

OzoNews

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

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GLOBAL

1. Kigali Amendment latest ratification

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

Colombia, 25 February 2021

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



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

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

United Nations Treaty Collection

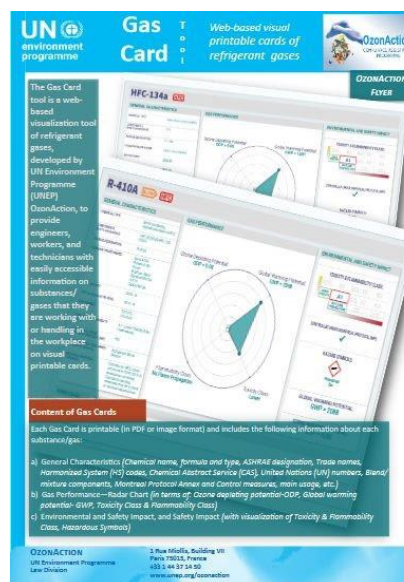
Image: UN Treaty Collection website

2. Gas Card Tool: Web-based Visual Printable Cards of Refrigerant Gases

The Gas Card tool is a web based visualization tool of refrigerant gases, developed by UN Environment Programme (UNEP) OzonAction, to provide engineers, workers, and technicians with easily accessible information on substances/ gases that they are working with or handling in the workplace on visual printable cards.

Content of Gas Cards

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



More Information

The Gas Card web-based tool is part of UNEP OzonAction's portfolio of activities and tools to assist various stakeholders in developing countries, including customs officers and technicians, to achieve and maintain compliance with the Montreal Protocol on Substances that Deplete the Ozone Layer. In the left navigation bar of the Gas Card tool web page, you will find a list of commonly used HFCs and HFC Blends in different sectors.*

Using the Gas Card web-based tool

The Gas Card tool is available online on the [OzonAction website](#)

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

3. Global CFC-11 emissions back on track

Global emissions of CFC-11, the second most abundant ozone-depleting substance controlled by the Montreal Protocol, dropped sharply from 2018 to 2019. The drop is comparable to the emission increase that occurred from 2012 to 2017, which may have resulted from new, unreported production of the substance after the 2010 global production ban. The results indicate that the long-term downward trajectory of CFC-11 emissions has been restored and a substantial delay in ozone layer recovery from increased emissions has been avoided.



The global phase-out of production of CFCs and other substances controlled under the Montreal Protocol has caused the atmospheric concentration of ozone-depleting chlorine to decrease since 1994 by about 15%. CFC-11 alone has been the second largest individual contributor to the overall drop in atmospheric chlorine, accounting for about 4% of that decline. By 2013, however, global CFC-11 concentrations were observed to be declining more slowly. The slowdown was attributed to increased emissions, and about half of the global emission increase was coming from eastern Asia, suggesting new, unreported production of CFC-11 after the 2010 phase-out of this substance required under the Montreal Protocol.

Following the reported unexpected increase of emissions, in 2018 and 2019, the parties to the Montreal Protocol and individual countries renewed efforts to eliminate any CFC production and associated emissions to ensure the timely recovery of the ozone layer. Continued declines in atmospheric chlorine concentrations are required for stratospheric ozone to recover by the mid- to late-21st century.

Recent studies, based on analyses of global air measurements, show that five years after the CFC-11 emissions started to increase unexpectedly, they dropped sharply between 2018 and 2019.

High-quality monitoring networks and interpretive capabilities were key to drawing attention to this issue, thus enabling a response. Future observations may provide an understanding of compliance with the Montreal Protocol by continuing to track emissions of CFC-11, other ozone-depleting substances, and chemicals that influence climate, and by identifying other emerging issues relevant to the parties.

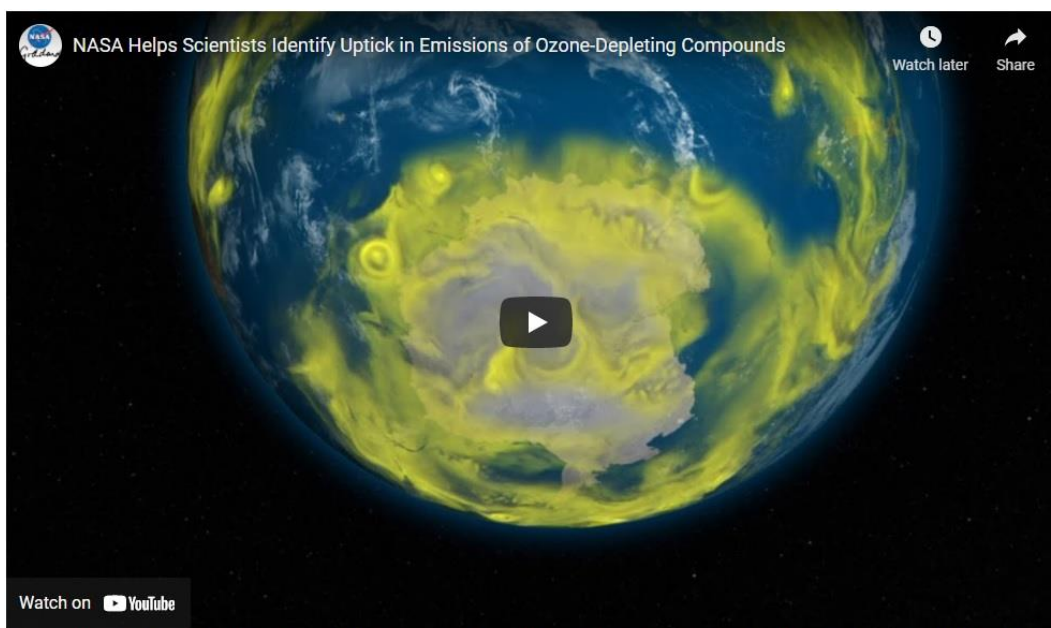
The United Nations Environment Programme, Ozone Secretariat, 22 February 2021

Image: Ozone Secretariat Website

4. NASA-funded network tracks the recent rise and fall of ozone depleting pollutants

A short-lived resurgence in the emission of ozone depleting pollutants in eastern China will not significantly delay the recovery of Earth's protective "sunscreen" layer, according to new [research](#) published Feb. 10 in Nature.

