

venticool

the european platform for ventilative cooling

Newsletter

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Welcome to venticool

It is with pleasure that we present to you this first newsletter of the European Ventilative Cooling Platform, **venticool**.

Are we aware about the energy saving potential of ventilative cooling? Is it sufficiently well-covered in (future NZEB) regulations to promote its adequate use? We believe that this strategy, if well designed and executed, can play a major role in the context of a drastic energy use reduction in buildings as required by the recast of the Energy Performance of Buildings Directive.

Through this newsletter, you will be regularly informed on the latest developments on ventilative cooling, including policy issues, events, innovative concepts, standardization, case studies, etc. Please, feel free to visit our website at www.venticool.eu

Peter Wouters, Manager of INIVE EEIG

Official Launch of the Ventilative Cooling Platform at the Copenhagen conference

Can we reconcile the ambitious goals of the recast of the Energy Performance of Buildings Directive – in particular, 2020 objective to realise nearly zero-energy buildings – with good thermal comfort and indoor air quality? There are reasons to be optimistic given the efforts undertaken by governments, industry and building professionals in the past few years. But at the same time, it remains extremely challenging to effectively have all new buildings in 2020 meeting the nearly zero-energy target.

The learning process is clearly underway and it is stimulated by the communication and feedback from a number of real projects. Some of these projects demonstrate the potential of (natural or mechanical) ventilative

cooling which, as part of an overall design strategy including adequate solar protections, intelligent use of thermal mass and sometimes support of active cooling, can help improve thermal comfort. Therefore, this strategy is more and more considered to reduce the cooling energy demand in summer and/or mid-season conditions, depending in particular on outdoor climate, building design and internal loads.

However, there are several concerns:

- Not all buildings function in line with the assumed performances and sometimes the real indoor climate is far away from the predicted performances;
- The national energy performance regulations not always reward the

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.

contribution of ventilative cooling strategies, which is a major barrier for market implementation.

The Ventilative Cooling Platform **venticool** was officially launched during the AIVC-TightVent conference in Copenhagen, Oct. 10-11 2012. **venticool** aims to bring resources together to accelerate the learning process in particular by raising awareness, sharing experience and by steering research and development efforts in this field. Expected results include in particular better guidance for 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. The platform will closely collaborate with organizations that have already significant experience and/or are well-identified in the field of ventilation and thermal comfort, e.g. AIVC (www.aivc.org), REHVA (www.rehva.eu), or possibly a new annex of the international energy agency.

venticool will also benefit from the input and feedback of renowned experts involved in related projects or invited to workshops, conferences and other events organized by the platform. The organization of 4 topical sessions on ventilative cooling at the AIVC-TightVent conference in Copenhagen falls within this scope.

The target audience of the platform ranges from European, national and regional government policy makers over designers, practitioners, supply industry to researchers. It is clear that awareness raising is key in the start-up phase, whereas in time the emphasis should move to providing the appropriate support tools and getting the knowledge into the market. The scope of **venticool** covers as well natural, mechanical and mixed-mode



Photo: Adam Mørk

AN EXAMPLE OF REAL PRACTICE Maison Air et Lumière in Paris, France: A one-family house designed to avoid overheating through the use of advanced ventilative cooling and solar shading strategies.

ventilation. It has been initiated by INIVE EEIG with (International Network for Information on Ventilation and Energy Performance) with at present the financial and/or technical support of the following partners: RENSON, WindowMaster and VELUX. For more information, or if you are interested to become a platform partner, please contact us at info@venticool.eu

Challenges of correct assessment of ventilative cooling in energy performance legislations

Because of their increasing weight on building design options, energy performance regulations have undoubtedly become key market drivers. This is a specific concern for ventilative cooling strategies as they require rather mature assessment methods for thermal comfort and ventilation losses to be correctly accounted for. In fact, adequate credit for ventilative cooling should account for thermal comfort criteria as well as ideally, indoor air quality, visual comfort, and noise. It should reflect the effective cooling potential which greatly varies within a single day, calling for rather sophisticated calculations seldom used in regulations. The good news is that

CEN standards (in particular, EN 15251 and EN 15242) provide methods that could fill the gap. In any case, this will be a clear focus area of the ventilative cooling platform.

References

EN 15242. 2007. Ventilation for buildings – Calculation methods for the determination of airflow rates in buildings including infiltration.

EN 15251. 2007. Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics.

IEA project proposal on ventilative cooling is in preparation!

The current development in building energy efficiency towards nearly zero-energy buildings represents a number of new challenges to design and construction of buildings. One of the major new challenges is the increased need for cooling present in these highly insulated and airtight buildings, which is not only present in the summer period but also in the shoulder seasons and in offices even during occupied hours in winter. In most post-occupancy studies of high performance buildings in European countries elevated

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temperature levels is the most reported problem, especially in residences. For residential buildings the design process is much more simplified than for commercial buildings and are to a very large extent based on experiences and rules of thumb. To reach a low energy need for heating designers apply guidelines for passive solar buildings developed in the past where insulation and airtightness levels were far from the levels of today. And as they have no previous experience with overheating problems in their previous designs, they underestimate the need for cooling and might not even take it into account.

Prediction of energy use in residential buildings is often based on simplified monthly methods and is estimated for the residence as a whole. Averaging the need for cooling in both time and space underestimates the need for cooling. Excess heat in spaces exposed to solar radiation is considered to be distributed fully to other spaces and excess solar radiation during daytime is partly distributed to night time. Therefore, the need for cooling to ensure acceptable temperature levels in all spaces will be higher in reality. The analysis of the risk of overheating is often based on the calculated cooling need. Unfortunately, there is no correlation between the calculated cooling need with these simplified methods and the number of hours with elevated temperature levels. So, even if no cooling need is predicted and designers do not expect overheating problems, the number of hours with elevated temperature levels can be considerable.

