

## A few words from the Editors

This issue focuses on technologies in the Nordic countries, where much attention has been paid to indoor environmental quality (IEQ) and energy efficiency for a long time. Requirements for indoor environment and ventilation may be high due to cold and dark winters. The principles for ventilation design for good indoor air quality are summarized by Wargocki et al., in a document from the Nordic Ventilation Group. Criteria for ventilation design, installation, and operation are implemented and regularly updated in the building codes of all Nordic countries. The latest update is from Denmark. The standard which is referred to in the Danish regulations is summarized in an article by Olesen et al.

A new proposal for the revision of the EPBD was published at the end of 2021. It includes several new requirements for the improvement of energy efficiency of buildings. The goal is to have only zero-emission buildings in EU by 2050. The draft EPBD suggests zero balance for annual primary energy use. An article by Kurnitski et al. critically reviews the draft and proposes, instead, to use the annual zero energy balance of non-renewable energy use as the criterion. Experimental research on zero-emission buildings through production of renewable energies has been going on also in the Nordic countries. Results from full-scale laboratory measurements used for simulation validation at the Zero emission laboratory in Norway are described by Nocente et al.

The major goal of the EU policy is to slow down the global warming, which, however, is still taking place. An article by Kosonen et al. shows how the predicted warming of the climate influences the future cooling capacity of A/C systems. New design weather data is needed.

Economical and environmental criteria for financing of energy renovations (taxonomy), are needed to ensure that the measures are cost-effective and sustainable. The quality of the indoor environment and the performance of ventilation should be included in these criteria. This has been done already in Estonia and is described in a summary by Kurnitski et al. From the building owner's point of view the question is how to identify sufficiently profitable measures for energy renovation. The internal rate of return has been used for a long time, although still valid, to evaluate these measures as illustrated in an article by Abel.

The EPBD proposal has more focus on IEQ and ventilation than before. Now the ventilation systems are dealt with as specific technical systems with requirements for regular inspection and monitoring of the performance. Unfortunately, ventilation does not always meet the expectations. Results of a questionnaire on the performance of ventilation systems by Olsson et al. summarizes the opinions of various professionals on the status of ventilation in Sweden. An article by Holopainen et al. shows that inspections are needed not only for energy efficiency but also for the total performance of ventilation systems, with focus on IAQ. The cold climate sets its own requirement to the performance of ventilation equipment. This is well shown in an article by Kempe on frosting and performance of heat exchangers for heat recovery from ventilation air.

Ventilation also affects the spread of airborne infections. New and more effective ventilation systems are needed to meet expanded indoor environmental criteria. An article by Melikov et al. shows, with CFD simulations, how the risk of airborne infection can be reduced by improving room air distribution. However, it is important to check the performance of both new and traditional systems also in practice. The failures in performance of DCV systems in practice are illustrated in an article by Kosonen et al.

An index (TAIL) for evaluation of IEQ in existing buildings was introduced as a result of an EU-project some years ago. Now a method to use a similar index at the design stage of renovations (PredicTAIL) is introduced in an article by Wei et al. ■



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