Stratospheric ozone, also known as Earth's ozone layer, helps shield us from the Sun's harmful Ultraviolet (UV) rays. Compounds like CFC-11 (Trichlorofluoromethane, also known as Freon-11), a chemical once considered safe and widely used as a refrigerant and in the production of insulation for buildings, rise to the stratosphere after emission on Earth's surface. Once in the atmosphere, CFC's are broken down by the UV light and result in the destruction of ozone molecules, both reducing stratospheric ozone concentrations globally and contributing to a "hole" in the layer that appears over Antarctica in the spring.



NASA computer models help scientists identify an uptick in atmospheric emissions of an ozone-depleting gas called CFC-11. NASA and the National Oceanic and Atmospheric Administration (NOAA) work together as part of a long-running research partnership to monitor emissions of stratospheric ozone and to support ozone scientists at MIT and the University of Bristol.

Credits: NASA's Goddard Space Flight Center

[Download this video in HD formats from NASA Goddard's Scientific Visualization Studio](#)

In 1987, the Montreal Protocol – an international treaty enacted to protect the ozone layer from additional degradation – banned new production and trade of ozone depleting substances like CFC-11. One hundred ninety-eight nations have since signed on to the agreement.

After production ceased, scientists still expected CFC-11 to continue leaking over the years from existing products, but at a gradually declining rate. Because of this, the gas is among those monitored at the global scale by the National Oceanic and Atmospheric Administration (NOAA)'s [Global Monitoring Division](#) and the Advanced Global Atmospheric Gases Experiment ([AGAGE](#)) – a network of monitoring stations funded by NASA and several environmental agencies, and headed by the Center for Global Change

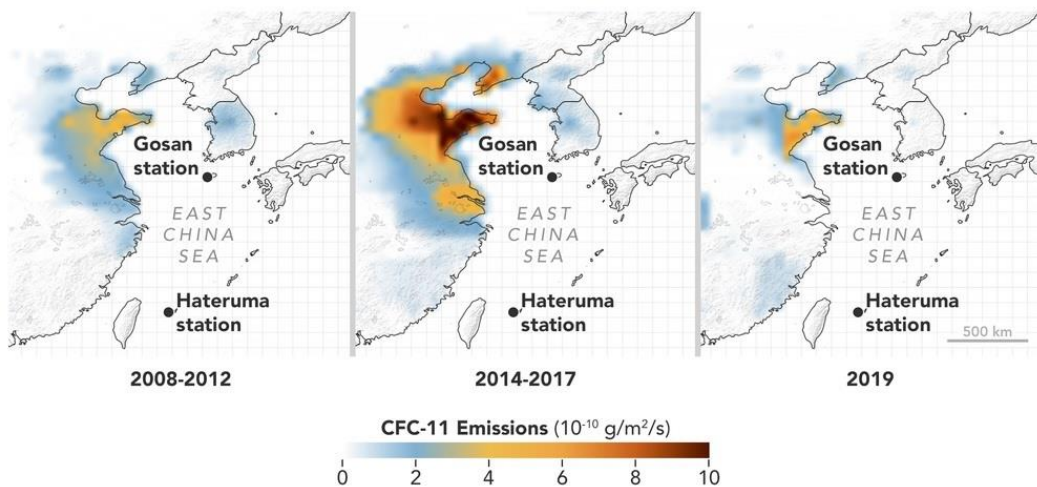
Science at the Massachusetts Institute of Technology and the Scripps Institute of Oceanography.

In 2018, NOAA first reported a smaller decrease in the decline of atmospheric CFC-11 than expected. The numbers didn't align with trajectories based on CFC-11's production ban, hinting that something had changed. "The slow-down in the rate of decline indicated that somebody was emitting again, or in larger quantities than we were expecting, we just didn't know where," says Matt Rigby, University of Bristol (UK) scientist and one of the lead authors of the new study.

It was the AGAGE network that helped track down the origins of much of the new emission of CFC-11 thanks to its geographic distribution. Two of its stations, the South Korean Gosan AGAGE station, run by Kyungpook National University in South Korea, and the AGAGE-affiliated station on Hateruma Island in Japan, run by Japan's National Institute of Environmental Studies, were both positioned close enough to the source for researchers to track much of the new emissions back to their source: eastern China.

"This is very much like detective work," said Qing Liang, a research scientist at NASA Goddard's Space Flight Center in Greenbelt, Md. and co-author of the study. "We figured out there was a problem, then **we tracked down where the problem was** regionally, and it seems that the actions taken in China, and perhaps elsewhere, have resulted in a big drop in the unexpected emissions [since 2018]."

Due in large part to effective monitoring, and subsequent reaction to the 2018 report, data and analysis in these two papers (published in February 2021) suggest that both the renewed eastern Chinese and overall **global emissions** of CFC-11 after mandated global phase out in 2010, have returned to previous levels.



