OzoNews

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In this issue

UNEP

Multilateral Fund for the Implementation of the Montreal Protocol

A fortnightly electronic news update on ozone and climate protection and the implementation of the Montreal Protocol

GLOBAL

1. Kigali Amendment: Towards Ratification

The Kigali Amendment to the Montreal Protocol was adopted by the 28th Meeting of Parties to the Montreal Protocol on 15 October 2016 in Kigali, Rwanda. Under the Amendment, all countries will gradually phase down hydrofluorocarbons, a policy move that would avoid up to 0.5°C of global warming by the end of the century, while continuing to protect the ozone layer.

The Amendment will enter into force on 1 January 2019, provided that it is ratified by at least 20 parties to the Montreal Protocol. If that condition is not met by that date, the Amendment will become effective on the 90th day following the date of ratification by the 20th party.

- Ratification of the Kigali Amendment - Briefing note
- Kigali Amendment to the Montreal Protocol as issued by the UN Secretary-General
- Consolidated text of the Montreal Protocol as adjusted and/or amended to date (*November 2016*)
- Frequently asked questions relating to the Kigali Amendment to the Montreal Protocol
- What's next for the Kigali deal to curb potent greenhouse gases?
  - UN Environment, Ozone Secretariat

2. Customs, Playing a Key Role in Protecting the Ozone Layer and Mitigating Climate Change

The Montreal Protocol on Substances that Deplete the Ozone Layer has been in the news a great deal recently. This is something quite unusual for a 'lesser known' convention. But how has this landmark environmental treaty, which some see as the most successful international agreement of any kind, managed to effectively halt the destruction of the ozone layer as well as making a huge contribution to combatting climate change? Dedicated and vigilant Customs officers – that's how.

The stratospheric ozone layer is the thin layer of the atmosphere that protects life on earth from harmful ultraviolet radiation from the sun. The objective of the Montreal Protocol is to protect human health and the environment by phasing-out the production and consumption of nearly 100 industrial chemicals known as ozone depleting substances (ODS), which include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, methyl bromide, carbon tetrachloride and methyl chloroform.

Under this treaty, developing and developed countries have equal but differentiated responsibilities with both groups of countries having binding, time-targeted, and measurable commitments. The Montreal Protocol has been ratified by 197 Parties, making it the first universally ratified treaty in the history of the United Nations (UN). The treaty has been successful in phasing out more than 98% of ODS, and it is expected that as a result the ozone layer will recover to its pre-depletion levels by around 2060. In addition, due to the phase-out of ODS, many of which are powerful global warming gases, the Montreal Protocol lowered greenhouse gas emissions by the equivalent of about 11 gigatonnes (11 billion tonnes) of carbon dioxide per year – a truly huge contribution to protecting the earth's climate.

Ensuring success

When those familiar with the Montreal Protocol consider the work of Customs officers in relation to this environmental convention, what may first come to mind is the central role they play in the detection and prevention of the illegal trade in ODS. Smuggling of CFCs, HCFCs and other ODS has been a significant problem which threatened to undermine the success of the Protocol, but significant seizures of these chemicals by Customs officers around the globe regularly hit the headlines. It has been estimated that in the early 2000s, the illegal trade in ODS represented around 10-20% of legitimate trade, with an approximate value of between 25 and 60 million US dollars a year [http://ozone.unep.org/Meeting_Documents/mop/18mop/ODS-Tracking-September-2006-1.pdf].

Important though this work on illegal trade is, to focus only on this part of the function of Customs would be to neglect the arguably more important, but perhaps less visible work of Customs, which is fundamental to the success of the Montreal Protocol – the day-to-day work of monitoring and reporting trade data on which a country's compliance with their commitments under the Protocol is based. While the Protocol deals with the production and consumption of ODS, in reality, this 'consumption' is not measured in situ, but is calculated from countries' ODS import, export, production, and destruction figures.

The import and export of ozone depleting substances is already controlled under the Montreal Protocol, however, hydrofluorocarbons (HFCs) such as R-410a (pink cylinder) will soon be subject to trade controls as a result of the 'Kigali Amendment' to the Protocol.

It is clear that to ensure accurate and timely reporting it is essential to have detailed and accurate import and export data, which is the domain of Customs. They must also ensure, by working closely with the designated national authority, that imports and exports of ODS are only allowed to proceed according to the national ODS licensing system and associated import and export quotas for each specific controlled substance. One of the requirements of remaining in compliance with the Montreal Protocol is timely annual data reporting, and another is ensuring that a country's imports and exports remain within the agreed ODS phase-out schedules. Both these requirements would not be able to be fulfilled without dedicated Customs officers.

UN Environment's OzonAction branch has provided training and capacity building to Customs officers for many years on the implementation of the Montreal Protocol, including training on the use of ozone depleting substance identifiers.

Providing support

OzonAction, a branch of United Nations Environment, assists developing countries and countries with economies in transition to achieve and sustain compliance with the Montreal Protocol. One of its priority areas of work is to provide capacity building support to Customs and other enforcement officers to assist them in their work. For this reason, OzonAction has developed a dynamic configuration of 10 regional networks comprising 147 developing countries, supported by staff located in regional offices who interact closely with these countries on a daily basis.

The regional networks provide a regular, interactive forum for officers in National Ozone Units – country representatives responsible for the implementation of the Protocol – to exchange experiences, develop skills, and share knowledge and ideas with colleagues from both developing and developed countries. These networks also provide a platform for interaction with, and the training and capacity building of, Customs and enforcement officers. The networks are considered a cornerstone in the success of the Montreal Protocol.

Phasing down HFCs

After more than seven years of intense and sometimes difficult negotiations, the historic decision taken by the Parties to the Montreal Protocol in October last year in Kigali, Rwanda which hit the headlines was that they had agreed to phase down the production and consumption of hydrofluorocarbons (HFCs) also. To appreciate the significance of this agreement, one needs to reflect on the fact that this is a treaty dealing with ozone depletion, addressing a group of chemicals which are not ozone-depleting.

The 'Kigali Amendment' will require all countries, both developed and developing, to phase down HFCs following various specific schedules. These chemicals are commonly used alternatives to ODS, and while not ozone depleting substances themselves, they are greenhouse gases which can have high or very high global warming potentials (GWPs) – about 121 to 14,800 times more powerful than carbon dioxide in causing climate change. It has been estimated that this agreement will help nations avoid up to 0.5° Celsius of global warming by 2100, which very much continues the historic legacy of the Montreal Protocol.

