The 28th Meeting of the Parties (MOP28) to the Montreal Protocol which was held in Kigali, Rwanda, from October 10 to 14, 2016, led to an international agreement on the phase-down of the production and consumption of HFCs. This is a milestone agreement. Hence, since 2009, each meeting related to this protocol, initially dedicated to the phase-out of the substances depleting the stratospheric ozone layer, namely CFCs and HCFCs, had been leading to conflicting exchanges on high GWP HFCs which replace CFCs and HCFCs most of the time. One year ago in Dubai, the Meeting of the Parties had eventually allowed for negotiations to begin. Those discussions were tough and three additional meetings were needed (in Bangkok in April 2016, Vienna in July and the Kigali-based meeting) to come to an agreement. This agreement will require adjustments in the coming years: financial help granted by developed countries to developing countries; changes in the phase-down schedule in view of the groups of countries which have allocated themselves additional time to proceed. View details on the Agreement in the “Refrigerant news” section (page 3).

However this major step - that we should explicitly welcome - will foster technological development in the different refrigeration areas. The availability as well as the constraints of replacement technologies will be addressed and presented to all countries on a regular basis. We will face other challenges, in particular in relation with the energy issue. Like in Kigali, the IIR will put forward a statement during the next edition of the Conference of the Parties which is scheduled in Marrakech, Morocco, in November 2016.

Didier Coulomb
Director General of the IIR

A responsible community, from science to society

Finding its roots in basic science, refrigeration has developed into a full-fledged industry, a discipline and is now a flourishing economic activity and, more important, an essential commodity for the benefit of mankind, as exemplified by the critical role of the cold chain for the reduction of food losses and preservation of health products, the irreplaceable value of cryogenic liquefaction and distillation to the gas industry, the contribution of heat pumps to energy efficiency in residential heating and industrial processes, or the vital part played by air conditioning in high ambient-temperature countries (as well as during heat waves in temperate-climate regions).

Fully conscious of their responsibility to society, and in spite of often diverging particular interests, the numerous actors of the trade in academia, industry and government have been for many years developing technology, improving processes, manufacturing and commercializing better products, establishing and enforcing regulations for public safety and consumer protection, but also addressing global issues involving refrigeration such as sustainable development, atmospheric ozone depletion or climate change, with tangible results. Let me recall the long-term action on the phasing-out and replacement of ozone-depleting refrigerants, initiated with the Montreal Protocol in 1987, within ten years, the refrigeration sector reduced chlorofluorocarbon (CFC) consumption by an order of magnitude, a decisive action to contain the level of chlorine in the stratosphere and initiate the restoration of the protective ozone layer.

Pragmatically, this was achieved by several parallel approaches seeking effectiveness while allowing the industry to adapt: transitional replacement of chlorofluorocarbons (CFCs) by hydrochlorofluorocarbons (HCFCs), development of hydrofluorocarbons (HFCs), limitation and end-of-life recovery of refrigerant charges, reduction of losses in operation. Confronted to the next challenge of reducing drastically the emission of greenhouse gases (Kyoto Protocol), the refrigeration community has again responded responsibly, by establishing impact estimators based on complete life-cycle analysis of the processes at work, by reducing direct emissions of fluorocarbons, by promoting the use of alternative, environmentally friendly refrigerants (“natural” or synthetic), and also by reducing energy consumption through more efficient processes and optimized control: indeed, the indirect CO₂ emissions resulting from the energy (electricity or fuel) used to run refrigeration equipment largely dominate their global-warming impact. The task remains formidable, both in developed countries and among the many peoples of the world who aspire to get better conditions of living, but the refrigeration community is addressing it with seriousness and foresight.

I am proud to be part of this responsible group and active in the IIR, the only independent, knowledge-based organisation covering all aspects and temperature ranges of refrigeration. Please bring your competency and experience to strengthen the knowledge base and enlarge the representativeness of the IIR by becoming a member and contributing to its commissions, conferences, working groups and publications.

