



3<sup>rd</sup> International Conference

# PALENC 2010

Cooling the Cities - The absolute Priority



## Passive & Low Energy Cooling for the Built Environment

Jointly Organised with:

5th European Conference on Energy Performance & Indoor Climate in Buildings (EPIC 2010)

& 1st Cool Roofs Conference

29 September - 1 October 2010 | Rhodes island, Greece

- *The full papers are listed as shown in the programme of the conference. This list includes papers that have been submitted by the 21<sup>st</sup> of September 2010.*
- *To find a specific author and/or paper please use the 'find' facility of this document by pressing "ctrl+F" or visiting Edit > Find.*

### DAY 1

#### Session 01: Opening

*Keynote lectures F.Nicol: Where are we and where next thermal comfort?*

*B. Todorovic: Planning improvements of energy performances of existing buildings at the level of the entire town. Predicted interventions and benefits. Example of Belgrade.*

#### Session 02: Progress on passive cooling

*Keynote speech S.Alvarez, J.Salmeron, J.Molina, F.Sanchez: Calculation methods as a barrier for the penetration of passive cooling.*

**L.Terrinoni, P.Signoretti, D.Iatauro, C.Romeo, A.Federici:** Summer air conditioning of buildings: Definition, analysis and application of a climatic severity index aimed at zoning the Italian territory.

**U.Dietrich, A.Lydia:** Design process for an office building starting with comfort criteria under special consideration of adaptive comfort model according to EN 15251 - teaching method and results.

**J.Salmeron, F.Sanchez, J.Sanchez Ramos, S.Alvarez, J.Molina:** Technical fundamentals of a software tool for design passive and hybrid cooling systems in buildings.

**A.Spanaki, T.Tsoutsos, D.Kolokotsa:** Parametric study of roof pond with gunny bags in the cooling season.

**A.Spanou, M. Santamouris, L.Kalisperis:** Energy performance of the Cyprus presidential palace.

**B.Philipson, N.Couillaud:** Energy savings by intelligent solar shading.



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### Session 03: Passive cooling at community level

**Keynote speech X.Cipriano, J.Marti, J. Carbonell, D.Perez:** *Is there any room for action? The effect of energy efficiency improvements in a working-class urban district.*

**N.Gaitani, M.Assimakopoulos, M.Santamouris:** Bioclimatic assessment in designing of open spaces in the historic center of Tirana, Albania.

**N.Wong, S.Jusuf, N.Syafii, Y.Chen, H.Sathyanarayanan, J.Britto, N.Hayadi, Y.Manickavasagam:** Evaluation of the impact of the surrounding urban morphology on the building energy consumption of a building.

**M.Romero:** Urban microclimate and the residential space configuration of Brasilia.

**M.Stathopoulou, S.Iacovides, C.Cartalis:** Quality of life changes using Landsat and socio-economic GIS data

**A.Synnefa, M.Stathopoulou, A.Sakka, K.Katsiabani, M.Santamouris, N.Adaktylou, C.Cartalis, N.Chryssoulakis:** Integrating sustainability aspects in urban planning: The case of Athens.

**K.Limpou:** *Designing outdoors: Ephemeral & adaptive book shelters in Thessaloniki, Greece.*

**N.Sanchez Egido, S.Soutullo, R.Olmedo, M.Heras:** *Monitorization of one evaporative wind tower in an open space.*

**F.Butera, N.Aste, R.Adhikari, M.Buzzetti, M.Manfren:** *Building energy performance calculation and distributed generation. Efficient design solutions at building and community level.*

### Session 04: Progress on thermal comfort

**Keynote speech N.Rodriguez Munoz, J.Hinojosa Palafox, M.Alpuche, K.Kohlhof, S.Tonn:** *Study of heat transfer and indoor comfort in model rooms.*

**T.Karlessi, M. Santamouris, J. Pfafferott, A.Tombazis:** Thermal comfort and energy performance of an office building in Greece with low energy cooling: A holistic approach.

**V.Zanotto, S.Ferrari:** Adaptive comfort towards energy savings.

**A.Roetzel, A.Tsangrassoulis, U.Dietrich, S.Busching:** Occupant's comfort expectations - a thermal lifestyle?

**A.Thewes:** Thermal comfort of a new university building in Luxembourg with passive cooling.



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**N. Cherry, J. Haig, R. Allen, G. With:** The thermal performance of tiled roofs in a range of climates.

