



October 2009

International Institute of Refrigeration
Institut International du Froid

Editorial

Since the beginning of the year, the Focus section of the Newsletter has dealt with environmental measures in general and measures addressing HFCs (hydrofluorocarbons) in particular that have already been adopted or are foreseen in various countries and at UN level.

All of our information points to the same issue: decisions are imminent. The next meeting of the Parties to the Montreal Protocol (Port Ghalib, Egypt, November 2009) and the next meeting of the UN Framework Convention on Climate Change (Copenhagen, Denmark, December 2009) is likely to confirm this. The IIR, in its capacity as an intergovernmental organization, will actively participate and will keep you informed.

This issue presents (see "Regulations-Standardization" section) various national implemented or imminent measures in particular. These measures are designed to control, tax or ban HFCs completely or in certain sectors. However, a new American (Canada, USA, Mexico) proposal has emerged and will be presented in Port Ghalib and Copenhagen. This proposal embodies a gradual phase-down in the production and use of HFCs with 2033 as end-point. This proposal is similar to that proposed by Mauritius and Micronesia in July, but is less restrictive. Even if these proposals are not adopted within the framework of the United Nations, they clearly demonstrate that whatever the arguments, whatever the current stances of various countries, it will be necessary, in the near future, to greatly restrict the amount of new equipment running on HFCs in a manner similar to that adopted for HCFCs.

Of course, energy efficiency and cost issues are also very important, and the IIR monitors these issues closely. However, it is vital to be ready for regulations on HFCs and we will assist you.

Didier Coulomb
Director of the IIR



IIR focus

IIR Working Parties

■ The IIR has 10 commissions: Cryophysics, cryoengineering (A1); Liquefaction and separation of gases (A2); Thermodynamics and transfer processes (B1); Refrigerating equipment (B2); Cryobiology, cryomedicine (C1); Food science and engineering (C2); Refrigerated storage (D1); Refrigerated transport (D2); Air conditioning (E1) and Heat pumps, energy recovery (E2). Each commission comprises about 50 members, all nominated by member countries. In order to give more flexibility and adaptability to our scientific and technical work, the IIR operates Working Parties (WPs). WPs are open to our members; they are more focused and can be transversal within the 10 commissions. They can be set up or stopped at any time. There are currently 11 WPs: Cold chain for pharmaceutical products; Refrigerant charge reduction in refrigerating systems; Energy labelling in the cold chain; Preservation of genetic resources; Cold chain optimization; Cold chain in warm countries; Magnetic cooling; Mitigation of emissions of greenhouse gases in refrigeration; Phase-change materials for refrigeration and air conditioning; Data and models

for refrigeration and freezing foods; Refrigerant system safety.

Many of them organize IIR conferences and workshops; some of them need to collect data and recruit members in various fields. Some recent news:

- The first meeting of the WP Energy labelling in the cold chain will take place during the IIR Conference Sustainability and the Cold Chain in Cambridge, UK, March 29-31, 2010. Please attend this important Conference and, if you are concerned by this subject, which is moving fast, please contact the President (G. Cortella: giovanni.cortella@uniud.it) and attend this meeting if you are already an IIR member. If not, it could be a good occasion to become a member.

- Preservation of genetic resources. A President (F. Engelmann) was nominated. We are looking for new members. Please contact us if you are active in this field.

- Cold chain in warm countries: we need more actions in these countries. Please contact the President of the WP (A. Chikouche: achikouche2003@yahoo.fr) or us if you would like to cooperate.

- Mitigation of emissions of greenhouse gases in refrigeration: we are collecting data in

Nous avons consacré les différents « Focus » de la Newsletter, depuis le début de l'année, aux mesures prises ou prévisibles dans différents pays et au niveau des Nations-Unies, dans le domaine de l'environnement et plus particulièrement des hydrofluorocarbures (HFC).

Toutes nos informations vont dans le même sens : des décisions sont proches. La prochaine réunion des Parties au Protocole de Montréal (Port Ghalib, Egypte, novembre 2009) et la prochaine conférence des Parties sur les changements climatiques (Copenhague, Danemark, décembre 2009) devraient le confirmer. En tant qu'organisation intergouvernementale, l'IIR y participera activement et vous tiendra informé.

Ce numéro vous présente (voir rubrique Regulations-Standardization) diverses mesures nationales – déjà prises ou en voie de l'être – pour contrôler, taxer ou interdire les HFC, de façon générale ou dans certains secteurs. Mais il faut aussi noter la nouvelle position américai-

ne (Canada, Etats-Unis, Mexique) qui sera présentée à Port Ghalib et à Copenhague et qui propose d'instituer un schéma de diminution progressive des production et consommation de HFC, d'ici 2033, moins contraignant mais analogue à celui proposé en juillet par l'île Maurice et la Micronésie. Même si ces dispositions ne sont pas adoptées dans le cadre des Nations-Unies, elles montrent bien que, quels que soient les arguments, quelles que soient les positions actuelles de tel ou tel pays, il faudra, dans un proche avenir, limiter fortement les nouveaux équipements fonctionnant aux HFC, comme on l'a fait pour les HCFC.

