EBC

Energy in Buildings and Communities Programme

Factsheet

Supplementing Ventilation with Gas-phase Air Cleaning, Implementation and Energy Implications

EBC ANNEX 78

Ventilation of buildings is estimated to account for approximately 20% of the global energy use for providing an acceptable indoor environment. The existing requirements for ventilation in most standards and guidelines assume the quality of (clean) outdoor air is acceptable. When outdoor air is of good quality, the use of air cleaning to partially substitute for ventilation air could possibly reduce the rate of outdoor air supplied to the indoor environment and thereby energy for heating or cooling the ventilation air and for transporting the air (fan energy) may be saved. However, in many locations in the world, outdoor air quality is often very poor. In such cases, the alternative may be to substitute ventilation with outdoor air, at least in part, with air cleaning so that the indoor air can be kept at high quality.

There is a possibility that gas phase air cleaning may simultaneously improve the indoor air quality and reduce energy use for ventilation, and so it may be considered as an interesting technology for potential future application. But, it is necessary to scientifically evaluate its potential to improve indoor air quality (and substitute ventilation rates), as well as the energy implications of this approach. There is also a need to develop standard test methods of the performance of gas phase air cleaning devices related to typical indoor sources such as bio-effluents from occupants and emissions from materials and indoor activities.

This project is bringing together researchers and industry to investigate the possible energy benefits of using gas phase air cleaners as partial substitutes for ventilation and is establishing procedures for improving indoor air quality with reduced ventilation using these technologies. It is also establishing a test method for air cleaners that considers the influence on the perceived air quality and pollutants in the indoor air.

PROJECT OBJECTIVES

1. quantify the energy performance of using air cleaning as part of the ventilation requirements,
2. analyse how air cleaning can partially substitute for ventilation,
3. advance standard testing procedures for air cleaners, and
4. carry out field studies of the energy performance and indoor air quality in buildings using gas phase air cleaning.

The planned deliverables from this project are:

- a method for predicting the energy performance of gas phase air cleaning technologies in buildings and the possible reduction of energy use for ventilation,
- a validated procedure for supplementing (by partially substituting) required ventilation rates in buildings with gas phase air cleaning,
- a test method for air cleaning technologies in buildings that includes perceived air quality as a measure of performance in addition to chemical concentration measurements, and
- a report on the long term performance of air cleaning in buildings.

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INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established as an autonomous body within the Organisation for Economic Co-operation and Development (OECD) in 1974, with the purpose of strengthening co-operation in the vital area of energy policy. As one element of this programme, member countries take part in various energy research, development and demonstration activities. The Energy in Buildings and Communities Programme has co-ordinated various research projects associated with energy prediction, monitoring and energy efficiency measures in both new and existing buildings. The results have provided much valuable information about the state of the art of building analysis and have led to further IEA co-ordinated research.

EBC VISION

By 2030, near-zero primary energy use and carbon dioxide emissions solutions have been adopted in new buildings and communities, and a wide range of reliable technical solutions have been made available for the existing building stock.

EBC MISSION

To accelerate the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge and technologies through international collaborative research and innovation.

Project duration

Ongoing (2018 - 2024)

Operating Agent

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