### Session 05: Progress on Natural Ventilation

**Keynote speech T.Kurabuchi, K.Tsuruta, Y.Kouchi, M.Ohba:** Decoupled simulation of cross-ventilated indoor airflow of residential buildings.

**M.El Mankibi, L.Bourru, P.Michel:** Experimental study and numerical modeling of air flow through windows.

**P.Elias-Lopez, V.Garcia, A.Espuna, R.Roux:** Naturally ventilation limited by the use of mosquito-net on windows in humid tropical climate.

**M.Elizondo Mata, R.Huerta Sanmiguel, L.Mendoza Perez:** Plaza de toros “La petatera” in Colima, Mexico; example of efficiency in buildings natural ventilation in sub-humid warm climate.

**I.Farrou, M.Santamouris, M.Kolokotroni, P.Warren:** The Building AdVent Project.

**T.Medinilha, S.Morais, E.Matsumoto, M.Oliveira, L.Labaki:** Study of natural ventilation in self built houses through wind tunnel measurements.

**A.Kindinis, R.Cantin, B.Moujalled, G.Guarracino, L.Bourru, J.Burgholzer, T.Marchal, S.Tasca-Guernouti, M.Humbert,**

**F.Janvier, B.Flament, J.Berger:** Comparison of long term field measurements with numerical results of a thermo-aeraulic model of historical dwellings.

**T.Martins, L.Bittencourt, C.Barroso-Krause, L.Bastos:** Wind-tower for ventilation in brazilian terrace houses.

**K.Sato, T.Kurabuchi, T.Ogasawara, N.Sahashi, S.Ikehara, M.Ohba, S.Iwamoto:** A study on convective heat transfer coefficient and thermal resistance of clothing under cross ventilated situation.

**K.Tsuruta:** Domain decomposition technique applied to evaluation of cross-ventilation performance of various opening conditions of a building.

### Session 06: Passive cooling and sustainability at the community level

**Keynote speech M.Ignatius, N.Wong, S.Jusuf:** Influence of urban morphology on air temperature within central business district and commercial area in Singapore.



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**M.Clementi, G.Scudo:** Solar radiation mapping at the micro-urban scale using GIS.

**P.Caputo, G.Costa, M.Manfren:** Energy simulations at community levels; a new methodological approach for a new model.

**H.Coch, A.Curreli:** Solar access in the compact city: A study case in Barcelona.

**N.Gaitani, A.Spanou, M.Saliari, M.Santamouris, F.Xyrafi:** Strategies for microclimatic modifications in the urban spaces-a case study in the area of Marousi, Greece.

**A.Kantzioura, P.Kosmopoulos, S.Zoras:** Urban surface temperature and microclimate measurements in Thessaloniki.

**T.Stasinopoulos:** Blending Green & Black: Cool urban design in Athens.

### Session 07: The use of heat sinks for passive cooling

*Keynote speech U.Eicker, A.Dalibard, S.Buttgenbach, S.Fiedler, J.Cremers: Low energy cooling of buildings with radiative cooling using hybrid PVT collectors.*

**C.Barbosa Teixeira, L.Labaki:** Study of evaporative cooling roofing in sub-tropical climate.

**E.Kruger, E.Gonzalez Cruz, B.Givoni:** Predicting the use of an indirect evaporative cooling for hot-dry conditions.

**C.Farnham, M.Nakao, M.Nishioka, M.Nabeshima:** Simulation and Validation of mist cooling with fire dynamics simulator.

**J.Garcia Chavez, B.Givoni:** Application of an indirect evaporative cooling system in a hot humid climate using embedded tubes.

**E.Gonzalez Cruz, E.Kruger, B.Givoni:** Application of a predictive method for assessing indoor temperatures in an indirect evaporative passive cooling system.

**R.Serra, J.Marin, J.Roset, A.Isalgue, H.Coch:** A daytime passive cooling radiation system.

### Session 08: Progress on natural and hybrid ventilation

*Keynote speech F.Tucci: Technologies for natural cooling in the experimentation of eco efficient housing in the Mediterranean.*

**D.Fidaros, C.Baxevanou:** Numerical study of the natural ventilation in a dwelling with a solar chimney.



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**G.Chiesa, R.Ramponi, R.Adhikari:** Energy impact of ventilation in building design - A literature review.