Bien sûr, les questions de l'efficacité énergétique et des coûts sont également très importantes et l'IIF les suit tout aussi attentivement. Mais il faut résolument anticiper les réglementations sur les HFC. Nous vous y aiderons.

Didier Coulomb
Directeur de l'IIF

cooperation with the Institute of Refrigeration (UK). Many new regulations will be implemented in this area and we need to base them on correct data. Do not hesitate to contact us.

- Refrigerant system safety: we are collecting data on accidents related to the use of various refrigerants. If you have data in your company or in your organization, please contact us. All these WPs are active, thanks to the work

of their members. You can join them, in order to contribute to better global policy and to enrich your own knowledge. Become a member of the IIR: you will be part of a lively and well-known network.

IIR events

International events

■ **The 7th IIR International Conference on Compressors and Coolants** took place in Casta Papiernicka (Slovakia) on September 30-October 2, 2009. This IIR conference focused on the performances of compressors and the future of refrigerants (threats to HFCs...).

■ **Andorra**, followed by Timor-Leste, ratified the Montreal Protocol. All UN countries have now ratified it. Andorra organized a celebration and a meeting with private companies in the refrigeration and air conditioning sector on September 16-17, 2009. Didier Coulomb was invited to present the IIR and policy to implement on refrigerants and energy issues.

■ **Transfrigoroute International (TI)** held its annual General Assembly in Brussels, Belgium, on September 17-18, 2009. The director of the IIR attended it, thanks to the IIR-TI partnership agreement.

Conference update

■ **Constant Progress in Cryomedicine** will take place in Tokyo on November 27-29, 2009. For full information on this 36th Annual Meeting of the Japan Society for Low Temperature Medicine, consult <http://homepage2.nifty.com/cryomedicine>

■ **The 2010 International Symposium on Next-generation Air Conditioning and Refrigeration Technology** to be held in Tokyo on February 17-19 aims to facilitate vigorous discussions on existing technologies, market trends and technological perspectives of various refrigerants among domestic and international researchers and engineers who are involved in the development of next-generation refrigerants and heat pump systems. ondanka@nedo.go.jp
<http://2010nextacr.com/>

■ **The 40th International Conference on Heating, Air Conditioning and Refrigeration** to be held on December 2-4, 2009 in Belgrade, Serbia, will cover sustainable systems; low-energy and zero-energy buildings and HVAC&R systems; low-temperature heating, high-temperature cooling; energy certification of new buildings and energy improvement of existing buildings; renewable energy sources; natural ventilation and air distribution; district heating and cooling systems; cogeneration and trigeneration; cooling systems; indoor air quality and comfort.

www.kgh-kongres.org/content/view/108/105/lang,english
office@kgh-kongres.org



■ **The 1st IIR Conference on Sustainability and the Cold Chain** will take place on March 29-31, 2010 in Cambridge, UK. Present a paper, check out pre-registration and keep updated on themes and short courses:

www.ior.org.uk/ior_general.php?r=2BEYI4EPAE
Miriam@ior.org.uk



■ Don't miss the **9th IIR-Gustav Lorentzen Conference on Natural Working Fluids (GL2010)** to be held in Sydney, Australia, on April 12-14, 2010. Present a paper and check out the preliminary programme:

www.airah.org.au david@airah.org.au

New IIR publications



■ The French version of the IIR guide *Saving Energy in Refrigeration, Air-Conditioning and Heat-Pump Technology* will be published in November 2009; the goal of this guide is to provide practical ways of minimizing the energy consumption of refrigerating systems. These solutions apply to the design, operation and maintenance of the various components (compressors, condensers, evaporators, expansion devices, etc.) and take refrigerant selection into account. Several practical cases of highly energy-efficient systems are presented as well as an extensive bibliography. Order: www.iifiir.org

■ A completely revised version of **the IIR Guide to Refrigerated Transport** will be published late 2009. The purpose of this book prepared by Robert Heap and other IIR experts is to provide all necessary basic information on the transport of perishable foodstuffs, regardless of the mode of transport - land (road and rail), sea or air. Keep informed and order: www.iifiir.org

■ A new **Publications Catalogue 2009-2010** has been published and will be disseminated during conferences and shows. You can also select and order books on line: www.iifiir.org

Obituary

Prof. A. H. C. van Paassen, Emeritus Professor in the section Energy Technology at the Faculty Design, Construction and Production of the Delft University of Technology (The Netherlands), died on June

30, 2009, at the age of 68. He taught courses and coached graduate students in the indoor climate technology field. Besides his research activities, he was Director of the consultancy firm Klima Delft. He was an active member of IIR Commission E1.

Prof. Dr Helmut Knapp, Honorary Member of the IIR and former President of IIR Commission A3 (Liquefaction and Separation of Gases) from 1979 to 1987, died at the age of 86.

The IIR extends its sympathy to the families of Prof. van Paassen and Prof. Knapp.

