Editorial

The International Institute of Refrigeration (IIR) is 100 years old. A number of events are to be held in IIR member countries in order to mark the IIR’s centenary. The Focus of this issue describes these events, and throughout 2008 all issues of the Newsletter will update readers on events celebrating the centenary.

A major global event is a conference, jointly organized by the IIR and the French Refrigeration Association (AFF), to be held on Thursday June 12, 2008 at the headquarters of UNESCO (United Nations Educational, Scientific and Cultural Organization) in Paris, France. AFF is also celebrating its centenary this year.

The joint conference illustrates the spirit in which these events are being organized, and the IIR and AFF are also working together to produce documents celebrating the centenaries of both organizations.

During the morning, the conference will feature a brief introduction to the history of refrigeration and its uses in four key sectors: cryogenics, health, air conditioning and food. The afternoon sessions will be devoted to two vital issues of vital importance, climate change and sustainable development, along with future technologies. Instead of long presentations dealing with these issues, we have opted for short presentations given by well-known experts along with roundtable discussions involving above all industrial stakeholders from the sectors in question and sponsors of the centenary events.

Let’s hope that public opinion and the media will draw on this 1-day event, and all the other events held worldwide, to give refrigeration the dynamic and innovative image it deserves.

The conference programme, along with information on all the other events, is available on our Web site: www.iifiir.org

Keep your eye on it!

Didier Coulomb,
Director of the IIR

IIR focus

2008, Refrigeration Year

Many events and actions have already been scheduled or have already taken place in various countries in order to celebrate the IIR’s centenary and the 100th anniversaries of several national associations of refrigeration (France, the Netherlands, Serbia).

The first event was in Russia. A conference was held in Saint Petersburg on January 29, 2008: “One Hundred Years that changed the World”. It was organized by the Saint Petersburg State University of Low Temperature and Food Technology, the International Academy of Refrigeration, the Working Group entitled “Refrigerant and Heating Medium” of the Russian Academy of Science, in cooperation with the Russian National Committee for the IIR. Specialists and scientists from various parts of Russia and Belarus attended it. Full information on the conference will be published in the journal Holodil’naya Tekhnika.

Several events have already taken place in France. Refrigeration Year was officially launched on February 6, 2008, during Interclima in Paris; the French Refrigeration Association and the IIR ran a stand, on which one of the oldest ice machines was on display and demonstrated. Logos and signs were provided for all the sponsors of the events in France and used during various shows, along with lectures dedicated to the refrigeration sector: “Mondial des metiers” (Lyon, February 7-10) “Etanchéité” (Nancy, March 7); “Froid pour le médicament” (Lyon, March 12-13); “Journée Grand Froid” (Paris, April 4); “Forum des metiers du froid” (Dinan, April 4-5).

In The Netherlands too: a series of short 1½h presentations took place at Delft University: “Refrigerating the Food Chain” (February 18), “Refrigeration and Sustainability” (March 3), and “New Developments in Rotating Machines” (March 17). Moreover, the Dutch Refrigeration Association (NVK) has published a 60-page illustrated book, in Dutch, presenting the current situation and uses of refrigeration in the Netherlands and the rest of the world. An English edition of a book on Kamerlingh Onnes, by Mr Dirk van Delft, Freezing Physics, has also been published.

In China, the IIR co-sponsored conference ICCR2008, held in Shanghai on April 6-9, provided an opportunity to present the history of the IIR and its present challenges. A lot of other events are programmed in these countries and in many other IIR member countries. The next issues of the Newsletter will give you a summary of them. However, you will find more complete information and updates on future events on our Web site. Our other publications, the e-Bulletin and the International Journal of Refrigeration (IJR), will also briefly mention them.

In addition, the IJR is celebrating its 30th anniversary this year: you will find more details in the IIR events section.

Please consult the dedicated pages on our Web site: www.iifiir.org

Un élément important de cette célébration mondiale sera le colloque organisé le jeudi 12 juin 2008 au siège de l’UNESCO (Organisation des Nations Unies pour l’éducation, la science et la culture) à Paris (France) par l’IIR et l’Association Française du Froid, qui fête aussi son centenaire cette année.

Il est représentatif de l’esprit dans lequel nous organisons ces événements et publions des documents de célébration.