**O.Irulegi, R.Hernandez:** Energy efficiency of ventilated active facade in office buildings in Spain.

**N.Khan, Y.Su:** Performance of monodraught natural ventilation and cooling systems.

**D.Serghides:** Ventilation and Infiltration in the zero energy house.

### Session 09: Progress on passive cooling

**Keynote speech P.Zangheri, P.Lorenzo:** Methodology for design and evaluation of zero energy buildings in mediterranean climate. Application to a Passivhaus with EAHE.

**T.F.Asmussen, P.Foldbjerg:** Efficient passive cooling of residential buildings in warm climates.

**C.Ganem, H.Coch:** Solar and heat protection techniques. Evaluation and design recommendations for different types of fabric awnings.

**M.Mandalaki, K.Zervas, T.Tsoutsos, A.Vazakas:** Assessment of shading devices with integrated PV for efficient energy use.

**T.Kurabuchi, K.Tsuruta, T.Ogasawara, Y.Iino:** Observation of environmental control behavior in elementary school classrooms equipped with air-conditioning systems and ceiling fans for cooling.

**A.Sakka, A.Wagner, M.Santamouris, L.Iro:** Thermal comfort and occupant satisfaction in residential buildings - Results of field study in residential buildings in Athens during the summer.

**C.Pina Santos, M.Rebelo, L.Matias, A.Santos, S.Almeida:** Development of sustainable thermal and visual comfort models.

**S.Pieri, P.Pieris, K.Sfakianaki, K.Vasilakopoulou, M.Santamouris:** Prototype zero energy tourist settlement.

### Session 10: Thermal comfort in outdoor environment

**Keynote speech Y.Ng, V.Cheng:** Urban human thermal comfort in hot and humid Hong Kong.



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**V.Dessi, G.Andreini:** Thermal comfort in urban greenways: Climatic mitigation strategy in Milan.

**A.Prata-Shimomura, L.Marques Monteiro, A.Barros Frota:** PET and TEP indexes: Applicability to the evaluation of thermal comfort in external environments.

**M.G. C. Fontes, C.L. B. Bartholomei, C.Dacanal, M.Nikolopoulou, L.Labaki:** Thermal comfort in open public spaces: Studies in woody areas in cities of the Sao Paulo State, Brazil.

**M.Tsitoura, T.Tsoutsos, D.Kolokotsa:** Comfort conditions in urban open spaces in Crete.

**C.Spataru, M.Gillott:** Temperature distribution and comfort responses as a result of the climate change impact on buildings.

## DAY 2

### Session 11: Plenary

**Keynote lectures O.Seppaenen:** *Technical regulations to control energy efficiency of buildings in some EU Member States.*

**T.E. Kuhn:** *Active solar facades (PV and solar thermal).*

**J.Stoops, R.Rooth:** *Measurement is critical to understanding.*

**A.Battisti, F.Tucci, F.Cipriani:** *Eco-efficient and sustainable settlement experimentation in Mediterranean housing.*

### Session 12: Progress on low energy design of buildings

**Keynote speech I.Meir, J.Golding:** *Green or Gray? Implications of green lip service in a hot dry climate.*

**A.Kashkooli:** Re-usability of high-rise buildings: the case of Arts Tower, Sheffield, United Kingdom.

**S.Cardoso Silva, H.Coch:** Collective dwellings.

**N.Aste, C.Del Pero, R.Adhikari:** Development of a methodology for energy diagnosis and performance assessment of office buildings.

**F.Vagi, A.Dimoudi:** Investigation of energy and comfort conditions in Greek primary schools.



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**L.Fais:** Skyscraper, a power plant in the inner city.

**A.Gavalas:** Acrobat on a thin rope - A sustainable house in Athens.

**T.Karlessi, M.Santamouris, T.Kuhn:** Analyzing the profile of high rise buildings in Greece: Actions and recommendations for improving their performance.

**I.Tzouvadakis, D.Batsos, A.Sotiropoulou, E.Trianti:** Climatic responsive architecture through the upgrading of the existing buildings' stock (The Bioclimatic Metro system).

**V.Assimakopoulos, I.Tsiros, L.Shashua-Bar, M.Hoffman, A.Efthimiadou:** Microclimatic conditions in the Athens urban clusters.

### Session 13: Advanced materials and systems for energy conservation

**Keynote speech T.Salem:** Impact of facade-integrated solar thermal collectors on the indoor environment of buildings.

**L.Mavromatidis, P.Michel, M. El Mankibi, M.Santamouris:** Investigation of the sensibility of Multi-foil insulations using the guarded hot plate and the guarded hot box test methods.