New IIR members

The IIR welcomes the following new members:

Corporate members

SB Alliance, Viroflay, France
Soko Inzinjering, Krnjesevci, Serbia

Private members

Mr Vincent Fargant, France
Mr David Limb, Canada
Mr Jianghong Wu, China

Junior members

Mr Snorre Brekke-Bu, Norway
Dr Napoleon Enteria, Japan
Mr Fabien Haget, France
Dr Henelyta Ribeiro, United Kingdom
Mr Youssef Srhir, Morocco

News from IIR members



■ **Alfa Laval** is providing solutions for the fast-expanding CO₂ market and has launched two new brazed heat exchanger models designed for transcritical CO₂ systems for transport refrigeration, commercial refrigeration and heat-pump applications. The new models, called AXP 10 and AXP 14, are designed to withstand pressures of over 140 bar and are compact. www.R744.com

■ **The Air Conditioning and Heat Pump Institute (ACHPI)**, was launched in the UK in September 2009. This new specialist group within the UK Institute of Refrigeration (IOR) has been set up to assist all those who install, service or maintain air-conditioning and heat-pump equipment. Thanks to manufacturers' support services and the IOR's experience, ACHPI provides updates on news and legislation and standards, and broadens practical knowledge and develops skills. Find out more: www.ior.org.uk

■ **ARTI**, the research arm of AHRI (the Air-Conditioning, Heating and Refrigeration Institute), has contracted with a consulting firm in order to review the regulatory barriers and issues concerning low-GWP refrigerants including CO₂, ammonia and hydrocarbons, in the US, Europe and Japan. Find out more: www.ahrinet.org

In the news

Markets and figures

■ The heat pump market is growing fast, especially in Europe and in Asia:

- In **Europe**, a recent report from Frost & Sullivan found that the heat pump market – covering commercial, residential, public and industrial applications – earned over € 2.94 billion in 2008 and estimates this to reach € 5.19 billion in 2015. The market received a boost in December 2008 with the passing of the “20-20-20” climate package by the European Parliament: by 2020, the European Union commits itself to cut greenhouse gas emissions by at least 20% below 1990 levels, produce 20% of its energy from renewable sources and increase energy efficiency by 20%. The short-term implication of this is an increased number of incentives for the use of heat pumps in many EU countries: in Germany, heat pumps are subsidized up to 3000 €; in Denmark, air-water heat pumps are subsidized about 1135 € and water-water heat pumps are subsidized about 2000 € under certain conditions; tax incentives have also been implemented in France (see *Newsletter of the IIR* No. 39); R-407C and R-410A (HFCs) are usually used as refrigerants in Europe.

- In **China**, JARN reports that the Chinese market for heat pump water heaters reached about RMB 1.3 billion in 2008 (about € 130 million) while for 2009 the market is expected to reach RMB 1.5 billion (€ 150 million) to be compared with just RMB 360 million in 2005 (€ 36 million). Although there are no incentives for such equipment at a national level, some local governments provide financial support. In China, the leading refrigerant is HCFC-22.

- In **Japan**, EcoCute heat pumps water heaters using CO₂ as refrigerant – which benefit from a government subsidy – have enjoyed rapid market gains in the residential market: over 500 000 units were shipped in 2008 (up 21% over 2007).

www.frost.com www.R744.com JARN August 25, 2009/2009

■ Figures: Australia

- According to *EcoLibrium*, no less than 29 million air-conditioning and refrigeration devices are used in Australia, which represents 1.33 devices per inhabitant and 45 000 GWh of electricity, i.e. 22% of national consumption; 40 Mt CO₂e are emitted indirectly and 4.5 Mt CO₂e are released directly through refrigerant leaks, which overall represents 7% of the country's greenhouse gas emissions.

Supermarkets are the largest emitters in the refrigeration sector due to significant refrigerant leak rates and account for up to 4% of national electricity usage. Because of these leaks, the compressor of a refrigeration plant has to run longer to achieve the pull-down of temperature, which means more indirect greenhouse gas emissions. The more leaks, the less efficient is the plant. As 1300 g of CO₂ are necessary to produce 1 kWh of electricity in Victoria and less in other states, a 700 kW_r refrigeration running 10% less efficiently than it should, 12 hours per day, would

emit in excess of 1.338 tons of CO₂ annually. *EcoLibrium*, July 2009

■ India: cold storage shortage

A recent report by KPMG and the Associated Chambers of Commerce and Industry of India (ASSOCHAM) points out the massive shortfall in cold storage facilities for India's agricultural produce by more than 10 million tons: only about 21.7 million tons of such facilities are available against the requirement of over 31 million tons, resulting in 40% of agricultural produce being lost post-harvesting. This ratio is in line with the average ratio (40%) assessed for developing countries in the IIR's recent IIR Informatory Note on Worldwide Nutrition (www.iifir.org). The report emphasizes that cold storage facilities now available are mostly for single commodity produce including potatoes, oranges, apples, grapes, pomegranates and flowers, which results in poor capacity utilization and stresses the need for setting up operating cold chain facilities for other specific products.