Après une brève introduction à l’histoire du froid, ses utilisations dans quatre secteurs clés seront présentées le matin : la cryogénie, la santé, le conditionnement d’air et l’alimentation. L’après-midi sera consacré à deux questions clés pour l’avenir : le réchauffement climatique et le développement durable ; les technologies de demain. Plutôt que de longs exposés, le choix a été fait de privilégier de courtes présentations par des personnalités et des scientifiques et des tables rondes impliquant en particulier les industriels des secteurs concernés, sponsors du centenaire.

Espérons que cette journée, comme les autres événements, seront suffisamment relayés par l’opinion et les médias pour donner au froid l’image de dynamisme et d’innovation qu’il mérite.

Le programme du colloque, comme les autres événements, sont disponibles sur notre site Web : www.iifiir.org

Consultez-le régulièrement !

Didier Coulomb,
Directeur de l’IIR
IIR events

International events

- IIR statutory meetings
  The Management Committee of the IIR met on February 1, 2008 in Paris, France. There was also a Publications Sub-Committee meeting and a restricted Science and Technology Council meeting on January 31 and February 1, 2008. A group also met in order to prepare the Strategic Plan 2008-2011, which is to be adopted during meeting of the Executive Committee on June 13, 2008.

- ASHRAE’s Winter Meeting took place in New York, United States, on January 19-23, 2008. There was, as usual, a big conference and a big exhibition on heating, refrigeration and air conditioning. A meeting of the Society Alliances was held on January 21, 2008 within the framework of the Winter Meeting.

- A national conference on HCFCs took place in Algiers, Algeria, on March 18, 2008, organized by Mr Ahmed Chikouche, Delegate of Algeria to the IIR, in order to raise the awareness of decision-makers and to discuss HCFC replacement solutions in Algeria, following the latest decisions of the Parties to the Montreal Protocol in September 2007. Phase-out of HCFCs will have to start soon in developing countries and awareness of this issue is needed.

- The European Central Asia network of the United Nations Environment Programme (UNEP) held its 7th annual meeting in Tirana, Albania. It was focused on the phase-out of CFCs in Metered-Dose Inhalants (MDIs) and the replacement of HCFCs in foams and refrigerants. Didier Coulomb was invited to present the IIR’s role in promoting technology innovation and energy efficiency.

- Interclima took place on February 5-8, 2008. The IIR and the French Refrigeration Association (AFF) ran stands and launched Refrigeration Year. Appropriately, a 100-year-old ice machine, La Rapide, was demonstrated by its owner, Mr Alain Guyard, on the IIR’s/AFF’s stand. With almost 107 700 visitors (up 9.5% compared with the 2006 edition), Interclima and Idéo Bain showcased energy-efficient and environmentally friendly technology. www.interclimaelec.com

Conference update

- Cryogenics 2008, to be held on April 22-25, 2008, will cover liquid helium and hydrogen technology, superconductivity, separation of air, natural gas and other cryogenic gases, liquefaction, storage and transport and application of low temperatures and air gases in industry and medicine (cell and tissue cryogenic storage). Register now: www.icaris.info icaris@icaris.cz

- Don’t miss the 8th IIR-Gustav Lorentzen Conference on Natural Working Fluids (GL2008), the event in this field, to be held on September 7-10, 2008 in Copenhagen, Denmark. With over 160 abstracts received, this will be a milestone event. Find out more: poul.jeremiassen@teknologisk.dk www.iir-gl-conference-2008.dk

- IIR 2008 - HVAC Energy Efficiency Best Practice Conference will be held in Melbourne on September 18-19, 2008. This cutting-edge event will cover solar air conditioning and heating of buildings, comfort and indoor environmental quality in energy efficient buildings and energy efficient building integration. Full details: brendan@airah.org.au www.airah.org.au

- The IIR-co-sponsored 6th International Conference on Compressors and Refrigeration, ICCR2008, will take place in Xi’an, China, on September 25-28, 2008. Find out more and register: sec@iccr2008.org www.iccr2008.org

- Design and operation of environmentally friendly refrigeration and AC systems, an IIR-co-sponsored event, will take place in Poznan, Poland, on October 15-17, 2008. Present a paper and register: m.michniewicz@clch.pl www.konferencjamich.pl

- The 1st IIR Cold Chain Conference will take place in Singapore on April 27-29, 2009. Keep updated: brendan@airah.org.au www.airah.org.au

The IJR is 30!