Two AGAGE stations, one in South Korea and one in Japan, captured the increase in CFC-11 emissions from eastern China and the drop in emissions that followed their detection.
Credits: NASA Earth Observatory/ Joshua Stevens

Not only is this important for the ozone layer's recovery, but CFC-11 also impacts climate as a potent greenhouse gas. The observed levels of increased emission were comparable to the carbon dioxide emissions of a city roughly the size of London. In other words, closing

off CFC-11 emissions has an additional climate benefit similar to that of shutting off a megacity.

Despite the monitoring success story, some emissions are still unaccounted for – and scientists have been unable to pinpoint where they are coming from due to current limitations of the monitoring network.

"The one critical piece of information we need is atmospheric observations," said Liang. "That's the reason why it is really important for NASA and NOAA, together with their international partners, to continue making measurements of these gases." Monitoring networks like the AGAGE stations are a valuable tool for understanding the role atmospheric chemistry plays in our changing climate.

Though these new CFC-11 emissions were identified relatively quickly, they have the potential to delay ozone layer recovery, especially if left unchecked, so a timely response is paramount.

"This was evidence for probably the biggest challenge that the Montreal Protocol has ever faced," said Rigby, "but I think it's been heartening to see how closely the science has been listened to by the parties of the Montreal Protocol, and then how rapidly the science has been acted on as well; All this has happened over the space of essentially two years, which is pretty incredible."

Banner image caption: Pollution hanging over eastern China in February of 2004. Credits: Image courtesy the SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE.

NASA's Goddard Space Flight Center, Greenbelt, Md., 17 February 2021, By Lara Streiff

ASIA AND THE PACIFIC

5. NASA, LAPAN launch Ozonesonde from Indonesian site for 1st time in 8 years



Up, up, and ... back down! On Jan. 27, scientists on an island in Indonesia launched a weather balloon carrying an ozonesonde – an instrument that measures ozone throughout the layers of Earth’s atmosphere. Ozonesondes collect valuable data that scientists use to understand Earth’s atmosphere, improve air quality predictions, and validate satellite measurements.

The Indonesian space agency, LAPAN, and NASA signed an agreement in November 2020 to resume ozonesonde launches from the Watukosek Observatory on the island of Java, Indonesia. NASA’s **SHADOZ** (Southern Hemisphere Additional Ozonesondes) project supplies the ozonesondes and launches them in collaboration with LAPAN scientists on Java. This was the first ozonesonde launch at the site since 2013, and the scientists were eager to see how atmospheric ozone above that area may have changed since then.

About 90% of atmospheric ozone is in the stratosphere, the layer of the atmosphere which extends from about 10 to 31 miles high near the tropics. The remaining 10% is in the layer nearest Earth’s surface, the troposphere. Stratospheric ozone protects Earth from the Sun’s ultraviolet radiation. However, ozone in the troposphere is an air pollutant.

NASA already has satellites that measure ozone in Earth’s atmosphere from space, including the **Ozone Monitoring Instrument** (OMI) aboard NASA’s Aura satellite, which launched in 2004. But the technique that satellites use to measure ozone isn’t able to see changes in atmospheric ozone closest to Earth’s surface.

“The satellites have to look through this huge wall of stratospheric ozone to see the ozone near the surface,” said Ryan Stauffer, a NASA and University of Maryland research associate with SHADOZ. The SHADOZ ozonesonde program is managed at NASA’s Goddard Space Flight Center in Greenbelt, Maryland.

That’s where ozonesondes come in. As the balloon rises, the ozonesonde measures ozone approximately every 330 feet, giving scientists a vertical snapshot of how ozone is distributed in the atmosphere. The instruments attached to each balloon collect meteorological information, such as temperature, pressure, and wind speed, as well as ozone levels.



Through the SHADOZ project, NASA works with international collaborators to launch ozonesondes from 14 sites in the equatorial and low-latitude Southern hemisphere regions and makes that data available to the public. The Watukosek station in Indonesia was one of the nine original stations to join when the project began in 1998 but ceased launches in 2013.

The air above this station is particularly sensitive to fires from El Niño events and volcanic eruptions that lead to the destruction of stratospheric ozone. Volcanic eruptions spew sulfur dioxide, which is transformed into ozone-destroying aerosols in the atmosphere. The site is also near Surabaya, the capital of eastern Java and home to nearly 10 million people.

“Each station has some unique characteristics that make its natural variations in ozone and its unusual events different,” said Anne Thompson, an atmospheric chemist and senior scientist for NASA’s SHADOZ project.

For example, at the Watukosek station the team expects to see impacts of urbanization in the region, such as an increase in tropospheric ozone – also known as smog – near the station.

“It will be really interesting – after eight years – to see how things might have changed,” said Stauffer. LAPAN has ozone data from the Watukosek station dating back to the early 1990s. “Comparing our earliest data to the new record will show natural variations and human impacts after nearly 30 years,” noted Ninong Komala, one of LAPAN’s collaborators on Java.

Header image caption: LAPAN scientists launch the first balloon-borne ozonesonde from the Watukosek Observatory in Indonesia since 2013. Credit: LAPAN / Thea Cindy Almira

WEST ASIA



6. German firm just removed what they called “A second bomb” from Beirut Port

Multiple containers of dangerous chemicals have been removed from Beirut’s port and are ready to be shipped out of the country by a German firm, six months after the catastrophic explosion that ravaged the city [4 August 2020].

According to the German Ambassador to Lebanon, Andreas Kindl, the German company Combi Lift completed the treatment of “52 containers of hazardous and dangerous chemical material” accumulated for decades in the port and posing “a threat to the people in Beirut.” [One container of Methyl Bromide is among the chemicals containers found in the port, and believed to be in the port since 2015].