Philippe Lebrun
President of the General Conference of the IIR
Past events

The Purdue Conferences included the 23rd Compressor Engineering, the 16th Refrigeration and Air Conditioning, and the 4th High Performance Buildings Conferences. They took place at Purdue University (Indiana, USA) on July 10-14, 2016. With more than 800 participants, they are by far the largest international event for the research in all these fields.

The 12th IIR Gustav Lorentzen Conference on Natural Working Fluids took place in Edinburgh (UK) on August 21-24, 2016. With almost 300 attendees, it confirmed the growing importance of the use of natural refrigerants in now nearly all the refrigeration applications and also the important current technical developments because of increasing environmental challenges in this field. The IIR Gustav Lorentzen Conferences are a milestone event on natural refrigerants. The next one will be organised in Valencia (Spain) in June 2018.

The 7th International Conference on Magnetic Refrigeration at Room Temperature (Thermag VII) took place in Turin (Italy) on September 11-14, 2016. With almost 200 participants and more than one third of industry representatives, it was a real success to highlight the potential of the technology; it will soon be commercialised. Thus, two workshops were organized:

- The very last workshop of the ELICiT project, an European research project, which the IIR has been involved in;
- A progress meeting of the IIR Industrial Sub-Working Group on Magnetic Refrigeration. The next Conference will take place in Darmstadt (Germany) in September 2018 and will address a wider thematic scope (other new refrigeration technologies, expanding scope of application temperatures), generating an even larger number of papers and contributions.

The 2nd IIR Workshop on “Cold Applications in Life Sciences” which took place in Dresden, Germany, on September 8-9, 2016 was attended by 62 participants from 12 countries. It was focused scientifically on new approaches in following areas: cryobiobanking of biologicals; advanced development of 3D-scaffolds; and tissue engineering for different applications; pharmaceutical freezing and storage of active agents.

A report of this event, prepared by Ralf Herzog, President of IIR Section A, (on the picture) is available on the IIR’s web site: http://www.iirfr.org/userfiles/site/webfiles/in-depth_files/IIR%202nd%20Workshop.pdf

Properties and Transfer Processes of Refrigerants (TPTPR), on April 23-28, 2017, in Seoul (South Korea), will bring together academic and industrial experts to discuss and exchange in the areas of cycle analysis, theoretical and experimental techniques, thermophysical property data analysis, and heat pump systems with new refrigerants. Manuscripts should be submitted before November 25, 2016.

- Attracting an increasing number of attendees year upon year and covering an ever wider scope of technologies in the field, the 7th IIR-Conference on Ammonia and 
  CO₂ Refrigeration Technologies will take place on May 11-13, 2017, in Ohrid (Macedonia). Hurry, there’s still time to send abstracts.

- From May 15-19, 2017, the 14th Cryogenics 2017 IIR International Conference in Dresden (Germany), will address key issues involving equipment and technology problems where temperature is below 120K (-153°C), whilst also including other related devices and technologies. Call for abstract closes November 1, 2016.

- The 9th International Conference on Compressors and Coolants - Compressors 2017, on May 24-26, 2017, in Bratislava (Slovakia), will provide an international meeting place for knowledge exchange in the field for specialists with a key focus on future outcomes through informing the latest news results in science, research and production. Call for abstract closes December 10, 2016.

Discounts on IIR conference registration fees

IIR Members receive a discount on IIR conference registration fees of up to a one-year IIR private membership from a paid-up Member Country.

IIR co-sponsored conferences

- A biennial event, the Healthcare ColDays in Lyon, France, on November 22-23, 2016, will bring together all stakeholders in the refrigeration, cooling, and conditioning sectors.
- The 47th International HVAC&R Congress and Exhibition in Belgrade (Serbia), on November 30-December 2, 2016, will bring together representatives from all professions involved in HVAC&R: design, construction and energy system installation in buildings.

New! Focused on the retrofit of historical buildings in the Mediterranean region, Climamed 2017 - Mediterranean Congress of Climatisation will unite key stakeholders on May 12-13, 2017, in Matera (Italy).