- The IJR is celebrating its 30th birthday! The first issue was published on May 1, 1978. In his first Editorial, the first Editor-in-Chief, Professor G. G. Haselden, University of Leeds, UK, spoke about the spirit, concept, and aims of the new Journal. They are still the same but the size, worldwide distribution, and the IJR’s international reputation and scope have grown tremendously since its early years. For instance, the citation impact factor rose from 0.418 in 2000 to 0.936 in 2006 and the IJR is now ranked 26th out of 106 journals in the domain of mechanical engineering and 14th out of 42 in the field of thermodynamics. Moreover, whereas in 2005 we had 125 000 downloads of full text IJR papers via ScienceDirect, since then an exponential increase in this number has been observed: the figure rose to 258 000 in 2007. www.iifir.org/en/periodicals.php?rub=2

New IIR members

- The IIR welcomes the following new members:
  Corporate members
  Frigor Service Réunion, Saint Pierre, Ile de la Réunion
  Veolia Environnement, Limay, France

  Private members
  Mr Jean-Pierre Bernard, France
  Mr Leonilton Tomaz Cleto, Brazil
  Mr Christian Coupiac, France
  Dr Bjørn Fagerli, Germany
  Prof. Juan Carlos Lage Soto, Mexico
  Prof. Rita Mastrullo, Italy
  Prof. Carlo Renno, Italy
  Mr Peter Schneider, Denmark

  Junior members
  Dr Filippo Busato, Italy
  Mr Luca Cecchinato, Italy
  Mr Marco Corradi, Italy
  Mr Rodrigo Llopis Domenech, Spain
  Mr Mauro Marinelli, Italy
  Mr Marco Cinciripini, Italy
  Dr Bjoern Fagerli, Germany
  Mrs Silvia Minetto, Italy
  Mr Antonio Messineo, Italy
  Mr Marco Noro, Italy
  Mr Peter Schneider, Denmark
  Prof. Guiseppe Peter Vanoli, Italy

Corporate members: news

- J&E Hall’s JCC cellar cooler will be chilling wines and beers to perfection in a bar within a major government building in Westminster, London. The JCC cellar cooler was selected on the basis of its competitive price and energy efficiency. Whereas most coolers operate at around 12°C, the JCC low-noise, compact cooler can operate at
The French Ministry of Economy, Finance and Employment published a message warning owners of refrigeration and air-conditioning equipment using HCFCs including R-22 that recycled R-22 is likely to be in short supply starting in 2010. The message encourages owners to start retrofitting or replacing their current equipment running on R-22, adding that delayed action could lead to a shortage of qualified staff capable of performing the work required.

3. Fluids Infos, September 2007

The HFCF phase-out challenge (2)

Following the decision taken in September 2007 by the signatory countries of the Montreal Protocol to accelerate by 10 years the phase-out schedule of HCFCs, the IIR has decided to have a regular section in the Newsletter dedicated to this crucial issue.

Adjustments to the Montreal Protocol— which will enter into force on May 14, 2008— specify that production and consumption of HCFCs are to be gradually phased out with complete phase-out by 2030 in developing countries and by 2020 in developed countries. Several countries such as Australia, Canada, Japan, New Zealand, the USA (see Newsletter No. 33), have established specific regulations regarding HCFCs.

In this issue of the Newsletter, we present the situation of the European Union countries. On June 29, 2000, the European Parliament issued Regulation 2037/2000 on substances that deplete the ozone layer— which specifies the following deadlines regarding HCFCs: on January 1, 2010: prohibition of the use of virgin HCFCs in the maintenance and servicing of all equipment; on January 1, 2015: prohibition of the use of all HCFCs, including recycled HCFCs. A review clause applies to this date: it specifies that "by the end of 2008, the European Commission will have investigated the technical and economic availability of alternatives to recycled HCFCs and that the results of this review will lead to a change in the previously defined date where necessary". More information should be provided in June 2008, since Member States will be presented with the report by a consultant entrusted to conduct a study on the impact of an earlier phase-out of HCFCs in industrial refrigeration. The 2015 time frame envisaged could be brought forward to 2012. These deadlines will probably pose important problems in many European countries. In France, for example, about 30% of industrial refrigeration plants still use R-22 (HCFC) and a shortage of R-22 for maintenance purposes could be expected when, by the end of 2009, the only way of recharging refrigerating plants will be to use recycled HCFCs.