**S.Chadiarakou, G.Guarracino, M.Santamouris:** Clustering analysis and determination of typical building.

**A.Michael, M.Efthychi, F.Bougiatioti:** Brick transformation: A bioclimatic design approach.

**S.Mofidi:** Cooling by daylighting for sunny regions: An ecotourism attraction.

**B.Mohd Noor, A.Zain-Ahmed, M.Abidin, W.Wan Daud, S.Jahaya, K.Wok, S.Tahiruddin:** Thermal performance of a novel roof insulation material made from "oil palm empty fruit bunch (OPEFB)" fiber.

**F.Palacin, C.Monne, S.Alonco, J.Heredero, J.Izquierdo:** Experiences on heat rejection sinks of a solar absorption cooling system.

**A.Pezzi:** Design of performative double layered facade systems in the Mediterranean area: Palenque business centre in Seville, Spain.

**A.Spanou, K.Vasilakopoulou, M.Santamouris:** Energy performance and lighting design of an historic building in Greece.



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### Session 14: EA/ECBCS/Annex 53 total energy use in buildings - Analysis and evaluation methods

*Keynote speech H. Yoshino: Overview of IEA/ECBCS/Annex 53 total energy use in buildings - analysis and evaluation methods.*

**B.Olesen, R.Andersen:** The influence of human behaviour on the energy consumption in buildings.

**S.Corgnati, V.Fabi, M.Filippi, N.Tala:** Statistical analysis methods to investigate energy use in buildings.

**P.Andre, S.Bertagnolio, J.Lebrun:** Analysis of influencing factors and evaluation of performance indicators on total energy use in buildings.

**S.Porritt, L.Shao, P.Cropper, C.Goodier:** Ranking of interventions to reduce dwelling overheating during heat waves.

**J.Schnieders, L.Rongen, W.Feist:** Passive houses in warm and hot climates.

**P.Silva, S.Silva, M.Almeida, L.Braganca, V.Mesquita:** Portuguese building stock indoor environmental quality "In-Situ" assesment.

**Y.Tripanagnostopoulos, A.Sakka:** Holistic energy saving aspects of buildings.

### Session 14A: Regulations and legislation

*Keynote speech M.Athanasaki, A.Papadopoulos: Legal issues when implementing energy renovation measures in multi-family buildings.*

**S.Ferrari, V.Zanotto:** EPBD implementation: Comparison of different calculation methods among EU countries.

**A.Drakou, I.Ridley:** Applicability of the Passivhaus standard to Greek climate.

**M.Laskari, M.Papaglastra, M.Santamouris:** Better summer comfort and efficient cooling by EPBD implementation.

**A.Tsangrassoulis, L.Doulos, F.Topalis, A.Roetzel:** Comparison of lighting energy savings methodologies due to daylight with EN 15193.

**P.Kosmopoulos, L.Bourikas, A.Kantzioura, P.Fragidou, D.Georgiadou, T.Zoras:** Pan-Hellenic Research on the R.E.S. application : A social survey of the cognitive level and the attitudes of the Greek people.

**K.Sfakianaki:** Energy consumption variation due to different thermal comfort categorization introduced by EN 15251 for new building design and major rehabilitations.





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**F.Nicol, L.Cunill:** Rethinking the comfort limits for free-running buildings in EN15251.

### Session 15: Progress on ventilation, indoor air quality and lighting

**Keynote speech M.Sleiman, H.Destailats:** *Evaluating the performance of photocatalytic oxidation (PCO) for indoor air cleaning: Challenges and perspectives*

**C.Georgakis, S.Zoras, M.Santamouris:** Neuro-fuzzy models for air flow predictions in canyons.

**D.Serghides:** The dynamics of the building envelope - Fenestration, the human factor, indoor comfort and energy efficiency.

**N.Stathopoulos, P.Michel, M.El Mankibi:** Experimental approach for natural ventilation performance characterization.

**K.Tsukamoto, M.Ohba, T.Kurabuchi, T.Endo, T.Nonaka:** Building simulation on reduction of cooling loads for detach house in intermediate and raining seasons by cross-ventilation in Japan.

**I.Venetis, I.Tzouvadakis, A.Stamos:** Some quality information of an internal incompressible flux field through two vent-holes for the cooling of buildings.

