

Good indoor environment should not be sacrificed for low energy use



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The indoor environment in buildings affects energy use and health, productivity and comfort of the occupants. Both energy use and effects on occupants are cost items. But the costs of the poor indoor environment for the society, employer and building owner are often higher than the cost of energy used in the same buildings.

Health and comfort of occupants shall not be sacrificed for lower energy use. Therefore, there is a need to specify criteria for the indoor environment for design, energy calculations and performance evaluation. Already in 2009, the EnVIE project, funded by DG Sanco, reported that EU-27 loses about 2 million disability adjusted life years annually (DALYs) due to the exposure to various pollutants indoors. The conclusions of this project underlined the need for an integrated approach to tackle effectively poor IAQ. The indoor environment is not only a health and comfort issue. It also affects work performance and learning of the occupants. Even a small increase in performance leads to a significant increase in productivity. This was summarised already in a REHVA Guidebook no 6, published in 2006.

Building owners appreciate both low energy use and good indoor environment, which enhances the value of the building. Also many certification systems of buildings include both energy use and the quality of the indoor environment, in the evaluation criteria. Thus, it is desirable to develop systems and solutions which lead to high quality indoor environment with low energy use.

The performance of a building depends how it is designed, built and operated. It is important to let a building owner know the consequences of the decisions related to indoor environmental quality in the design phase. The building with better design and higher investment cost usually also performs better. The owner cannot expect high quality with low investment cost. However, some building owners and occupants do not expect the building to meet the most stringent criteria of indoor air quality, and may still be satisfied with the quality of the building as they do not expect the perfectly controlled indoor environment. In all cases the designer shall always document design criteria for the indoor environment, these criteria shall be available with the energy use data when renting or selling the building space. It is also recommended that

design values for the indoor environment and indicators for the environmental comfort are included in the energy certificate and displayed with actual values for the energy consumption. During the life time of a building the use of rooms may change significantly. Unfortunately, the changes in HVAC system are not always made accordingly, and as consequence occupants suffer from poor indoor environment.

One of the most important factors affecting indoor environment of building is the ventilation. Increased ventilation rates usually mean higher energy use. However, the scientific evidence shows that ventilation is essential for good indoor environmental quality. Ventilation strategies are also important for the energy efficiency of buildings. The requirements for good indoor air quality and energy efficiency have often been considered to conflict with each other but they do not have to be. Many strategies and technologies are available which improve indoor air quality while at the same time maintain or even lower the level of energy use.

On European level significant efforts are taken to this direction when two important ventilation related standards are being revised: EN 15251 "Indoor environmental input parameters for the design and assessment of energy performance of building" and EN 13779 "Ventilation for non-residential buildings". Both belong to the mandate from the European Commission to CEN for revising EPBD related standards. These draft standards are almost completed and are scheduled for be sent for national enquiry in September. Several technologies are described in these standards and accompanying technical reports. These include heat recovery, air tightness, demand controlled ventilation, specific fan power, filtering, localised control of indoor environment, revised target values of indoor environment etc. Hopefully these standards will be used when revising the national building regulations. ■