VACC&R Industry is big in Australia

A new Cold Hard Facts report makes up for the lack of previous data concerning the Australian HVAC&R industry and reveals the crucial importance of the sector in the national economy. For instance, the study values the direct spending of the industry at AUD 16 billion at least in 2006, i.e. slightly over 1.7% of the GDP. Other striking figures involve electricity consumption of related machinery (45 000 GWh in 2006, i.e. 21.9% of Australian electricity consumption), greenhouse gas emissions (40 Mt of CO2, i.e. 7% of all Australian GHG emissions) or staff employed: at least 163 000.

Other figures point at more specific aspects of the sector’s activity: for example the existence of at least 5.63 million installed air conditioners in 2006 (approximately 0.7 units per household). National cold storage capacity amounts to 9.46 million m3 with possibly 70% using ammonia as a refrigerant. 22 450 chiller units are installed in the country and 1438 chiller units were sold in 2006 alone. The recent availability of such figures has suddenly made the sector a “highly visible industry we should take note of”, according to Steve Anderson, Refrigerant Australia, who launched the study at AIRAH’s 2007 Sustainability Conference in Melbourne in November.

According to GIFAM, the number of refrigerators sold in 2007 was 2.33 million (4% less than in 2006 but similar to the 2005 figure) and the number of freezers sold was 0.73 million. It is noteworthy that in 2007, 22% of refrigerators sold were labelled A+ or A++, as compared to 3% in 2002. For freezers, 39% of freezers sold were A+ or A++-labelled. A+ and A++ are the highest energy-efficient classes, launched by the European Union in 2000, and represent energy savings of about 25 and 45% respectively compared with standard A-labelled equipment. These figures are important since, according to ADEME, more than 30% of the power consumption of French families is related to household refrigeration appliances. www.gifam.fr

Chiller market grows and diversifies

According to reports published during the 2008 AHR Expo held on January 22-24, 2008 in New York, the chiller market in 2006 was USD 2 billion in Asia-Pacific, USD 1.5 billion in Europe and USD 1 billion in the US. The growth (as compared to 2005) was the highest in China (+13.1%) and in the US (+6.2%). In the US, reciprocating, screw and scroll chillers had the largest market share, followed by centrifugal and then absorption. Screw-chillers – particularly those using R-410A (HFC) – have increasingly replaced reciprocating chillers in many applications; more attention is paid to development of high-capacity screw compressors. Some of the noteworthy developments seen at the Expo were a new integrated variable speed water-cooled screw chiller and a new air-cooled chiller with microchannel coils (Evergreen 23 XRV and AquaForce, Carrier Corp.), a new oil-free centrifugal chiller (Smardt) and an self-containment air-cooled scroll chiller using R-410A which is said to reduce operating costs by 15-20% as compared to standard models due to high energy efficiency at part load and improved reliability thanks to corrosion-resistant microchannel coils (Tempo, York).

www.achrnews.com

Higher temperatures for frozen foods?

The British Frozen Food Federation (BFFF) has recently begun talks with the Food ministry, in order to support slightly higher temperature levels for storage of frozen foods. Current food safety regulations state that frozen foods must be stored at a maxi-
mum of -18°C. BFF is seeking to raise this threshold to -15°C considering that such low temperatures are not justified by scientific research, as microbial growth stops at -5 to -6°C and quality is generally maintained at -12°C, with the exception of ice cream, which requires -15°C. A temperature rise of 3°C would represent huge energy savings. In order to provide data, studies on the entire cold chain are being performed by four companies. www.foodmanufacture.co.uk

■ ASERCOM Energy Efficiency Award 2008: win 10 000 € for the top concept. The Association of European Refrigeration Component Manufacturers, ASERCOM, is to award its annual prize to the most innovative energy saving concept in refrigeration or air conditioning, including heat pumps. For full details: www.asercom.com Deadline: June 30, 2008.

Out of the ordinary

■ Keeping clay soldiers (relatively) cool
The largest group of terracotta figures ever lent by China was on display at the British Museum until April 6, 2008. The Chinese government required the 20 warriors to be kept at temperatures of 22°C ± 2°C and at humidity levels of 45% RH ± 8%, a challenge, considering the variations in load presented by display lighting and up to 400 visitors every hour. Eight Moducel LKP air-handling units provided the air conditioning. Four units were identical fresh air units, equipped with filters and chilled air water-cooling coils, the other four units were identical recirculation units with filters, chilled water-cooling coils and humidifiers. These humidifiers presurized the void beneath the exhibition floor with air supplied via floor-mounted swirl diffusers. Return air was drawn back through grilles around the perimeter enclosure via air-handling units including cooling, reheat coil and integrated Vapac electrode-steam humidifiers to achieve the necessary temperature and humidity control at all times.