However, the work to achieve this target is all still to be done. Once again, Customs officers will be called upon to play their indispensable role. It will soon be necessary to monitor and control the trade in HFCs as the import and export of these substances comes under regulation, and quotas are issued. It will be necessary to identify and distinguish HFCs from their alternatives and other chemicals. The latest edition of the Harmonized System (HS) released in 2017 does not include specific codes for HFCs, but they are expected to be included in the 2022 edition. This may present a particular challenge as countries are required to establish working licensing systems for HFCs by 2019, although controls for developing countries do not follow this for some years.

Continuing cooperation

For many years, OzonAction and the WCO have collaborated on developing and deploying innovative information material and training tools, such as e-learning modules which are available on the WCO CLiKC! Platform, and cooperated in the carrying out of enforcement operations and intelligence-sharing exercises that have specifically targeted the illegal trade in ODS. These actions have cemented the strong ties between OzonAction and the WCO at the international level, while having a positive impact at the national level.

OzonAction currently has projects in some 100 developing countries. These projects include support for Customs officers, by way of capacity building, training and the provision of information material. By ensuring that Customs and enforcement officers on the frontline are well informed about these new chemicals and remain vigilant, United Nations Environment is confident that the success of the Montreal Protocol will continue to be underpinned by the tireless work of Customs officers. Continued cooperation between OzonAction and the WCO will support this even further.

Author: Dr. Ezra Clark, UN Environment, OzonAction

- WCO news, February 2017, n° 82, Page 44

3. Limited Options for Low-Global-Warming-Potential Refrigerants

[…] Hydrofluorocarbons (HFCs), which are currently used as refrigerants in air-conditioning (AC) systems, are potent greenhouse gases, with high values of global warming potential (GWP). Although the present contribution of the HFCs to climate change is small, their contribution is projected to rapidly increase under various scenarios[1]. A phase-down of HFCs is mandated in the European Union[2], and at an October 2016 meeting of the parties to Montreal Protocol, a global phase-down was negotiated[3]. Thus replacement fluids must be found.

A refrigerant is the essential working fluid in a vapour-compression refrigeration cycle; it absorbs heat at a relatively low temperature in the evaporator (for example, the cooling coil in an air conditioner) and releases it at a higher temperature in the condenser (for example, the outside coil). HFC refrigerants were commercialized in the 1990s as replacements for the ozone-depleting chlorofluorocarbons and hydrochlorofluorocarbons. The HFCs are now the dominant refrigerants in new refrigeration, AC and heat-pump equipment. In particular, HFCs are used in small AC systems known as unitary systems: self-contained systems comprising a positive-displacement compressor, condenser, evaporator, and associated fans and controls. R-410A (a blend of HFCs) is currently the dominant refrigerant in such systems. R-22 (a hydrochlorofluorocarbon) was most commonly used prior to R-410A, and it is still commonly used in developing countries. (We use the shorthand nomenclature for these compounds specified in ANSI/ASHRAE Standard 34 (ref. 4); ISO Standard 817 (ref. 5) is substantially equivalent.)

A viable low-GWP candidate must possess a number of other attributes[6], including zero (or very low) ozone-depletion potential, chemical stability within the refrigeration system, thermodynamic properties matched to the refrigeration application, low toxicity and other practical considerations, such as compatibility with the materials of construction. Existing safety codes7 require nonflammable refrigerants for many applications, but that requirement is being reconsidered.

This work presents the results of a comprehensive search for the best single-component, low-GWP replacement fluids. We search for suitable replacement fluids by applying thermodynamic and environmental screening criteria to a comprehensive chemical database8. The fluids passing these screens are then simulated in an AC system, with the calculated volumetric refrigeration capacity and energy efficiency serving as additional screens. We conclude that only a limited number of fluids possess the combination of chemical, environmental, thermodynamic and safety properties necessary for a refrigerant in small AC systems and that these fluids are at least slightly flammable. We argue that the presented list of refrigerants is essentially exhaustive. Our focus here is on single-component refrigerants (that is, pure fluids). Refrigerant blends are in common use and offer additional possibilities. We do not consider blends explicitly but, for the sake of completeness, do include several fluids that would not be suitable low-GWP fluids in their own right but that might be useful as a blend component.

Our findings give certainty as to the options available to the AC industry in their transition away from high-GWP fluids. It is also important for policy makers to understand these limits and trade-offs as they consider phase-down schedules. […]

To read the full article:

- Nature Communications 8, Article number: 14476 (2017), Published online: 17 February 2017, Authors: Mark O. McLinden, J. Steven Brown, Riccardo Brignoli, Andrei F. Kazakov & Piotr A. Domanski

4. Sustainable Management of Refrigeration Technologies in Marine and Off-Shore Fisheries Sectors, 6-8 April 2017, Bangkok, Thailand

Pre-registration is now open

Organized by the UN Environment (UNEP), ASHRAE, the International Institute of Refrigeration (IIR), and the United Nations Industrial Development Organisation (UNIDO), with the kind support of the Government of the Kingdom of Thailand and the Department of Industrial Works, the Sustainable Management of Refrigeration Technologies in Marine and Off-Shore Fisheries Sectors Conference takes place April 6-8, 2017, in Bangkok, Thailand.

Refrigeration technologies are essential for the cold food chain management both on land and in marine applications. The Montreal Protocol (Protocol) Technology and Economic Assessment Panel (TEAP) reported that 80% of mobile marine refrigerated systems use hydrochlorofluorocarbons-22 (HCFC-22) refrigerants. HCFC-22 is currently being phased-out worldwide under the Montreal Protocol on Substances that Deplete the Ozone Layer.

RAC technology management in the mobile marine and fisheries sector has a critical role in meeting the phase out targets specified by the Meeting of the Parties (MOP) to the Protocol and ensuring sustainable environmental practices in their RAC applications. Refrigeration, freezing, ice making and air-conditioning equipment are fundamental for mobile marine and fishery operations as well as sustaining economic livelihoods.

This international conference will focus on the practices of this industry in the management of existing systems, longer term energy efficient systems, advancement and selection of related refrigeration and air-conditioning (RAC) technologies. In keeping with the ongoing developments of the Montreal Protocol, the conference will address the different aspects, mentioned earlier, in conjunction with eliminating/minimizing the use of either hydrochlorofluorocarbons (HCFC) or high-GWP hydrofluorocarbons (HFC), as refrigerants, and the relevant obligations under the Montreal Protocol as well as other international policies and governing treaties.

