

## Foreword

We are happy to introduce to you the 11<sup>th</sup> newsletter of the venticool platform of December 2017!

Our first two articles, provide feedback on the ventilative cooling workshop in Brussels followed by the final IEA-EBC Annex 62 expert meeting in Gent in October, 2017. Further on, Professor Maria Kolokotroni presents the summing-up of the ventilative cooling track at the 38<sup>th</sup> AIVC-6<sup>th</sup> TightVent-4<sup>th</sup> venticool joint conference held in Nottingham, UK on 13-14 September, 2017. Christoffer Plesner from Velux, follows up on his last article on new work items recently approved by CEN and ISO with regard to ventilative cooling.

As usual, this edition provides detailed information on upcoming events in the field of ventilative cooling. A major venticool event is the upcoming 39<sup>th</sup> AIVC-7<sup>th</sup> TightVent & 5<sup>th</sup> venticool joint conference: "Smart ventilation for buildings" in Juan-les-Pins, France on 18-19 September 2018, with a specific track largely devoted to ventilative cooling. We hope to see you there.

For more frequent updates, please visit our website, follow us on twitter and Linked In and subscribe to our monthly newspaper "Energy Efficiency and Indoor Climate in Buildings" to find out more about our activities. We wish you a pleasant reading.

The venticool team



## IEA EBC Annex 62- Ventilative Cooling- 8th Expert Meeting, Gent, Belgium, October 24-25, 2017

*Per Heiselberg, Aalborg University*

16 delegates from 10 countries attended the 8<sup>th</sup> expert meeting. The host was KU Leuven, Faculty of Engineering Technology, Technology Campus Ghent, Associate Professor Hilde Breesch.

This was the final project meeting and the main focus was to complete the final reports of the project. They include a Guide Book for ventilative cooling design, a Source Book for ventilative cooling technology and a book of Case Studies with 15 well-documented examples of application of ventilative cooling solutions and their performance. These publications will be available in the beginning of 2018 from the IEA and venticool websites.

The meeting also included a discussion of recommendations for standards, legislation and compliance tool to improve the application of ventilative cooling in new and existing buildings in the future. These recommendations are based on a thorough analysis of international standards in the field and of the present legislation as well as the compliance tools used in 8 European countries. The full background report as well as a short summary with recommendations will also be available in the beginning of 2018.



*Happy participants after completion of the last meeting of Annex 62 meeting at KU Leuven, Gent, Belgium*

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## Feedback from Brussels workshop on ventilative cooling, 23 October 2017

62 persons from 15 countries attended the international workshop on “ventilative cooling in buildings: now & in the future” held in Brussels, Belgium on 23 October 2017. This workshop aimed at discussing the implementation of ventilative cooling as well as its role to guarantee good thermal summer comfort in commercial, educational and residential buildings. The programme firmly built on the results of IEA-EBC Annex 62, namely:

- The ventilative cooling potential excel tool that allows to assess the effectiveness of ventilative cooling solutions taking into account climate conditions, building envelope thermal properties, occupancy patterns, internal gains and ventilation needs
- A book with design guidelines derived by the expert group which should be under review in the next weeks
- An overview of the ability of national energy performance calculation methods to properly take into account ventilative cooling solutions
- An overview of solutions and technologies that can be implemented, including lessons learnt from 15 case studies analysed within the project
- An analysis of relevant CEN and ISO standards and the identification of gaps to fill to increase the adoption of ventilation cooling solutions

The interaction with the audience after these presentations, reflected the interest and need for such tools. These tools will be gradually available on our website.

In the discussions, besides purely ventilative cooling solutions, appropriate solar shading was often mentioned as a pre-requisite. Several thought that Phase Change Materials (PCM) and personal comfort solutions (e.g., using micro-evaporators) could be major new elements influencing future design solutions.

It was also acknowledged that, while ventilative cooling solutions can be effective on multiple aspects including comfort, energy use, power demand and costs, it also requires more work at design stage, possibly with dynamic simulations including airflow modelling, as well as more post-occupancy care, in particular to inform occupants. Several attendees also stressed the need to learn from user interaction and that “visible” automatic controls (e.g. window opening or solar shading controls) need to be understandable for user acceptance.

There were debates about the objectives of the smart readiness indicator (<https://smartreadinessindicator.eu/>) to be included in the future Energy Performance of Buildings Directive. Since only its broad contours are defined at this stage, it is clearly too soon to assess the relevance of a single indicator for the scope foreseen and how this could affect the uptake of ventilative cooling; however, in principle, accounting for electricity grid management and indoor climate would converge with the goal sought with ventilative cooling solutions.

