venticool
the international platform for ventilative cooling

Newsletter
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Foreword

14 countries have expressed interest to participate in IEA Annex 62 on “ventilative cooling”; 11 are very likely to participate and are already active in the preparation phase of the Annex.

Why? Maybe simply because these countries have identified the potential of ventilative cooling, but also barriers to field applications which call for international collaboration?

Anyways, as you will learn through this newsletter, the March Brussels workshop on “ventilative cooling—need challenges and solution examples” followed by the Annex 62 meeting have been two major milestones to answer their concerns.

This is just a start, the 34th AIVC and 1st venticool conference in Athens will be a major discussion place on ventilative cooling for researchers, professionals and policy makers as well as the 2nd project meeting. So please mark September 25-26 on your calendar for this key event.

Peter Wouters, Manager of INIVE EEIG

IEA Annex 62 Ventilative Cooling

The Executive Committee of the IEA accepted the formation of a new IEA Annex on Ventilative Cooling at their last meeting in November 2012. This new Annex 62 is given a one year preparation phase which, if successful, will continue in a four year working and reporting phase from 2014 – 2017. During the preparation phase two workshops will be arranged to define and focus the Annex’s objectives, feasibility, methodology, and deliverables in detail. The 1st Annex 62 Preparation Meeting was held March 21 - 22 in the BBRI offices, Brussels, Belgium and the 2nd Preparation meeting will be held in Athens, September 23-24, 2013.

In order to address the cooling challenges of buildings the research focus of the annex will be on development of design methods and compliance tools related to predicting, evaluating and eliminating the cooling need and the risk of overheating in buildings and to develop new attractive energy efficient ventilative cooling solutions. Annex 62 will be divided in three subtasks. **Subtask A “Methods and Tools”** will analyse, develop and evaluate suitable design methods and tools for prediction of cooling need, ventilative cooling performance and risk of overheating in buildings. The subtask will also give guidelines for integration of ventilative cooling in energy performance calculation methods

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.

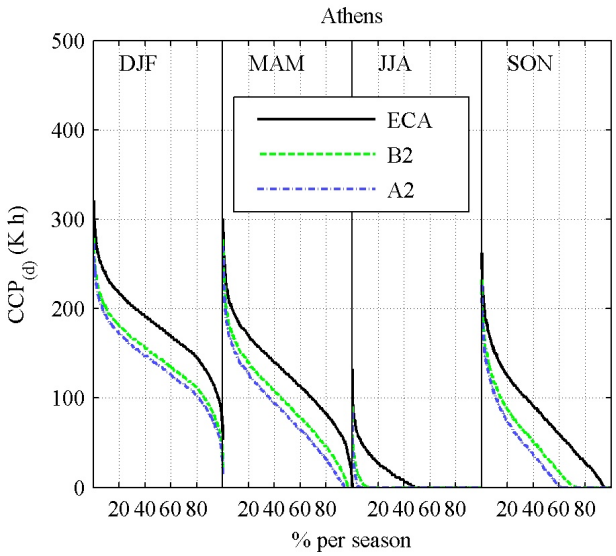


Figure 1: Seasonal cumulative distribution functions of Climate Cooling Potential (CCP) in Athens for current climate (ECA data) and selected simulation runs with mean values for forcing scenarios A2 and B2(emissions scenarios for the years 2071-2100 relative to the baseline 1961-1990, as simulated by the Danish Meteorological Institute regional climate model) (presented by Per Heiselberg).*

Figure 2: A dual sports hall in Nyon, Switzerland (presented by Flourentzou et al.). Graeme Mann & Patricia Capua Mann Architects, 2011.*

and regulation including specification and verification of key performance indicators. **Subtask B "Solutions"** will investigate the cooling performance of existing mechanical, natural and hybrid ventilation systems and technologies and typical comfort control solutions as a starting point for extending the boundaries for their use. Based upon these investigations the subtask will also develop recommendations for new kinds of flexible and reliable ventilative cooling solutions that can create comfort under a wide range of climatic conditions. **Subtask C "Case studies"** will demonstrate the performance of ventilative cooling through analysis and evaluation of well-documented case studies.

Annex 62 will include the participation of approximately 15 countries from Europe, Japan and the US, from universities, research centers and manufacturers and suppliers of ventilation equipment. At the first preparation meeting the focus, research objectives and research methodology was determined. The second and final preparation meeting in September will focus on the development of a detailed work plan for the research to be carried out on Ventilative Cooling from 2014-2017.

Please contact Professor Per Heiselberg (e-mail ph@civil.aau.dk), Aalborg University, Denmark for further information.

Summary of International Workshop on Ventilative Cooling, Need Challenges and Solution Examples, Brussels, March 19-20, 2013

The one and a half-day workshop on "ventilative cooling - need challenges and solution examples" was held in Brussels, March 19-20, 2013. About 60 participants from 15 countries gathered to discuss how and when strategies for increased ventilation with outdoor air can reduce the cooling load while maintaining good indoor environmental quality. The programme consisted of five topical sessions with contributions from various countries and international organisations.