Learn more

On-line pre-registration is now open:

1, Go to page: https://www.ashrae.org/membership--conferences/conferences/ashrae-conferences/marine-2017

2. Scan down and you will see: Registration Application: https://fs12.formsite.com/ashrae/form32/index.html

Participants at the Sustainable Technologies for Stationary Air Conditioning Workshop

5. Next Generation of Air Conditioners to Be More Energy Efficient and Climate Friendly

Experts and Industry showcase alternatives to hydrofluorocarbons at the Sustainable Technologies for Stationary Air Conditioning Workshop in Las Vegas

One of the most common gases used to cool homes and refrigerate food is ironically one of the strongest at warming the planet. In October 2016, due to the concern for the high global warming potential (GWP) of hydrofluorocarbons (HFCs), countries agreed to start phasing down their use through an amendment to the Montreal Protocol (known as the Kigali Amendment).

An HFC phase down will require countries and businesses to move toward replacements suitable for a variety of uses and climates, and that are safe for both people and the environment.

To discuss these alternatives almost 200 people from governments, NGOs and the private sector met in Las Vegas, Nevada, at the Sustainable Technologies for Stationary Air Conditioning Workshop, to learn about environmentally-friendly, energy efficient and cost effective alternative technologies in air conditioning, the fastest growing sector using HFCs.

The workshop was held on the margins of one of the world's largest air conditioning, heating and refrigeration expositions and provided the opportunity for industry representatives to showcase climate friendly and energy

efficient technologies available, and in development, to replace high GWP HFCs.

"The Kigali agreement to phase down HFCs was a major global achievement. Clean technology workshops, such as this one, demonstrate that climate-friendly alternatives to HFCs are available in the marketplace, and can be implemented in all countries," Catherine McKenna, Canada's Minister for Environment and Climate Change, said. "Replacing HFCs with climate-friendly refrigerants and technologies will help spark business innovation, while creating good-paying jobs in a low-carbon economy."

"The workshop illustrates that alternative technologies with no or negligible global warming potential exist, have proven their applicability for air conditioning purposes, and significantly advance energy efficiency benchmarks," said Maria Krautzberger, President of the German Environment Agency.

Over 20 international experts identified key HFC alternative technologies for the air conditioning sector, taking into account safety, operation performance in many environments including those with high ambient temperatures, energy efficiency, and technology deployment in developing countries. They also discussed the development of appropriate policies and standards necessary to facilitate the introduction and safe use of alternative refrigerants and technologies.

"The leadership of the business community in identifying, developing and deploying alternatives has been the hallmark of the successful refrigerant transition over the last thirty-five years," remarked Kevin Fay, executive director of the industry coalition, the Alliance for Responsible Atmospheric Policy. "During this next stage, industry will continue to advance new solutions that are as functional, safe and energy efficient as incumbent technologies, while generating significant economic contributions."

Numerous experts also noted that new generation air conditioning systems are much more energy efficient than their predecessors, thus providing a huge climate benefit from decreased energy use in addition to the benefits from reducing HFCs.

The workshop was a valuable opportunity to raise awareness and confidence of the availability of efficient technologies across a wide range of applications, including residential and light commercial air conditioning to large centralized systems, chillers and systems suited for special circumstances like those found in mines or data centers.

HFCs are widely used as replacements for ozone-depleting substances (ODS), and air conditioning and refrigeration are the largest uses of HFCs. Global demand for air conditioners has been rapidly growing due to rising comfort requirements in industrialized countries and to increasing industrial production as well as private income in emerging economies like China and India. Between now and 2040, it is expected that the global demand for high-GWP HFCs in the air conditioning sector could increase over seven times in a business-as-usual scenario.

According to a recent study, HFC emissions to the atmosphere are increasing rapidly, at a rate of about 10–15 per cent per year. If no measures are taken, it is estimated that HFCs will amount to 9–19 per cent of total CO_2 emissions by 2050. Now more than ever there is a need to encourage the expanded use of alternative solutions that benefit the environment in an economically-viable manner.

The Sustainable Technologies for Stationary Air Conditioning Workshop was organized by the Climate and Clean Air Coalition (CCAC), the governments of Canada, Germany and the USA, and the Alliance for Responsible Atmospheric Policy. There was additional support from the Air Conditioning, Heating, & Refrigeration Institute (AHRI). It took place on the margins of two important industry events in Las Vegas, the 2017 International Air-Conditioning, Heating, Refrigerating Exposition and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 2017 Winter Meeting.

- CCAC secretariat, 2 February 2017

ASIA PACIFIC

6. Japan Confident of Achieving HFC Phase-down Targets

Officials from Japan's Ministry of Economy, Trade and Industry and Ministry of Environment attending ATMOsphere Japan 2017 were confident that the country would achieve its f-gas phase-down targets.

Photo: Atsuhiro Meno, director, Fluoride Gases Management Office, Ministry of Economy, Trade and Industry

As the global HFC phase-down gathers pace, participants in the first-ever ATMOsphere Japan conference – held on Monday at the Shin-Marunouchi Building Conference Square in Tokyo – heard how the f-gas phase-down is creating new opportunities for natural refrigerants in Japan.

Representatives of Japan's Ministry of Economy, Trade and Industry – and the Ministry of Environment – argued that the Kigali Amendment to the Montreal Protocol on phasing down HFCs would have a positive impact on the adoption of natural refrigerants by Japanese businesses.

Atsuhiro Meno, director of the Fluoride Gases Management Office at the Ministry of Economy, Trade and Industry, remarked: "We feel comfortable that [Japan] will be able to achieve the HFC phase-down targets set by Kigali. However, we still feel that f-gas reduction and control measures must be even tougher."

"We feel that Japan has an opportunity to take the initiative in terms of technological development. We, as a government, would like to support that effort," Meno said.

Japan set to comfortably achieve HFC phase-down targets

Two laws current guide Japan's f-gas policy: the *Ozone Layer Protection Law*, which targets CFCs and HCFCs, and April 2015's *Act on Rational Use and Proper Management of Fluorocarbons*, which targets HFCs.

Meno highlighted the impressive progress made already – with close to a 10% decrease in overall consumption of HFCs (47.73 million tonnes CO_2e) achieved in the past twelve months.

Meno said: "We feel confident that [Japan] is already on track to achieve the new HFC phase-down targets [set by Kigali]. However, going forward, we still feel reduction and control measures can be even tougher."

New HFC production and consumption control measures, such as a quota system, may eventually be needed, hinted the government official.

"Though we are not limited to promoting specific refrigerants, if we see progress being made in certain areas then we are willing to support that effort," Meno explained.

- R744.com, 23 February 2017, By Andrew Williams

LATIN AMERICA AND CARIBBEAN

7. Eliminación de HCFC en planta de Mabe permitirá cumplir de manera anticipada compromisos de México ante el Protocolo de Montreal

Con apoyo del PNUD, 55 toneladas potenciales de agotamiento del ozono fueron eliminadas, equivalentes a emisiones generadas por 200 mil vehículos durante un año en CDMX.