- The 10th International Conference on Compressors and Coolants - C & C 2017 will take place on September 11-13, 2017, in London (United Kingdom), will include a full industry day dedicated exclusively to topics of high importance to industry. Call for abstracts closes on December 2, 2016.

Please consult our conference calendar on the last page for details and information on the other 2017 conferences.

European projects

The last ELICiT workshop at Thermag VII

On this occasion, the IIR organised, coordinated and facilitated the last ELICiT workshop on September 14, 2016 after the closing ceremony and welcomed over 60 participants from the magnetic cooling technology community. Technical partners presented the progress and outcomes of their research. Started in January 2014, this ELICiT project focused on the application of magnetic cooling technology in domestic refrigeration appliances. Funded by Framework Programme 7 (FP7), this 3-year project will officially terminate on December 31, 2016.

Following the workshop, a progress meeting of the IIR Industrial Sub-Working Group took place on Magnetic Refrigeration concerning the implementation of the project on the standards developed by the consortium. ELICiT-project.eu

SuperSmart kicked off the GL2016

On August 24, 2016, the IIR organised the 2nd SuperSmart Workshop at the GL2016 during the welcome reception. The SuperSmart consortium took the opportunity to ask all participants to fill in an online survey on how to involve Retail Stores to obtain their views on what should be considered within the scope of the new EU Ecolabel and which criteria should be taken into account. The outcomes of the first survey “Removing Non-Technical Barriers were presented to the audience. The general conclusions were that awareness of financial support/interventions for energy planning/management of food retail stores should be more promoted; dedicated training by experienced trainees should be provided especially to food retail store staff; and in overall the EU-Ecolabel is positively perceived as an important tool to reduce the carbon footprint of food retail stores. In the second part of the workshop, the technical partners presented the progress of their specific research topics on how to systematising the non-technical barriers to efficiently address them. The presentations of the 2nd SuperSmart Workshop at the GL2016 are downloadable from: http://www.supersmart-supermarket.info/downloads/

If you are interested to contribute to the criteria development process, please become a member of an Expert Panel and the Labelling Board of the SuperSmart project by signing up for one of the expert panels at: info@supersmart-supermarket.org

Endorsement

“Harmonization of Life Cycle Climate Performance Methodology”, a new IIR Informatory Note, summarizes the LCCP guidelines prepared by the IIR Working Group “Life Cycle Climate Performance Evaluation”. This Informatory Note, prepared by Yunho Hwang, Chairman of the eponymous Working Group, provides recommended assumptions and data sources for different types of units, presents the various existing LCCP tools and outlines usage and limitations of LCCP. IIR members can consult this note at www.iirfr.org in the “Publications/Informatory Notes” section.

Become an IIR member!
https://goo.gl/MDvQ8O

Latest IIR conference papers in Fridoc!

Papers from recent IIR conferences can all be downloaded from IIR Fridoc at the following direct links. IIR members are entitled to a number of free downloads. Don’t forget to login or register first!

- International IIR Conference on Cryogenics and Refrigeration Technology (ICCRT2016):
  https://goo.gl/TWTxjF
- 12th IIR Gustav Lorentzen Conference on Natural Refrigerants and Air Conditioning:
  https://goo.gl/tB9M3r
- 7th International Conference on Magnetic Refrigeration at Room Temperature (THERMAG VII):
  https://goo.gl/3FmNXW

IIR conference papers visible in Scopus!

Since 2014, the IIR has started the indexing of the IIR conference proceedings papers in Scopus and Web of Science (WoS). Scopus and Web of Science are abstract and citation databases developed by Elsevier and Thomson Reuters respectively.

From Scopus, it is now possible to download the papers of ICCRT2016, ICCCG2016 and PCM2016 conferences indexed in Fridoc. To do so, go to http://www.scopus.com/; insert 01511637 in the search engine box for the ISSN and select 2016 to restrict the search. Select the wanted article and press on “View at Publisher” or “Full Text”. Click on the green link below the article through Fridoc. University libraries have generally a subscription agreement with Scopus that allows students and staff members to access Scopus free of charge.