The director of the German company was quoted saying “we have to say it as it is: what we found here was a second Beirut bomb.”

Thomson Reuters Foundation’s Lebanon Correspondent, Timour Azhari, calculated the total amount of hazardous, explosive materials at the Beirut Port that we know of at almost 4,000 tons. [...]

However, according to the German Ambassador, much remains to be done in the port, as destroyed ships, offices, quayside, and contaminated soil remained present...

[The961, Lebanon News, 7 February 2021, By: Rim Zrein](#)

Image: Dangerous chemicals left unsupervised at Beirut Port months after the Explosion – Photo shared by Ambassador Andreas Kindl – @GermanEmbBeirut

See also >>> ["قنبلة ثانية" إنقاذ مرفأ بيروت من](#), Lebanon Debate, 8 February 2021

NORTH AMERICA

7. Developing alternate refrigerants in the fight against climate change

As the negative effects of climate change continue to manifest in extreme, deadly, and costly weather events, building design professionals remain aware that refrigerants used in buildings are a significant contributor — particularly fluorine-based refrigerants — to climate effects. Fluorinated gases comprise 3% of the total greenhouse gas emissions in the U.S., and 92% of these fluorinated gases come from refrigerants in buildings and vehicles, according to recent data released by the U.S. Environmental Protection Agency (EPA). Further, Project Drawdown, a global resource for climate change solutions, identifies refrigerant management as the No. 1 most impactful strategy in the construction industry. [...]



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California is targeting a 40% reduction in HFC emissions from 2013 levels by 2030. In tracking this goal, California adopted two of the EPA's major Significant New Alternatives Policy (SNAP) rules, which include the banning of various common refrigerants in new commercial chillers beginning in 2024. This will have a massive impact for HVAC engineers and chiller manufacturers, as many commercial chillers are currently only compatible with HFCs and will begin to lose their relevance in the market as these refrigerants are phased out. California is a large market, too.

At this time, chillers are typically compatible with one of two refrigerants. The majority of chiller manufacturers specify R-134a for medium-pressure systems and R-410A for high-pressure systems. However, R-134A and R-410A will be banned or limited by the year 2024 in California. The ban on these types of refrigerants is expected to eventually encompass other commercial applications, such as variable refrigerant flow (VRF) systems.

Refrigerant	Global Warming Potential
R-134A	1,430
HFC R-404A	3,920
HFC R-407C	1,770
HFC R-410A	2,090
HFO R-1233zd	4.7-7
HFO R-1234ze	6
HFO R-513A	630
HFO R-514A	7

TABLE 1: Global Warming Potential for Common HFC and HFO Refrigerants.
Source: U.S. Environmental Protection Agency, 2020

Lower Impact Refrigerants

With these benchmarks in mind, mechanical engineers and manufacturers are turning toward refrigerants with less impact on global warming, primarily hydroflouroolefins (HFOs).

These “next generation” refrigerants offer similar performance to HFCs but exhibit less environmental impact with zero ODP and a very low GWP. While these HFOs still contain fluorine gas, the GWP is significantly lower than HFCs. For example, the GWP for R-410A is 2,090 — i.e., R-410A is 2,090 times more potent than CO₂ in terms of its impact on climate change — and R-454B has a GWP of 466, which is a 75% reduction. Table 1 shows the impact on GWP of various refrigerants for comparison.

Consequently, newer technologies are needed to ensure equipment compatibility with next-generation refrigerants while maintaining functionality and efficiency. [...]

HVAC engineers have a significant opportunity to downsize the volume of refrigerant needed by reducing a system’s cooling capacity. This is achieved with energy reduction strategies, such as utilizing thermal storage for peak shaving, designing high-efficiency central plants, selecting airside energy-recovery systems, and specifying high-performance envelopes. These strategies will lower the building’s cooling demand, thereby reducing the plant size and thus the volume of refrigerant used.

Next-generation refrigerants often offer comparable efficiencies to traditional refrigerants and require minimal modifications in equipment design, the cost of which is typically negligible across the life cycle of the equipment. There are instances where an alternative refrigerant will result in an efficiency loss or incompatibility with the desired equipment. Engineers should discuss these details with various manufacturers to determine the optimal solution for each project.

Ultimately, manufacturers have control over the environmental impact of their products. Rather than waiting for regulations to be enforced, engineers should encourage manufacturers to proactively work to create more HFO-compliant equipment. While a few HVAC manufacturers — including Trane, York, and others — are working to stay ahead of the regulations by offering select HFO-compliant equipment, there is much room for improvement by manufacturers in the industry overall. Engineers should hold manufacturers accountable for making improvements to their equipment and addressing all issues they come across via advocacy to regulatory agencies and lobbying for necessary code changes.

For more details on these case studies and discussion of these issues, see Buro Happold and Autocase’s recent white paper, [Quantifying the Social Impact of Refrigerant Choices, The Role of Refrigerants in Climate Change ... and What You Can Do About it](#).

[Engineered Systems \(ES\) Magazine, 22 February 2021](#)

Images: Engineered Systems website

8. There's an invisible climate threat seeping from grocery store freezers. Biden wants to change that.

New undercover survey suggests leaks of powerful planet-warming gases pervade many supermarkets.

Some of the climate impacts of a grocery store trip are obvious, like the fuel it takes to get there and the electricity that keeps its lights glowing, conveyor belts moving and scanners beeping. But then there are the invisible gases seeping out into the atmosphere when you reach for your ice cream of choice.