Clic aquí para ver el video

Celaya, Guanajuato. - El Programa de las Naciones Unidas para el Desarrollo (PNUD) en México, la Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT), el Gobierno del Estado de Guanajuato y la empresa Mabe inauguraron la nueva línea de producción de refrigeradores libre de Hidroclorofluorocarbonos (HCFC) en la planta ubicada en Celaya, Guanajuato.

Esta nueva línea es uno de los resultados del proyecto "Conversión del HCFC-141b y HCFC-22 en la fabricación de espumas de aislamiento rígido de poliuretano para los refrigeradores domésticos de Mabe" ejecutado por PNUD y SEMARNAT y co-financiado por el Fondo Multilateral para la implementación del Protocolo de Montreal. Esta iniciativa conjunta logró eliminar 55 toneladas potenciales de agotamiento del ozono, las cuales se traducen en la eliminación directa de 808,700 toneladas de CO_2eq. Esto significa evitar las emisiones generadas durante un año, por 200 mil vehículos que circulan en la Ciudad de México.

El proyecto permitió a la empresa Mabe continuar con la producción de más de 1.2 millones de refrigeradores anuales, sin utilizar sustancias agotadoras de la capa de ozono, al eliminar el 4.69% del consumo base establecido en México para HCFC, lo que ha permitido que México cumpla de manera anticipada con los compromisos con el Protocolo de Montreal, al eliminar el 50% de estas sustancias en 2016.

El Coordinador Residente del Sistema de las Naciones Unidas en México y Representante Residente del PNUD, Antonio Molpeceres, resaltó que este éxito ha sido posible gracias al rol protagónico del gobierno de México en la implementación del Protocolo de Montreal. Explicó también que los avances en el plano climático también han implicado nuevas alternativas científicas, tecnológicas y sin duda, económicas, como las celebradas este día por la reconversión de la infraestructura de Mabe.

A manos de la Subsecretaria de Gestión para la Protección Ambiental de SEMARNAT, Martha Garcíarivas Palmeros, la empresa Mabe recibió el reconocimiento de "Industria Limpia" por sus medidas proactivas y voluntarias que le han permitido minimizar sus residuos y evitar sus emisiones.

La Subsecretaria invitó a Mabe a continuar con la mejora de sus procesos y elevar sus estándares ambientales hasta lograr en un futuro la "Excelencia Ambiental"; y añadió que con ello se demuestra que el desarrollo industrial y el cuidado del medio ambiente son dos parámetros que deben ir de la mano permanentemente.

A partir del trabajo de México con el Protocolo de Montreal se ha reducido en más del 98% el consumo de las Sustancias Agotadoras de la Capa de Ozono (SAO) en el país, lo que ha ayudado a la recuperación del daño causado a la atmósfera por la emisión de estas sustancias.

A futuro, este esfuerzo permitirá avanzar en las metas sobre cambio climático establecidas en el Acuerdo de París, y contribuirá a dar cumplimiento a la Agenda 2030 para el Desarrollo Sostenible, en particular, tres Objetivos de Desarrollo Sostenible (ODS): ODS 9: Industria, innovación e infraestructura, ODS 12: Producción y consumo responsables y ODS 13: Acción por el clima.

"Felicito a MABE, una empresa comprometida y socialmente responsable, por la inauguración de estas nuevas instalaciones libres de HCFCs en sus componentes aislantes, beneficios que serán no sólo para el estado de Guanajuato y para México, sino que también pueden ser compartidos con los países de América Latina", agregó el Representante Residente del PNUD.

El desarrollo de alternativas costo eficientes está intrínsecamente asociado a buscar alianzas y fortalecer la cooperación técnica, por ello, el representante del PNUD reiteró su disposición para continuar colaborando con SEMARNAT en el marco de la Estrategia Nacional de Eliminación de HCFCs en México para consolidar un desarrollo sustentable y eficiente.

Participaron en el evento de inauguración: Ing. Ramón Ignacio Lemus Muñoz Ledo, Alcalde del Ayuntamiento de Celaya; Lic. Pablo Moreno Cadena, Presidente de la Cámara Nacional de Manufacturas Eléctricas; Ing. Manuel Martínez, Vicepresidente de Manufactura de Mabe.; y el Dr. Juan Ángel Mejía Gómez, Director General del Instituto de Ecología del Estado de Guanajuato.

- Para más información: http://bit.ly/2kkLeXv
- Contacto para prensa: Ana Del Toro, PNUD México
- Programa de las Naciones Unidas para el Desarrollo en México, 15 de febrero 2017

NORTH AMERICA

8. New Gases, New Challenges for Refrigerant Recovery Sector

HCs, natural, and semi-flammable refrigerants — the talk of the industry

VARIABLE-SPEED: Russ Harju, product marketing manager, Fieldpiece Instruments Inc., displayed the company's MR45 refrigerant recovery machine.

LAS VEGAS — The supply of virgin R-22 allocations in the U.S. will be reduced from 17.6 million pounds in 2016 to 13.2 million pounds in 2017. Meanwhile, the U. S. Environmental Protection Agency (EPA) reports that 9.3 million pounds of refrigerant were reportedly reclaimed by EPA-certified reclaimers in 2015, of which 7.3 million pounds were R-22. That number is well below the EPA's target of 25 million pounds of reclaimed R-22 annually.

Of course, reclaimers can only reclaim what contractors and technicians recover, and while the R-22 numbers may never match the hoped-for projections, the industry is already looking to the future and preparing to address new challenges in a post-hydrochlorofluorocarbon (HCFC) world that also is likely facing a phasedown of hydrofluorocarbons (HFCs).

For example, while there is much talk in the industry about hydrocarbons (HCs) and natural refrigerants and whether they should be recovered or vented, just as important is the topic of semi-flammable (A2L) refrigerants, such as R-32 and R-1234yf, said Bob Belvick, product manager, service tools, Inficon. The A2L classification from ASHRAE designates these refrigerants as low toxicity (A) and mildly flammable (2L). They fall between A1 (nonflammable) and A2 (lower flammability) on the classification spectrum. These refrigerants, Belvick said, are the result of continual efforts to create new refrigerants with reduced global-warming potentials (GWPs). He added they are becoming increasingly popular in certain parts of the HVACR applications and are already used in many automotive and air conditioning applications.

"For A2L refrigerants, the question is whether they are safe for use with a standard recovery machine," Belvick told *The NEWS*. "The majority of recovery machine manufacturers do not specify if they are safe to use with A2L refrigerants."