**G.V.Maragno, H.Coch:** Integrated environmental response of shaded transitional spaces in hot climates: The design of the Brazilian veranda.

**K.Tsikaloudaki, K.Laskos, A.Karaoulis, A.Chatzidimitriou:** Optimizing the energy performance of lightweight prefabricated dwellings.

**A.Belonia, E.Sklavou, M.Xenakis, I.Tzouvadakis:** *The effect of air quality in health care environments.*

### Session 16: Advanced systems and techniques for energy conservation

**Keynote speech J.Pfafferott, D.Jacob, D.Kalz, G.Salvalai:** *Evaluation of a low-energy cooling concept using a coupled building and plant simulation model.*

**M.Fanny, N.Milad, G.Kanarachou, S.Kanarachos, J.Petrou:** Development of an integrated low energy building design methodology for the Mediterranean region.

**C.Aparecida Silva, J.Lebrun, J.Hannay:** Building renovation; Example of preliminary study performed with the help of an engineering equation solver.



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**J.Llorente, F.Palacin, F.Serna, L.Guiral, M.Lozano:** Viability study of a solar thermal system with seasonal storage in Zaragoza.

**G.Loehlein:** Middle East: sustainable University City Campus in a desert environment.

**T.Le Phan, H.Yoshino:** Survey on energy consumption of residential buildings in Vietnam.

**S. De Bruycker:** Building envelopes in a holistic perspective: a plea for fit for purpose approach.

**R. Matzig:** Insulation first!

#### **Session 17: Dynastee - Paslink session on dynamic methods for building performance assesment**

**Keynote speech S.Ferrari, V.Zanotto,:** Assessing building envelope's dynamic thermal performance through simplified parameters

**J.Salmeron Lissen, J.Sanchez Ramos, F.Sanchez De La Flor, J.Molina Felix, S.Alvarez:** Numerical and experimental analysis of downdraught evaporative cooling systems at Seville.

**D.Pahud, M.Belliardi, P.Caputo:** Geocooling potential of borehole heat exchangers in low energy office buildings analysed with dynamic system simulations.

**N.Losurdo, F.Iannone:** Energy efficiency and thermal comfort of a residential complex for the elderly in Andria (Italy). A numerical and experimental approach for performance evaluation in summer regime in a Mediterranean climate.

**S.Boemi, T.Slini, A.Papadopoulos:** A statistical approach to the prediction of the hotel stock's energy performance.

**J.Cipriano, J.Olivera, J.Carbonell, J.Marti, D.Chemisana:** Discrepancies between predicted and measured performance of high innovative low energy buildings: Two case-studies in Spain.

**T.Daras, D.Kolokotsa, M.Efpaxia, I.Apostolakis:** Examination of parameters for the energy performance of school buildings in the region of Chania.

**M.J. Jimenez, R. Enriquez, M.Heras:** System identification applied to energy analysis in a bioclimatic office building in semidesertic weather in the south of Spain.



### Session 17A: Sustainable green design of systems and outdoor spaces

**Keynote speech E.Tzanakaki, M.Kikira, E.Alexandri:** *Microclimate design in energy efficiency policies for Greek cities.*

**L.Abreu, L.Labaki:** Specific radius of influence on microclimate provided by different arboreal species.

**H.Fadaie, M.Mofidi:** Iranian garden as a microclimate in Arid regions.

**V.Lytra:** Exploration of self-shaded forms in London climate.

**A.Mingozzi, S.Bottiglioni:** Environmental, energy retrofitting and enlargement of an hypermarket: An integrated approach towards sustainability.

**M.Nakao, M.Nabeshima, M.Nishioka, T.Hasegawa:** *Continuous moving measurement method of urban environment.*

**C.Yousif, C.Perez Garcia, F.Rey Martinez:** *Energy performance of residential buildings in Malta.*

**H.Sacht, L.Braganca, M.Almeida:** *Facades modules for eco-efficient refurbishment of buildings: glazing thermal performance analyses to Coimbra and Faro.*

**A.Kilaire, N.Khan:** *Double skin facade low energy cooling and natural ventilation.*

**P.Ilia:** *Thermal evaluation of retrofitting methods: Conversion of the 'Spierer' tobacco warehouse in Volos, Greece.*