www.acr-news.com

■ Fed up with warm beer?
Warm beer at a barbecue got young Kent Hodgson thinking about ways of cooling drinks without lugging around a chilly bin. The 22-year-old New Zealand inventor has invented Huski, a device that turns a tepid beverage into a cold drink within seconds. Thanks to the surface temperature of dry ice (-78.5°C), the portable device has a cooling capacity almost four times that of regular ice. What’s more, Huski doesn’t water down the drink. Huski was presented during Design Exposure 2007. The inventor says that the Huski is “extremely simple”. “You have plastic cooling cells which are pressed down into the dock housing the liquid CO2. The liquid CO2 expands and is pressurized into dry ice in the base of the cooling cells… in a moment. You then pop it into your drink…” Cooling power is almost instant. One canister can fill thirty 330 ml bottles at minimal cost. Mr Hodgson is looking at patenting the Huski, which is expected to retail at around NZD 50.

www.nzherald.co.nz/category/story.cfm?c_id=8&objectid=10475718

Climate control in the Gibraltar tunnel project

As in the Channel tunnel (which would otherwise heat up to 50°C in summer), two cooling networks consisting in smooth tubes would run through the walls, using water as a secondary refrigerant. Both networks would be operated by two separate cooling stations on both sides equipped with electric pumps. Cooling the water from 13 to 1°C in the Channel tunnel requires 80 MW on each side and brings the air inside the tunnel down to about 30°C. Due to the shorter tunnel, and the use of fewer and lower trains allowing for a weaker “piston effect”, the EurAfriken tunnel should only require two 40 MW cooling stations. However, outside temperatures preclude the use of air cooling for the cooling medium (water) and cooling towers or (better) heat exchangers in a water closed loop system would have to be used instead. The cooling systems could comprise large refrigeration sets, which are generally energy consuming and require reliable local energy grids. An alternative is to use medium-voltage stand-alone thermo-refrigeration cogeneration systems that could send their surplus energy to the national power grids. These cogeneration systems could be based on a gas turbine or a reciprocating engine. Renewable energy sources such as solar energy could be used to guarantee the power supply to the system’s control and safety circuits, with batteries as back up.

Refrigeration World, December 2007

Technology

Intense competition for the next generation MAC refrigerant

Less than 3 years before the January 1, 2011 deadline for using fluorinated gases (F-gases) with a GWP higher than 150 in the new models of cars according to the European Directive 2006/40 on emissions from mobile air-conditioning (MAC) systems, there is intense competition regarding the alternative refrigerant which will replace R-134a (GWP: 1300).

• R-152a (HFC) has a relatively low GWP (140) but is flammable and thus must be equipped with an isolating secondary loop so that passengers are never endangered, meaning added expense and weight.
• CO₂ (R-744) has a GWP of 1, which is negligible but poses engineering challenges due in particular to the high pressures required to operate it; however, several automotive suppliers are developing CO₂-based MAC systems and are currently running fleet tests. These suppliers include Nippon Denso in Japan, Ixetic GmbH and Behr in Germany, Valeo in France, and Delphi and Visteon in the US. CO₂ has been chosen as the next-generation refrigerant in MAC systems by the German Association of the Automotive Industry (VDA) in Summer 2007 (see Newsletter No. 32) and Ixetic announced in December 2007 that it is “producing the world’s first CO₂ compressor for air conditioners in serial form” following a “series order received from a renowned car manufacturer”.

In parallel, chemical companies such as Honeywell, DuPont and Ineos-Fluor have rushed to develop new alternative refrigerants; 3 blends, named Fluid H, DP-1 and AC-1 achieved varying degrees of success when Fluid H was dropped over flammability and Ozone Depletion Potential (ODP) while the 2 other failed to meet toxicity criteria. Honeywell and DuPont recently teamed up to develop a new candidate, HFO-1234yf, and initial test results were presented during VDA’s Winter Meeting in February 2008. According to these companies, HFO-1234yf (CF₃CF=CH₂) has a very low GWP of 4, 0 ODP, low toxicity and system performance very similar to that of R-134a, and mild flammability (significantly better than R-152a, with potential to use it in a direct-expansion system); the goal is “to match R-134a as closely as possible to minimize the transition costs for the equipment manufacturers”. The next steps for this new blend will be to complete property testing (in particular on toxicity and flammability) and to obtain EPA SNAP approval.

