

Energy conservation technologies for mitigation
and adaptation in the built environment:
The role of ventilation strategies and smart materials

FINAL
Programme

34th AIVC Conference

3rd TightVent Conference

2nd Cool Roofs' Conference

1st venticool Conference

25-26
September 2013

Divani Caravel Hotel
Athens, Greece

www.AIVC2013Conference.org

CONGRESS ORGANISERS



08:00-18:00: Registration

Macedonia Room

09:15-10:45: Opening – Plenary session (part 1)

Chairpersons: Peter Wouters, Denia Kolokotsa

- **Welcome on behalf of AIVC, venticool, TightVent, INIVE**
Peter Wouters, Manager of INIVE EEIG
- **Welcome on behalf of ECRC**
Denia Kolokotsa, Professor, Technical University of Crete, Greece
- **Model projected heat extremes and air pollution in the Mediterranean and Middle East in the twenty-first century**
Jos Lelieveld, Director, Max-Planck-Institute for Chemistry, Germany (Invited Speaker)
- **Optimization of nighttime ventilation parameters to reduce buildings energy consumption by integrating DOE2 and MATLAB**
Hashem Akbari, Professor, Concordia University, Canada (Invited Speaker)

10:45-11:15: Coffee break

11:15-12:45: Plenary session (part 2)

Chairpersons: Max Sherman, Yun Gyu Lee

- **High performance insulation materials**
Karim Ghazi Wakili, Senior scientist, EMPA, Switzerland (Invited Speaker)
- **Latent heat storage – The technology for rational energy use in buildings**
Branislav Todorovic, Professor, University Belgrade, Serbia (Invited Speaker)
- **Where are we today with ventilation and infiltration in buildings?**
Peter Wouters, Manager of INIVE EEIG

12:45-13:45: Lunch break

Macedonia Room

13:45-15:15: Parallel Session IA: Short oral presentation session- Ventilation for summer comfort - Energy impacts

Chairpersons: Maria Kolokotroni, Ivan Pollet

- **Preferred air velocity and local cooling effect of desk fans in warm environments**
Angela Simone, Denmark
- **Indoor air and thermal environment of environment-friendly house by passive design in Japan**
Tomoyuki Endo, Japan

- **Evaluating the performance of selected thermo-physiological indices on quantifying bioclimatic conditions for pedestrians in a street canyon**
Katerina Pantavou, Greece
- **Natural ventilation in hospital wards of semi-arid climates: A case for acceptable indoor air quality and patients' health**
Mohammed Alhaji, UK
- **Individual appraisal of air conditioned surroundings**
Samuel Hassid, Israel
- **A study on the thermal environment in Greek primary schools based on questionnaires and concurrent measurements**
Paraskevi Dorizas, Greece
- **Combining thermal inertia, insulation and ventilation strategies for improving of indoor summer thermal comfort**
Evola Gianpiero, Italy
- **The use of integrated PV shading systems for energy savings and interior comfort conditions in Mediterranean countries**
Theocharis Tsoutsos, Greece
- **The thermal comfort and IAQ of recent Dutch energy efficient office buildings with Thermal Activate Building Systems**
Wim Zeiler, Netherlands
- **Heat recovery ventilation with closed-loop ground heat exchange**
Bart Cremers, Netherlands
- **Impact of climate change on a naturally night ventilated residential building, Greece**
Theofanis Psomas, Greece
- **Energy saving effect of the ERV (Energy Recovery Ventilator) with outdoor air cooling**
Doosam Song, Republic of Korea
- **Double skin system of room side air gap applied to detached house (part I)**
Kan Lin, Japan

Mycenae Room

13:45-15:15: **Parallel Session IB: Long oral presentation session- Field measurements and surveys addressing IAQ**

Chairpersons: Manfred Plagmann, Samuel Caillou

- **National survey on ventilation system and occupants? Health in Japan**
Kenichi Hasegawa, Japan
- **Energy efficiency and IAQ aspects of the school buildings in Greece**
Niki Gaitani, Greece
- **Health issues in relation to building dampness in European Social Housing**
Stavroula Karatasou, Greece
- **Sanitary aspects of domestic ventilation systems: an in situ study**
Joris Van Herreweghe, Belgium