www.acr-news.com/news/print.asp?id=1661

Briefs

■ MAC news

Following a request of the European Automobile Manufacturer's Association for a 2-year delay, European Industry Commissioner G. Verheugen has confirmed that from January 1, 2011, no new EU type approvals for passenger cars and light-commercial vehicles can be granted if the installed mobile air-conditioning (MAC) unit is built to contain refrigerants with a GWP value over 150. As a result, R-134a can clearly no longer be used in such vehicles after that date. Regarding the 2 main alternative refrigerants competing to replace R-134a – CO₂ and HFO-1234yf – new information is available. In August 2009, the Japan government decided that HFO-1234yf can be imported into Japan without volume or use restrictions and that no special controls or monitoring are required. Moreover, the President of the German Association of the Automotive Industry (VDA) which has until now backed CO₂ as the natural alternative declared “We need agreement on a worldwide standard to maintain the competitiveness of the European industry. Separate individual solutions are not an option”.

www.R744.com www.honeywell.com www.acr-news.com

■ Doubt on the air quality in airplanes

The Committee on Toxicity, an independent group of experts consulted by the British government estimated that 1% of all daily passenger air flights were affected by smoke incidents in the cabin, and airlines acknowledge 0.05% in the United States alone, this represents 280 and 14 flights a day.

In most airplane air-conditioning systems, outdoor air is mixed with cabin air after passing through the compressors and engines. When oil leaks occur, incoming air may contain harmful substances such as tricresyl phosphate, despite filters which are relatively inefficient against such substances. This can even sometimes lead to emergency landings, such as on July 30 during an Air France Airbus flight from

Paris to Douala (Cameroon). However, confirming the existence of such risks is difficult, because of the lack of sensors. ASHRAE published the main study on the issue and recommends using sensors and launching new standards.

Most criticism concerns air renewal in the cabin. Since the early 1990s, only half the inside air has an external source, the rest having been recycled, in order to save fuel. Such new systems are claimed to make some passengers unwell. According to a recent Harvard study, the CO₂ levels has doubled and the dryness of the air may cause phlebitis, a potential source of pulmonary embolism or even heart failure. *Le Monde*, August 2-3, 2009

■ Middle East: DuPont expresses anger over counterfeit R22 and R134a refrigerants

DuPont has set up a task force to help local authorities deal with refrigerant counterfeits in the Middle East, it claims are potentially harmful. Pascal Faigy, business manager at DuPont Fluorochemical Refrigerants, claims they were dangerous for those working directly with the refrigerant and contained ozone-depleting substances such as R12 and therefore did not comply with the CFC phase-out, the deadline for which is 2009 in the region. They also witnessed cases of some of them damaging components in air-conditioning systems. Many of the counterfeit refrigerants are believed to emanate from certain Asian countries and are destined for the Middle East, due to the region's high demand for R22 and R134a for air-conditioning systems. www.ACR-news.com

■ Financial benefits of frozen food highlighted

A study commissioned by the British Frozen Food Federation (BFFF) and conducted by the Manchester Food Research Centre concluded that it was more cost-effective for foodservice establishments to buy prepared frozen alternatives, rather than to manufacture identical dishes on site. In nearly all cases during the research, dishes made to duplicate recipe from scratch cost more than 24% more than their frozen counterparts. This figure rose to 66% with more labour-intensive dishes which involved a high skill level. Based on these results, BFFF estimates that frozen food could save the UK foodservice industry millions of pounds a year.

www.bfff.co.uk/sites/default/files/Final_report_220609.pdf

■ Russia

The 8th International Specialized Exhibition Cryogen-Expo will be held on November 10-12, 2009 by the Exhibition Company Mir-Expo and under the auspices of the IIR, the International Academy of Refrigeration and the Ukrainian Association of Industrial Gases Manufacturers, UA-SIGMA.

www.cryogen-expo.com/



■ The Vth Spanish Congress and IIIrd Ibero-American Congress on Refrigeration Science and Technology - CYTEF 2009

were held on September 23-25, 2009 at the University Jaume I of Castellon, Spain. 120 researchers from 12 countries took part. 85 research papers were presented and

covered a wide range of refrigeration issues. These events are organized by the Spanish Society of Refrigeration Science and Technology (SECYTEF). The next event in the series will take place in early 2011 at the Technical University of Madrid. The full papers presented at five Congresses spanning 2002-2009 are available in the form of *Advances in Refrigeration Science and Technology*, Volumes 1-5. The papers are mostly in Spanish but some are in Portuguese and a few are in English or French.

Contact antonio.lopez@upct.es.

Africa

■ First Ozone village in Africa

The Nigerian government announced in August 2009 that it intends to build a revolutionary ozone village in Ogun State. The project will feature locally manufactured prototype ozone-friendly systems, CFC recovery and recycling, and hydrocarbon refrigerant production. A major aim is to prepare for HCFC restrictions beginning on January 1, 2013 by finding alternative refrigerants. www.unep.org/ozonAction/information/mmcfiles/6288-e-firstO3villageAfrica.PR.pdf

■ A project to replace CFC chillers in Africa

A new UN Industrial Development Organisation (UNIDO) and French Global Environment Facility (FFEM) joint project aims at replacing chillers in several African countries. A survey conducted in Cameroon, Egypt, Namibia, Senegal and Sudan, identified a total of 340 chillers that use CFCs as a refrigerant. Over 85% of these chillers were located in Egypt and Nigeria. Replacing them with new 40%-more efficient chillers will lead to an indirect emissions reduction of some 462 400 tonnes of CO₂e annually and a direct phase-out of around 80 tonnes of CFCs required for servicing the chillers annually. The agreement will implement an innovative and commercially viable strategy and help remove relevant barriers. It also includes the transfer of green technology, the creation of a working fund mechanism, the management of CFC stockpiles and an awareness raising campaign. www.unido.org

