

Smart ventilation performance from an international perspective

Gaëlle Guyot, Raissa Andrade, Jean Paul Harrouz

Cerema

BPE research team

46, Rue Saint-Théobald

L'Isle-d'Abeau, France

**Corresponding author: gaelle.guyot@cerema.fr*

ABSTRACT

Smart-ventilation with airflows adapting to the need of buildings reduces energy consumptions and can improve IAQ. In some countries, smart ventilation strategies have been widely used for a long term (like Belgium, France,...). We still need to quantify IAQ and energy benefits of smart ventilation through a common internationally validated performance assessment scheme developed in the framework of the IEA-EBC Annex 86. The SmartAIR French project focuses on the adaptation of the tools developed in the framework of the Annex 86 project and test their relevance in the context of the generalization of humidify-based ventilation and the innovation towards new ventilation systems.

Since 2018, new research has been published and collected, notably in the context of the IEA-EBC Annex 86 - Energy Efficient Indoor Air Quality Management in Residential Buildings (2022-2025) with a series of deliverables to be published shortly. In this Annex, the preliminary scheme developed by (Poirier et al., 2021b) based on 5 indicators based on relative humidity, CO₂, formaldehyde and PM_{2.5} with associated input data on emission scenarios (Poirier et al., 2021a) has been extended and tested in a common exercise performed in 5 countries (France, Denmark, Belgium, Brazil, Austria).

This paper will illustrate IAQ and energy performance of a set of 8 smart ventilation strategies based on the modelling of two typical dwellings selected in the French context, with boundaries conditions varying throughout Europe. Most cases selected the same input values, such as CO₂ and humidity emissions, while the occupancy schedules, cooking and showering times and duration varied to better represent the country's habits.

KEYWORDS

Smart ventilation, energy, buildings, indoor air quality, modelling

AKNOWLEDGMENTS

The French Agency for ecological transition ADEME – (Grant number 2262D0108) for funding the contribution of Cerema.

The IEA-EBC Annex 86 experts group, and especially the ST4-Smart ventilation group: Jelle Laverge, Jakub Kolarik, Douaa Al Assad, Quiten Carton, Marcos Batistella, Markus Wirnsberger, Daniela Mortari and Klaas de Jonge.