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Low-temp systems save home's energy

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The hot topic among many European governments is implementation of the "low-energy usage home," which is likely to be the future trend in Europe. Heating experts over there unanimously believe that hydronic radiant floor and wall heating are the perfect heat-delivery systems for low-energy dwellings.

The future low-energy house is comprised of a combination of a super-insulated structure with a condensing boiler or ground-coupled heat pump, a heat recovery system for the fresh air supply, solar collectors for domestic hot water production and a hydronic radiant heating/cooling system for distribution.

If we applied such a system in a typical 3,000 sq. ft. home in New England, the house would use less than 480 gal. of heating oil or 670 therms of gas during the course of a year of heating and domestic hot water production.

Only a low water temperature delivery system such as floor or wall heating or panel radiators can make this energy dream house possible. Since condensing boilers and heat pumps can only deliver high efficiencies at low system supply and return water temperatures, you need a large heat-emitting surface, such as a radiant floor, to get it to work.

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A research institute in Darmstadt, Germany, performed a study on energy use in a test house using a variety of heating technologies.

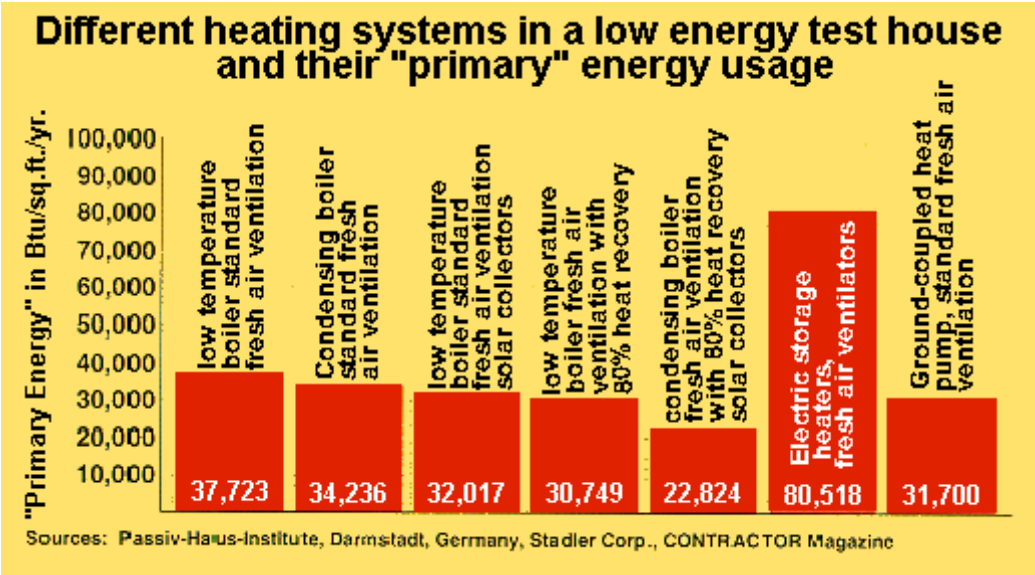
A low-energy house was built in 1987 in the state of Hessen with a total living space of 1,600 sq. ft. and with R-30 insulation in the exterior walls and roof. The house was equipped with a heat recovery ventilator for fresh air and various low-temp-erature heat sources.

The purpose of the study was to compare the total usage of "primary energy" in conjunction with different low-temperature heat sources and ventilation systems.

Primary energy was an important concept in the test. It considers, for example, the amount of energy needed to produce electricity versus solar energy that arrives at the rooftop ready to use.

Researchers created this primary energy model to establish a true energy consumption comparison among different systems and their energy sources.

The study clearly demonstrates that low-temperature hydronic heating systems of all types in conjunction with low-energy homes are a perfect match. The single caveat is that electricity can be used as the heat source only if it is in combination with high-efficiency, ground-coupled heat pumps.



A research institute in Germany tested a variety of heating systems' energy usage to see which system would be the most efficient. The winner was a condensing boiler with a heat recovery ventilator and solar domestic hot water.

Low-temperature oil- and gas-fired boilers, as well as gas-fired condensing boilers, all provide a perfect match with low-temperature radiant systems and low-energy homes.

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