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Second heat source optimises heat pump system

Central individual room and supply control systems supplement the concept

Air-to-water heat pumps utilise the outside air as a heat source. Because of their relatively low initial cost, they are currently enjoying growing popularity among owners of new-build or refurbished low-energy homes. Their disadvantage: They work with decreasing outside air temperatures, so when the heating demand increases there is also decreasing energy efficiency. The new BINE-Projektinfo brochure entitled “Double heats better” (04/2018) presents a new system concept in which the building exhaust air is integrated into the system as a second heat source and the regulation of the heat distribution is optimised.

Exhaust air supplies heat at a comparatively high temperature level and leads to favourable system costs. The scientists tested the interaction of the heat pump with the cross heat exchanger for the compact ventilation unit in order to find the optimal extraction point for the waste heat. The results show that the exhaust heat is best extracted downstream of the heat exchanger. A second focus was on optimising the control strategy for the heat distribution system. The aim was to prevent the heat pump from raising the temperature higher than the actual heat demand. To achieve this, the scientists centrally collated the data from the various individual room controllers and used them to determine the supply temperature in the heat distribution system.

In the concluding simulations, the data from the two sub-projects was merged and evaluated at the source and sink side. The investigations relate to new-build and refurbished single-family homes with 140 m² of living space on two floors and an energy demand of less than 120 kWh/m²p.a. The research project was carried out by Vaillant GmbH in cooperation with the Fraunhofer Institute for Solar Energy Systems and the E.ON Energy Research Centre at RWTH Aachen University.

The BINE-Projektinfo brochure, which can be obtained free of charge from the BINE Information Service at FIZ Karlsruhe, is available online at www.bine.info or by calling +49 (0)228 92379-0. The brochure cover and additional image material can also be downloaded from this web portal in the press section.

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