**K.Gobakis, G.Stavrakakis:** *Simplified building thermal capacitance modeling and control using Matlab/Simulink.*

**J.Garcia Rodriguez, H.Becerra Santacruz, D.Altan:** *Alternative cover for better thermal performance for residential buildings in a temperate climate zone of Mexico.*

**J.Ferdyn-Grygierek, A.Baranowski:** *Numerical analysis of the energy consumption in the office building.*

**N.Aste, D.Marini, R.Adhikari:** *Comparative performance of different types of heat pump technologies in a low energy building.*

**N.Aste, M.Buzzetti, R.Adhikari:** *Evaluation of energy rehabilitation strategies for a historical courtyard building.*

**K.Pavlou, F.Ntousikou, A.Vousvounis:** *"Energy Building 2010", validation's outcomes.*



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### Session 18: Advanced systems and techniques for low energy buildings

**L.Beis:** “Terpsithea” Sustainable housing project in Porto Rafti, Greece.

**C.Cabello Matud, H.Coch:** Architectural repercussions of the air conditioning installations.

**T.Stefou, A.Dimoudi:** Energy performance assessment of urban block apartments.

**I.Diaz Regodon, F.Manteca, M.Sampedro, F.Palacin, M.Pascual, E.Zubiri:** CE3X method for the certification of energy performance for existing buildings in Spain.

**N.Avgerinos, A.Dimoudi, P.Kosmopoulos:** Energy performance of secondary school buildings.

**Y.Dutil, D.Rousse:** A review of active solar cooling technologies.

**J.Futcher:** The influence of the surrounding urban system on cooling loads.

**A.Seng, S.Mok, N.Wong, E.Tan, S.Jusuf:** Passive designs of zero energy building in Singapore.

### Session 19: Adaptation and mitigation technologies for low energy buildings

*Keynote speech O.Morck, K.Thomsen: Demonstrating cost-effective low energy buildings- Results from the EU Concerto project Class1.*

**M.Karagiorgas, D.Galanos, M.Michael, K.Vrellis:** Free and solar cooling based energy upgrade of the MMM building, Greece.

**A.Al-Musaed, A.Almssad:** Passive and low energy housing in the context of “Archi-Metrics” concept.

**M.Palme, A.Isalgue, H.Coch, R.Serra:** Relevant factors in Spanish buildings energy certification process.

**G.Papadimitriou, T.Nikolaou, D.Kolokotsa, P.Skittides, G.Stavrakakis, T.Tsoutsos:** The benchmarking of Greek office buildings using clustering techniques.

**N.Papamanolis, K.Oungrinis, M.Liapi:** Environmental Responding Architecture. Methods for addressing the diverse environmental behavior in Greece for energy efficient buildings.

**S.Chadiarakou, A.Papadopoulos:** Comparison of the old and new thermal insulation regulation in Greece



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### Session 20: IEA Annex on phase change materials as a tool towards low energy buildings

**A.De Gracia, K.Menoufi, A.Castell, L.Cabeza, D.Boer:** Life cycle assessment of phase change materials (PCM) in brick construction systems.

**A.Tokuc, G.Kokturk:** A proposal to improve tinaztepe campus by use of renewables and energy storage technologies.

**C.Barreneche, A.Fernandez, A.Castell, L.Cabeza:** PCM in building envelopes for energy efficiency: experimental results and new concepts.

**J.Borderon, S.Clouseau, R.Cantin, J.Virgone:** Simulation of a building equipped with a PCM/air heat exchanger.

**G.Susman, L.Li, S.Craig, Z.Dehouche:** Development of passive and active PCM 'sails' for low energy cooling.

**T.Karlessi, M.Santamouris, P.Didaskalopoulos, K.Apostolakis:** Incorporating phase change materials (PCMs) in building coatings: A study of their thermal performance for the mitigation of urban heat island.

**S.Oguta, Z.Dehouche:** Experimental assessment of phase change material for summer cooling.

**Z.Gkouskos, G.Limnaios, T.Tsoutsos:** Simulation of PCMs in building applications.

### DAY 3

#### Session 21: Plenary

**R.Giridharan, M.Kolokotroni:** *Micro scale geographical study of urban heat island within London.*

**H.Akbari:** *Global cooling updates: Reflective roofs and pavements.*

**Y.Wang, Y.Ng:** *Parametric study on microclimate effects of different greening strategies in high density city.*



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## Session 22: Cool roofs technologies

**Keynote speech E.Bozonnet, M.Doya:** *Cool roofs impact on building thermal response - a French case study.*

**C.Herrmanns, H.Poersch-Panke, J.Rokowski:** Reducing over-heating in buildings by use of white reflective roof coatings.