[…] **ANALYSIS GAINS IMPORTANCE**

Refrigerant analysis is becoming increasingly essential to the reclamation/reclaim industry, according to Zachary Ziegler, product manager, HVACR & commercial division, Neutronics Inc.

The refrigerants industry has seen many changes over the past year, including the Paris Agreement regulating greenhouse gases was ratified; stricter regulations were imposed on the use of HFCs, HCFCs, and chlorofluorocarbons (CFCs); low GWP/ozone-depletion potential (ODP) refrigerants, such as HFOs and HFO blends saw increasing use; and another large reduction in the new production of R-22 takes effect in 2017, Ziegler said.

"Through all the changes, one issue continued to occur: refrigerant contamination," Ziegler said.

According to Ziegler, the industry is aware that cross-contamination may occur during the recovery process. If analysis is completed before recovery, then consolidation and reuse of good refrigerant can occur rather than destruction or venting of contaminated refrigerants. Therefore, the refrigerants industry demands proper recovery and reclamation to stabilize refrigerant costs as new refrigerant production begins to decrease.

"With the supply of many of the popular refrigerants decreasing, and the demand still high for these older refrigerants, proper recovery, recycling, and reuse is more important than ever," Ziegler said. "Analyzing refrigerant before recovery and reclamation not only promotes better quality refrigerant but also promotes proper recovery practices that protect the ozone, reduce global warming risks, and provide a sustainable future." […]

- ACHR news, 27 February 2017, By Ron Rajecki

9. Leak Detection: Tools and Best Practices for Supermarkets: US EPA GreenChill Webinar

Date: Tuesday, March 21, 2017

Time: 2:00 pm to 3:00pm (*Eastern time*)

Description: As the regulatory landscape continues to shift around the commercial refrigeration industry, retailers and contractors are under increasing pressure to reduce — and even eliminate — refrigerant leaks. Do you know where in your facility leaks can occur and how you can use detection technologies more effectively? Join John Wallace from Emerson Climate Technologies as he discusses: what an effective leak detection program looks like and the benefits of putting such a program in place; an overview of the regulatory environment related to leak detection; and how to apply various leak detection technologies, including tips on interpreting results.

To join the webinar:

1. Go to http://epawebconferencing.acms.com/leak-detection/

2. Select "Enter as a Guest". It is important that you select the option to enter as a guest.

3. Enter your name.

4. Click "Enter Room".

5. Click "OK".

For audio:

1. Call the toll free call-in number: 1-866-299-3188 (706-758-1822 from outside the U.S.)

2. Use Conference Code: 202 343 9185#

- US EPA GreenChill, March 2017

EUROPE & CENTRAL ASIA

10. EU Paves Way for Global HFC Phase-down

EUROPE: Ratification of the Kigali amendment to the Montreal Protocol could be virtually assured following proposed backing from the European Commission.

The European Commission today adopted a proposal for the EU to ratify the Kigali amendment to the Montreal Protocol on a global phase-down of HFCs – the majority of which are used as refrigerants in refrigeration and air-conditioning systems.

The proposal follows the agreement reached last October in Kigali, Rwanda, where the 197 Parties to the Montreal Protocol agreed to gradually limit their production and use of HFCs. For the Kigali amendment to enter into force, at least 20 Parties need to ratify it. Ratification by the EU countries alone could thus trigger the entry into force.

Under the amendment, first reductions in developed countries are due in 2019. Most developing countries will freeze the level of HFC quantities in 2024, and a few countries will follow in 2028.

Commissioner for Climate Action and Energy Miguel Arias Cañete said: "Not only will this landmark deal help us meet our climate objectives, but it will also provide new opportunities for European manufacturers of air conditioning and refrigerants to access the global market, creating additional jobs and attracting new investment."

The EU has already taken action to reduce HFCs under the F-gas regulations, and it is now encouraging other

countries to take early action as well.

- CoolingPost, 2 February 2017

11. Six-month Prison Sentence for Offering HCFC Refrigerant on Internet

On 9 January 2017, the Madrid Provincial Court convicted a former company owner to a six-month prison sentence, a fine and prohibited the involvement in any commercial activity related to refrigeration or air-conditioning during a period of 6 years.

After closure of his enterprise in 2012, the person decided to sell the remaining equipment and materials and offered a 60 kg R22 refrigerant cylinder on Internet. He was aware of the fact that selling HCFC refrigerant in Europe is illegal.

The advertisement was spotted by the SEPRONA Unit in the Public Prosecutor´s Office for Environment and Land Planning on 11 January 2013, and the Guardia Civil offered to buy the R22 refrigerant under a fictitious name. The refrigerant cylinder was seized on 6 February 2013 and a court case initiated. The judge ordered the destruction of the refrigerant.

- ECA Cool, 24 February 2017

FEATURED

OZONE SECRETARIAT

- - Twenty-Eighth Meeting of the Parties.
- - Resumed 38th meeting of the Open-ended Working Group.
- - 57th meeting of the Implementation Committee.

Final text of the Kigali Amendment to the Montreal Protocol available in all the six official UN languages (A C E F R S)

Click here to access MOP 28 documents, General information …etc.

- Browse through the Ozone Secretariat "In Focus" to learn about latest updates.
- Click here for Montreal Protocol Meetings Dates and Venues
- Methyl Bromide Technical Options Committee 2014 Assessment Report
- Medical Technical Options Committee 2014 Assessment Report

Progress & Quadrennial Assessment Reports:

- Environmental Effect Assessment Panel (EEAP)
- Scientific Assessment Panel (SAP)
- Technology and Economic Assessment Panel (TEAP)

Halon Technical Options Committee Reports:

- Halons Technical Options Committee 2014 Assessment Report (Volume 1)
- Halons Technical Options Committee 2014 Supplementary Report #1 - Civil Aviation (Volume 2)
- Halons Technical Options Committee 2014 Supplementary Report #2 - Global Halon 1211, 1301, and 2402 Banking (Volume 3)
- Technical Note #1- Revision 4 - Fire Protection Alternatives to Halon - 2014

- Technical Note #2 - Revision 2 - Halon Emission Reduction Strategies - 2014
- Technical Note #3 - Revision 2 - Explosion Protection - Halon Use and Alternatives - 2014
- Technical Note #4 - Recommend Practices for Recycling Halon and Halocarbon Alternatives - 2014
- Technical Note #5 - Halon Destruction - 2014

THE MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL

Report of the 77th Meeting of the Executive Committee, 28 November - 2 December 2016, Montreal, Canada

See also: Adjusted business plan of the Multilateral Fund for 2017-2019 after the 77th meeting of the Executive Committee

Learn more

OZONACTION

UN Environment, OzonAction highlights

OzonAction Factsheets:

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

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

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

OzonAction Factsheet: Tools Commonly used by Refrigeration and Air-Conditioning Technicians

New **OzonAction Multimedia Video Application**: **Refrigeration and Air-conditioning Technician Video Series** - OzonAction has launched an exciting new application which hosts series of short instructional videos on techniques, safety and best practice for refrigeration and air-conditioning technicians. This application, consisting of short instructional videos on techniques, safety and best practice, serves as a complementary training tool for refrigeration and air-conditioning (RAC) sector servicing technicians to help them revise and retain the skills they have acquired during hands-on training. Additional videos will be added regularly.

