Cool Up Upscaling Sustainable Cooling

COOL UP - CHILLVENTA STUDY TOUR SUCCESS STORY

Activity	Cool Up – Chillventa Study Tour Nürnberg, Germany
Date	07-11 October 2024
Participants	43 participants from across the MENA region and Türkiye

Chillventa trade fair

Chillventa trade fair in Nürnberg, Germany is one of the leading exhibitions for innovative solutions in refrigeration, air conditioning (AC), ventilation and heat pump technology. In 2024, it welcomed over 32 thousand visitors and 1010 exhibitors from 49 countries. On 8-10 October 2024, the Cool Up programme coordinated a Study Tour to the Chillventa trade fair with over 40 experts from cooling industry and country governments (Egypt, Jordan and Türkiye) from the Cool Up partners countries. The study tour offered an opportunity to explore cutting-edge technologies using natural refrigerants in AC and refrigeration. Following an engaging Study Tour at the Chillventa trade fair, the Cool Up consortium, joined by key industry representatives from AC and Commercial Refrigeration Manufacturers, suppliers, installers, technical trainers and RAC associations, along with several policy makers representing the National Ozone Units, participated in a series of workshops on the latest developments regarding sustainable cooling solutions. The Study Tour underscored the potential of the industry to drive the sustainable cooling transition forward through collaborative action with the financial and pollical sides.

Key achievments of the Chillventa study tour include the following:

- Facilitation of cross-country discussion among key industry players in the Cool Up Programme target countries,
- Networking with key global industry players and explore cooperation and collaboration potential (e.g. demo projects) as well as capture the feedback and concerns of the industry players in the Cool Up countries,
- Introduce key industry players in the Cool Up countries to the latest cutting-edge technologies available in the global market,
- Shared and celebrated the recent activities of the Cool Up Programme and highlight key examples supporting Cool Up's vision and mission.

Chillventa Study Tour Day 1&2

10 guided tour visits were coordinated to connect with key industry players and explore sustainable cooling innovations.

1. Main outcomes of the Study Tour: Chillventa guided tours

The opening day introduced attendees to the latest developments in **natural refrigerants, AC systems and commercial refrigeration through a series of guided tours**. Participants embarked on an informative tour to meet manufacturers and suppliers, exploring how natural refrigerants are reshaping the sector.

On Day 2, the Chillventa Study Tour continued with a guided tour focusing on **industry associations**. Key highlights included discussions on the need for international cooperation and the potential for cross-country collaboration and knowledge exchange. Informal networking sessions organized throughout the study tour fostered not only professional connections but also a shared vision for the future of sustainable cooling solutions in the MENA region and Türkiye.

How the discussion narrative has shifted at this year's Chillventa compared to previous years

1. **Natural Refrigerants are leading the market:** The transition to natural refrigerants has gained a significant momentum in Europe and is picking up globally, solidifying the natural refrigerants as an industry standard. With increasing regulatory changes, such as the EU's F-gas and PFAS regulations, synthetic refrigerants are becoming less viable, and major industry players are exiting the sector.
2. **Heat Pump innovations:** The market is witnessing a surge in heat pump technologies utilizing hydrocarbons, ammonia and CO_2. These developments include high-temperature solutions designed to meet growing demand for efficient and environmentally friendly heating and cooling systems, with a focus on ease of installation and adaptability.
3. **Expansion of chiller options:** The range of industrial and commercial chillers has expanded, with more systems incorporating ammonia, hydrocarbons and CO_2 refrigerants being offered.
4. **Focus on PFAS elimination:** Discussions at the event highlighted the critical shift towards PFAS-free refrigerants and components. The industry is emphasizing natural refrigerants as the way forward to a PFAS free industry.

Chillventa Study Tour Day 3

8 workshop sessions were organized during the Cross-Country Technical Workshop.

2. Main outcomes of the Study Tour: Cross-Country Technical Workshop

On the last day of the Chillventa Study Tour, participants engaged in a dynamic Cross-Country Technical Workshop, an essential capacity-building component of the tour, which facilitated knowledge transfer across the Cool Up countries and set the groundwork for further collaboration in the MENA region and Türkiye. The workshop covered the latest developments in policy, finance as well as the refrigeration and air conditioning market landscape. The interactive "Ask the Trainers" discussion panel provided participants with the chance to leverage the hands-on knowledge from key experts implementing the solutions, fostering a collaborative exchange of knowledge.