IIR member news

Star Refrigeration latest low charge ammonia chiller

Star Refrigeration has successfully tested its...
latest low charge ammonia Azanechiller 2.0. This new air-cooled low charge ammonia chiller has an efficiency that is 71% higher than the EU Ecodesign Directive (Ecodesign 2009/125/EC).

A low charge design uses a combined evaporator/separater to achieve refrigerant volumes as little as 0.18 kg/kW. With COPs up to 5.2, it is expected to deliver a statement in order to make a link between the HFC issue and the energy consumption. The IIR Director General already stated during a UNEP OEWG38 in Vienna, the results of this initiative which has already avoided the emission of 45 million tonnes CO2 eq on the 1993-2013 period. More information: https://goo.gl/9D7tDd

AC news

The future of air conditioning

The report « The Future of Air Conditioning for 2016 - 2028 » prepared by Navigant Consulting for the US Department of Energy (DOE) provides valuable figures on the expected growth in air conditioning (AC) demand and its role in the future of energy in the US.

Today, AC equipment represents close to a USD 100 billion, 100 million-unit per year global market, and accounts for 4.5 exajoules of energy consumption, comprising just over 4% of global building site energy consumption. While adoption of AC in developing countries is still nascent, by the end of the 21st century, the 21st century will see greater adoption in developing countries, especially in those that are not (and possibly) humid climates with large and growing populations, such as India, China, Brazil, and Middle Eastern nations. IEA projects that AC energy consumption by 2050 will increase 4.5 times over 2010 levels for non-OECD countries versus 1.3 times for OECD countries. Globally, stationary AC systems account for nearly 700 million metric tons of direct and indirect CO2 equivalent emissions annually. Indirect emissions from electricity generation account for approximately 74% of this total, with direct emissions of HCFC and HCFC refrigerants accounting for 7% and 1%, respectively. Transitioning to low-GWP refrigerants could eliminate the vast majority of these emissions. It should be noted that preliminary testing indicating the potential for efficiency improvements for equipment using low-GWP refrigerants, reductions to indirect emissions in the US are possible. If high-efficiency equipment adoption is incentivized globally through efficiency standards and labeling, and if low-GWP refrigerant options available today, DOE sees opportunity to reduce global AC CO2 emissions by 20% or more (75% or more of all direct emissions). Desirable levels of emissions that are possible in the long-term from lower-GWP refrigerants and improved efficiency. https://goo.gl/9GWN4

Energy use by air conditioning in UK

According to a recent study by the Building Research Establishment, a unit of the UK Department of Business Energy and Industrial Strategy, air conditioning to cool buildings may account for 5% of UK electricity consumption. The study found that 65% of office space and 30% of retail space in the UK is equipped with air conditioning. Cooling in offices typically uses around 40 kW/m2 per year. The researchers found that part of the reason for such a high ratio is that air conditioning is often used even when buildings
are unoccupied, for example in the evenings and at weekends. They also found that the number of heat waves in the UK has increased significantly since the 1960s.

http://www.bre.co.uk/ac_energyuse

India tests expose AC inefficiencies at higher temperatures
Split air conditioners (ACs) represent the largest single source of electricity use by the Indian household sector. According to an analysis of data on electricity use by households in India, accounting for 61% of the AC market. With extreme weather events, heat waves and heat island effects becoming common, testing of ACs must become stringent to ensure real world performance. Responsible consumers are expected to buy air conditioners, star labelled ones that are energy efficient to save energy, costs and the climate. But new tests from testing of split room air conditioners (RACs) released by the Centre of Science and Environment (CSE) showed that during high summer months, temperatures in the 40-50°C range, a “5-star” rated split AC becomes worse than a 2- or 1-star rated unit. It starts consuming 10-28% more power than its declared capacity; and cooling capacity drops by about 30%. Air conditioners are responsible for peak energy consumption across cities in India. In India, air conditioning accounts for about 28% of the total monthly electricity consumption during the hottest months. The CSE calls on the Bureau of Energy Efficiency (BEE) to use unification of energy efficiency standards and test procedures to reduce the margin of deterioration in the real world. It also notes that India’s energy efficiency standards are amongst those of many other countries including Australia, Brazil, Canada, China, EU, Japan, Korea, South Africa and the USA.