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

Now available in the Android Play Store and Apple Store/iTunes.

(*Just search for 'OzonAction' or scan this QR Code*)

OzonApp eDocs+ launched in Android Play Store and Apple Store - This new application launched by OzonAction on February 12, includes publications, videos, fact sheets and other awareness materials to help National Ozone Units (NOUs) and other stakeholders to build their capacity to implement the Montreal Protocol in a sustainable manner and at the same time to derive climate benefits. Now available in the Android Play Store and Apple Store/iTunes.

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

OzonAction News Drops - UNEP OzonAction is presenting a series of short video "**News Drops**" which focus on ozone layer protection, climate change and the importance of continuing ozone observations.

Regional News Drops

The Regional Networks of National Ozone Units (NOUs) under the Multilateral Fund are a path-breaking mechanism for North-South and South-South cooperation. Networking provides a platform for NOUs from Article 5 countries to exchange experiences, develop their skills and tap the expertise of their peers in both developing and developed countries. Conducted at the regional level, the Networking activity builds the Ozone Officers' skills for implementing and managing their national ODS phase-out activities. During 2016 these videos were filmed at the regional network meetings around the world.

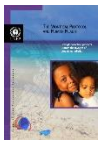
The NOUs were asked about their success stories, alternative refrigerants selected and their personal messages for national ozone celebrations…

Click here to access the News Drops

OzonAction Recent Publications:

Lower-GWP Alternatives in Commercial and Transport Refrigeration: An expanded compilation of propane, CO_2, ammonia and HFO case studies - This booklet presents an expanded compilation of case studies on lower-GWP alternatives in commercial and transport refrigeration and provides an update to the first set of case studies which was published in 2014 by UNEP DTIE OzonAction/CCAC (Low GWP Alternatives in Commercial Refrigeration: Propane, CO_2 and HFO Case Studies.

NATIONAL CERTIFICATION SCHEMES FOR RAC SERVICING TECHNICIANS - This publication aims to provide introductory information for institutions in developing countries to better understand the issue of certification in the field of refrigeration and air conditioning, to assist in the creation of such certification and training schemes and to demonstrate to service technicians and enterprises why it is in their interest to participate. Read/Download



THE MONTREAL PROTOCOL AND HUMAN HEALTH - This booklet summarizes how the successful implementation of the Montreal Protocol has protected human health. It describes how ozone depletion would have led to increases in UV radiation and, based on current understanding of the mechanisms by which UV affects biological processes, how that would have led to a dramatic increase in skin cancers, cataracts and affected human health in other ways. It also covers recent progress in understanding the 'World Avoided' – that is the world we would have lived in without a successful Montreal Protocol. Read/Download

FINANCING THE CLIMATE CO-BENEFITS OF THE HCFC PHASE-OUT - A guide for Low Volume Consuming Countries - Hydrochlorofluorocarbons (HCFCs) are being phased out worldwide under the Montreal Protocol on Substances that Deplete the Ozone Layer. The Parties to this treaty encouraged countries to promote the selection of alternatives to HCFCs that minimise environmental impacts, in particular impacts on climate. The Protocol's Multilateral Fund encourages developing countries to explore potential financial incentives and opportunities for additional resources to maximise the environmental benefits from HCFC Phase out Management Plans (HPMPs). This booklet explains how Ozone Officers in low volume consuming countries can explore such opportunities for climate co-benefits. Read/Download in English | French | Spanish

SAFE USE OF HCFC ALTERNATIVES IN REFRIGERATION AND AIR CONDITIONING - An Overview for Developing Countries - Many of the alternative refrigerants to hydrochlorofluorocarbons (HCFCs) have particular characteristics in terms of toxicity, flammability and high pressure which are different from those used previously. It is therefore important that the refrigeration and air-conditioning industry adapts to both the technical and safety issues concerning these refrigerants. This publication provides an overview of the alternatives, their general characteristics and their application in the context of the safety issues. It provides guidance for National Ozone Units (NOUs) and other interested parties in developing countries on how they can advise and assist their national stakeholders in the selection and implementation of alternative refrigerants. Read/Download

PHASING-OUT HCFCS IN SMALL AND MEDIUM-SIZED ENTERPRISES - This booklet aims to assist foam enterprises, especially SMEs, to better understand policies on HCFC phase-out, access to assistance from the Multilateral Fund for the Implementation of the Montreal Protocol and access alternative technologies in different foam applications taking into account challenges in converting to alternative technology. It also discusses some tips on how to identify enterprises that may use HCFCs and verify the HCFCs consumption of enterprises. Read/Download

INTERNATIONAL STANDARDS IN REFRIGERATION AND AIR-CONDITIONING - This guide provides an introduction and simple overview of the issues related to international standards in the refrigeration and air-conditioning sector and how they can be useful in the context of the phase-out of hydrochlorofluorocarbons (HCFCs) in developing countries as required by the Montreal Protocol on Substances that Deplete the Ozone Layer. Read/Download in English | French | Spanish

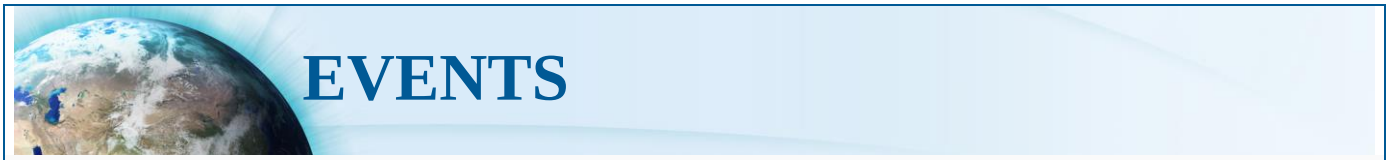
Guide on Good Practices: Phasing out HCFCs in the Refrigeration and Air-conditioning Servicing Sector

Phasing out HCFCs in Small and Medium-sized Foam Enterprises

Demonstrating the feasibility of R-290 based AC manufacturing: China's Midea and Meizhi case

Low-GWP Alternative for Small Rigid PU Foam Enterprises

Learn more about OzonAction publications



EVENTS

2017

Refrigeration Standards Update, Safety and Environmental Requirements, AIRAH and Standards Australia are pleased to present a seminar series on the recently adopted and published refrigeration safety and environmental standards; AS/NZS/ISO 817:2016 Refrigerants – Designation and safety classification which replaces AS/NZS 1677.1:1998 and AS/NZS 5149 Refrigerating systems and heat pumps – Safety and environmental requirements: Parts 1 to 4, which replaces AS/NZS 1677.2:1998. Each of these new adoptions have had major modifications and revisions over the previous AS/NZS1677 series and are critical as we move to low global warming potential refrigerants. AIRAH will be holding the update seminars throughout Australia in February and March 2017 to provide an introduction and overview to the main changes that will affect the HVAC&R industry.

