet this target.

High carbon fossil fuels are increasingly being replaced with low carbon alternatives for heating and the decarbonisation of the electricity grid is driving a shift towards electric heating technologies with heat pumps forecast to make up a significant part.

The Committee on Climate Change has said that to meet the commitment to reach net zero by 2050, 19 million heat pumps will need to be installed and that hybrid heat pumps should be widely used by 2035. Heat pumps are not a new technology – they have been used in a variety of different applications for many years.

The increased use of air conditioning has been borne out of necessity to maintain comfortable temperature ranges, humidity levels and ventilation rates within the built environment. The use of mechanical cooling is now recognised as essential in many buildings to overcome solar and internal heat gains. In addition, noise pollution, air quality and city centre microclimates eliminate the opportunity for free cooling using ambient air in many applications.

The increased use of both heat pumps and air conditioning comes at a time when the legislative landscape is looking increasingly at restricting or limiting the use of refrigerants that have a direct environmental impact. This places additional considerations on the building services designer with regard to which refrigerants can be used and what the likelihood is of restrictions on their use over time.

This guide aims to provide an overview of the different applications with regard to what refrigerant options are available and what the implications may be for using certain refrigerants in certain applications. It gives the reader a good understanding of why the selection of refrigerant type is important in consideration of the expected lifecycle of the system. It provides a high-level overview of legislation in the global context of the developing Montreal Protocol and reference to refrigerants now banned from working with but still in use in many systems.

The guide has not considered some refrigerants such as R404A which has been used in commercial applications but is now effectively being phased out due to restrictions on the use of certain refrigerants under the F-Gas Regulations. It also does not consider Ammonia because it is predominantly used in industrial process cooling or large-scale freezer applications rather than the building services sector.

[Published by BSRIA, Author: Graeme Fox, April 2022](#)

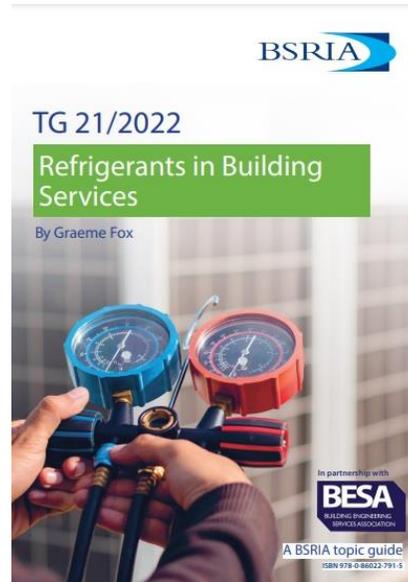


Image: BSRIA website

See also >>> Q&A – Environmental engineer Shelie Miller, "[Rethinking air conditioning amid climate change](#)". ACs and refrigerators help keep people safe – but they also further warm the planet. Scientists are working on eco-friendlier solutions as global demand for cooling grows. Knowable Magazine, 12 April 2022, By Saugat Bolakhe

14. How to use natural refrigerants? Learn more at the upcoming Cool Trainings!

The Cool Training online course teaches basic knowledge about refrigeration, with a focus on climate-friendly natural refrigerants. It provides the **theoretical basis for participating in our on-site trainings**.

The online course uses the e-learning platform www.atingi.org. It consists of **19 videos** (3-8 minutes) **for self-learning**, and additional download material. The learners can watch the videos at their own pace: all at once, one at a day, everything is possible.

Participants will have the possibility to pose questions. For those who participate between March and Mai 2022, the questions will be answered in **live webinars** with the German vocational training institute Bundesfachschule Kälte-Klima-Technik (BFS). The related dates can be found [here](#).

Participants who successfully answer the quiz questions in the online course will receive a **certificate of attendance**.

Participation is **open to everybody and free of charge**.

The **English** course is already available. A **French** and a **Spanish** version will be launched in April.

To register write an e-mail to cool.training@giz.de and tell us in which course you want to participate (English, French, Spanish).

For further information, please check www.cool-training.org

A Two-week Training of Trainers/technician, in English/Spanish/French in Maintal, Germany" and "One-week policy training, in English, in Maintal, Germany (2023)" are also offered by GIZ at cost (contact [GIZ](#) for more information).

[Green Cooling Initiative, April 2022](#)

Image: GCI website



FEATURED

Overview for the meetings of the ozone treaties in 2022

68th IMPCOM, Bangkok, Thailand | 09 July 2022

44th OEWG, Bangkok, Thailand | 11 - 16 July 2022

5th ExMOP, Bangkok, Thailand | 16 July 2022

69th IMPCOM, Venue – to be determined | 29 October 2022

33rd MOP Bureau, Venue – to be determined | 30 October 2022

34th MOP, Venue – to be determined | 31 October - 04 November 2022

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

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](#)

See also >>> [IISD Daily coverage and photos](#)

Online introductory course 'International legal framework on ozone layer protection'

Designed for government representatives and national stakeholders new to the Vienna Convention and Montreal Protocol, students of environmental law, and anyone interested in learning about the ozone treaties, the [online course](#) launched by the Ozone Secretariat aims to provide an introduction to the international legal framework on ozone layer protection.



[The course is hosted on InforMEA](#), the United Nations information portal on Multilateral Environmental Agreements (MEA). The portal is a one-stop information hub on international environmental law searchable by key terms across treaty texts, COP/MOP decisions, national plans and reports, laws, court decisions and more. In addition, part of the platform is dedicated to e-learning containing around 40 free online courses on topics related to MEAs.

The Ozone introductory course, found under 'Climate and Atmosphere', is a self-paced course that allows navigating the lessons at your convenience and takes about 2-4 hours

to complete, excluding additional materials. On completing the course and taking a final quiz, you will obtain a certificate.