http://www.bre.co.uk/ac_energyuse

India first refrigerated container train leaves for Moscow

A refrigerated container train carrying fruit and vegetables was dispatched from Dalain, China, last month to Rostov on Don. Rostov near Moscow, Russia, on an 8,600 km long line, with an anticipated journey time of 18 to 20 days, 60%shorter than the old route using sea and rail travel, marking the opening of a new transport link between the two countries. The pilot shipment uses six 40 ft containers. These are connected to a diesel generator and a CO2 refrigeration system and maintains the internal temperature at the appropriate level to ensure the produce arrives in good condition. Russia considers demand for “a stable supply” of Chinese produce in the Russian market, with the potential for three or four trains per week, each conveying up to eight 40 ft containers. This regular service could offer an “optimized” transit time of around 12 days. It also believes the rail service would be competitive with road on price. As well as fresh produce, the refrigerated service would be suitable for frozen and chilled products, pharmaceutical goods and electronics.

http://www.bre.co.uk/ac_energyuse

Briefs

Top World Energy Efficiency Rankings
According to the 2016 International Energy Efficiency Scorecard published by the nonprofit ACEEE, Germany continues to lead the world in energy efficiency. On a scale of 100 possible points in 35 categories, the nations were ranked by ACEEE as follows:

Germany (1, 38%)

United States (2, 36%)

Japan (2, 36%)

UK (3, 35%)

Australia (4, 33%)

China (5, 33%)

South Korea (6, 32%)

Canada (10, 31%)

Poland (11, 30%)

South Africa (12, 30%)

India (14, 29%)

Turkey (15, 28%)

Moldova (16, 28%)

Thailand (17, 28%)

Australia (18, 28%)

Mexico (19, 27%)

Taiwan (20, 27%)

Brazil (21, 27%)

Saudi Arabia (23, 27%)

These 23 countries represent 75% of all the energy consumed on the planet; and over 80% of the world’s gross domestic product (GDP). ACEEE evaluated each country using 35 policy and performance metrics spread over four categories: buildings, industry, transportation, and overall national energy efficiency efforts.


Energy trends in German supermarkets
A research project within the framework of the CLEI2050 project, shows that the average energy used to provide cooling to chilled and frozen displays represents 40% of the total energy demand of German supermarkets. The energy percentage for air conditioning is 8% and the energy for refrigeration is 20% for heating and lighting. Since 2014, the energy cost has fallen by 6% through the implementation of energy efficiency measures such as the use of low energy LED lighting, energy monitoring and efficient refrigeration systems recovery. Transcritical CO2 systems are used in 50% of new and refurbished supermarkets surveyed.

JARM, August 25, 2016

China making push to reduce data center energy and water use
China’s 1.37 billion people, many of them fully connected to the Internet, use an enormous amount of energy. The Chinese government estimates that the country’s data centers consume more energy than the total energy use of Hungary and Greece combined. Last year, China’s Ministry of Industry and Information Technology launched the country’s first green data center pilot program. Most data centers in China are inefficient, operating at a power usage efficiency (PUE) of 2.2. Also, a large amount of water is being used to cool data centers, further exacerbating shortages in the already water-stressed nation. While there are no national-level data center efficiency regulations yet, the City of Beijing recently issued a ban on data centers with a PUE higher than 1.5. Beijing’s restrictions have already forced some companies to leave the city. But there are signs of change. Some operators are now installing advanced cooling systems with reduced water consumption.

http://www.bre.co.uk/ac_energyuse

Potential of natural refrigerants in China, the case of the heat pump market
In a paper*, C. Poolman et al. present their findings and stress that there is a substantial potential for increased use of natural refrigerants in the Chinese heat pump market. Their low cost and low GWP are attractive features in the case of HFCs and HCFCs. Among various natural refrigerants, three of them receive the most attention, CO₂, R290 and ammonia which are still at an early stage of commercialisation.