13:45-15:15: Parallel Session 1C: Long oral presentation session- Airtightness: Collection and analysis of field data

Chairpersons: Andrzej Gorka, Paula Wahlgren

- **Airtightness and ventilation of social housing in Ireland – A review of field measurements and occupant perspectives pre- and post- retrofit**
Derek Sinnott, Ireland
- **Airtightness quality management scheme in France: assessment after 5 years operation**
Sandrine Charrier, France
- **Preliminary analysis of a French Buildings Airtightness Database**
Adeline Bailly, France
- **A stochastic approach to predict the relationship between dwelling permeability and operational infiltration in English apartments**
Benjamin Jones, UK

Pella Room

13:45-15:15: Parallel Session 1D: Topical session- Cool Roofs: Recent developments and Rating Schemes

Chairpersons: Hashem Akbari, Afroditi Synnefa

- **The climate effects of increasing the albedo of roofs in a cold region**
Hashem Akbari, Canada (Invited Speaker)
- **Interlaboratory comparison of cool roofing material measurement methods**
Afroditi Synnefa, Greece
- **Development and analysis of inorganic coating for energy saving for buildings**
Denia Kolokotsa, Greece
- **Study on the appropriate selection of urban heat island measure technologies to urban block properties**
Hideki Takebayashi, Japan

15:15-15:30: Room change

Macedonia Room

15:30-16:30: Parallel Session 2A: Long oral presentation session- Experience with ventilative and passive cooling

Chairpersons: Per Heiselberg, Lorenzo Pagliano

- **Passive cooling dissipation techniques for buildings and other structures: The state of the art**
Denia Kolokotsa, Greece

- **Experimental analysis of different operational configurations for single sided natural ventilation as part of a low energy retrofit**
Paul O'Sullivan, Ireland
- **Ventilative cooling of residential buildings: Strategies, measurement results and lessons-learned from three Active Houses in Austria, Germany and Denmark**
Peter Foldbjerg, Denmark
- **Evaluation of ventilative cooling in a single family house**
Karsten Duer, Denmark

Mycenae Room

15:30-16:30: **Parallel Session 2BC: Topical session- Quality of ventilation systems**

Chairpersons: Arnold Janssens, François Durier

- **Securing the quality of ventilation systems in residential buildings: Existing approaches in various countries**
Arnold Janssens, Belgium (Invited Speaker)
- **Overview of the UK residential ventilation market and initiatives to improve the quality of the installed systems**
Alan Gilbert, UK (Invited Speaker)
- **Detailed analysis of regulatory compliance controls of 1287 dwellings ventilation systems**
Jobert Romuald, France

Pella Room

15:30-16:30: **Parallel Session 2D: Long oral presentation session- Analysis of cool roofs' characteristics and optical properties**

Chairpersons: Despina Sergides, Stella Chadiarakou

- **Effect of ageing processes and atmospheric agents on solar reflectivity of clay roofing tiles**
Chiara Ferrari, Italy
- **Field observation of cooling energy saving by the high reflectance paint**
Chihiro Yamada, Japan
- **Composite material for renovation of roofs in existing buildings**
Stella Chadiarakou, Greece
- **Cooling roofs through low temperature solar-heat transformations in hydrophilic porous materials**
Dimitrios Karamanis, Greece

16:30-17:00: Coffee break

17:00-18:30: Parallel Session 3A: Short oral presentation session- Ventilation and cooling strategies

Chairpersons: Peter Holzer, Angela Simone

- **Parametric analysis of environmentally responsive strategies for building envelopes specific for hot hyperarid regions**
Isaac Meier, Israel
- **A low-energy innovative system for space cooling**
Giouli Mihalakakou, Greece
- **Double facades: comfort and ventilation at an extreme complex case study**
Wim Zeiler, Netherlands
- **Double skin system of room side air gap applied to detached house (Part 2)**
Simulation analysis for reduction of cooling load by natural ventilation in the wall
Togo Yoshidomi, Japan
- **Building Envelope Design for climate change mitigation: a case-study of hotels in Greece**
Ifigenia Farrou, UK
- **The effect of a novel roof pond to the indoor air temperature for passive cooling**
Artemisia Spanaki, Greece
- **Passive ventilation in multi-storey Atrium buildings: A first-order design guide**
Andrew Acred, UK