**M.Kolokotroni, M.Santamouris, A.Synnefa, H.Akbari, M.Zinzi, D.Kolokotsa, P.Perdikis, J.Kolokotsa:** Cool roof technology in Europe: Description of a handbook.

**D.Kolokotsa, S.Papantoniou, C.Diakaki, A.Vlissidis:** On the application of cool roofs technology in a laboratory building at Iraklion Crete Greece.

**A.Libbra, A.Muscio, P.Tartarini:** Actual solar reflectance of roof surfaces and standard energy performance of Italian buildings in summer.

**S.Sakai, M.Nakamura, K.Furuya, J.Nakata, M.Onishi, I.Iizawa, K.Yamaji, R.Asano, K.Tamotsou:** Sierpinski's forest: New technology of cool roof with fractal shapes.

**T.Jeannette, J.Menard, J.Pellise:** Efficiency assessment of Materis paints' cool roof.

**A.Synnefa, M.Santamouris:** Implementation of an action plan for the promotion, policy development, market transformation of cool roofs technology.

**G.Peacock:** Cool metal roofing in Europe

## Session 23: Green roofs and roofing technologies

**Keynote speech O.Schweitzer, Y.Waisel, E.Erell:** *Evaluation of green roofs in a water-scarce environment.*

**M.Ibiapina, V.Gomes Da Silva, M.Ilha, D.Kowaltowski:** Rainwater retention capacity of green roofs in Campinas - Brazil.

**C.Bueno, K.Chvatal, J.Rossignolo:** Influence of expanded clay on thermal performance of flat roof systems.

**C.Baxevanou, D.Fidaros, T.Bartzanas, C.Kittas:** Estimation of the reduced cooling needs from a typical green roof.

**A.Figueroa, G.Castorena:** The effect of sun shading screen on roofs for naturally acclimatized houses in warm conditions: A case of study in Cuernavaca, Mexico.

**G.Kotopoulos:** Implementation of an Extensive Green Roof on the New Building of the Bank of Greece in Thessaloniki, Northern Greece. A paradigm of an efficient Mediterranean green roof.



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# PALENC 2010



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**G.Kotsiris, A.Androutsopoulos, P.Nektarios:** Thermal performance of semi-intensive type, planted roofs in Greece.

**M.Doya, E.Bozonnete, F.Allard:** Benefits of cool facades in dense urban environment.

### Session 24: Advanced buildin materials, techniques and systems for low and zero energy

*Keynote speech A.Chida, S.Tagawa, C.Reinert: Zeffle infrared reflective coatings.*

**M.Zinzi, M.Santamouris, A.Synnefa, E.Carnielo:** The database of cool roof materials: products, testing procedures and results.

**S.Arsenault, R.Wayne Skilton, K.Wood, R.Levinson:** Expanding the palette of “cool colors” with highly weatherable topcoat technology.

**J.Pascual, M.Casanova, D.Tavan, D.Perez, E.Mitre, B.Tena:** Multidimensional performance analysis of office buildings with highly glazed facades. How do they perform in a Mediterranean climate?

**D.Da Silva, M.Brancaccio, B.Duplessis, J.Adnot:** Room air conditioner load control under summer comfort constraint.

**I.Tzouvadakis, A.Stamos, A.Sotiropoulou:** Design of structural coating material for summer-time solar protection and cooling of buildings.

**A.Al-Musaed, A.Almssad:** Biophilic habitat (Environment adaptability in context of bio-ecological architectural conception).

**N.Aste, C.Del Pero, R.Adhikari, M.Manfren:** Methodology for energy loads assessment and CHCP system application for a commercial complex.

### Session 25: Cool materials technologies

*Keynote speech A.Yoshida, S.Kinoshita, K.Minobe, S.Wada, Y.Shimazaki: Evaluation of outer structure on solar reflection characteristics of high reflectivity material in consideration of human thermal sensation.*

**M.Kolokotroni, B.Gowreesunker, R.Giridharan,:** Cool roof technology in London: An experimental and modelling study.

**D.Kolokotsa, A.Pouliezios, M.Zinzi, A.Synnefa, M.Santamouris:** Development of a toolkit for the evaluation of energy performance of cool materials in the EU region.