Because of the safety risks, ammonia is mainly considered for industrial scale cooling applications. The potential of using CO₂ refrigerant in home heating is still under investigation. The potential of CO₂ refrigerant in China is mainly in domestic CO₂ heat pump water heaters (HPWHs). Currently, CO₂ HPWH has encountered several challenges, which hinders its market initiation. More R&D activities should be supported by government institutes and manufacturers to improve the product’s efficiency. Policy decisions which offer subsidies to CO₂ HPWH would also be a key measure to support the development of CO₂ refrigerant heat pump systems. The potential of R290 refrigerant is in air-source heat pumps (ASHPs) for room air conditioning. Active policy support and strong industry commitments are both helping R290 ASHPs to increase market shares. Meanwhile, existing national standards and regulations for R290 and the necessary safety requirements. Training of professionals should also be paid attention to.

The potential of ammonia refrigerant is in food chain, pharmacy, chemical industry as well as sports facilities.

Su C, Palm B. Potential of natural refrigerants in China, the case of the heat pump market
Available in Fridoc: https://goo.gl/4qAGGv

Alternative low-GWP refrigerants for transport refrigeration
C. Poolman et al presented the flammability risks and benefits associated with the use of alternative low-GWP-refrigerants in the transport refrigeration. They focused on refrigerated containers and considered five refrigerants (R290, R744, R32, R1234yf, R1234ze(E)) with either mildly flammable or flammable properties. They determined that while R290 (propane) is an attractive refrigerant from an energy efficiency standpoint, a design using propane has not yet been identified for container refrigeration equipment that is able to adequately mitigate the flammability risks and comply with today’s and – to date – future standards. Regardless, for R290, R32, R1234yf and ze(E), a double circuit/double compressor design allows charge reduction but circuit/charge is still too high and the lower flammability limit (LFL) can be reached, leading to explosion risks.

For all alternative refrigerants, the indirect cooling is not able to adequately mitigate the safety risks outside the box. Given the safety risk and operational and service complexity associated with the use of either mildly flammable or flammable refrigerants in transport refrigeration, R744 (CO₂) emerges as the best alternative among the options analysed.

Poolman C et al. Low GWP refrigerants in transport refrigeration: risk and benefit assessment of flammable and mildly flammable alternatives
Available in Fridoc: https://goo.gl/MgCfCz

ThermagVII highlights

Two main topics were addressed in the 72 papers presented during Thermag VII conference: magnetocaloric materials (alloys and compounds with magnetic properties) and thermoelectric materials (electrocalorics, barocalorics, etc.) and heat switches, which may represent promising research themes for the future. We present below summaries of two papers along with the direct link where the papers can be downloaded in Fridoc database.
Future developments in magnetocaloric refrigeration and heat pumping

Dariusz Theodorowicz et al have presented a critical review of activities and achievements in the development of magnetocaloric refrigeration and heat pumping. It addresses some of the very important scientific, technical and non-technical factors which can provide a basis for future improvements. Since the earliest days of engineering magnetocaloric devices for applications near or above room temperature, a total of about 70 prototypes have been developed for different parts of the world. However, while the number of publications in material science grows exponentially, there is only relatively limited attention being paid to magnetocaloric engineering and heat pumping. The authors also consider that there is a gap between material science and engineering; materials scientists do not actually receive a concrete appreciation of what engineers and manufacturers about what can be achieved when the material properties are the most crucial for successful future developments. On the other hand, this paper focuses on the solutions that engineers indicate as being the most important. The authors stress the main technical problems which remain unsolved, which explains why we should not expect any relatively small steps towards the commercialisation of magnetocaloric technology. However, they believe that there are still engineering solutions that can possibly foster developments towards the first real market applications.