Cross-Country Technical Workshop:

1.	**AC Market Overview and Future Trends** Information on the AC market future projections, common AC and fan coil technologies, and key industry players in the Cool Up countries. *Markus Offermann, Guidehouse*
2.	**Commercial Refrigeration in Jordan: The Abdin Industrial's experience** Case studies on cutting-edge commercial refrigeration solutions running on CO_2 and R290 implemented in the MENA region. *Eng. Firas Abdin and Eng. Mohammed Abdin, Abdin Industrial*
3.	**Facilitating the transition towards sustainable cooling: Development of National Cooling Action Plans for the MENA region** Recent updates on the progress of NCAPs and NCS development in the Cool Up countries, namely Egypt, Jordan and Türkiye. *Dr. Felix Heydel, Öko-Recherche*
4.	**Finance Landscape in the MENA Region** Introduction to key available funds and financing programmes in the MENA region and how to tap into those opportunities. *Michal Deuszkiewicz, Frankfurt School of Finance & Management*
6.	**Natural Refrigerants in Practice: Conversion of conventional system to hydrocarbon system** Case study and practical guidance on the conversion of conventional fluorinated commercial refrigeration cabinet to R290/hydrocarbon operated cabinet. *Ulas Güdücü, Ahmet Yar Refrigeration*
7.	**Capacity Building and Market needs in the MENA region** Current MENA AC and commercial refrigeration workforce readiness for the uptake of natural refrigerants. *Dr. Ahmad Abdelrasoul, RCREEE*
8.	**Ask the Trainers: Discussion Panel** Key recommendations when dealing with natural refrigerants equipment and key observations on the current training quality in the Cool Up countries. *Kivanc Aslantas, Türkiye* *Eman Shawqi, Egypt*

3. Main outcomes of the Study Tour: technology overview

3.1 Market trends in single-split AC

Several companies already offer single-split units solutions with R290 as a refrigerant. Several of those are already selling globally, while others operate only in Europe.

Numerous other manufacturers indicated that their R290 products would enter the global market in 2025.

R290 AC split units **are on the rise ↑ ↑**

- Midea reached 7.65 million sales in Europe and Asia of mainly portable AC (self-contained units with max charge of 150g) and single-split AC units with R290 as a refrigerant.
- Clivet, Haier and Hisense placed R290 units on the market in 2024.
- GREE, Hitachi and Mitsubishi indicated readiness to sell R290 units in 2025.

According to manufacturers, the key factors to a faster rollout of R290 units include:

- Existing F-gas regulations and more favorable policies for natural refrigerants
- Availability of well-trained technicians

3.2 Technical specifications of R290 single split AC

Wide range of available capacities:
Capacities ranging from 2.5 - 3.5 kW, (up to 5 kW)
This indicates that most residential single-split AC solutions can already be covered by R290 split-units

High Energy efficiency:
High energy efficiency in classes A++ and A+++, comparable to conventional systems and in some cases outperforming those.

Charge limits:
ACs R290 refrigerant charge limit are not constrained to the 150g and are specified in IEC 60335-2-40 as a formula depending on room size.

Typical charges are around 300 to 350g.

With the adoption of the updated IEC standard, charges can go up to almost 1 kg with safety mitigation measures;

Advanced Safety Measures:
Units aiming at higher refrigerant charge (> 150g) have additional mitigation measures addressing releasable charge. A key example is the installation of leak sensor(s) that:

- Detect leakage,
- Send signal to the outdoor unit,
- Immediately stops refrigerant flow,
- Periodic Indoor ventilation. (combination with mechanical ventilation)

> Safety is no longer a barrier, **solutions exist**!
> time for action is now!

3.3 Multi-split AC and VRF

Multi-split AC units using R290 are **still in the research and development (R&D) phase**. Many companies, such as Midea, Clivet, GREE or Mitsubishi, are accelerating their R&D activities, targeting new products showcase at the next Chillventa taking place in 2026.

> Manufacturers have indicated that a stable market for single-split AC using R290 will be crucial for a successful rollout of multi-split ACs.

Alternative solutions utilizing CO2 or splitting the refrigerant cycle into several 150g partitions already exist to address centralized system demand.

3.4 R290 and CO_2 Chillers

Chiller solutions with CO_2 and R290 are still not widespread and have not reached their market potential yet. several companies like LG, PETRA, Midea, Panasonic and HiRef already have several products in the global market operating with R290 and CO_2 with comparable efficiencies to conventional fluorinated systems. These companies have also expressed their interest in expanding their (existing or new) operations to the MENA region chillers market, namely Egypt.

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