A comparison between Ventilation Air Heating and Electric Radiators in regard of Low Energy Houses' indoor climate

Rickard Adlercreutz, M. Sc., R&D Manager, LVI/Rettig Sweden AB, r.adlercreutz@rettigicc.com

Mikko Iivonen, M. Sc, Director of Technical Environment and Standards, Rettig ICC

Objectives

Ventilation Air Heating is commonly used in Low Energy Houses. Some tenants complain about cold floors and difficulties in adjusting different temperatures in different rooms. Could Electric Radiators of low power improve the situation?

Methods

Interviews with tenants and indoor climate measurements using Ventilation Air Heating with either "additional air heater" or "Electric Radiators (100W-300W) placed below windows".

Results

The air temperature difference between 0,1 m and 1,1 m above floor level decreases from 1,7°C to 0,4°C (mean value) when radiators are used. The operative temperature at 0,6 m is below air temperature at 1,1 m without radiators but above with radiators. The same amount of energy is used in the two cases. Tenants state they feel more comfortable with radiators below windows than with air heating as the vertical air temperature difference is smaller, as they feel more comfortable when not feeling the cold window surfaces (even though it is a triple-pane window) and as they are happy to be able to have lower temperature in their bedroom than in the living room.

Increased operative temperature allows to lower the air temperature without loosing comfort. Lower air temperature reduces the energy consumption with about 5%/C° and also the feeling of dry air.

Investigations (SABO 2006 Energiförbrukning i nybyggda flerbostadshus & Fjärrsyn 2009:4) show that Ventilation Air Heating does not save as much energy as expected. To achieve a low yearly energy consumption, it might be better to equip Low Energy Houses with Exhaust Air Pumps complemented with radiators. Ventilation Air heating is in bypass during the non-heating season where the heat pump recycles energy all year. Electric radiators only consume energy at the coldest days of the year.

Conclusions

Electric radiators in comparison with Ventilation Air Heating improve the indoor climate in low energy houses, which is confirmed both by measured data and interviews with tenants.

Complete text: www.lviprodukter.se/engagemang/passivhuskonferens-2013.htm

Keywords

Radiators, Electric oil-filled radiators, Balanced Ventilation, Heat Recovery, Indoor Climate, Cold floor, Passive House, Low Energy House.