The development of Building Information Modelling (BIM) could also be seen as an opportunity for ventilative cooling as it could ease thermal comfort evaluation and, thereby, encourage designers to look into efficient solutions to prevent overheating. Nevertheless, the structuring of the huge amount of data to be included in BIM objects to cover possible applications, could be a serious hurdle to make this happen in the near future.

This workshop was also the occasion to discuss a new IEA-EBC Annex proposal building on the findings of IEA Annex 62, but looking more broadly at the issues of smart overheating prevention and cooling in changing urban environments. The scope goes beyond the boundaries of the building, addressing also heat island mitigation and outdoor comfort, and includes active cooling as a complementary measure to passive techniques. The goal is to foster “resilient” cooling solutions,

i.e., solutions that either maintain or adapt to maintain their function as outdoor temperatures rise without augmenting stress on the outdoor environment.

In summary, there is no doubt that overheating prevention and cooling will be high on political agendas with the effects of global warming, which we are just starting to experience. The workshop showed an alternative path to the generalisation of full mechanical cooling capacity implementation which would be both energy demanding and detrimental to urban heat island and the adoption of passive cooling techniques. The discussions further stressed challenges and opportunities for research and technology development on resilient cooling to fight and adapt to climate change, in a constantly evolving context of regulations and information technology. This could be the core theme of a new IEA-EBC project.

## Ventilative cooling summary from AIVC 2017 conference

*Maria Kolokotroni, Brunel University London*

The joint 38<sup>th</sup> AIVC, 6<sup>th</sup> TightVent and 4<sup>th</sup> venticool Conference on ‘Ventilating Healthy Low-energy Buildings’ was held in Nottingham, UK, 13-14 September 2017. The programme consisted of plenary sessions and 3 parallel tracks, one devoted to Ventilative Cooling in four sessions (20 papers) and 17 papers in poster sessions. Two sessions were topical proposed by IEA EBC Annex 62 plus one discussion session. One topical session focused on case-studies [6, 18, 23-25] including houses, offices, a large space and shopping malls. O’Sullivan [26] presented preliminary conclusions (~20 buildings), completed post 2010 studied by Annex 62 participants. The second topical session was devoted to Indicators and Strategies/Components. Flourentzou [37] presented energy performance indicators with following papers [15,

31-34] on experiences from offices to renovated dwellings to supermarkets and shopping malls where potential is high. Peter Holzer chaired the discussion session on the proposal for a new IEA EBC Annex on Resilient Cooling.

The paragraphs that follow attempt to group papers according to Technology Readiness Levels (TRL) - Figure 2, and compare with TRLs of those presented two years before at the 26th AIVC conference in Madrid (35 papers).

1. Low TRL: 16 papers were presented on simplified design tools and inter-model comparison of more complex tools for better prediction with emphasis on overheating dissipation. In many cases only boundary conditions are different – ie external conditions (weather data) and internal conditions (use of space) [1-16]. More papers were presented (11 in Madrid) and were similar in scope.

2. Mid TRL: 6 papers presented performance assessment of prototypes through laboratory experiments and/or simulation. A variety of components was presented such as phase change materials and radiant panels combined with ventilation [19, 20], adjustable jets [21], façade improvement [22] bulk air flow measurements [18] including hot climates [17]. Number of papers was less than in Madrid (10) with more emphasis on experimental results.

3. High TRL - 14 papers presented performance verification with data from operational buildings [23-36] for a variety of buildings types. In Madrid the number was similar (13) where in general measurements did not include ventilation/air flow but parameters related to environmental and thermal comfort performance. In Nottingham, more papers included ventilation/air flow measurements. Energy indicators are still investigated but work on health impact has increased.

The need for more explicit reference to Ventilative cooling within building energy performance regulations was discussed [37] with more work initiated by IEA EBC Annex 62. In conclusion, based on papers

presented, work towards more explicit reference to ventilative cooling in energy regulations has progressed, evidence from operational buildings has progressed including health impacts but less work on component development was reported. The complete article including the full list of referenced papers is available [here](#).

## New standardization projects on ventilative cooling and natural and hybrid ventilation systems

Christoffer Plesner, VELUX

New Work Items (NWI's) relevant to ventilative cooling applications have been approved by the European Committee for Standardization (CEN) and the International Organization for Standardization (ISO) (see [venticool newsletter June 2017](#) . The scope of this work is to make technical documents focusing on design aspects of ventilative cooling, and natural and hybrid ventilation systems in residential and non-residential buildings.

The projects are progressing well and have now officially started under CEN/TC 156 (Ventilation for buildings) and ISO/TC 205 (Building environment design). Some of the projects have developed further than others, e.g. the ISO standard (see below) where some of the contents have already been discussed. The others are still in the initial phase of setting up task groups and discussing the scope.