www.icis.com  www.r744.com
**Efficient mine cooling**

- Bluhm Burton Engineering (BBE) is currently implementing energy management ventilation and refrigeration systems for mines to reduce overall and to manage energy consumption. BBE’s Director, Raymond Funnell, has underscored that there is a boom in the mining industry and that the building of new power stations addressing needs could take 10-15 years. Thus, for the next 15 years, the South Africa’s power crisis is likely to get worse. Moreover, mines are going deeper and more power will be needed for ventilation and refrigeration, thus aggravating the situation. In July 2007, BBE launched ventilation energy management projects at Impala Platinum, Kloof gold mine and Driefontein gold mine in South Africa. The firm is retrofitting existing surface fan stations with automatic inlet guide vane control. This approach allows the fans to operate at reduced flow during peak electrical demand periods, while also maintaining high efficiency. BBE recently completed an ice thermal storage system for the surface refrigeration installation at AngloGold Ashanti’s Mponeng mine, near Carltonville. This system will maximize cooling during critical summer periods and reduce electrical costs in winter and midseason by minimizing electrical power consumption during the evening peak power tariff period. After extensive modifications, an existing refrigeration machine is used to cool glycol to temperatures as low as -7°C; this glycol is then pumped in closed circuit through a submerged coil bank comprising over 100 km of steel piping. Ice is formed on the submerged coil bank during standard and off-peak power tariff periods. This ice is then melted to provide cooling in order to reduce the load on all refrigeration machines during the peak power tariff period. Roughly 800 tonnes of ice are made and melted in a daily cycle. A world first in mining applications, the system is also generating significant energy savings. Thanks to a deviation in ambient temperatures versus design conditions of the day, refrigeration duty ranges from 10 MW, for the peak daily condition, to only 5 MW during off-peak periods. By using ice-thermal storage to even out daily deviations, it is possible to use a smaller refrigeration machine for the average duty of about 7.5 MW and to reduce power consumption. The system can also be used for load-shifting during peak electrical demand.

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**Secondary refrigerants strike back**

- With the F-gas Regulation’s stringent demands on fluorinated refrigerant leakage control, the use of secondary refrigerants such as ethylene glycol is coming into vogue. Recently, when opening a new Mexican food factory, Discovery Foods, a British family-owned ethnic food-manufacturing business, asked cooling specialist Coolimation to design an unusual food application that would provide both chilled water to mix with a dough product and chilled air to blast cool tortillas when removed from the oven. The project included a 250 kW Rhoss air cooled glycol chiller. Using secondary refrigerants such as glycol has several advantages: only a small amount of refrigerant is held in each circuit, which limits harmful potential risks of leakage and allows the system to remain operative in the case of multi-circuits. Gas leaks from chillers are easier to locate as they only happen in the confines of the chiller rather than on the long pipe runs found in direct-expansion systems. Chilled glycol systems generally hold 90% less refrigerant than direct expansion systems and the risk of harmful refrigerant leakage is restricted to the machine room, sparing the food production area. Chilled glycol also has the advantage of not being a blend: in blends, the various fluids evaporate at different rates in cases of leakage, obliging the blend to be replaced. Glycol systems can also be factory-assembled and tested whereas direct-expansion systems which have to be assembled on site. Only the leak testing of the outdoor chiller is compulsory in secondary refrigerant systems, which are also more flexible and are easy to replace. The modular approach this allowed was one of the reasons secondary systems were chosen for this project. The primary refrigerant used here was R-407C.

**Briefs**

- **Solar vaccine fridges for hot countries**
  - Storing vaccines can be difficult in areas with insufficient electric grids, and renewable energies are increasingly being used as a solution. Two companies specializing in renewable energy technologies are to supply vaccine fridges to Nigeria and Haiti. True Energy has signed a USD 600 000 deal with the World Health Organization (WHO) to send solar fridges to Nigeria. Each fridge comes equipped with a 130-watt polycrystalline solar array and 2 ultra heavy duty sealed batteries. Electron Solar Energy, a Miami based distributor of alternative energy systems, is to supply 100 complete renewable solar energy systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti. Other companies provide similar equipment: Dulas systems for the medical sector in Haiti.