17:00-18:30: Parallel Session 3B: Short oral presentation session- Ventilation system performance and indoor air quality

Chairpersons: Wouter Borsboom, Pavel Charvat

- **Investigation of the air flow field in front of the reinforced slot exhaust hood**
Ondrej Pech, Czech Republic
- **A study on effects of energy saving by applying complex insulation integrated the soft material in apartment house**
Mi Yeon Lee, Republic of Korea
- **Energy saving and Indoor Air Quality in office buildings**
Eleni Provata, Greece
- **Occupancy estimation based on CO₂ concentration using Dynamic Neural Network Model**
Hwataik Han, Republic of Korea

- **Analysis of Indoor Air Quality in Greek primary schools**
Paraskevi Dorizas, Greece
- **Does Indoor Environmental Quality affect students' performance?**
Paraskevi Dorizas, Greece
- **Indoor and outdoor distribution of airborne pollutants in naturally ventilated classrooms**
Paraskevi Dorizas, Greece
- **Instationary operation of a ventilation system**
Martin Schmidt, Germany
- **Energy saving opportunities by suitable HVAC management: the Procuratie case in Venice**
Luigi Schibuola, Italy
- **High efficiency retrofit in historic buildings by demand-controlled ventilation**
Luigi Schibuola, Italy
- **Uncertainties in different level assessments of domestic ventilation systems**
Regina Bokel, Netherlands
- **Measurements and modelling of an earth- to- air heat exchanger for retail building ventilation**
Andrzej Gorka, Poland

Naoussa/Edessa Room

17:00-18:30: Parallel Session 3C: Long & Short oral presentation session- Methods for characterizing airtightness – Durability

Chairpersons: Rémi Carrié, Derek Sinnott

- **Durability and measurement uncertainty of airtightness in extremely airtight dwellings**
Arnold Janssens, Belgium
- **Airtightness of buildings - Calculation of combined standard uncertainty**
Christophe Delmotte, Belgium
- **Impact on IAQ of building material emitted pollutants through building leaks: State of the art and sample testing methodology**
Sarah Juricic, France
- **Application of blower door test measurements in the evaluation of workmanship influence in airtightness**
Nuno Ramos, Portugal
- **Control of airtightness quality management scheme in France: results, lessons and future developments**
Sandrine Charrier, France
- **Airtightness of very large volume buildings: Measuring method and first results**
Florent Boithias, France
- **Comparison of different air tightness and air exchange rate measurements in a very small test building before and after sealing**
Stanislavs Gendelis, Latvia

17:00-18:30: Parallel Session 3D: Short oral presentation session- Applications of cool materials in the built environment

Chairpersons: Argyro Dimoudi, Triantafullia Nikolaou

- **Use of cool materials in outdoor places in order to mitigate the urban heat island in a medium size city in Greece**
Argiro Dimoudi, Greece
- **Cool fluorocarbon coatings in industrial buildings: Optical properties and energy performance**
Eleni Mastrapostoli, Greece
- **Using cool paving materials to improve microclimate of urban areas- Design realisation and results of the Flisvos project**
Mat Santamouris, Greece
- **Experimental determination of comfort benefits from cool-roof application to an unconditioned building in India**
Vishal Garg, India
- **Simulation of the cooling effect of roof added photovoltaics**
Vasilios Kapsalis, Greece
- **Experimental analysis of small scale roof ponds, protected by a variety of materials in different positions in regard to water level**
Artemisia Spanaki, Greece
- **A case study of sustainable urban planning with the use of a decision support system**
Afroditi Synnefa, Greece
- **Urban gardens: As a solution to energy poverty and urban heat island**
Vasiliki Tsilini, Greece
- **A holistic approach of the development and application of innovative composite cool-thermal insulating materials**
Sofia – Natalia Boemi, Greece
- **Solar optical and thermal properties of mesoporous materials for cooling applications compared to typical building materials**
Spyros Krimpalis, Greece
- **Heat island phenomenon and cool roofs mitigation strategies in a small city of elevated temperatures**
Eftychios Vardoulakis, Greece
- **Assessing thermal risk in urban areas – An application for the urban agglomeration of Athens**
Anastasios Polydoros, Greece
- **Evaluation of the application of cool materials in urban spaces: a case study in the center of Florina**
Stamatis Zoras, Greece

