



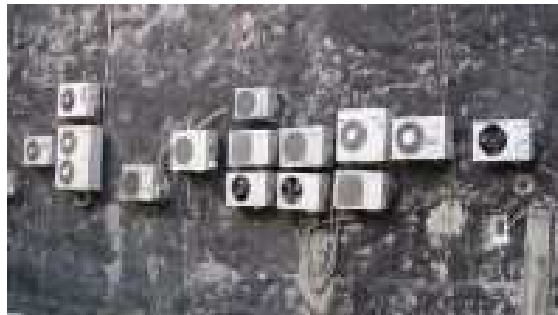
## ROUNDTABLE ON CLIMATE & OZONE-FRIENDLY TECHNOLOGIES IN REFRIGERATION & AIR-CONDITIONING

**Belgrade, Serbia, 10-11 May 2011**

### **Working towards the HCFC freeze in 2013 Promoting climate- & ozone-friendly technologies**

*Belgrade, 10 May 2011*

In partnership with private sector companies, academic research as well as national and international refrigeration & air-conditioning (RAC) associations, it is the first time that the Serbian Ministry of Environment, Mining and Spatial Planning and UNEP OzonAction organized the regional technology roundtable on ozone- and climate-friendly technologies for RAC experts and Ozone Officers from European & Central Asian countries.



Unregulated installation of split AC systems

The event promoted technology innovation by research bodies and equipment manufacturers and informed Government representatives and RAC associations from more than 20 countries on commercially available RAC systems which do not harm the Ozone Layer and have minimum Climate Impact taking into account direct carbon equivalent emissions from refrigerant leakage and indirect emissions from energy use during their useful life time.

Honorable State Secretary Miladin Avramov opened the roundtable and emphasized that “...*energy-efficient technologies using ozone- and climate-friendly technologies exist but there are barriers to wide market introduction. This roundtable meeting with Ozone Officers and national RAC experts from some 20 countries in Europe & Central Asia will help overcoming some of these barriers.*”.



Honorable State Secretary Miladin Avramov  
Serbian Ministry of Environment, Mining and Spatial Planning

Head of UNEP OzonAction Rajendra Shende highlighted during his pre-recorded welcome speech, that the “... contribution made by the member countries of the Regional Ozone Network for Europe & Central Asia to mitigate climate change by phasing out nearly 6,000 tons of CFCs which is nearly 36 million tons of carbon dioxide equivalent / year. Meeting the challenge of HCFC phase out will result into additional climate benefit of about 1 million tons of carbon dioxide equivalent / year. If we consider improvement in energy-efficiency and destruction of CFCs and other ODS, the climate benefits will further enhance.”



Mr. Rajendra Shende, Head of UNEP OzonAction

Well-known companies including Danfoss, Enex Refrigeration, FilterFrigo, GEA Grasso, Guentner AG, Johnson Controls, Klima Smederevo, Mayekawa, MPG-KGH, Soko Inzinjering, Stulz and Green Cooling Association presented their products and case studies to the audience. In addition, the international organizations AREA, ASHRAE, GIZ, IIR, UNDP, UNEP and UNIDO, researchers from universities in Belgrade, Istanbul and Skopje and bilateral partners from Czech Republic and Hungary delivered expert presentations. Highlights include:

- Mayekawa presented opportunities of climate & energy efficiency co-benefits using the ‘natural 5’ refrigerants: ammonia, CO<sub>2</sub>, HCs, water and air. The systems with ammonia and CO<sub>2</sub> are already well established on the market in a wide range of applications for very low to high temperature applications (heat pumps). They produce the first ammonia semi-hermetic compressors enabling compact design and factory assembled units. There are applications with CO<sub>2</sub> in cascade systems, transcritical systems and indirect systems using carbon dioxide as a secondary coolant.



Mayekawa ammonia system

- GEA Grasso recently launched its BluAstrum ammonia chiller which was awarded by German Refrigeration Prize in the category “Climate-Friendly Use of Refrigeration Systems in Production of Foods and Beverages”. This is a highly competitive chiller minimizing the carbon footprint by using natural refrigerant, improved efficiency by applying new technologies, small dimensions, low noise level and improved control systems. Additional benefits are: less and easy maintenance, long service life time of roller bearings, less complexity, no oil pumps and fewer connections.



GEA BluAstrum ammonia chiller

- Johnson Controls offers a wide range of screw and reciprocating compressors and packaged units using natural refrigerants such as ammonia, carbon dioxide and hydrocarbons and with high coefficients of performance (COP), improved energy efficiency, better environmental profile (low TEWI); significantly less maintenance; easy and efficient service and worldwide support. Their products and systems are used in many applications like cold stores, food and drink processing and in many other industries.



Johnson Controls Sabroe compressor

- The Guentner Group is a global leader in the production of heat exchangers for the RAC industry and launched air cooled condensers with the micro-channel technology. Important benefits are: a reduced refrigerant charge, aluminium heat exchanger and protection against corrosion. They developed a special “Guentner Motor Management” (GMM) which is an efficient control system of the fan operation during partial load operation. They produce heat exchangers suitable for various refrigerants including ammonia and carbon dioxide.