The **first session** of the workshop introduced the **needs and potential for ventilative cooling**. The speakers addressed the need for ventilative cooling strategies and approaches that take into account the effect of future climate change predictions as well as adaptive comfort as a way to optimize the ventilative cooling potential of a building. Predicted scenarios for climate change showed that although the night cooling potential will be reduced significantly in the summer periods, this strategy will remain relevant for more than 50% of the year even in warm European climates (Figure 1).

A discussion on personal control over indoor climate and the use of operable openings showed that operable openings are more than just a tool to optimize the ventilative cooling performance of a building since provisions for personal control over ventilation is an important feature in comfort perception.

During the **second session**, several speakers presented a number of **case studies** where ventilative cooling was applied. The case studies demonstrated ventilative cooling solutions in schools, sport halls, offices etc. with considerable energy savings obtained mainly by night ventilation. Figures 2 and 3 show naturally cooled buildings with demonstrated energy savings for cooling ranging from 50% (for Mediterranean climates) to 100% (for central European climates) while Figures 4 and 5 show office buildings with intensive night cooling application.

The **third session** of the workshop discussed **ventilative cooling in standards and regulations**. Some limitations of existing CEN standards relevant to ventilative cooling were mentioned (EN15242, EN15241, EN 15251, EN 13779) which can be a barrier to the integration of ventilative cooling in energy performance regulations. These limitations should be addressed in the context of the implementation of the Energy Performance of Buildings (EPBD) recast for which the European Commission has issued a mandate (M/480) to revise a set of standards. The future of ventilative cooling integration-inclusion in building regulations was yet found to be more promising for some countries namely Austria and Denmark, where hourly methods are under development and the

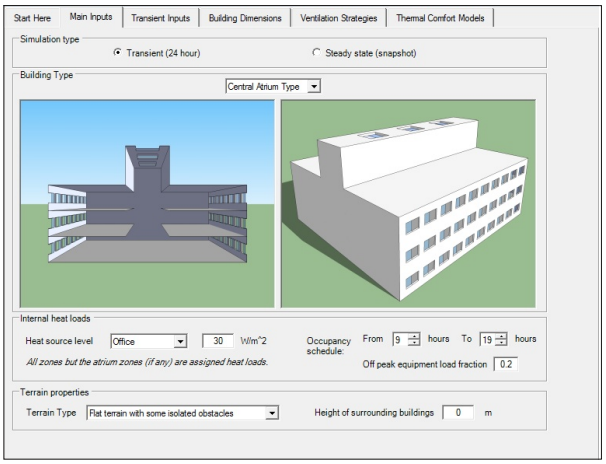
Figure 3: The Nicosia Town hall, Nicosia, Cyprus
(presented by Flourentzou et al.)*
Irwin & Kritioti Architects, 2013.

Figure 4: Renson offices, Waregem, Belgium
(presented by Ivan Pollet).*
Jo Crepain architect, 2002.

Figure 5: GreenOffice® by Bouygues, Paris, France
(presented by Ivan Pollet)*
Ion Enescu architect, 2011.

US, where the starting point is that active cooling is installed but that its energy use can be reduced with ventilative cooling.
The **fourth topical session** of the workshop dealt with the **prediction of cooling needs and the overheating risk**. The speakers acknowledged the complexity of the use of passive systems in design tools and outlined the challenges behind air flow modeling and simulation methods. Research results showed that assuming correct and appropriate use, building performance simulation can be reasonably good for relative comparisons (contrasting design solutions, sensitivity analysis, robustness analysis, (multi objective) design optimization, scenario studies, etc.) but is generally quite poor in absolute predictions, such as future real world energy consumption.
An example of a natural ventilation design tool, CoolVent (Figure 6) was presented which is easily usable in early design stages and provides quick informative results of temperatures, air change rate and thermal comfort, predicts zonal vertical temperature distribution and models air momentum in ventilation shafts while accounts for low-power auxiliary fans. Work is underway to compare simulation results with measured data in an office building in Japan.
The **last session** of the workshop looked into **ventilative cooling new solutions and technologies**. The session started with an analysis of the process of applying ventilative cooling, in terms of opportunities and barriers that relate to legislation and standards on European, national, regional and community level and examples of ventilative cooling applications in building were presented (Figure 4, 5). The session continued with research results on the application of phase change materials (PCM) in ventilative cooling strategies. . Research results on a new ventilation mode namely as stratum ventilation to offset of warm sensation in high temperature conditions, proved to be effective in providing satisfactory indoor thermal comfort and air quality.
During a **final round table**, industry and practitioners have exchanged their views with the audience regarding challenges and opportunities for ventilative cooling strategies. Most of the discussion focussed on regulation and standard issues, stressing both the lack of incentives and tools to choose this design option. The discussion also pointed out the questions of product performance characterization as well as system control (i.e., how to control ventilative cooling systems to minimize discomfort) which are poorly addressed in existing standards. Legislators and standardization committees should endeavour to find the right balance between simplicity (desirable in a regulatory context) and complexity (due to the physics of ventilative cooling).
Overall, the workshop identified the potential of ventilative cooling in many cases to improve energy performance while maintaining a good indoor climate and at the same time, major barriers related in particular to regulations and standards. Since standards or regulations should not hinder the development of competitive technical solutions, they should build on past and recent research developments on ventilative cooling. Pioneering experience in some countries to better account for ventilative cooling strategies is promising. These should inspire other countries for similar developments and standard committees in particular for the revision of the EPBD standards.