SuperSmart free training & workshops at EuroShop and ISH - The two world-leading events for the food retail industry (EuroShop); and the building, energy,

renewable energy and air-conditioning sectors (ISH), are approaching quickly. Reason enough for the SuperSmart team to be on-site and offer free-of-charge opportunities for you to get trained, learn about our project and its targets, and add your voice to make Europe's supermarkets smarter. SuperSmart training at EuroShop: Energy-efficient food retail stores, at Euroshop, 6 March, Düsseldorf, Germany, 2-3 pm / 3-4 pm / 4-5 pm - you may select the session(s) you are interested in EuroShop Hall 13, room 13.2

Contact Nina Masson, Chief Strategy Advisor / Special Projects at info@supersmart-supermarket.org

International Ground Source Heat Pump Association (IGSHPA) Technical Conference and Expo, 14-16 March 2017, Denver, USA

AIRAH's Refrigeration 2017 Conference calls for abstracts, 27–28 March 2017, Melbourne, Australia. **The conference committee is now calling for abstracts**.

Sustainable Management of Refrigeration Technologies in Mobile Marine and Fisheries Sectors, co-organized by UNEP, ASHRAE, IIR and UNIDO with the kind support of the Government of the Kingdom of Thailand and the Department of Industrial Works, 6-8 April 2017, Bangkok, Thailand

5th IIR International Conference on Thermophysical Properties and Transfer Processes of Refrigerant, 23-26 April 2017, Seoul, South Korea

7th Conference on Ammonia and CO_2 Refrigeration Technologies, 11-13 May 2017, Ohrid, Macedonia

12th Heat Pump Conference, 15-18 May 2017, Rotterdam, the Netherlands

ATMOsphere America 2017, 5-7 June 2017, San Diego, USA. Interactive workshops bringingtogether decision makers from industry and government to change the future of natural refrigerants.

ATMOsphere Asia 2017 taking place a day before the **Bangkok RHVAC trade show**, 7-9 September, which ranks among the world's best HVAC&R exhibitions and is the second largest in the Asia Pacific region.

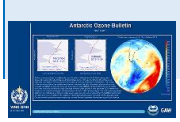
9th International Conference on Compressors and Coolants, 6-8 September 2017, Bratislava, Slovakia

Future of HVAC 2017 – 13–14 September 2017, Sydney, NSW, Australia

READING

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

UNEP and USEPA: Promoting ozone and climate-friendly technologies in public procurement - a scoping study of Asia Pacific



WMO Antarctic Ozone 2016 Bulletins - Containing information on the state of the ozone layer in the Antarctic at roughly two week intervals from August to November. The bulletins are based on data provided by WMO Members which operate ozone

monitoring stations in the southern hemisphere and satellites to observe ozone globally.

The EU F-Gas Regulation Handbook, Keeping Ahead of the Curve as Europe Phases Down HFCs - a free online resource for climate media and other concerned parties, published by the London-based Environmental Investigation Agency (EIA).

Alternative Refrigerant Evaluation for High-Ambient-Temperature Environments: R-22 and R-410A Alternatives for Mini-Split Air Conditioners

AREA Guidance on minimum requirements for contractors' training & certification on low GWP Refrigerants - AREA has updated its Guidance on minimum requirements for contractors' training & certification on low GWP Refrigerants.

Free guide to F-gas changes The European contractors association AREA has produced a timely guide to the F-gas regulations which clarifies the new rules, their impact and their practical application…Read more

The recent Alternatives to HCFCs/HFCs in developing countries with a focus on high ambient temperatures" study carried out by Öko-Recherche for the European Commission stresses that the refrigerant and blowing agent demand is expected to triple by 2030 in developing countries as a result of economic growth. A sector by sector analysis shows that a climate-friendly replacement for current and future of HCFCs and high GWP HFCs is possible in most applications …

Primer on Hydrofluorocarbons, Fast action under the Montreal Protocol can limit growth of HFCs, prevent up to 100 billion tonnes of CO_2-eq emissions by 2050, and avoid up to 0.5°C of warming by 2100. IGSD, January 2014, Lead authors: Durwood Zaelke, Nathan Borgford-Parnell, and Danielle Fest Grabiel. Contributing authors: Stephen O. Andersen, Xiaopu Sun, Dennis Clare, Yuzhe Peng Ling, and Alex Milgroom.

Flammable Refrigerants Safety Guide, AIRAH - Many of the refrigerants traditionally used in refrigeration and air conditioning systems in Australia have been non-flammable, non-toxic, synthetic greenhouse gases (SGGs) that have a high global warming potential (GWP). These were typically synthetic refrigerants including CFCs, HCFCs and HFCs. Due to the growing national and international concern regarding the resulting atmospheric effects of SGGs, the use of alternative low GWP refrigerants is increasing. …

Recent Trends in Global Emissions of Hydrochlorofluorocarbons and Hydrofluorocarbons: Reflecting on the 2007 Adjustments to the Montreal Protocol. S. A. Montzka *†, M. McFarland ‡, S. O. Andersen §, B. R. Miller †∥, D. W. Fahey †, B. D. Hall †, L. Hu †∥, C. Siso †∥, and J. W. Elkins †† Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Boulder, Colorado 80305, United States ‡ DuPont Chemicals & Fluoroproducts, Wilmington, Delaware 19805, United States § Institute for Governance & Sustainable Development, Washington, D.C. 20007, United States∥ Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, Colorado 80309, United States

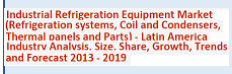
Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems- ASHRAE

A first edition, the IIR guide "CO_2 as a Refrigerant" highlights the application of carbon dioxide in supermarkets, industrial freezers, refrigerated transport, and cold stores as well as ice rinks, chillers, air conditioning systems, data centers and heat pumps. This guide is for design and development engineers needing instruction and inspiration as

well as non-technical experts seeking background information on a specific topic. Publication, IIR Technical Guide, 2014.

