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Heat Pumps best option, EU project finds

Heat pumps using natural refrigerants emerge as an optimal solution for heating and cooling in a nearing energy crisis, experts at the SHERHPA workshop have found. Read here about latest progress and remaining challenges CO_2 heat pumps face in the EU.

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Natural refrigerants, such as CO_2, are a viable alternative to chemicals in all heat pump applications. This has been proved at a one-day workshop exploring latest technical progress for heat pumps based on propane, ammonia, and carbon dioxide.

At the final event of the EU-funded SHERHPA (Sustainable Heat and Energy Research for Heat Pump Applications) project, manufacturers, research institutes, and decision makers came to the following conclusions:

Heat pumps best solution for highly regulated EU market

Existing and upcoming EU legislation will spur the use of renewable energy solutions, most importantly heat pumps. This key message emerged from the workshop which identified three main drivers in the EU for heat pumps using natural refrigerants: the targets set under the Kyoto Protocol to reduce GHG emissions by 2012, the F-Gases Regulation restricting the use of fluorinated gases in heat pump applications, and soaring energy prices. In addition, the EU has issued or is in the process of launching legislation ruling the safety, environmental and efficiency performance of heating systems, such as the Energy Performance of Building Directive (EPBD), the Eco Label, or REACH.

The use of heat pumps using natural refrigerants is thus seen as the most viable solution to comply with legal requirements. However, the SHERHPA organizers insisted that heat pump manufacturers would have to play their part in promoting the systems to consumers and industry players in the EU. More importantly, heat pumps should be more present on political agendas.

SHERHPA
Sustainable Heat and Energy Research for Heat Pump Applications

Energy markets must transform quickly in a carbon-restrained world

By 2030, the annual carbon emissions of heating a typical EU home could decrease from 8 to 1 tonne only by using a heat pump system. These savings will be essential in meeting not only Kyoto goals but also ensuring energy supplies beyond 2010. By then, the oil and gas supplies will peak with an annual decline of up to 3% after that. As a consequence, the heating and cooling market must transform away from oil and gas, moving to more sustainable solutions. As has been shown by latest studies of Eurelectric – the representative of all major electrical utilities – heat pumps will be key in reducing energy use.

CO_2 heat pumps: Technical challenges remain

Experiences so far have shown the viability of CO_2 heat pumps in tap water and space heating. Japanese hot water "EcoCute" units installed in Sweden have been operating over a period of 4 years without any problems. At present, leading manufacturers are investing in R744 heat pumps in the EU, including Green&Cool, Bock, Dorin, Denso, Sanyo, and Stiebel Eltron.

Speakers at the event, however, unanimously mentioned the lack of suitable components as a key obstacle for a wide-spread use of these systems. More specifically, they lamented that heat exchangers are not available in the needed quality. Several projects did not lead to high efficiency because of the low

compressor performance that differed largely from the efficiency levels indicated by the manufacturer. Ahmed Bensafi from the French research institute Cetiat summed up: "We need more components to offer products," urging Japanese manufacturers to supply needed compressors for the EU market.

The SHERPA project – Background & Next Steps

The project is coordinated by GREТh (Groupement pour la recherche sur les Echangeurs Thermiques) and EHPA (European Heat Pump Association) with financial support from the EU 6th Framework Programme. It involves 19 small and medium-sized companies and 10 research institutes in the area of heat pump manufacturing, energy and control from 13 countries. The project evaluated capacity, costs, safety, environmental performance and efficiency of heat pump applications using natural refrigerants.

Talking to R744.com, Rayner Mayer from EHPA, and Bernard Thonon from GREТh, expressed their hope to continue with the SHERHPA project. Mayer was positive that the European Commission would support a project extension. After the concept has been proved, the next project would have to improve the system durability, enhance the component development, and solve remaining technical challenges to present more sophisticated systems.

More information:

SHERHPA workshop, 13 November - Introduction (2.4 MB)

SHERHPA website

EHPA website