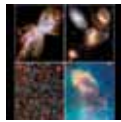
News from the space



■ Ammonia air conditioning for International Space Station

Astronauts from the spaceshuttle Discovery completed a 6-hour spacewalk outside the International Space Station in September 2009, installing a new ammonia refrigerant tank. They removed an 816 kg ammonia tank from a cargo carrier attached to the station and moved it with a robotic arm to its home outside the station. The tank was the largest item ever moved by astronauts during a spacewalk.

www.ammonia21.com



■ Following repairs to its cooling system, NASA's Hubble Space Telescope is back in business, uncovering new worlds, peering deeper into space, and mapping the invisible backbone of the universe. The first images from the refurbished Hubble showcase the 19-year-old telescope's new vision. Exciting new views include multi-wavelength pictures of far-flung galaxies, a densely packed star cluster, a "pillar of creation," and a "butterfly" nebula. View new exciting images and a video: <http://hubblesite.org/newscenter/archive/releases>

Out of the ordinary



■ **Ötzi's last days** are turning into a 5000-year-old murder case. New investigations by researchers have established the chronology of the injuries that Ötzi, the glacier man preserved as a frozen mummy, sustained in his last days. It has now been demonstrated that Ötzi only survived the arrow wound in his back for a very short time – a few minutes to a number of hours – and also received a blow to the back with a blunt object just before his death. In contrast, the cut wound on his hand is a few days older. Ötzi, the man from the Neolithic Age, is the oldest ice mummy ever found and is providing information about life more than 5000 years ago.

www.sciencedaily.com/releases/2009/01/090128074826.htm

Technology

Energie savings in display cabinets

■ Several new developments make it possible to save energy in display cabinets.

- Optimizing air curtain velocity

A team at the Air Curtain Research Laboratory at Kettering University in Michigan, US, has modelled the air flow in air curtains and air infiltrations behind them. The team discovered that the velocity of cold air sent into the cabinet could be reduced while raising the temperature of the air curtain. It was also shown that infiltration of warm air into the air cabinet could be maintained while lowering the velocity in the air curtain from 30 m/min down to an optimal 22 m/min. Decreased velocity surprisingly resulted in food being one degree colder as the cold air was distributed more evenly. Warm air infiltration was also reduced by 12%. Infiltration – which represents 83% of the cooling load – was reduced by 12% and power consumption by 13%. *CCN World News*, July 2009

- Automatic shutters

ISA, a British cabinet specialist, is launching a multi-deck cabinet range with an innovative shutter device allowing for 35-40% savings over existing designs. The transparent shutter opens automatically when a customer approaches the cabinet and is activated by a movement sensor ("In-Touch") on the top of the canopy. A further sensor detects any

resistance against the shutter as it closes, in case a product has been left blocking the shutter for instance. In-Touch technology has been shortlisted as a finalist in the Cooling Industry Awards 2009. *RAC*, June 2009

- Light Emitting Diodes

LEDs are one of the most efficient and cost-effective sources of lights with fluorescent lamps (TL), but unlike the latter, they become more efficient at low temperatures, which makes them ideal candidates for freezer display cabinets. Less heat emissions from the light source result in additional energy saving in cooling: a 1 W reduction in input power of the light source will result in between 2.5 W and 4 W reduction in total power on average. Clients such as Sainsbury's have been realizing up to 70% energy savings on their frozen cabinet estate with a specific LED freezer module. *RAC*, June 2009

MAC developments

■ While in the mobile air-conditioning (MAC) sector, R&D is focusing on alternative refrigerants to R134a (see "In the news" below), some other research projects or achievements are noteworthy:

- The National Renewable Energy Laboratory in Colorado, US, will test an alternative MAC system that uses thermoelectrics. Basically, semiconductors that produce a hot and cold side when an electrical current is passed through them would be placed throughout the car. The biggest obstacle will be the scarcity of the material – bismuth telluride – that is used to manufacture the modules. Beyond the re-engineering of MAC systems, the NREL is looking at other ways to reduce air-conditioning use, including the use of solar-reflective glass and paint that can lower the interior temperature by 35%. The NREL will partner with Ford which was recently awarded USD 4.2 million by the US Energy Department to improve MAC efficiency and develop a thermoelectric air-conditioning system.

- Sentience Research, UK, has developed an Enhanced Air-Conditioning (EAC) control system for hybrid cars using Internet-enabled mobile communications, GPS and other available real-time navigational technologies to predict when the vehicle is likely to need to stop and even on-line monitoring for traffic jams. The EAC control system is able to pre-cool the cabin slightly, immediately prior to the vehicle stopping, so that the hybrid engine can be switched off as part of its stop-start functionality. For UK summer conditions, the tests indicate that a fuel saving of 9% is achieved by ECA.