FREE HVAC Optimisation Guide released by AIRAH and the NSW Office of Environment & Heritage outlines 20 HVAC optimisation strategies and how they can be applied to the vast majority of commercial systems, both in older and modern buildings…

Organic Bromine Compounds—another threat to the ozone layer



Latin America Industrial Refrigeration Equipment Market Benefits from Region Flourishing Food and Beverage Production and Processing Market – Trends and forecast 2013-2019.

Solvents & Bio Solvents Market Outlook - Global Trends, Forecast, and Opportunity Assessment (2014-2022)

Chlorofluorocarbon Market: Global Industry Analysis and Forecast 2015 to 2021

Getting The World Off the Chemical Treadmill: A per capita convergence framework for an ambitious phase-down of HFCs under the Montreal Protocol, By: Umang Jalan, Research Associate, Climate Change Programme, Centre for Science and Environment

Global Market for Natural Refrigerants to Reach 1,408.20 Million by 2020, Growing at CAGR of 11.0% by 2020

MOPIA New 2016 Regulatory Compliance Guide summarizes regulatory controls (*Manitoba and Canada*) and provides some other useful links and references...

The Importance of Ambition in the 2016 HFC Phase-Down Agreement. Download the full report here

Update on the Illegal Trade in Ozone-Depleting Substances – The Environmental Investigation Agency (EIA) briefing to the 38th meeting of the Open-Ended Working Group of Parties to the Montreal Protocol, in Vienna, Austria, from July 18-21, 2016.

F-Gas Regulation shaking up the HVAC&R industry. Commissioned by the Greens in the European Parliament, the study provides qualitative and quantitative analysis of the early impacts of the EU F-Gas Regulation on the European industry and evaluates its influences on other countries and regions in designing their own policies to curb HFCs.

January Edition of Accelerate America! By shecco

"The Road to Competence in Future Green Technologies", the International Special Issue 2016-2017 of Centro Studi Galileo. Read/Download pdf version | E-book

The 2016 editions of ASHRAE's major refrigerants-related standards have been published as a package with 30 new refrigerants and refrigerant blends added.

Quest for climate-friendly refrigerants finds complicated choices, National Institute of Standards and Technology (NIST), 17 February 2017, Summary: Researchers have just completed a multiyear study to identify the 'best' candidates for future use as air conditioning refrigerants that will have the lowest impact on the climate.

The second issue of The Natural Voice magazine, entitled 'Mainstreaming Natural Refrigerants' showcases examples of installations using natural refrigerants around the world, including in the Gambia, Jordan, South Africa, China, Thailand, Tanzania and Saudi Arabia.

MISCELLANEOUS

UN knowledge platform launches live-tracking tools to review progress towards SDGs, UN Environment s dynamic online platform designed for sharing contextualized data...

New ***International Journal of Refrigeration*** service for IIR members - As of January 2017, not only will IIR members continue to receive the hard copy of the journal but IIR membership will now also give members access to the complete archives of the *International Journal of Refrigeration (IJR)* online. Designed with IIR members in mind, this new and practical electronic subscription gives members substantial advantages:

- Immediate and permanent access to the latest research and to IJR archive
- Access the latest articles as soon as they become available online.
- Browse, search and read each one of the nearly 4,500 papers since Volume 1, Issue 1.
- Unlimited access to seminal contributions to the field of refrigeration dating back to 1978.
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Enhanced content and functions

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

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

GIZ first Cool Training 2017 will take place from 27 March to 7 April 2017 in Maintal, Germany. This two-week Cool Training deals with the safe application of the natural refrigerants propane, CO_2, and ammonia. It is composed of 30% theoretical and 70% practical work. It is carried out in cooperation with the Bundesfachschule Kälte Klima Technik (BFS) in Maintal, an international vocational training center in Germany that specializes on cooling technologies. Participants are required to have extensive experience in the RAC field and the capability to act as a multiplier of the acquired knowledge in the training. Furthermore, the training requires that participants are physically fit and able to work in English.

The two-week training package is offered for 3200 EUR and includes the following: course fee, training materials, protective clothing, safety equipment, airport pick up, hotel accommodation (with breakfast), and lunch on training days (i.e. weekdays). Not included in this package are the following: international flights, per diem allowance (as applies per your regulations), and insurance.

Registration and reservation of slots are now ongoing and should be sent to Cool.training@giz.de along with the CV of the proposed participant. Please be reminded that qualified participants are accommodated on a first come first serve basis.

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

TRAINING AVAILABILITY - The UEE32211 Certificate III in Air-conditioning and Refrigeration is conducted at the APTC Suva Campus in Fiji.

COURSE DURATION - Course duration is 22 weeks full time including a 1 week mid semester break. Students will attend classes for a minimum of 5 days per week. Training will be delivered face to face. Training will be delivered in English incorporating language, literacy and numeracy (LLN) support and a work skills facilitation program. Additional out-of-hours study time will be required.

ENTRY REQUIREMENTS - Applicants must be a citizen of a Pacific Island Forum country. Individuals are required to have a minimum equivalent of one year full time recent industry experience and hold a relevant local qualification. Applicants will be asked to complete the Literacy and Numeracy Assessment and Vocational Knowledge Assessment. Applicants may apply for recognition of prior learning. For further information visit: http://www.aptc.edu.au/index.php/recognition of-prior-learning.

COURSE FEE - The course fee is FJD 3,500. The fee includes personal protective equipment, stationery and uniform. The Australian Government subsidises the cost of the course including materials and consumables. Course fees are subject to change without prior notification.

For current fees visit: http://www.aptc.edu.au/index.php/course-fees

**Courses offered, course dates and fees may vary depending upon student and industry demand*.

The recently launched new ASHRAE Technology Portal gives ASHRAE members an easy, fast method of connecting to the latest information generated by ASHRAE's research program. It serves a central body of knowledge for ASHRAE technology and research products. It provides access to more than 1,700 Journal articles published since 1997 and more than 600 final reports from ASHRAE research projects.

1st Meeting of the Intersessional Process for Considering the Strategic Approach to International Chemicals Management (SAICM) and the Sound Management of Chemicals and Waste Beyond 2020

The Montreal Protocol Who's who

See the latest nominations /

Nominate Ozone Layer Protection Champion

From Your Country /Region >>

http://www.unep.fr/ozonaction/montrealprotocolwhoswho

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

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