

Energy plus fresh air

Vallox – smart ventilation for optimal air balance integration

VALLOX GMBH *During the construction of a new residential building in Upper Bavaria, the intelligent networking of regenerative energy systems led to the building producing more energy than consumed for heating the building, heating the drinking water, ventilation technology and household usage. In addition to unconventional solutions such as a thermally active gravel trap under the house as a seasonal thermal store, the controlled ventilation with heat recovery contributes to maximising the energy efficiency and thermal comfort.*

“The result of the regenerative energy concept with the main components of solar energy, heat storage, heat pump and controlled ventilation with heat recovery is an energy-plus house”, the client explains about the energy system of the house which was completed in the spring of 2014. The principle of retaining the energy expenditure for heating, cooling and airing the living space to an absolute minimum is based on intelligent home technology that is networked with KNX.

The main components of the implemented energy system are the seasonal storage of “waste heat from solar power” in a geothermal heat store, heat recovery from the indoor air and a salt water-brine/water heat pump. With the heat absorbers under the photovoltaic modules, twice the energy is produced because the heat absorption of the absorbers simultaneously cools the modules.

The generated solar power and the heat recovery from the indoor air are the energy types which are used

immediately within this energy system, while the heat gained from cooling the module is used with a time delay as the principle is partially based on the timed displacement of energy generation and energy consumption through seasonal storage.

The Vallox ValloPlus 800 SE ventilation unit installed in the attic supplies the living spaces and offices with filtered and preheated fresh air. A structurally identical device supplies the bedrooms, bathroom and side rooms in the basement with fresh air; the operation of the ventilation unit is controlled via a humidity sensor for these areas. The ventilation units achieve a maximum air performance of 790 m³/h and transfer up to 90% of the thermal heat from the extracted air to the incoming air with a large heat exchanger.

Among the wishes of the open-minded clients for the energy-efficient building was having an overview of the networked building functions. A touchscreen display integrated in the wall on the ground floor displays the respective circuit and hydraulic diagrams of the individual building systems. From this panel, the occupants operate all the facilities from lighting to regulating the building control systems. To be able to measure the energy efficiency which can be achieved with the intelligent networked energy system, a total of 22 KNX sensors installed in the heat generation and distribution system record the room and medium temperatures as well as the flow rates and air flow volumes.

The building technology which has been refined for maximum energy efficiency and optimum indoor air hygiene saves energy costs and avoids emissions.

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Under the sloping roof, there is space for the comfort system including the soundproof and thermally insulated connection lines for outdoor air and exhaust air, as well as extract air and supply air.

A touchscreen display visualises the setup and interplay of the energy system composed of photovoltaics, heat pump, geothermal heat and controlled ventilation. For the display and evaluation of operating data sensors placed throughout the system record the current actual values of temperatures, air flow and flow rates whose data is collated in the control cabinet.

Photos: Vallox GmbH