18:45: Reception

08:45-09:45: Parallel Session 4A: Topical session- Ventilative cooling in standards and regulations - Challenges for Annex 62

Chairpersons: Per Heiselberg, Peter Holzer

- Recent developments to integrate ventilative cooling in the Danish regulatory context
Per Heiselberg, Denmark (Invited Speaker)
- Recent developments to integrate ventilative cooling in the Austrian regulatory context
Peter Holzer, Austria (Invited Speaker)

08:45-09:45: Parallel Session 4BC: Long oral Presentation session- Ventilation and airtightness nearly zero-energy buildings

Chairpersons: Risto Kosonen, Samuel Caillou

- Market transformation towards nearly zero energy buildings through widespread use of integrated energy design
Theoni Karlessi, Greece
- The first Dutch Passive house and Plus energy schools: some Dutch IAQ experiences in schools
Wim Zeiler, Netherlands
- Optimization method for the ventilation system choice in zero energy buildings
Patrick Ampe, Belgium

08:45-09:45: Parallel Session 4D: Long & short oral presentation session- Cool materials: Mitigating the Urban Heat Island

Chairpersons: Alberto Muscio, Niki Gaitani

- Using cool pavements as a mitigation strategy to fight urban heat island- A review of the actual developments
Mat Santamouris, Greece
- Green and cool roofs. Urban heat island mitigation potential in European climates for office buildings under free floating conditions
Denia Kolokotsa, Greece
- Preliminary studies for cool roofs? Energy rating and labelling system in Italy roofs'
Michele Zinzi, Italy

- On the possibilities and limitations of CFD for the study of urban street canyons
Marina Neophytou, Cyprus
- Simultaneous integration of urban heat island mitigation technologies in the existing urban fabric in Athens, Greece
Elli Calokerinou, Greece
- Urban rehabilitation at the municipality of Acharnes, Greece
Niki Gaitani, Greece
- The project MAIN-Materials INtelligent: dissemination of the cool roof and cool pavement concepts in the Mediterranean area
Romain Veyan, GIP FIPAN- Academie de Nice, Alberto Muscio, DIEF, University Modena & Reggio Emilia

Pella Room

08:45-09:45: Parallel Session 4E: Long oral presentation session- Trends and directions in buildings' energy efficiency

Chairpersons: Despina Sergides, Annarita Ferrante

- Urban recreation energy efficient retrofit for carbon zero and socio-oriented urban environments
Annarita Ferrante, Greece
- Comparative studies of the occupants' behaviour in a University building during winter and summer time
Despina Serghides, Greece
- Fuel poverty and the financial crisis: A household survey in Greece
Mat Santamouris, Greece

09:45-10:05: Coffee break

Macedonia Room

10:05-11:35: Parallel Session 5A: Long oral presentation session- Climate change and summer comfort

Chairpersons: Francis Allard, Lorenzo Pagliano

- Micro-climate modification and potential for reduction in summertime over-heating in social housing, South Wales, UK
David Holmes, UK
- Impact of climate change on indoor thermal comfort of naturally ventilated public residential buildings in Singapore
Steve Kardinal Jusuf, Singapore
- Potential of night ventilative cooling strategies in office buildings in Spain. Comfort analysis
Olatz Irulegi, Spain
- Improving ventilation conditions in a city centre through bioclimatic redesign of open urban areas
Argiro Dimoudi, Greece

- **Study on the future weather data considering the global and local climate change for building energy simulation**
Hideki Kikumoto, Japan

Mycenae Room

10:05-11:35: Parallel Session 5BC: Topical session- Ventilation and health in high performance buildings

Chairpersons: Wouter Borsboom, Max Sherman

- **Proposed research agenda for achieving indoor air quality supporting health and comfort in highly energy efficient buildings**
Pawel Wargocki, Denmark (Invited Speaker)
- **Why we ventilate?**
Max Sherman, United States (Invited Speaker)
- **Characterization of particle matter**
Wouter Borsboom, Netherlands
- **New developments on cooker hoods**
Max Sherman, United States
- **New developments on air cleaners**
Pawel Wargocki, Denmark

Naoussa/Edessa Room

10:05-11:35: Parallel Session 5D: Long oral presentation session- Smart materials