A customer pushes a shopping cart through the frozen foods section of Costco in Louisville. (Luke Sharrett/Bloomberg News)

In nearly every supermarket in America, a network of pipes transports compressed refrigerants that keep perishable goods cold. Most of these chemicals are hydrofluorocarbons — greenhouse gases thousands of times more powerful than carbon dioxide — which often escape through cracks or systems that were not properly installed. Once they leak, they are destined to pollute the atmosphere.

The Biden administration now sees eliminating these chemicals from the nation's refrigerators as low-hanging fruit in its broader effort to rein in climate pollutants. The Environmental Protection Agency issued a public call last week for companies to report production and import data on HFCs.

Under the American Innovation and Manufacturing Act, which passed in December, the EPA must phase down the production and import of these potent greenhouse gases 85 percent over the next 15 years.

"The environmental benefits here are very large, they're very important," said Cindy Newberg, who directs the stratospheric protection division in the EPA's Office of Air and Radiation. The new law, she added, "provides explicit authority for us to do this work, and that's incredibly important to the agency, and for all of us."

A **new undercover investigation** by an advocacy group suggests that some supermarkets are leaking climate-damaging refrigerants at an even higher rate than regulators have assumed. The industry estimates that every year supermarkets lose an average of 25 percent of their refrigerant charge — chemicals introduced in the 1990s to replace ones depleting the Earth's ozone layer.

Armed with high-tech sensors, undercover investigators for the Environmental Investigation Agency have documented widespread leakage of HFCs at grocery stores in D.C., Maryland and Virginia. While Walmart and other supermarket companies have pledged to curb their use of these chemicals, more than half of all the stores the EIA surveyed were emitting these climate-warming refrigerants.

Out of 45 supermarkets surveyed — including 20 Walmarts as well as stores operated by ALDI, Costco, Giant, Harris Teeter, Safeway, ShopRite, PriceRite, Trader Joe's and Whole Foods — investigators found leaks in 55 percent of them. (Whole Foods is owned by

Amazon, whose founder and CEO, Jeff Bezos, owns The Washington Post.) The investigation did not determine the exact amount of HFCs released.

“This is a systemwide, industry-wide problem,” said Avipsa Mahapatra, climate lead for the EIA, the advocacy group. “In reality, they could easily check for this.”

None of the companies contacted for this story provided a comment on the survey itself, but a few noted their commitment to curbing these pollutants.

Whole Foods said it is “proud to be a leader among U.S. supermarkets in our efforts to reduce emissions of hydrofluorocarbons.” A little more than 30 of its stores have switched to carbon-dioxide refrigerants, and it touts one market in Brooklyn that has become 100 percent HFC-free.

Walmart noted it has pledged to reach zero emissions across its operations within two decades, a goal that includes “transitioning to low-impact refrigerants for cooling and electrified equipment for heating in our stores, clubs and data and distribution centers by 2040.”

Giant said it is also transitioning its stores to less climate-damaging refrigerants as part of a plan to halve its overall carbon emissions by 2030 and is also working with suppliers to make further cuts in its supply chain. “We have committed to working with our suppliers to reduce emissions from farm to fork,” said Felis Andrade, a spokeswoman for Giant’s parent company, Ahold Delhaize USA.

Commercial refrigeration, which includes grocery stores as well as restaurants and food processing, accounts for about 28 percent of all U.S. emissions of HFCs. Air conditioning for commercial buildings and homes represents between 40 and 60 percent of emissions, according to federal data.

The EIA survey was based on a limited sample in one region of the United States. The investigators were also not able to measure the overall quantity and rate of leakage. But it suggests that large supermarket chains may be unaware of the extent of the problem, and do not have regular monitoring in place. In some cases, the leaks persisted months after they were first detected.

The investigators, who began their survey in 2019, used leak detectors that they could insert in refrigerators and freezers as well as an infrared camera that could film fugitive greenhouse gases.

Tracking environmental actions under Biden

The food retail sector represents one part of the puzzle of how to drastically cut back on emissions in the coming years. HFCs trap thousands of times more heat than carbon dioxide, and with increasing sales they are projected to represent nearly a fifth of all climate-warming emissions by mid-century. It’s a growing problem: The hotter the Earth gets, the more people need cooling infrastructure.

According to new data released Friday, HFC emissions in the United States rose by 4 million metric tons between 2018 and 2019. The 38,000 supermarkets in the United States use thousands of pounds of HFCs each year, according to the EPA, with each store having the equivalent climate impact of 300 cars on the road. Taken together, it is equal to 49 billion pounds of coal being burned each year.

While monitoring for leaks and upgrading refrigeration systems translate into long-term savings by reducing energy use, stores operating on tight margins cannot always afford it.

Ratio Institute co-founder Jonathan Tan, whose organization works with the food retail industry, policymakers and conservationists on the issue, estimated that while it can cost a store between \$50,000 to \$100,000 to make repairs to a system, transitioning from current refrigerant to a less-potent greenhouse gas like carbon dioxide can cost between \$1 million and \$2.5 million.

Walmart, for example, said private companies would need government help in making the transition. “We also believe that private and public sector action is needed to foster innovation and enable an economically viable phasedown of HFCs globally,” it said in a statement.

Europe is making a swifter transition than the United States. Over 26,000 supermarkets in European countries are using lower-impact refrigerants, compared with 600 stores in the United States.

The EPA has regulated earlier generations of refrigerants for decades under the 1987 Montreal Protocol, the landmark global treaty aimed at repairing the ozone layer. Those compounds — chlorofluorocarbons and hydrochlorofluorocarbons — damaged the ozone layer that shields the Earth from damaging ultraviolet rays from the sun. HFCs made an appealing substitute because they didn’t deplete ozone, but they warmed the planet instead.