** Presented during the International workshop Ventilative Cooling : Need Challenges and Solution Examples, Brussels, 19-20 March 2013.*



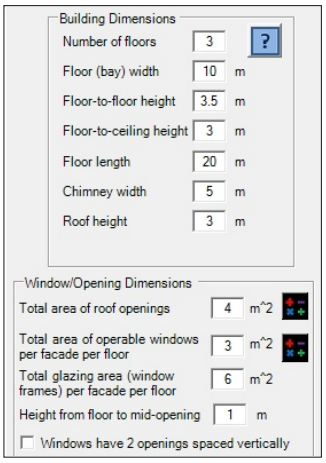


Figure 6: CoolVent, MIT (presented by Steven Ray).*

34th AIVC 3rd TightVent 2nd Cool Roofs' 1st venticool conference

Athens 25-26 September 2013

AIVC conferences have been the major international events on air infiltration and ventilation for over 30 years. The Ventilative Cooling Platform, venticool, was launched during the 33rd AIVC 2012 conference in Copenhagen, where several sessions on challenges and perspectives for ventilative cooling were organized. Over 160 participants attended the conference. This year, AIVC has combined forces with venticool the international platform for ventilative cooling together with the Building and Ductwork Airitghtness Platform (TightVent Europe - www.tighvent.eu) and the European Cool Roofs Council (ECRC). The conference will be held in Athens, 25-26 September 2013.
Best papers will be considered for full publication in peer reviewed scientific journals.
Visit the conference website www.aivc2013conference.org for more information.

Conference organisers:

AIVC, TightVent Europe, ECRC European Cool Roofs Council, venticool the international platform for ventilative cooling, INIVE, Hellenic Republic National and Kapodistrian University of Athens, Technical University of Crete

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:

- **AGORIA-Naventa** is the Belgian association of manufacturers of natural ventilation in residential and non-residential buildings. This group was founded within Agoria, the federation of the Belgian technological industry. As Naventa, we give special consideration to health-related issues when developing new natural ventilation, solar shading and night cooling systems. By supporting the venticool platform, Naventa wants to increase her knowhow and raise awareness that there is a huge need for CEN standards to calculate the influence of ventilative cooling on the energy performance of buildings.

AGORIA no future without technology

- **ESSO**, the European Solar-Shading Organisation (ES-SO), is the umbrella body representing the European solar shading and roller shutter industry. Its objectives are to provide a permanent point of contact between its members (mainly the national professional trade associations) and the European authorities, and to demonstrate that solar shading can make a substantial contribution to energy savings and indoor comfort. By joining the ventilative cooling platform ES-SO underlines the importance of different technologies and strategies to be used in a multidisciplinary and integrated conceptual way to reach the target of low energy buildings' thermal comfort criteria as well as maintaining a good indoor climate and visual comfort.

ESSO European Solar-Shading Organization

- **Eurima** is the European Insulation Manufacturers Association, representing the interest of the mineral wool insulation industry. Eurima actively support venticool to develop knowledge and application of ventilative cooling solutions for a successful implementation of the EPBD recast bearing in mind comfort issues. This requires appropriate levels of insulation and well-functioning ventilation making best use of building materials in order to guarantee energy efficiency, comfort and good indoor air quality.

eurima European Insulation Manufacturers Association

- The **VELUX** Group offers a wide range of solutions for daylight and fresh air through the roof – regardless of roof pitch, size and purpose of the building.The VELUX Group considers ventilative cooling to be a sustainable technology. A technology which today is not at all used to its full potential. The mission of venticool is therefore crucial. It supports the effective and knowledge-based promotion of the use of ventilative cooling, it fills in the gaps in the value chain of ventilative cooling that exist in calculation methods, standards and regulations, and it promotes the communication and awareness of ventilative cooling that could act as a catalyst in the development of the right solutions for the market when they are most needed.

VELUX

- **WindowMaster A/S** is founded on a vision to create better buildings that have plenty of fresh air and excellent and safe indoor climates. We supply sustainable indoor climate solutions for all types of buildings and our solutions are based on natural and hybrid ventilation. Also natural smoke ventilation is a part of our offerings. Our expertise is built on our knowledge of regulatory standards and project development, and our experience from thousands of completed projects across Europe.

WindowMaster Natural Ventilation

PLATFORM FACILITATOR

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

INIVE