The Ozone Secretariat is developing an advanced course to complement the introductory one with further insight and deep-dive into the ozone treaties to further enhance the knowledge of our stakeholders.

[United Nations Environment Programme \(UNEP\), Ozone Secretariat, 14 February 2022](#)

Image: UNEP, Ozone Secretariat website

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](#)

- [Evaluation of regional networks of national ozone officers \(desk study and terms of reference for the second phase\)](#)
- [Evaluation of regional networks of national ozone officers \(desk study and terms of reference for the second phase\): Corrigendum](#)
- [Guide for project preparation of Stage I of Kigali HFC implementation plans \(KIP\) \(February 2022\)](#)
- [Updated guide for the presentation of stage II of HCFC phase-out management plans \(February 2022\)](#)
- [Executive Committee Primer 2022](#)

>>> 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).

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 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.*

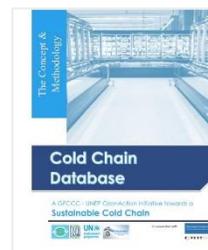
Using the Gas Gard web-based tool

- 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 31st 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”.

> [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](#)

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



Substances	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
R134a	100	100	100	100	100	100
R404A	100	100	100	100	100	100
R502	100	100	100	100	100	100

[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)

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. The factsheet, as well as more information on ASHRAE-UNEP joint activities and tools, is also available on the **ASHRAE UNEP Portal**.



Read/download the [factsheet](#)

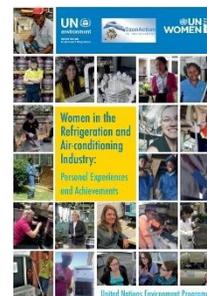
Contact: [Ayman Eltalouny](#), OzonAction, UN Environment Programme

[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](#).

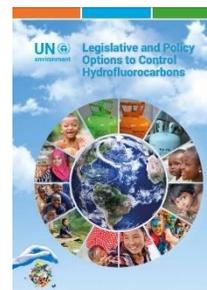
Download the Cold Chain Technology brief in [English](#) | [French](#) | [Russian](#) | [Spanish](#)



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. 3-2022](#) (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](#)

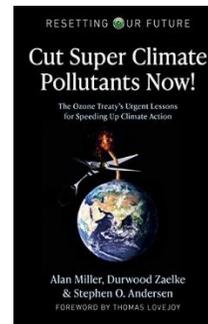


Green Cooling in public procurement How to advance the procurement of climate-friendly and energy-efficient cooling equipment in the public sector? Air conditioning in public buildings is often responsible for around 50% of total electricity consumption. Switching to climate-friendly cooling technologies ("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](#)

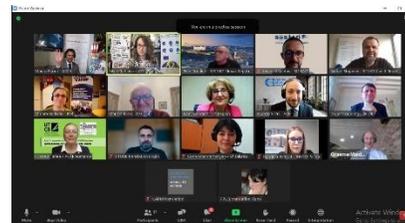


Cut Super Climate Pollutants Now!: The Ozone Treaty's Urgent Lessons for Speeding Up Climate Action (Resetting Our Future). We have a decade or less to radically slow global warming before we risk hitting irreversible tipping points that will lock in catastrophic climate change. The good news is that 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.



"Refrigerant Emissions Alternatives and Leakage - blended learning for low GWP refrigerants" - On 2nd March more than 370 participants joined the live Real Alternatives' webinar "Refrigerant Emissions Alternatives and Leakage - blended learning for low GWP refrigerants" for 3 hours of presentations with simultaneous translation in 6 languages and 13 speakers.



If you missed this important webinar, you can click [here](#) to access the registration of the event, making it possible to benefit from the event even for those who have not been able to join live (almost **700 registrations** were received).

Great feedback was obtained both from the experts and from the participants in the event: the presentations provided a valuable overview of the current situation of **alternative refrigerants** with low-GWP and how the **REAL Alternatives** project, today with 20 member countries, can support companies, technicians and associations in the transition towards new systems and safety while respecting the environment.

In addition to the experiences reported by the representatives of the many associations involved, the event also included two top-level technical presentations, based directly on the courses, by **Marino Bassi** Italy (Good practice for Flammable Refrigerants) and **Kıvanç Aslantaş** Turkey (Good practice for Carbon Dioxide).

The entire event was held in English and **simultaneously translated** into 5 European languages.

The REAL Alternatives Consortium's aim is that the success of this event will lead to **additional countries joining**, in addition to those of the 20 countries already involved: further information on this is available on the project's [website](#) and by contacting **REAL Alternatives Ambassador**, Mr [Marco Buoni](#) (ATF Secretary General and AREA President).

NEW publication by Stellar: E-Book on Process Safety Management (PSM) Training for Ammonia Refrigeration - a new e-book about the critical elements of a process safety management (PSM) training program for facilities operating an ammonia refrigeration system.

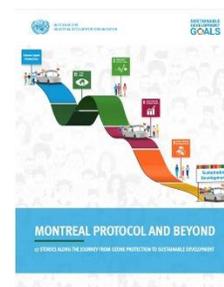
The e-book, titled "[7 Keys to a Compliant PSM Training Program for Ammonia Refrigeration](#)," outlines important questions a facility's program should address and questions that trained plant personnel should be able to answer. Topics covered include:

- Safety hazards and health considerations
- Emergency shutdown procedures
- Addressing deviations from system operating limits
- Risks and costs of non-compliance with regulatory standards

Request free Download [here](#)



NEW publication by UNIDO: [Montreal Protocol and beyond: 17 stories along the journey from ozone layer protection to sustainable development](#) - The 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs) embody the global commitment to build a more sustainable future for all. These universally agreed objectives address the most urgent environmental, social and economic challenges of our time...
Read/Download [here](#)



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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