In 2016, the Obama administration helped broker the Kigali Amendment, where countries pledged to phase down HFCs under the treaty. But the agency’s effort to regulate the refrigerants ran aground during the Trump administration.

One rule identifying “unacceptable” uses of HFCs was partly overturned by the U.S. Court of Appeals for the D.C. Circuit in 2017. The administration rewrote the rule, but the same court ruled it failed to follow proper procedures and did not need to abolish the Obama-era requirements altogether. Last year, Trump officials withdrew another Obama-era rule, which required companies to detect and repair any leaks from any appliance or piece of equipment using more than 50 pounds of HFCs.

President Donald Trump declined to submit the Kigali Amendment to the Senate for ratification: President Biden signed an executive order last month instructing his secretary of state to take that step.

The federal government has pursued cases against grocery chains, and won, when it comes to leaks of older refrigerants that damage the ozone layer. In 2019, for example, Southeastern Grocers agreed to spend \$4.2 million to reduce coolant leaks and pay a \$300,000 civil penalty. But HFCs are in a different category.

“EPA’s recognized that it is a significant contributor to climate change and has tried to take action,” said Tom Land, a longtime agency staffer who retired in 2019 after working on both international climate negotiations and the agency’s voluntary refrigerants program, GreenChill. “It basically had to stop, it didn’t have authority.”

Food retailers that participate in the GreenChill program have a leak rate of 14.3 percent, nearly half the industry average. Kristen Taddonio, senior climate and energy adviser at the Institute for Governance & Sustainable Development, said in an interview that reinstating regulations mandating leak detection could help grocers make even greater reductions.

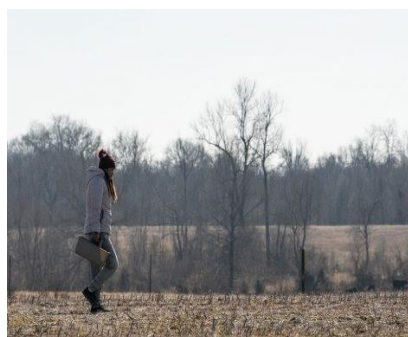
"It's like that old adage, you can't manage what you can't measure," said Taddonio, who worked on energy efficiency at the EPA and the Energy Department between 2004 and 2015.

[The Washington Post, 16 February 2021, By Juliet Eilperin and Desmond Butler](#)

Image: A customer pushes a shopping cart through the frozen foods section at Costco in Louisville. (Luke Sharrett/Bloomberg News)

9. Effects of cover crops: International Student Feature

Madhavi Tiwari, a master's student from Nepal in the Department of Agriculture in Carbondale, Ill. collects gas samples for further study on Wednesday, Feb. 3, 2021.



Nitrous oxide (N₂O) is one of the greenhouse gases (GHGs), which plays a significant role in ozone layer depletion and eventually leads to global warming.

About 77.8 percent of total U.S. N₂O emission takes place in agricultural sectors. Nitrogen (N) is leached and emitted from the soil in the form of nitrate and nitrous oxide gas. Cover crop (CC) rotations and no-till are the most important practices to prevent N loss," Tiwari said.

The objective of the study was to compare the effects of cover crops on yield, N uptake, N leeching, and N balance to conventional tillage practices, such as reduced tillage or no till. N₂O emissions were measured in all treatments in the hopes of increasing grower awareness and knowledge of tillage and cover crop combination to promote better conservation practices.

[Daily Egyptian, The student news site of Southern Illinois University, 25 February 2021, By: Monica Sharma](#)

Image: Daily Egyptian website

EUROPE & CENTRAL ASIA

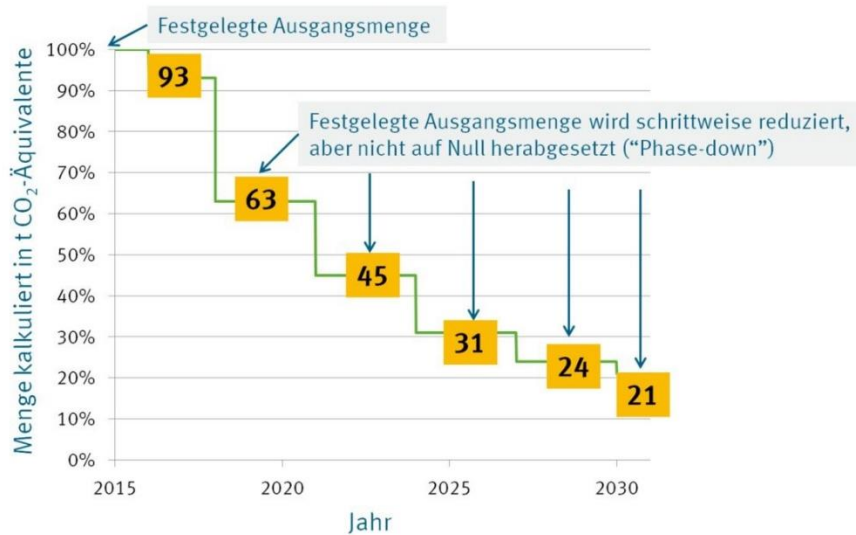
10. Federal government tightened instruments against illegal trade in fluorinated greenhouse gases - Germany

The EU member states want to reduce the consumption of climate-damaging partially fluorinated hydrocarbons (HFCs) by around 80 percent by 2030. However, the previous regulations could not completely prevent illegal trade in the so-called F-gases. For this reason, the federal government decided today to amend the Chemicals Act accordingly. In future it will be banned in Germany to enter the EU illegally acquire or resell imported HFCs. In order to facilitate control by authorities and market participants, information about manufacturers and importers of HFCs as well as information about the legality of the imported goods in the supply chain must be passed on. F-gases are used as refrigerants in refrigeration and air conditioning systems, as propellants in sprays, as propellants in foams and insulation materials, and as fire extinguishing agents.