**Regulations—Standardization**

- **Europe**
  - The European Commission has issued regulations establishing standard requirements under the European "F-gas" Regulation No. 842/2006 which came into effect on July 4, 2007:
    - leakage checking (Art. 3.7): Regulation No. 1516/2007 of December 19, 2007, details the procedure, measuring methods (direct or indirect) and equipment that certified personnel should use; Regulation No. 1497/2007 of December 18, 2007 defines specific requirements applying to fire protection systems;
    - data reporting format (Art. 6.2): Regulation No. 1493/2007 of December 17, 2007, sets out the format for data to be submitted every year by producers, exporters and importers;
    - labelling (Art. 7): Regulation No. 1494/2007 of December 17, 2007, defines the form of labels and additional labelling requirements.
  - These regulations entered into force in January 2008 with the exception of the Regulation on labelling which is to be applied with effect on April 1, 2008. The minimum qualifications for training (Art. 5.1) are still outstanding. Consult these regulations: www.iifiir.org/en/regulations.php?rub=2

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**Cooling the Venus rover**

One of the main technical challenges in sending a probe on Venus is the searing temperatures on the planet’s surface: 450°C, enough to melt lead! Several probes landed on Venus in the 1970s and early 1980s, but never lasted more than two hours. Two NASA researchers have designed a refrigeration system aiming at keeping a robotic rover operative for up to 50 Earth days. Keeping the electronics cool is the main concern: these would be contained in a ceramic-based insulator, within a metal sphere the size of a grapefruit. The sphere would be cooled thanks to a Stirling cooler, which works with a double-piston system that alternately compresses and expands gas. This produces cryogenic temperatures on the one hand, while dissipating high temperatures on the other, via a radiator. But, in this case, in order to dissipate heat, the radiator would have to be hotter than the surrounding atmosphere, so the newly-designed radiator can reach 500°C, and cool the rover’s electronic components at a mere 200°C! New Scientist, November 2007

**Ice cream scoops**

A new edible antifreeze developed by a US researcher could keep ice cream smooth and tasty by preventing the formation of gritty crystals when the ice cream is subjected to sudden temperature fluctuation. The antifreeze contains proteins similar to those that enable snow fleas to survive in winter. Unilever has patented a yeast that is genetically modified to produce anti-freeze from Arctic fish blood, and Canadian researchers are working on an antifreeze deriving from winter wheat. Danisco has been marketing ice cream containing the Grinsted IcePro stabilizer system, initially developed designed to enable the fat content to be reduced, and now proven to raise quality: crystals are 37-57% smaller than those in ice cream with conventional stabilizers.

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www.miningweekly.co.za

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www.groovygreen.com

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www.aer-online.com

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www.renewable-resources.com

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www.eer-online.com

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ECLSA Newsletter, January 2008
Germany
An integrated plan comprising 14 separate legislative measures, built around the overall target to reduce GHG emissions by 40% by 2020, is the world’s most ambitious national environment package so far. If all the measures are implemented in time, the Ministry of Environment hopes to double Germany’s GHG emission reductions from the current 18% to 36% compared to 1990 levels.

Concerning refrigerants, a new “Chemicals & Climate Protection Act” based on the EU “F-gas” Regulation 842/2006, which is to be implemented under national law as of July 4, 2008:

Maximum limits for systems installed after June 30, 2008 are 1% per year for systems containing more than 100 kg of fluorinated refrigerant, 2% if the charge is 10-100 kg and 3% if the charge is less than 10 kg. For older systems, the requirements are slightly less stringent.

Heat pumps and other renewable heating solutions will be supported by the law on heating through renewable energy which specifies that by 2020, 14% of all heating will have to come from renewable energies. The law requires a minimum COP of 3.3 for electrically-driven air-water heat pumps and a COP of 4.0 for water-water heat pumps.

Chiiventa News, March 2008 www.r744.com

Australia and New Zealand
After 2 years of industry consultation, the Australian and New Zealand Refrigerant Handling Code of Practice 2007 was recently released. This code, written by AIRAH, applies to all systems using fluorocarbon refrigerants. It is divided into 2 parts; Part 1 covers self-contained low charge systems (less than 2 kg) and Part 2 covers all other stationary and transport refrigeration and air-conditioning systems (except automotive air conditioning). Both can be downloaded on the Australian Refrigeration Council Web site: www.arctick.org/news/pdf/Stationary_COP_2007_Part_1.pdf

Climate Control News, March 2008

International Institute of Refrigeration
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