Chairpersons: Marija Todorovic, Theoni Karlessi

- **Green roofs and vertical greenery systems evaluation - Heat and mass transfer modeling and experimental quantification**
Marija Todorovic, Serbia (Invited Speaker)
- **The effect of solar radiation on thermochromic building coatings: testing the performance and proposing methods for their improvement**
Theoni Karlessi, Greece
- **Influence of the Irradiance Spectrum on Solar Reflectance Measurements**
Chiara Ferrari, Italy
- **Performance of self-cleaning cool cementitious surface**
Ana Werle, Brazil
- **Development and testing of photovoltaic pavement for heat island mitigation**
Chrysanthi Efthymiou, Greece
- **A numerical and experimental analysis of the aging of the cool roofs for buildings in Greece**
Elena Mastrapostoli, Greece

10:05-11:35: Parallel Session 5E: Long oral presentation session- Advanced energy efficient technologies for buildings

Chairpersons: Theodoros Tsoutsos, Stamatis Zoras

- **Nearly zero energy hotels, the European project NEZEH**
Theodoros Tsoutsos, Greece
- **The impact of temperature increase in Greece on the energy demand of buildings**
Triantafyllia Nikolaou, Greece
- **Development of an algorithm for predicting the performance and optimising the design of an energy efficient lighting system**
Konstantina Vasilakopoulou, Greece
- **A development of a lighting controller using smart sensors**
Sotiris Papantoniou, Greece
- **Development of an Innovative Energy Management System for University Campuses**
Ariadni Vasilomichelaki, Greece

11:35-11:50: Room Change

11:50-12:50: Parallel Session 6A: Topical session- Active House – buildings combining comfort, energy and sustainability

Chairpersons: Karsten Duer, Maria Kolokotroni

- **Introduction and welcome**
Karsten Duer, Denmark
- **Introduction to the Active House Specification, with specific focus on requirement to indoor comfort, calculation methodologies, evaluation methods and the use of the radar diagram to communicate the evaluation**
Peter Foldbjerg, Denmark
- **Experience and trends with different ventilation systems for Active House, like the use of demand control ventilation systems to optimize the indoor comfort and reduce the energy consumption, use of demanded openings of windows to create ventilative cooling in buildings, use of heat pumps to recover heat from the extract air to hot water**
Ivan Pollet, Belgium
- **Systematic comparison of different ventilations strategies**
Peter Holzer, Austria (Invited Speaker)

11:50-12:50: Parallel Session 6BC: Long oral presentation session- Ventilation performance and requirements

Chairpersons: Willem de Gids, Hannu Koskela

- **Guidelines for health-based ventilation in Europe**
Pawel Wargocki, Denmark (Invited Speaker)

- Filter pressure drop control in balanced ventilation systems for dwellings
Alain Ginestet, France
- Air flow model for sub-slab depressurization systems design
Thierno Diallo, France

Naoussa/Edessa Room

11:50-12:50: Parallel Session 6D: Long oral presentation session- Cool materials and passive cooling of buildings

Chairpersons: Hashem Akbari, Sofia Natalia Boemi

- Heating energy penalties of cool roofs: the effect of snow accumulation on roof
Hashem Akbari, Canada (Invited Speaker)
- Influence of cool materials on building energy demand at district scale
Adrien Gros, France
- Design impacts of cool roof coating, skylights and ground inertia on commercial low-rise building energy demand and summer comfort
Remon Lapisa, France
- Cool Roof for passive cooling: simulations of an existing building in Southern Italy
Vincenzo Costanzo, Italy

Pella Room

11:50-12:50: Parallel Session 6E: Long oral presentation session- Building envelope: Concepts and experience

Chairpersons: Federico Rossi, Konstantina Vasilakopoulou

- Development and application of “thermal radiative power” for urban environmental evaluation
Yupeng Wang, Canada
- Development of self-cleaning top-coat for cool roof
Takeshi Sonoda, Japan
- Effect of cool roofs and green roofs on temperature in the tropical urban environment
Steve Kardinal Jusuf, Singapore

12:50-13:50: Lunch break

Macedonia Room

13:50-15:20: Parallel Session 7A: Long oral presentation session- Cooling needs and indoor environment