The EU F-gas regulation has been regulating the trade and use of F-gases since 2015. So far, the fight against illegal trade in F-gases has been made more difficult because the quota obligation under the EU F-Gas Regulation only applies to manufacturers and importers who bring the gases in question onto the market for the first time. Downstream dealers and consumers of F-gases are not covered under EU law. According to EU law, you do not have to prove that your goods were legally offered on the EU market. With the draft law passed today, the federal government is expanding the EU-Requirements for national regulations and thus strengthens the fight against illegal trade in F-gases.

In future, all actors in the supply chain in Germany will have to document that the gases have been brought onto the European market with a quota assigned by the EU Commission. The new documentation requirements make it easier for the respective enforcement authorities of the federal states to monitor compliance with EU-wide and supplementary national bans. In addition, they give all actors in the supply chain a high degree of legal security when purchasing and selling products made from F-gases.

Since 2015, every company that wants to import HFCs into the EU must have a sufficient quota. Companies based outside the EU must authorize an only representative in the EU to apply for quotas. HFCs in containers and filling quantities in imported devices are covered by the quantity restriction and quotation. Some applications are excluded, for example the use of HFCs as a feedstock.



Classic greenhouse gases such as CO₂ are mostly released as undesirable by-products, for example when burning fossil raw materials. HFCs, on the other hand, are specifically produced and used. However, due to their high greenhouse gas potential, these gases are particularly harmful to the climate and are expected to decrease to a fifth of the sales volumes of 2015 (21 percent) by 2030. The total amount of HFCs available annually in the EU will therefore be gradually reduced to a fifth of the initial amount by 2030 and divided annually between the quota holders in the EU. This means that there is no separate quota for individual member states or individual applications. The artificial shortage increases the price of climate-damaging HFCs in The EU and the switch to climate-friendly alternatives are becoming more attractive.

The law has to be passed in the Bundestag and has to pass the Bundesrat.

Germany Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Press release No. 020/21, 10 February 2021

Image © UBA

See also >>> [Illegal refrigerant market hit 31MtCO₂e in 2019](#), article in CoolingPost, 25 February 2021

11. Annual Natural Refrigerants Virtual Trade Show

Registration is now open for the **Natural Refrigerants Virtual Trade Show 2021** taking place LIVE on 30-31 March 2021.

Register below for *FREE* and join on 30 March the global event LIVE for 24hrs, to include all time zones. **The platform will open at 10am CET on 30 March and close at 10am CET on 31 March.**

Attend and click-through the exhibitor halls featuring cutting-edge technology providers' booths, tune into live webinars, panel discussions, network with other industry stakeholders in the virtual lounge and vote for the Innovation of the Year Award.

[Learn more >>>](#)

Image: Atmo website



FEATURED



OZONE SECRETARIAT

Reset Earth!
One Ozone. One Planet.
One Chance.

The UNEP Ozone Secretariat hopes to raise awareness among teens on the importance of protecting the ozone layer and safeguarding the environment through animation and a games app. (Available free of charge for *iOS* and *Android*)



You've watched the [film](#), now play the [game](#), and see what you can do to [Reset Earth!](#)

Overview for the meetings of the ozone treaties in 2021

- **11th ORM**, Geneva, Switzerland | 14 - 16 April 2021
- **66th IMPCOM**, Bangkok, Thailand | 12 July 2021
- **43rd OEWG**, Bangkok, Thailand | 12 - 16 July 2021
- **67th IMPCOM**, Nairobi, Kenya (tentative) | 23 October 2021
- **12th COP – 32nd MOP Bureau**, Nairobi, Kenya (tentative) | 24 October 2021
- **12th COP (part II) – 33rd MOP**, Nairobi, Kenya (tentative) | 25 - 29 October 2021

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

The UN Environment Assessment Panels

The Assessment Panels have been vital components of ozone protection since the Montreal Protocol was first established. They support parties with scientific, technological and financial information in order to reach decisions about ozone layer protection and they play a critical role in ensuring the Protocol achieves its mandate. The Assessment Panels were first agreed in 1988 to assess various direct and indirect impacts on the ozone layer. The original three panels are:

- [The Technology and Economic Assessment Panel](#)
- [The Scientific Assessment Panel](#)
- [The Environmental Effects Assessment Panel](#)

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

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



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

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



OzonAction

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

The section below features several of our most recent products.
Visit [OzonAction website](#) for more information, discover the entire range of products.

The Gas card tool is a web-based visualization tool of refrigerant gases, developed by UN Environment Programme (UNEP) OzonAction, to provide engineers, workers, and technicians with basic information on each substance/gas on visual printable cards that they are working with or handling in the workplace.





HCFC Quota and Licence Tracker - UNEP OzonAction launches a new desktop application to assist with HCFC licences and quotas

National Ozone Officers have the great responsibility of managing the allocation and

monitoring of quotas for substances controlled under the Montreal Protocol. This process can be complex with many importers, especially if the country imports a range of different hydrochlorofluorocarbons (HCFCs) and mixtures containing HCFCs.

To address this challenge, OzonAction developed a new desktop application that helps Ozone Officers with the tasks of planning, calculating, monitoring and managing consumption quotas and licences. It can be used on a daily basis to track and manage the current year's quota allocations for different importers, or for future planning by trying different scenarios that adjust the type of substances imported, their quantity, or the number of importers.

