

## **ATMOsphere Ibérica 2018: Experts discuss action plans for commercial and industrial refrigeration**

**At an interactive workshop, experts analysed existing barriers and agreed on key recommended actions for further uptake of natural refrigerant-based systems for commercial and industrial refrigeration in Spain and Portugal.**



*Industry experts discuss natural refrigerants technology at ATMOsphere Ibérica 2018.*

### **Summary:**

Training emerged as the key priority to boost a wider uptake of natural refrigerants in Spain and Portugal, agreed participants in the workshop held as part of the ATMOsphere Ibérica 2018 conference in Madrid on 18 September.

The goal of the workshop was to form an action plan to gather industry support for further uptake of natural refrigerants in the Iberian Peninsula.

Participants included representatives from leading end users from Spain (Mercadona, Masymas) and Portugal (Continente), OEMs and distributors of HVAC&R equipment such as EPTA, Carrier and Beijer Ref, and suppliers, as well as from local end users, contractors, trade associations and research centres.

Alvaro de Oña, COO and head of media at shecco – which organised the conference – facilitated the session and provided background on the topic, highlighting how technology innovations are improving the market prospects and business case for natural refrigerant-based HVAC&R solutions, even in warm climates.

In a World Café format, participants were asked to separate into twelve groups. Each group was then tasked with discussing and summarising the most significant existing barriers to wider uptake of natural refrigerant-based HVAC&R solutions, and recommending solutions to overcome them.

A first round of discussion tackled commercial refrigeration options such as CO<sub>2</sub> transcritical (TC) and hydrocarbon water loops, while a second round looked at industrial refrigeration technology such as low-charge ammonia systems. Participants rotated between each table after each round, while table hosts collected the main conclusions from each group.

### Commercial refrigeration

The discussion on commercial refrigeration focused on centralised transcritical CO<sub>2</sub>, condensing units with CO<sub>2</sub> (CU), and hydrocarbon-based waterloop systems. The following were identified:

	CO <sub>2</sub> TC centralised	CO <sub>2</sub> CU	HC waterloop
<b>Advantages</b>	System efficiency; 0 ODP and minimal GWP (1)	Small format; easy installation; 0 ODP and minimal GWP (1)	System simplicity; easy installation; ODP and minimal GWP (3)
<b>Barriers</b>	System complexity; lack of trained technicians; high price for small systems; retrofit	Limited system efficiency, especially in warm regions; retrofit	Current charge size (<150 g) set in standards; noise; retrofit
<b>Recommendations to favour this technology</b>	More training; subsidies and incentives	Ecolabelling; more training	More training; standards review to allow a higher charge size; new safety regulations; use of variable-speed compressors

In general, all participants praised the ultra-low environmental effect of these three technologies. As top priority, there was an overwhelming agreement on the need to increase the training offer to improve the skill levels of manufacturers, installers, and technicians to handle these systems. Retrofits and the difficulties in converting existing systems to more efficient ones using natural refrigerants was another major barrier identified by many participants.

Participants agreed that government incentives would contribute significantly to helping end users overcome high capital costs and accelerate the adoption of technology using environmentally friendly refrigerants.

Participants advocated revising the charge limit on hydrocarbons in hermetically sealed commercial refrigeration systems set in international standards, arguing that the current limit of 150g is too restrictive. A few participants also pointed out the importance of increasing the offer of components too, so as to widen the market supply and help these systems becoming more widely available and competitive price-wise.

### Industrial Refrigeration

As for industrial refrigeration, participants were asked to have a similar discussion about low-charge ammonia (NH<sub>3</sub>), and centralised transcritical CO<sub>2</sub> systems respectively. Main highlights of the discussion were the following:

	<b>Low-charge NH<sub>3</sub></b>	<b>CO<sub>2</sub> TC</b>
<b>Advantages</b>	High energy efficiency; refrigerating capacity; low operating pressures; system simplicity; smaller number of compressors needed to achieve the same cooling capacity	Lower upfront investment costs compared to NH <sub>3</sub> installations; no safety problems with leakages
<b>Barriers</b>	Psychological fear of accidents; toxicity (in case of accidents); high prices for installations and components; expensive retrofit; complex technology	Lack of trained technicians; high operating pressures; high number of compressors required; usually, smaller number of applications; complex technology
<b>Recommendations to favour this technology</b>	Training; Compact installation; safety improvement; semi-hermetic compressors	Training; favourable legislation

In general, participants underlined how technicians are in this sector more used to working with ammonia rather than carbon dioxide. Nonetheless, CO<sub>2</sub> can represent a good opportunity to expand the application range for industrial refrigeration purposes (ammonia still boasts a wider range today).

In any case, the need for further training emerged as a top priority, to allow technicians to develop their skills and properly handle modern systems like those under discussion. This is also linked to the complexity of these systems, which in certain cases are considered too dependent on electronical components. In the specific case of ammonia, toxicity remained a significant issue, even though system safety is expected to improve as charges are reduced. Several participants highlighted the need to overcome existing legislative barriers, as well as increasing the offer of available components.

### **Background on ATMOsphere Ibérica**

ATMOsphere is a conference series focused on the promotion of natural refrigerant technology. The second annual ATMOsphere Ibérica conference was held in Madrid on 18 September.

The conference focused on several applications of natural refrigerants in residential, commercial, and industrial applications.

For more on ATMOSphere see here: [www.atmo.org](http://www.atmo.org)