Chairpersons: Francis Allard, Yun Gyu Lee

- Ventilation and energy aspects of food retail and catering facilities service buildings
Maria Kolokotroni, United Kingdom (Invited Speaker)

- **Optimizing the operation of earth-to-air heat exchangers in high-performance ventilation systems for low-energy buildings - A case study**
Alexandru Tudor, Romania
- **Are heat recovery systems necessary for nearly zero energy buildings in mild climates?**
Flourentzos Flourentzou, Switzerland
- **Indoor environmental quality in very low income households during the winter period in Athens**
Mat Santamouris, Greece
- **Dwelling Environmental Quality Index: an indicator of indoor environmental quality in residential buildings**
Marina Laskari, Greece

Mycenae Room

13:50-15:20: Parallel Session 7BC: Long oral presentation session- Ventilation performance measurement and monitoring

Chairpersons: Tomasz Mroz, Arnold Janssens

- **Uncertainties in air exchange using continuous - injection, long term sampling tracer - gas methods**
Max Sherman, United States (Invited Speaker)
- **On investigating instantaneous wind-driven infiltration rates using CO₂ decay method**
Dimitrios Kraniotis, Norway
- **Experimental performance characterization of a new single room ventilation device with heat recovery**
Samuel Gendebien, Belgium

Naoussa/Edessa Room

13:50-15:20: Parallel Session 7D: Long oral presentation session- The role of cool materials in the urban context

Chairpersons: Marina Neophytou, Anna Laura Pisello

- **Modeling of urban canyon: analytical and experimental remarks**
Federico Rossi, Italy
- **On the analysis of cool roofs for cooling system efficiency**
Anna Laura Pisello, Italy
- **Toward designing strategies for UHI mitigation based on multiscale flow considerations**
Marina Neophytou, Cyprus
- **Studying the effect of 'cool' coatings in street urban canyons and its potential as a heat island mitigation technique**
Chrissa Georgakis, Greece
- **On the thermal characteristics and the mitigation potential of a medium size urban park in Athens, Greece**
Fotini Skoulika, Greece
- **Evolution over time of UV-Vis-NIR reflectance of cool roofing materials in urban environments**
Riccardo Paolini, Italy

13:50-15:20: Parallel Session 7E: Short oral presentation session- Smart and cost effective technologies

Chairpersons: Panagiota Michalakakou, Michele Zinzi

- **Experimental investigation of the thermal and optical behaviour of the intensive green roof system installed in an office building in Athens**
Panagiota Karachaliou, Greece
- **Considering the Attica Example: Hotel location as a determinant factor of tourist carbon footprint**
Stella Panayiota Pieri, Greece
- **Rehabilitation of a residential building in Greece with energy and cost efficient technologies: simulation scenarios and cost analysis**
Theoni Karlessi, Greece
- **Resource- and Cost-effective integration of renewables in existing high-rise buildings**
Theoni Karlessi, Greece
- **Retrofitting an office building towards a zero-energy building (NZEB)**
Eleni Pyloudi, Greece
- **Development of a smart sensor for controlling artificial lights and venetian blinds**
Pantelis Foutrakis, Greece
- **Exergy analysis of biogas-fed SOFC**
George Fragoyiannis, Greece
- **Pilot application of flywheels in RES-based power plants**
George Prodromidis, Greece

15:20-15:35: Coffee break

15:35-17:30 Closing – Plenary session

Chairpersons: Peter Wouters, François Durier

- **Energy Performance and Indoor Climate: progress in the past 20 years and perspectives**
Francis Allard, Professor, University of la Rochelle, France (Invited Speaker)
- **Summing up of the ventilative cooling track**
Per Heiselberg, Professor, University of Aalborg, Denmark (Invited Speaker)
- **Summing up of the airtightness track**
Martin Liddament, VEETECH, United Kingdom (Invited Speaker)
- **Summing up of the ventilation performance and IAQ track**
Willem de Gids, VentGuide, Netherlands (Invited Speaker)
- **Summing up of the cool roofs track**
Denia Kolokotsa, Professor, Technical University of Crete, Greece
- **Building Urban Mitigation and Adaptation Technologies for a Resilient Built Environment**
Mat Santamouris, Professor, National and Kapodistrian University of Athens, Greece



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