The initiated projects are planned as Technical Specifications (normative documents of lower status than EN Standards), an EN standard under CEN/TC 156, and as an ISO standard under ISO/TC 205.

More specifically, three projects relevant to ventilative cooling applications, have already started:

*Ventilative cooling systems:*

- Main focus: Thermal comfort (prevent overheating)
- Document type: Technical specification
- Work started in WG/21 in CEN/TC 156

*Natural and hybrid ventilation systems in non-residential buildings:*

- Main focus: Indoor air quality
- Document type: Technical specification
- Work started in WG/20 in CEN/TC 156

*Design process of natural ventilation for reducing cooling demand in energy-efficient non-residential buildings:*

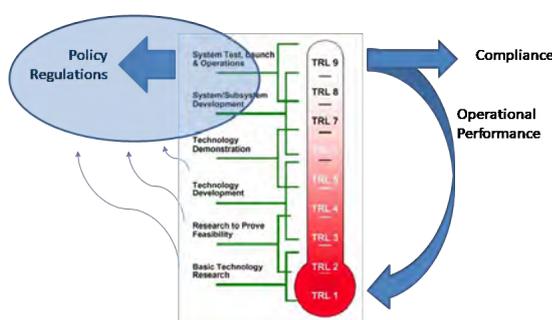
- Main focus: Thermal comfort (design process to prevent overheating)
- Document type: ISO standard
- Work started in WG/2 in ISO/TC 205

and, one project is upcoming:

*Expansion of Natural and Hybrid ventilation in residential buildings in upcoming "Revision of EN 15665:2009 and CEN/TR 14788:2006":*

- Main focus: Indoor air quality
- Document type: EN standard
- Work started up in WG/2 in CEN/TC 156

The technical documents are a good opportunity to define design aspects and processes of ventilative cooling and natural and hybrid ventilation systems on the European and International scene e.g. by applying findings from the venticool platform and the upcoming IEA EBC Annex 62 reports on ventilative cooling.



*Technology Readiness Levels; adapted from: NASA  
Technology Readiness Levels - [https://en.wikipedia.org/wiki/Technology\\_readiness\\_level](https://en.wikipedia.org/wiki/Technology_readiness_level)*

# 18 -19 September 2018 - 39<sup>th</sup> AIVC & 5<sup>th</sup> venticool conference in Juan-les-Pins, France

The 39<sup>th</sup> AIVC- 7<sup>th</sup> TightVent & 5<sup>th</sup> venticool conference "Smart ventilation for buildings" will be held on 18 and 19 September 2018 in Juan-les-Pins, France. The conference will consist of 3 parallel tracks largely devoted to:

- Smart ventilation, Indoor Air Quality (IAQ) and health relationships
- Ventilation and Airtightness
- Ventilative cooling – Resilient cooling

Specific topics of interest on ventilative cooling-Resilient cooling include:

- Thermal comfort and ventilation;
- Coupling of ventilation with cooling systems;
- Ventilative cooling (design, technologies, components, controls, case studies);
- Bioclimatic architectural design towards better summer

performance

- Technologies of passive cooling and overheating prevention
  - Personal comfort control during the hot season
  - Efficient part-time or zonal cooling, including options of precooling
  - Technologies and control strategies towards energy flexible buildings
- Important dates

- Deadline for abstract submission: March 1, 2018
- Notification of abstract acceptance: April 1, 2018
- Deadline for full paper submission: June 10, 2018

The conference is organised by:

- CETIAT, the French technical centre for the heating, ventilation and air conditioning industries
- ADEME, the French environment and energy management agency
- INIVE, the International Network on Ventilation and Energy Performance on behalf of the AIVC, TightVent Europe and venticool.

For more information and to submit your abstracts, please visit:

<http://www.aivc2018conference.org>

## What is ventilative cooling?

Ventilative cooling refers to the use of natural or mechanical ventilation strategies to cool indoor spaces. This effective use of outside air reduces the energy consumption of cooling systems while maintaining thermal comfort. The most common technique is the use of increased ventilation airflow rates and night ventilation, but other technologies may be considered as well. Ventilative cooling is relevant in a wide range of buildings and may even be critical to realize renovated or new NZEB.

## What is venticool?

venticool is the international ventilative cooling platform launched in October 2012 to accelerate the uptake of ventilative cooling by raising awareness, sharing experience and steering research and development efforts in the field of ventilative cooling. The platform supports better guidance for the appropriate implementation of ventilative cooling strategies as well as adequate credit for such strategies in building regulations. The platform philosophy is to pull resources together and to avoid duplicating efforts to maximize the impact of existing and new initiatives.

## Disclaimer

Conclusions and opinions expressed in contributions to the venticool Newsletter represent the author(s)' own views and not necessarily those of venticool partners.

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