Guentner heat exchanger

- Enx Refrigeration elaborated that despite the low coefficient of performance (COP) of carbon dioxide in the transcritical ideal cycle, a well-thought plant design in combination with the use of flash vapour recompression cycle and heat recovery can significantly improve COP and energy efficiency. There are standardized and proven design concepts for transcritical and subcritical operation, and for cascade systems. Carbon dioxide systems for supermarkets are commercially available where in the past

refrigerant HFC-404A with a high global warming potential (GWP) was widely used. Carbon dioxide transcritical systems are in particular efficient for heating water from 10°C up to 90°C using sanitary water heat pumps (COP > 4).



Enx carbon dioxide system

- Danfoss supplies automatic control components for RAC systems covering ammonia, carbon dioxide and hydrocarbon applications. Danfoss explained that transcritical carbon dioxide systems are more efficient in the Middle and Northern European countries and highlighted the market drivers for natural refrigerants including:

- 1) Legislation (tax on refrigerants, refrigerant charge, F-gas regulation);
- 2) Operating cost (energy, service, refrigerant cost)
- 3) Green profile (carbon footprint).



Danfoss system comparison

- Stulz company presented applications of free cooling in base stations of telecommunication networks and IT data centres which in the past mostly used comfort air-conditioning until operating throughout the year. The installation of additional free cooling units and a microprocessor controller allows using the more energy- and cost-efficient free-cooling mode most of the time and compressor cooling is only activated when required. Thus the operation of compressor cooling and associated energy costs are minimized. The total investment and operating costs are approx. 50% less over a 10-year period of operation than conventional air-conditioning systems.



Stulz free-cooling system

- Several Serbian companies presented case studies of installations using the natural refrigerants ammonia and carbon dioxide:

- a. Energy efficient free-cooling systems in food confectionery industry in Serbia (MPG-KGH)
- b. New high temperature heat pumps for application in district heating systems, KLIMA
- c. Ammonia as a refrigerant for liquid cooling in an apple store, FilterFrigo
- d. A new refrigeration plant based on ammonia with secondary fluids loops, Industrial Refrigeration Care
- e. Use of carbon dioxide in refrigeration systems in Serbia, SOKO Inzinjering.



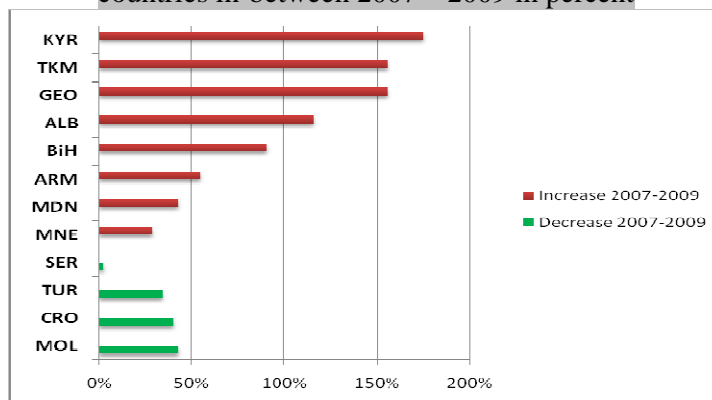
Case studies and equipment presented by Serbian companies (see Roundtable Brochure)

Prof. Risto Ciconkov, Professor at Skopje University, reiterated that “... ozone- and climate-friendly technologies are commercially available in developing countries, but not yet widely applied with the exception of ammonia in cold stores, food and beverage processing. The reasons are mainly the lack of information about new technologies using, higher initial investment cost and limited access to safety information, education and training courses.”

The roundtable takes place within the context of the accelerated phase-out of HCFCs which requires ECA network countries to freeze their HCFC consumption levels in 2013 so that they do not exceed the average levels of 2009-2010. By 2015 HCFC consumption levels should be reduced to 90% of 2009-2010 levels. So far, the Executive Committee of the Multilateral Fund has already approved funding for HCFC phase-out strategies in Armenia, Croatia, The Former Yugoslav Republic of Macedonia, Kyrgyzstan and Serbia. Other countries are currently preparing their HCFC phase-out strategies.

Halvart Koeppen, Coordinator of UNEP’s Regional Ozone Network for Europe & Central Asia (ECA network) explained that “... whereas most ECA network countries reported increased HCFC consumption in-between 2007-2009, accession countries like Croatia, Serbia and Turkey either stabilized or significantly reduced their HCFC consumption through early policy setting and quota systems, training, certification and awareness raising. This proves what is feasible if it is a political priority and if appropriate policy measures are put in place.”