- The world's lightest bus air-conditioning unit developed by **Konvekta**, Germany, was delivered starting in August 2009 to well-known European manufacturers. The "UL" (Ultra Light) unit allows 30% weight savings (60-75 kg compared with traditional systems) thanks use of a new durable construction material able to integrate all necessary components while ensuring a robust and safe installation on all bus types. From 2010, the air-conditioning units will also be available with CO₂ as a refrigerant.

www.nrel.gov *Climate Control News*, August 2009
www.konvekta.de/Konvekta-News.812.0.html?&L=1

Briefs

■ Ice slurries, heart attack victims and surgery patients

In cardiac arrest victims, without fresh oxygen from blood pumped through the body, brain cells start to die in just minutes. Within 10-20 minutes after the heart stops beating, even if doctors can get the heart beating again, the brain has died. Surgeons at the **University of Chicago Medical Center** and researchers at the U.S. Department of Energy's **Argonne National Laboratory** are developing a new technique using an ice slurry technology to reduce the brain and other organs' demand for oxygen, giving doctors extra time to diagnose and treat critical patients in emergencies. Argonne researchers have designed and patented the equipment used to produce ice slurry used to quickly chill the targeted organ. This cooling reduces an organ's need for oxygen, thus slowing the rate at which cells asphyxiate.

Recently, Kasza and colleagues Yue Wu, Adrian Tentner, and Paul Fischer have teamed up with University of Chicago surgeons under BIA-SE, to further develop and demonstrate the use of ice slurries for protective cooling during several types of surgical applications for ice slurry cooling: minimally invasive laparoscopic kidney surgery; cardiovascular surgery; and surgery that would otherwise risk neurological damage. Researchers are also working on ways of using slurry to stabilize soldiers who sustain severe injuries on the battlefield. Since troops in battle lack access to immediate and sophisticated medical care, these casualties have up until now been almost universally fatal. Many medical researchers believe that by chilling the body's core to just a few degrees above freezing, doctors can keep patients in temporary stasis until they can receive the necessary medical intervention. In order to more efficiently and safely introduce the slurry into a patient's body for a given application, researchers have begun to use 3-dimensional models and computer simulation to analyse the thermal interaction between slurry and tissue.

www.uchicago.edu/research/2008/11/12_slurry.shtml#

■ As part of the European programme Solera, CEA LITEN researchers recently set up a 4.5-kW **solar air-conditioning prototype** in the facilities of the INES (French National Institute of Solar Energy) in Chambéry in the French Alps, where the system will be tested for two years. This technology – which is designed for residential and small-scale commercial applications – uses solar collectors to provide heat, which is then provided to an absorption system. This system uses boiling to dissociate a water and lithium bromide solution, allowing the refrigerant (water) to pass from low to high pressure. The cooling distribution system is similar to that of a conventional air conditioner. Extra heat produced by the system is removed to the ground using geothermal probes. For greater simplicity, all the system components (solar combisystems, solar collectors, energy-efficient fan coil units, etc.) are off-the-shelf components. This clean, efficient solution reduces

power consumption; what's more, the system is reversible and can supply heat in the winter. www.cea-technologies.com

■ Double-effect trigeneration for energy savings in French space centre

The Centre Spatial de Toulouse, which is part of the French Centre National d'Etudes Spatiales is now equipped with a large-scale trigeneration plant. The Centre comprises 60 buildings and employs 2500 employees and until 2002 also had a huge power bill. The site has major cooling requirements because of its powerful computers and purchased a trigeneration plant in 2001. Natural gas powers the heat engines generating electricity. Heat is then recovered on the cooling circuit for water heating, then further heat recovery from the exhaust fumes feeds cooling system providing water at 6°C. The "double effect" consists in a dual heat exchange an absorption cooling system level, providing high-performance cooling. The energy initially consumed is upgraded to up to 80%. The plant will avoid consuming 70 000 MWh of energy and emitting 19 000 tonnes CO₂e over a 12-year period. Its initial cost was 3.85 M € but will save 668 000 € annually and thanks to subsidies from ADEME and regional authorities, the return on investment will be achieved within a five-year period. www.ademe.fr

■ CERN: LHC relaunch

CERN's **Large Hadron Collider (LHC)** will initially run at an energy of 3.5 TeV per beam when it starts up in November this year. All tests on the machine's high-current electrical connections have now been completed and demonstrate that no further repairs are necessary for safe running. Following the incident of September 19, 2008 that brought the LHC to a standstill, testing has focused on the 10 000 high-current superconducting electrical connections like the one that led to the fault. At the end of 2010, the LHC will be run with lead ions for the first time. After that, the LHC will shut down and work will begin on moving the machine towards 7 TeV per beam. For updates from CERN (the European Organization for Nuclear Research), consult cern.ch/bulletin and twitter.com/cern and youtube.com/cern