Cooling and overheating in residences have so far not been considered as a design challenge. Therefore, the developed solutions available for

application in residences to address the cooling issue are very limited and often too simplified. This leads in the few cases, where the cooling challenge is addressed to design of "one-of-a-kind" solutions, which are expensive and need careful commissioning to function. Finally, also to home owners cooling are an unknown challenge that they have not experienced before. They do not know how to reduce the overheating problem efficiently and their behaviour might instead actually increase the problem.

Ventilative cooling can be an attractive and energy efficient solution to avoid overheating of both new and renovated buildings. Ventilation is already present in most buildings through mechanical and/or natural systems and it can both remove excess heat gains as well as increase air velocities and thereby widen the thermal comfort range. As cooling becomes a need also outside the summer period the possibilities of utilizing the free cooling potential of low temperature outdoor air increases considerably.

This has led to the development of a new international IEA ECBCS project proposal with the following scope: "How and when can strategies for increased ventilation reduce the cooling load while maintaining good environmental quality?"

The new project is intended to address both residential and non-residential buildings, however, these two sectors will be treated separately because the issues, challenges and possible solutions are very distinct. It is also intended to address both new constructions and renovated buildings. The objectives of the project are to address the design challenges related to prediction and evaluation of the cooling need and the risk of

AIVC-TightVent conference

Copenhagen 10-11 October, 2012

The **Ventilative Cooling Platform, venticool**, has organized several sessions on challenges and perspectives for ventilative cooling, within the framework of the **33rd AIVC –2nd TightVent– 2012** conference. The conference combines a mixture of workshops focused on the conference topics, presentations on invitation and presentations from call for papers.

The topical sessions nested within the **ventilative cooling** track were:

- International initiatives on ventilative cooling
- Ventilative cooling in residences
- Advanced ventilative cooling concepts in Nearly Zero-Energy Buildings
- Ventilative cooling in building regulations

More information on the conference at: <http://goo.gl/CaVbP>

overheating in high performance buildings as well as to develop new attractive ventilative cooling solutions. The very first project definition workshop is held October 8-9, 2012 in Copenhagen just before the AIVC/Tightvent conference. It is expected that the next workshop will be held in March/April 2013. Please contact Professor Per Heiselberg (ph@civil.aau.dk), Aalborg University, Denmark for further information.

Previous projects

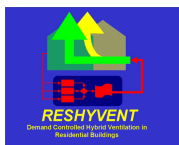
It is within the scope of this platform to raise awareness on previous projects of relevance to ventilative cooling strategies and therefore deserve mentioning.



Natvent, 1994: A European project aimed to contribute a better understanding of the barriers and possibilities for applying natural ventilation in office buildings. (<http://projects.bre.co.uk/natvent/>)



Annex 35 HybVent, 1998: A project of the International Energy Agency aimed to develop control strategies for hybrid ventilation systems for new build and retrofit of office and educational buildings, to develop methods to predict hybrid ventilation performance in hybrid ventilated buildings, to promote energy and cost-effective hybrid ventilation systems in office and educational buildings and to select suitable measurement techniques for diagnostic purposes to be used in buildings with hybrid ventilation systems. (http://www.hybvent.civil.aau.dk/site_guide/index_site_guide.htm)



RESHYVENT, 2002: A project aimed to develop and to construct totally new advanced ventilation concepts for residential buildings based on demand control, hybrid technologies and integration of renewables. (http://www.aivc.org/medias/pdf/LitList%203_3_Reshyvent.pdf)



KEEPCOOL, 2005: A European project aimed to propose intelligent ways of getting passive cooling to penetrate the market and to establish a new definition of sustainable summer comfort. (http://www.iee-library.eu/images/all_ieelibrary_docs/keepcool_finalreport.pdf)



Promotion and Dissemination of Passive and Hybrid Draught Cooling systems in Building - PHDC, 2007-2010: A European project aimed to promote Passive and Hybrid Down-draught Cooling systems (PHDC) in the building sector amongst building design professionals, developers building owners and potential users. (www.phdc.eu)

PARTNERS

venticool is a market oriented platform in which involvement of industry partners is crucial. Partnership is open for all organisations with a direct or indirect interest in the topic of ventilative cooling, e.g. companies specialised in natural and mechanical ventilation, innovative cooling techniques, major architectural and consultancy companies, companies active in thermal insulation, material with high thermal capacity, phase change materials, solar control, solar control, At present, we have the confirmed participation of the following associations and companies:

- **RENSON®**, trendsetter in ventilation and sun protection, develops and manufactures innovative solutions and concepts, which improve the working and living conditions of people and at the same time cut energy costs – Creating healthy spaces. Our natural ventilation systems with a continuous fresh air supply and demand controlled extraction, ensure a high indoor air quality in energy-performant buildings. Thanks to our solar control solutions, overheating is prevented during summer and solar gains maximized during winter.



- **The VELUX Group**, creates better living environments with daylight and fresh air through the roof. Amongst other things the VELUX product programme contains a wide range of roof windows and skylights, along with solutions for flat roofs. The VELUX Group represents one of the strongest brands in the global building materials sector and its products are sold in most parts of the world.



- **WindowMaster A/S**, founded with a vision to create better buildings that have plenty of fresh air and excellent and safe indoor climates, supplying sustainable indoor climate solutions for all types of buildings with solutions based on natural forces – natural ventilation.



PLATFORM FACILITATOR

- **INIVE**, a registered European Economic Interest Grouping (EEIG) bringing together the best available knowledge from its members- organizations in the area of energy efficiency, indoor climate and ventilation.



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