Magnetocaloric air-conditioning system for an electric vehicle

In their presentation, B. Torregrosa-Darime et al analyse the application of a permanent-magnet active magnetic regenerator refrigerator (AMRR) in the air-conditioning (AC) system of an electric vehicle. A comprehensive optimisation study has been performed in order to determine the maximum working parameters of the AMRR that fulfil the thermal requirements of the vehicle with minimum combined electric consumption and CO2 emissions. With the obtained design, the AMRR would weigh between 20 and 50 kg and would work with an EER from 2 to 4 and a COP (coefficient of performance in heating) ranging from 2.7 to 3.5, similar to current vapour-compression technology. The efficiency of the AMRR depends on the considered design point, which is determined by the number of air changes in the electrical auxiliary. As the efficiency of the AMRR increases, the consumption of the auxiliaries becomes more relevant. Hence, the design of the AMRR minimizes the total energy consumption of the AC system, all the components must be taken into account.

Torregrosa-Darime B, Payá J, Corberán JM. Integral optimization of a magnetocaloric air-conditioning system for an electric vehicle. Available in Fridoc: https://goo.gl/4ZvDz

Case studies

- R290 units in Vietnam's cold stores delivering 20-25% efficiency gains over R22. In 2014, the United Nations Industrial Development Organisation (UNIDO) initiated a project in Vietnam to assess the safety and ozone-depleting substance emissions through technology transfer in industrial refrigeration. R290 units were installed in four companies to replace previous R22-based systems. A full conversion with a total of about 70 prototypes have been developed for different parts of the world. A small Michigan-based company has developed a plastic pane that inserts into existing window frames and is designed to prevent the same insulating glass unit from being broken. The transparent polymer panes are bordered by foam frames that fit into windows. A single pane of the prototype has an R-value (thermal resistance) of R-5 and can go up to R-13, based on the number of panes. Windows are the biggest cause of energy loss. This product can reduce heating and cooling energy by up to 20% compared to double glazing. It reduces the build-up of condensation and reduces the need for air conditioning in buildings with many windows.

- HFO chillers for the renovation of the Channel Tunnel refrigeration system. In order to maintain the Channel Tunnel temperature below 30°C, refrigeration is needed, since, although at 50 meters below the sea level, the temperature would reach 50°C because of the heat generated by the circulation of the trains. Eight months of the year, huge fans circulating air cooled in cooling towers are sufficient to maintain the temperature in the tunnel, but in the summer additional refrigeration is needed. Since January 1st, 2015, R22 refrigeration is not allowed and maintenance is practically impossible. That's why a Eurotunnel decided to change the existing R22 chillers serving the Channel Tunnel and to use HFO-1233zd(E), which has a GWP of 1.

- Four HFO-1233zd(E) chillers are to be installed, two at Sangatte (France), one at Shakespeare Cliff (UK), and a fourth in the near future, delivering 1400 kW each for the 50 km railway tunnels. The new chillers should deliver 26 MW refrigeration each, they weigh more than 60 tons each, and take up about five times the size of standard chillers. Energy savings of 40% are expected. http://www.coolingpost.com/world-news/hfo-chillers-to-cool-the-channel-tunnel/

- R&D

- Sainsbury’s testing truck cooled by liquid nitrogen engine. UK supermarket chain Sainsbury's is currently testing a refrigerated delivery truck cooled by a liquid nitrogen powered engine. Traditionally many refrigerated trucks require two diesel engines, one to power the chill chain and one for the refrigeration unit. It is the latter which is here replaced by a zero-emission cooling unit supplied by Dearman. The new system harnesses the rapid expansion of liquid nitrogen to deliver zero-emission power and cooling. During the three-month trial, the vehicle is expected to save up to 1.6 tonnes of CO2 emissions and is expected to reduce road noise.

