

# Heating and nearly zero energy buildings

**E**nergy performance of buildings directive aims to “20-20-20” in the year 2020. The main focus is on greenhouse gases production and energy use decrease in buildings by 20% coupled with the increase of renewable energy sources ratio up to 20% in energy production. To fulfill this ambitious target several steps in building design, construction, commissioning and operation have to be done.

At first it is necessary to reduce energy needs of buildings expressed by their energy performance. Energy performance of buildings describes inter alia annual energy use for heating, ventilation, air conditioning, hot water generation and lighting. Heating in moderate and Nordic climate regions is a significant energy user. Its reduction is based on improving building envelope thermal resistance along with enhancing the ability of a heating system to respond sensitively to a random heat gain that may reduce the total energy need. Development of new technologies in this field focuses on an intelligent control of a heating systems, which allows an output control of the system during the whole heating period within 0–100%. Typical examples of such a high efficient flexible system are radiant heaters for industrial halls. A big challenge for office and residential buildings is an integrated low temperature heating/ high temperature cooling system and thermal activated building structures using low potential energy sources. Nowadays it is possible to find a lot of examples of these technologies and ongoing measurements and tests indicate expected behavior of these systems.

The second issue is the use of high efficient or renewable sources to cover remaining energy needs. In this field we can expect wider development of micro-cogeneration, the use of biomass and of course solar and wind energy use.

Frequently asked question is whether a heating system in an almost zero energy building in Central or North Europe will be ever necessary. The answer is not simple and of course depends on the final definition of almost zero energy building. Detailed analyses based on computer models and in-situ measurements indicate massive reduction of heating demand. However will we be by 2020 really ready to discontinue a 400 000 years long period of human settlements development based on fire and heating?



**KAREL KABELE**  
GUEST EDITOR

CSc. PROF. ING.  
CZECH TECHNICAL  
UNIVERSITY IN PRAGUE,  
REHVA VICE-PRESIDENT