

# How ventilation units with external or integrated heat pumps support climate and health mitigation strategies

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In an era of unprecedented climate and health challenges, the imperative to mitigate global warming and improve indoor air quality has never been more pressing. Central to this effort is the HVAC sector, which plays a pivotal role in addressing environmental and health concerns, particularly through the adoption of low-GWP and natural refrigerants, as well as innovative technologies such as fresh air ventilation units combined with external or integrated heat pumps. Alexandre Stubert, Application Manager for Air Handling Units and Heat Pumps at Systemair Group, provides insights into these developments' significance, implications for climate action, and their role in enhancing indoor air quality.



**Alexandre Stubert**, Application Manager for Air Handling Units and Heat Pumps at Systemair Group

## **Context: The Urgency of Climate Change and Healthy Indoor Air**

While the importance of ensuring healthy indoor spaces has been proven throughout dozens of academic studies, the declaration of 2023 as the hottest year on record by the World Meteorological Organization underscores the urgency of climate action. With the global average temperature steadily approaching the critical threshold of 1.5 degrees Celsius above pre-industrial levels, the need for effective mitigation measures is undeniable. In this context, the HVAC sector emerges as a crucial player, with its contributions and innovations shaping the trajectory of climate change and indoor air quality mitigation efforts.

## **The Role of HVAC in Global Warming Potential (GWP) Dialogues**

According to Stubert, the HVAC sector's impact on global warming potential (GWP) cannot be overstated. As discussions surrounding climate change intensify, evaluating and addressing the environmental footprint of HVAC systems becomes increasingly important. Recognising this, Stubert emphasises the need for a comprehensive understanding of how HVAC technologies contribute to ecological challenges and the potential for innovative solutions to mitigate their impact.

## **Trends Driving Adoption: Heat Pumps and Low-GWP Refrigerants**

Against the backdrop of escalating temperatures worldwide, the demand for efficient and more climate-friendly heating and cooling solutions is rising. Stubert highlights a shift towards enhancing the efficiency of existing HVAC systems rather than simply increasing, for example, the number of air conditioning units and their capacity. This trend is driving the adoption of technologies such as air handling units with integrated and external heat pumps, which offer improved energy recovery and reduced carbon footprint compared to traditional heating and cooling systems. Moreover, the transition towards low-GWP and natural refrigerants aligns with efforts to mitigate climate change by reducing greenhouse gas emissions.

## **Exploring the Benefits of Heat Pumps in Combination with Fresh-air Ventilation Units**

Heat pump and ventilation unit combinations offer many benefits, including high-efficiency heat and cooling recovery, streamlined installation processes, enhanced energy efficiency, and a positive impact on indoor air quality. Stubert explains how these systems leverage smart control technologies to dynamically respond to real-time demand, delivering precise heating or cooling as needed. By effectively regulating temperature, humidity and fresh air levels, they also contribute to creating a healthier indoor environment for occupants.

## **Balancing Efficiency with Environmental Impact: The Synergy of Components**

A key consideration in HVAC system design is balancing energy efficiency and environmental impact. Stubert emphasises the importance of optimising the synergy between various components, such as compressors, heat exchangers, and refrigerants, to achieve this balance. By combining heat pump technologies utilising low-GWP or natural refrigerants and an air handling unit coupled with a high-efficiency heat exchanger, HVAC systems can significantly reduce their environmental footprint without sacrificing performance. Simultaneously, this approach enhances indoor air quality by delivering fresh, filtered air, which stand-alone air conditioning systems usually do not.

## **Levels of Adoption and Market Dynamics**

While there is growing interest in heat pump technologies, Stubert acknowledges varying levels of adoption across different regions. Regulatory frameworks and market demand drive adoption, particularly in areas like the European Union, where stringent environmental regulations exist. However, Stubert notes that educating the market and demonstrating the value of these technologies remain critical challenges, particularly in regions less familiar with energy recovery systems.

## **Cultivating an Informed Market: The Importance of Training**

Stubert advocates for comprehensive training initiatives to foster market understanding and acceptance of fresh air ventilation systems combined with heat pumps. Mechanical consultants and installers need to be educated on the benefits of these systems and their proper application in diverse settings. Moreover, training on handling flammable refrigerants is essential to ensure compliance and safety in HVAC installations. Industry and HVAC engineering associations like Eurovent and REHVA need to step up the game when it comes to defining codes of good practice and regulatory interpretations.

## **Looking Ahead: The Future of Sustainable HVAC**

In conclusion, Stubert underscores the importance of investing in sustainable HVAC technologies to address health considerations, climate change and future-proof operations. By embracing fresh air ventilation units, heat pumps and low-GWP refrigerants, organisations can align with corporate social responsibility objectives and remain adaptable to future regulatory changes. Ultimately, transitioning towards sustainable HVAC solutions is crucial in mitigating environmental impact and building a resilient future. ■