■ Swiss supermarket chain COOP chooses CO₂

COOP has implemented CO₂ as refrigerant of choice for low- and medium-temperature applications and aims at becoming CO₂ neutral by 2023. The first supermarket has been equipped with a CO₂ booster system engineered by Frigo-Consulting AG. A central system cools the 90 m of display cabinets as well as walk-in-coolers, for the low- and medium-temperature ranges. With traditional refrigerants the supermarket was using direct CO₂ equivalent emissions from leakage of 30 000 kg/year occurred. The new system reduces direct emissions to a mere 30 kg/year. Moreover, the savings from indirect emissions and reduced energy consumption spare the environment another 15 000 kg of CO₂e/year. The company will save over 100 000 kWh/year, equal to the annual consumption of 20 Swiss households. ww.r744.com

Regulations-Standardization

HFC news

■ A joint North American proposal from **the United States, Canada and Mexico**, supplementing the Mauritius and Micronesia proposal (see Newsletter of the IIR No. 39), will be considered as an amendment to the Montreal Protocol during the next UN meeting of the Parties in Port Ghalib, Egypt, in November 2009. The key elements of this proposal are:

. specification of 20 HFCs as a new Annex F to the Protocol;

. phase-down – rather than phase-out – of production and consumption: Parties to the Protocol will be required to achieve a final phase-down plateau of production and consumption of 15% of the baseline by 2033 for developed countries and by 2043 for developing countries. The phase-down will start in 2013 in developed countries and 2016 in developing countries, while the baseline will be calculated as the average of 2004-2006 annual production and consumption of HCFCs and HFCs. This proposal would leave unchanged the provisions of the Kyoto Protocol that currently governs HFCs.

http://ozone.unep.org/Meeting_Documents/mop/21mop/USA-HFC%20Submission%20Summary.doc

- The **Swedish** Ministry of Finance has published a proposal on introducing a tax on HFCs which is expected to decrease emissions by around 0.1 million tonnes of CO₂e by 2020. The tax rates would be based on each respective HFC compound's GWP; in concrete, this would translate into a tax of 287 Krona (about 28 €) per kg in the case of R-134a. The total emissions of fluorinated greenhouse gases ("F-gases") have increased from about 0.5 million tonnes of CO₂ equivalents in 1990 to around 1.2 million tonnes in 2007 and are expected to decrease to around 0.4 million tonnes in 2020 without a tax (mainly due to the EU "F-gases" Directive). The proposed tax is complemented by a premium to be paid when HFCs are delivered for destruction. This proposal – based on an evaluation of the existing Danish and Norwegian taxes on F-gases – is expected to enter into force on July 1, 2010.

www.regeringen.se/content/1/c6/12/89/80/c7d0b072.pdf

- A motion for introducing the "Hydrocarbons Limitation Bill 2008-09" was presented this summer in the **UK** House of Commons by Labour MP C. Efford. The Bill seeks to make provisions for limiting the use of HFCs in certain premises. More specifically, it will end the use of HFCs in the refrigeration units of large supermarkets. Efford argues that the phasing out of HFC use in supermarkets by 2015 has the potential to save 175 million CO₂e by 2050, which is more than one quarter of the UK's current annual greenhouse gas emissions. The Bill still must pass several stages in both the House of Commons and the House of Lords to become an Act.

www.R744.com

IIR Agenda

IIR conferences

March 29-31	Cambridge United Kingdom	1st IIR Conference on Sustainability and the Cold Chain Miriam Rodway: Miriam@ior.org.uk Fax: +44 020 8773 0165- http://www.icccuk2010.com	IIR Conference C2, D1, D2
April 12-14	Sydney Australia	9th IIR-Gustav Lorentzen Conference on Natural Working Fluids (GL2010) David Leach: david@airah.org.au Fax: +61 3 9614 8949 - www.airah.org.au	IIR Congress B1, B2 with E1, E2
April 26-29	Bratislava Slovak Republic	Cryogenics 2010 Romana Kocova: Romana@icaris.cz Vaclav Chrz: Vaclav.Chrz@chart-ind.com Fax: +420 266 312 113 http://www.icaris.cz/conf/Cryogenics2010	IIR Conference A1, A2, C1
June 16-17	Stockholm Sweden	2nd IIR Workshop on Refrigerant Charge Reduction in Refrigerating Systems Björn Palm: iir.rcr.2010@gmail.com Hélène Macchi Tejeda: helene.macchi@cemagref.fr Fax: +420 266 312 113 http://www.imst.upv.es/iir-rcr2010	IIR Workshop B1, B2, D1, D2, E1, E2
August 23-27	Baotou China	4th International Conference on Magnetic Refrigeration at Room Temperature (Thermag IV) Organizers: thermag4@brire.com Organizers: huangjh@brire.com Fax: +86 472 5152008 - http://www.brire.com	IIR Conference A1, A2, C1

April 14-16	Ohrd Macedonia (FYROM)	Ammonia Refrigeration Technology Prof. Risto Ciconkov: ristoci@ukim.edu.mk http://www.mf.edu.mk	IIR Conference B1, B2, D1
August 21-26	Prague Czech Republic	23rd IIR International Congress of Refrigeration: Refrigeration for Sustainable Development Ladislav Cervinka: icaris@icaris.cz http://www.icr2011.org	IIR Congress All Commissions

Briefs

■ The December 31, 2009 deadline for the phase-out of HCFCs is expected to generate important problems in many countries:

- **In the US**, no HCFC-22 can be produced or imported for use in refrigerating equipment manufactured after December 31, 2009. Based upon the latest EPA demand projection and recent proposed allowance rule, in 2010, the refrigeration industry will face a 20% HCFC-22 shortfall. Based on EPA allocation draft to set HCFC limits to meet more stringent phase-down caps under Montreal Protocol in 2007, 2010 allowed supply is estimated at about 50 000 tonnes while service demand is estimated at about 62 000 tonnes. www2.dupont.com/Refrigerants/en_US/assets/downloads/k15798_r22_out-look.pdf

- **In Europe**, use of virgin HCFC in refrigerating plants will be banned as of January 1, 2010 in application of EU Regulation 2037/2000. During a recent round table of refrigeration stakeholders organized by UK RAC Magazine, general lack of awareness or reluctance from companies to invest in new systems and non-decreasing demand for virgin HCFC-22 demand were considered as major causes of concern. Participants were especially concerned about people stockpiling virgin HCFC-22. Mel Bridges, from IDS Refrigeration, argues that in the UK, "the current amount available for reclaim is 200

tonnes, which is only 10% of the market; if 2000 tonnes a year is being bought to replace leakage of 15%, there would be a potential bank of about 15 000 tonnes out there, half of which is not reprocessible because of contamination... if we don't control it will be out there with the unscrupulous contractors. With many end-users not knowing what... is going on, they will be dumping it in their systems, and the machines are going to break down." RAC, September 2009

■ **China** aims to save 75 TWh of power consumption per year – the equivalent of 75 million tonnes of CO₂e by promoting energy-efficient air conditioners and other home appliances. The National Development and Reform Commission has detailed the first types of air conditioners whose sales would be subsidised by 300 to 850 RMB (30-85 €) by the government. It would make it possible to save up to 6 TWh a year if their market share rises to over 30% from the current 5%. According to the Commission, air conditioning consumes 20% of China's power and accounts for nearly 40% during peak demand time in the summer in Chinese cities. *Climate Control News*, July 2009

■ The **US Department of Energy (DOE)** has published on August 31 the first energy efficiency standards for refrigerated vending machines. The new standards take effect in 2012 and over the following 30 years, DOE

IIR-co-sponsored conferences

2009

■ **Tokyo** – Japan - November 27-29
Constant Progress in Cryomedicine - Cryomedicine Update 2009
Noboru Motomura: noboru@motomura.org
Fax: +81 3 5684 3989
<http://homepage2.nifty.com/cryomedicine>

■ **Belgrade** – Serbia - December 2-4
40th International Conference on Heating, Air Conditioning and Refrigeration Serbian Society For Heating, Refrigerating & AC: office@kgh-kongres.org
Fax: +381 11 3231 372
<http://www.kgh-kongres.org/content/view/108/105/lang,english>

2010

■ **Tokyo** – Japan - February 17-19
2010 International Symposium on Next-Generation Air Conditioning and Refrigeration Technology
Organizing Committee: ondanka@nedo.go.jp
Minoru Idemoto: idemotomnr@nedo.go.jp
Fax: +81 445205253
<http://2010nextacr.com>

■ **Oran** – Algeria - April 18-21
LNG 16 - Liquefied Natural Gas LNG Conference Secretariat - Oran: lng16-secretariat@avl.sonatrach.dz
Fax: +213 41 489 190
<http://www.lng16.org>

■ **Antalya** – Turkey - May 9-12
Clima 2010 - 10th REHVA World Congress
Burcak Melekoglu: info@clima2010.org
<http://www.clima2010.org/>

■ **Stockholm** – Sweden - June 13-16, 2010
Sustainable Refrigeration and Heat Pump Technology
Björn Palm: info@sustainablerefrigeration.org
Fax: +46 8 20 4161
<http://www.sustainablerefrigeration.org>

■ **West Lafayette** – United States - July 12-15
13th International Refrigeration and Air Conditioning Conference at Purdue
Virginia (Ginny) Freeman: herlconf@ecn.purdue.edu
Fax: +1 (765) 494-0787
<https://engineering.purdue.edu/Herrick/Events>

■ **West Lafayette** – United States - July 12-15
20th International Compressor Engineering Conference at Purdue
Virginia (Ginny) Freeman: herlconf@ecn.purdue.edu
Fax: +1 (765) 494-0787
<https://engineering.purdue.edu/Herrick/Events>

estimates it will save about 47 TWh of energy. In comparison, the US currently uses roughly 29 000 TWh of energy per year. These standards apply to both glass-front and solid-front vending machines representing 2.3 million machines in the US.

http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=14876



International Institute of Refrigeration
Institut International du Froid

177, bd Malesherbes - 75017 Paris, France
Tel.: 33 (0)1 42 27 32 35 - Fax: 33 (0)1 47 63 17 98
E-mail: iif-iir@iifiir.org

Web site: www.iifiir.org

The *Newsletter of the IIR* is a quarterly publication of the IIR

Managing Editor: Didier Coulomb

Editor: Jean-Luc Dupont

Editorial assistants: Susan Phalippou Mitchell, Gerard Vidal, Cornelia Keizer, Thomas Michineau

Graphic Design: Arobace Communication