- Personalized environment thanks to IoT sensors

- Designers and researchers from Carlo Ratti Associati have equipped the Agnelli Foundation, a cultural foundation in Turin, Italy, with an Internet-of-Things (IoT) sensors that monitor different sets of data, including occupancy levels, temperature, CO2 concentration, and the status of meeting rooms. Based on this information, the building management system (BMS) responds dynamically, adjusting lighting, heating, ventilation, and room booking in real-time. Once building occupants set their preferred temperature via a smartphone application, the thermal bubble follows them throughout the building, as the fan coil units, situated in the false ceilings, are activated by human presence. By synchronising thermal and human occupancy within buildings, we can create a more sustainable and responsive architecture, theoretically slashing energy consumption by up to 40%,

- US: innovative technologies to reduce air conditioning costs

- A team of researchers at MIT has developed a new way of making windows that can switch from transparent to opaque with little to no power, to maintain its new state; unlike other materials, it only needs electricity when it’s time to switch back again. The new discovery uses electrochromic materials, which change their colour and transparency in response to an applied voltage. These are quite different from photochromic materials which tend to have much slower response times and to undergo a smaller change in their levels of opacity. The MIT team was interested in using lightweight sponge-like materials called metal-organic frameworks (MOFs), which can conduct both electrons and ions at very high speeds. Besides preventing glare, these new windows could lead to pretty significant energy savings by drastically reducing the need for air conditioning in buildings with many windows.

- A utility is offering incentives for certain grocery stores in New York City to install thermal energy storage systems to help better manage refrigeration requirements. A handful of grocery stores in New York could produce ice overnight as an unusual way of storing energy and working with the local utility. The program aims to help manage the demand on the grid during peak times of day, like a hot summer afternoon when city residents turn on their air conditioners. The technology to make and manage the ice is being offered by a young startup. By encouraging grocery stores to use energy to make ice at night, instead of during the middle of the day, the plan to reduce power surges and shift some of its peak load and the grocery stores can save money on their energy bills. The company’s software and data system continuously detects when the ice will melt and manages the process. The ice batteries can also provide backup cooling if the power grid goes down, enabling supermarkets to keep profitable food cold during blackouts.

- Portable “mini-fridge” to maintain vaccine temperature

- 22-year-old designer Will Broadway has developed a portable, cold storage device that keeps vaccines at the ideal temperature while they are transported across developing countries. Today, ice or cold packs are generally used, which can freeze the vaccine to a temperature lower than considered thermally stable, and leads to vaccines losing potency. This new system, called Isobar, is specifically designed to maintain stable...
The Australian government will introduce legislative amendments in order to implement new measures as soon as possible. New emission standards will be introduced by 2024, with amendments in the standards to be based on low-GWP alternative refrigerants. This means that amendments in the standards would enable the safe use and market adoption of relevant standards in a neutral manner. This will come into effect on July 1st, 2016. The labelling system for refrigeration equipment containing over 50 lbs rate thresholds that trigger the duty to repair refrigerant-management-regulations

Refrigerator safety standards high on agenda

During the meetings under the Montreal Protocol with stakeholders in Vienna (Austria), on July 15-24, 2016, many discussions focused on the necessity to revise safety standards in order to adapt them to low-GWP alternative refrigerants classified as A2L (mildly flammable) or A3 (flammable). Some experts stressed that current versions of certain international standards - according to which refrigerant charge limits are set - are not based on scientifically sound measurements and fail to account on mitigation measures and could limit the potential of flammable refrigerants such as hydrocarbons.

In Vienna, China formally called on the Parties to establish regular consultations on safety standards with a view to accelerating the revision of relevant standards in a neutral manner. This should enable the safe use and market adoption of low-GWP alternative refrigerants required by the future HFC amendment. The proposal was finally modified and adopted during the Kigali MOP29 meeting in Kigali in October. Links will be organized with national authorities in charge of standardization, particularly ISO and IEC.

In India, the Bureau of Indian Standards (BIS) is considering amendments to safety standards recommended by the Centre for Science and Environment (CSE) which would enable wider use of hydrocarbons. Currently, India does not have any safety standards for refrigerating systems. To bridge this gap, the BIS committee had proposed the adoption of ISO 5149: Refrigerating systems and heat pumps-Safety