Increase / decrease of HCFC consumption in ECA network countries in-between 2007 – 2009 in percent





Mr. Halvart Koeppen, Coordinator of UNEP's ECA network

Mr. Jim Curlin, Network & Policy Manager of UNEP's OzonAction Programme briefed the participants that *"... in parallel to the network meetings in Male and Belgrade, UNEP has launched the virtual exhibition on ozone & climate-friendly technologies in refrigeration & air-conditioning. The web-based platform simulates physical exhibitions of many of the companies and organizations attending the roundtable and their virtual booths are accessible worldwide via Internet. Visitors of the virtual exhibition can obtain information about innovative ozone- and climate-friendly products, company contacts and they can conduct online discussions with the exhibitors. Interested parties are invited to visit the virtual exhibition at [www.unep.org/ozonaction/virtualexpo](http://www.unep.org/ozonaction/virtualexpo)."*



UNEP virtual exhibition on ozone- and climate-friendly technologies



Mr. Jim Curlin, Network & Policy Manager of UNEP's OzonAction Programme

This virtual exhibition has been launched by the Vice-President of Maldives and by Hon. Miladin Avramov, State Secretary of the Serbian Ministry of Environment and Spatial Planning during the technology roundtable in Belgrade.

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## **NOTES TO EDITORS:**

### **UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)**

UNEP is the United Nations system's designated entity for addressing environmental issues at the global and regional level. Its mandate is to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and the international community for action.

### **Montreal Protocol on Substances That Deplete the Ozone Layer**

The Montreal Protocol on Substances That Deplete the Ozone Layer is an international treaty designed to protect the ozone layer by phasing out the production and consumption of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature on September 16, 1987 and entered into force on January 1, 1989. Since then, it has undergone five revisions, in 1990 (London), 1992 (Copenhagen), 1995 (Vienna), 1997 (Montreal), and 1999 (Beijing). Due to its widespread adoption and implementation it has been hailed as an example of exceptional international cooperation "Perhaps the single most successful international agreement to date..."

### **About the Compliance Assistance Programme (CAP) of UNEP DTIE**

UNEP as an Implementing Agency of the Multilateral Fund of the Montreal Protocol has a unique regionalized programme that delivers compliance assistance services to countries to assist them meet the international commitments under the Protocol. The compliance regime requires countries to: achieve and sustain compliance, promote a greater sense of country ownership and implement the agreed Executive Committee framework for strategic planning.

UNEP through the Compliance Assistance Programme (CAP) has moved from project management approach to a direct implementation initiative through its specialized staff. Consistent with the above approach the regionalised CAP team has developed to be the centre for policy advice, compliance guidance and conduct training to refrigeration technicians, customs officers and other relevant stakeholders on compliance issues, promote bilateral and multilateral cooperation and promote high-level awareness by utilising UNEP's staff.

OzonAction Programme: [www.unep.fr/ozonaction](http://www.unep.fr/ozonaction)

### **Regional Ozone Network in Europe & Central Asia (ECA network)**

The Regional Ozone Network in Europe and Central Asia was created in 2003 with the technical and financial support from the Multilateral Fund, the Czech Republic, Hungary and the Slovak Republic. It is now part of UNEP DTIE's OzonAction Compliance Assistance Programme and includes the following 12 member countries: Albania, Armenia, Bosnia and Herzegovina, Croatia, Georgia, Kyrgyzstan, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Serbia, Turkey and Turkmenistan.

The ECA network is a dynamic group of countries spread over three sub-regions (Caucasus, Balkan, Central Asia). The following Countries with Economies in Transition (CEIT countries) participate in selected network activities as part of their GEF-funded institutional strengthening projects: Azerbaijan, Kazakhstan, Tajikistan, Uzbekistan. Other CEIT countries are involved in selected activities subject to funding availability.

Several former ECA network countries have already acceded to the European Union and have been reclassified as Article 2 countries. Candidate countries include Croatia, Macedonia (FYR) and Turkey and potential candidate countries Albania, Bosnia and Herzegovina, Montenegro and Serbia.

The network is supported by implementing agencies (UNDP, UNIDO, World Bank) and bilateral partners

(Czech Republic, European Union, Hungary, Poland) as well as the Multilateral Fund and Ozone Secretariats. Additional partners include the World Customs Organization's Regional Intelligence Liaison Offices (RILOs), South Eastern Cooperation Initiative (SECI), Green Customs partners, United Nations Conference on Trade & Development (UNCTAD), Organization on Security & Cooperation in Europe (OSCE), the Air-conditioning and Refrigeration European Association (AREA), the International Institute of Refrigeration (IIR) as well as industry, TEAP and TOC experts.

Regional networking provides a regular interactive forum for Ozone Officers from the region to exchange experiences, develop skills, and share knowledge and ideas with counterparts from both developing and developed countries in order to meet compliance, the provisions of the Montreal Protocol and its amendments. Through regular network and thematic meetings and on-going dialogues, networking helps ensure that Ozone Officers have the information, skills and contacts required for managing national ODS phase-out activities successfully. Specific compliance assistance is provided to countries with compliance issues.