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**J.Maxted:** Beyond the rainbow: Reflectance and radiative property control in coil coating systems.

**R.Portsmouth, D.Robb, D.Edwards, R.Tonkin:** Is white the best solution for cool roofs?

**A.Synnefa, M.Saliari, M.Santamouris:** Experimental and numerical assessment of the impact of increased roof reflectance on a school building in Athens.

**H.Takebayashi, T.Sugihara, M.Moriyama:** Study on the cool roof effect of Japanese traditional tiled roof. No.2 Numerical analysis of solar reflectance of unevenness tiled surface and heat budget of typical tiled roof system.

**M.Zinzi, C.Romeo, E.Marinelli:** Energy and comfort benefits of a cool roof application in a not-residential building. A Sicilian case study.

#### Session 26: Green roofs and roofing technologies

*Keynote speech M.Sleiman, T.Kirchstetter, P.Berdahl, H.Gilbert, D.Francois, M.Spears, R.Levinson, H.Destaillats, H.Akbari: Development of an accelerated soiling method that mimics natural exposure of roofing materials.*

**M.Ampatzi:** Optimal roof configuration for seaside resorts on Greek islands.

**H.Kinoshita, H.Miyazaki, Y.Tamai, Y.Yuda, K.Higashisaka, T.Kato, Y.Fujinami:** The proposal for improving the thermal performance of the tiled roof - based on the historical changes in the traditional tiled roof in Japan.

**Y.Yuda, Y.Tamai, H.Miyazaki, H.Kinoshita:** Thermal effects of air layers under roof tiles - proposal for thermal improvement of traditional tile roof method.

**A.Spanaki, T.Tsoutsos, D.Kolokotsa:** Review of the parameters affecting the selection of a roof pond variant for cooling purposes.

**E.Vardoulakis, D.Karamanis, P.Mihalakakou, M.Assimakopoulos:** Moisture sorption properties of modified porous clays for roof evaporative cooling applications.

**E.Vazquez, E.Gonzalez Cruz, M.Elizondo Mata:** Shaded roof pond for hot dry climate: Experimental optimization.

**M.Zinzi, S.Agnoli, G.Fasano:** Cool and green roofs. A comparison among passive cooling and mitigation urban heat island techniques in the mediterranean region.

**D.Kolokotsa, L.Hilditch:** What the policy can do for Cool Roofs?

*K.Masumoto, M.Sonoyama, A.Kato, T.Orita, H.Goda, N.Nishimura: The application of a low cost hydroponic roof planting by sweet potato for mitigating urban heat island in summer.*





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*A.Efthimiadou, I.Tzouvadakis: The role of green roofs in big cities. Are green roofs a solution for better climatic conditions? Case study: Athens.*

### Session 27: Green design and zero energy buildings

*Keynote speech M.Kapsalaki, V.Da Silva Leal: An assessment of the influence of the climate in the design of net zero energy buildings.*

**V.Zanotto, S.Ferrari:** Performances of external walls with different heat capacity: experimental tests in climatic chamber.

**J.Garcia Chavez:** Low embodied energy construction system applied in an educational building for improving comfort in a hot Humid climate.

**S.Monteiro Da Silva, M.Almeida:** Optimization of the indoor environmental quality of buildings.

**A.Almssad, A.Al-Musaed:** Green housing (The optimal solution to combat the negative effects of global climate change).

**S.Pieri, M.Xenakis, A.Xinos, I.Tzouvadakis:** Minimizing the CO2 footprint of buildings through the use of materials and techniques.

**M.Todorovic, O.Ecim:** Multidisciplinary engineering assessment to approach sustainable ZE - Eco- Settlement.

*D.Damas de Oliviera, L.Labaki: Green walls and influence in the built environment: Case study.*

### NON-PRESENTED PAPERS

**P. Caputo A. Vancheri, P. Giordano:** Towards sustainable cities. Analysis and improvement of the urban metabolism of Lugano and Barcelona.

**A. Serra and F. Spanedda:** Energy Refurbishment of small city centres. A study case Italy.

**D.K. Papanastasiou, T. Bartzanas and C. Kittas:** Monitoring the urban heat island in a Greek coastal city.

**K. Dornelles, R. M. Caram, M. Roriz, V. Roriz:** Thermal performance of cool paints produced in Brazil for roof paint and their effect on buildings designed for hot climates.