The HCFC Quota and Licence Tracker allows Ozone Officers to see the effect of such scenarios on the national HCFC consumption and helps ensure that the quotas stay within agreed HCFC Phase-out Management Plan (HPMP) targets. For countries that have ratified the Kigali Amendment, in the future OzonAction will extend the tracker to include hydrofluorocarbons (HFCs) once countries begin designing their quota systems for those controlled substances.

Access the:

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

GWP-ODP Calculator Application – Updated

“Quickly, efficiently and accurately convert between values in metric tonnes, ODP tonnes and CO₂-equivalent tonnes”

Data are extremely important for the Montreal Protocol community, and the data reporting formats for both A7 and CP have changed recently, to a large degree triggered by the Kigali Amendment. HFCs, blends, CO₂-equivalent values, etc, now have to be addressed much more frequently by Ozone Officers during their daily work.

Sometimes the terminology and values are complex and can be confusing, and it helps to have it all the official facts and figures in one place. Conversion formulas need to be applied



to calculate CO₂-eq values from both GWP and metric tonne values. This free app from OzonAction is a practical tool for Ozone Officers to help demystify some of this process and put frequently-needed information at their fingertips.

What's new in the app:

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

The new and updated UNEP OzonAction **GWP-ODP Calculator** application will help you to convert between values in metric tonnes, ozone depleting potential (ODP) tonnes and CO₂-equivalent tonnes of substances controlled by the Montreal Protocol and their alternatives.

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

Operation of the application is very simple — just select a substance from the dropdown list and enter the known value in the appropriate field; the calculator will automatically perform the conversion between metric tonnes, ODP tonnes and/or CO₂-equivalent tonnes and display the corresponding converted values. The ODP, GWP and information about the substance is provided. For mixtures, the components of the mixture and their relative proportions (metric, ODP, CO₂- equivalent tonnes) are also calculated.

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

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

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

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



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



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



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

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

OzonAction **WhatGas?** Updated

New features:

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



The WhatGas? application is an information and identification tool for refrigerant gases: ozone depleting substances (ODS), HFCs and other alternatives. It is intended to provide a number of stakeholders, including Montreal Protocol National Ozone Officers, customs officers, and refrigeration and air-conditioning technicians with a modern, easy-to-use tool

that can be accessed via mobile devices or the OzonAction website to facilitate work in the field, when dealing with or inspecting ODS and alternatives, and as a useful reference tool. If the user requires additional information or assistance in identifying a refrigerant gas they are inspecting or that is described in the relevant paperwork, this can be easily obtained by consulting the application.

Using the application:

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

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



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

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

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

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

RAC Technician Videos - Full length films!

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

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




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


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

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

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

 You can watch these videos on the OzonAction YouTube Channel:

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

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



If you prefer to access the video clips via the OzonAction smartphone application, just search for “RAC Technician Video Series” or UNEP in the Google Play Store and iTunes/App Store or scan the QR code – **Free to download!**

The flyer is available from the [OzonAction website](#).

Refrigerant Cylinder Colours: What has Changed

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

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

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

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



Read/download the [factsheet](#)

Update on new refrigerants designations and safety classifications

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

The factsheet, produced by [ASHRAE](#) in cooperation with [UN Environment Programme OzonAction](#) is updated every 6 months.

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



Read/download the [factsheet](#)

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

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

OzonAction's iPIC platform - Updated

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

Those chemicals, which are primarily used as refrigerants for air conditioners and fridges, are controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer and are being phased out by all countries according to a specific timeline.

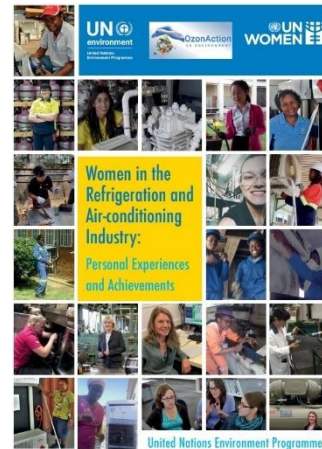


Women in the refrigeration and air-conditioning industry: Personal experiences and achievements

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

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

Read/download the [publication](#)



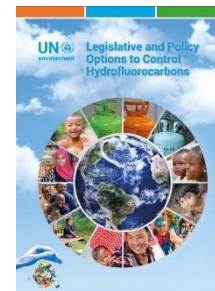
PUBLICATIONS

Legislative and Policy Options to Control Hydrofluorocarbons

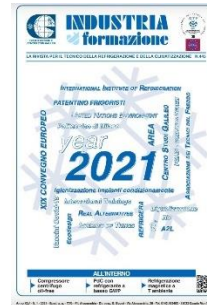
In order to follow and facilitate the HFC phase-down schedules contained in the Kigali Amendment, the Parties, including both developed and developing countries, will have to implement certain measures.

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

[Read/download](#)



Latest issue of Centro Studi Galileo magazine,
Industria & Formazione, n. 1 - 2021
(in Italian).



MISCELLANEOUS

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



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

We are pleased to invite you to submit your nomination*, and/or nominate Ozone Layer Champion(s). **The short profile should reflect the nominee's valuable work related to the Montreal Protocol and ozone layer protection.**

Please notify and nominate worthy candidates through the [on-line form](#).

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

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*



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

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

If you wish to submit articles, invite new subscribers, please contact:
Samira Korban-de Gobert,
samira.degobert@un.org



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UNEP, OzonAction, 1 rue Miollis, Bat. VII, Paris 75015, France

