

Table of Contents

Foreword	xv
Organization	xvi
Technical Papers	
1. Low energy cooling for buildings in the middle Europe -case studies <i>M. Lain, V. Zmrhal, J. Hensen</i>	597
2. Regulation for energy efficiency labelling of commercial buildings in Brazil <i>R. Lamberts, S. Goulart, J. Carlo, F. Westphal</i>	602
3. Solar chimney: modelling and verification <i>D. Lanceta, J. Llorente</i>	610
4. Cooling of outdoor spaces by means of evaporative-cooling ceramic-pillars <i>D. Lanceta, F. Manteca, C. Martín, D. Martínez, F. Serna, J. Llorente</i>	615
5. The effects of roof angle and width of adjacent buildings on wind-induced cooling ventilation of atrium spaces <i>R. Li, A. Pitts, M. Niu</i>	621
6. A study on the indoor air quality management effect of intelligent building certification program <i>S. Lim, H. Lee, W. Choi, I. Song, J. Yu</i>	626
7. Research and practice co operation in Dubai <i>G. Loehlein</i>	633
8. Sustainability assessment of an energy efficient optimized solution <i>R. Mateus, S. Silva, L. Bragança, M. Almeida, P. Mendonça, P. Silva</i>	636
9. The stack effect using materials with high thermal inertia <i>E. Matsumoto, R. M. Caram</i>	641
10. Towards a comprehensive methodology for Post Occupancy Evaluation (POE): A hot dry climate case study <i>I.A. Meir, W. Motzafi-Haller, E.L. Krüger, L. Morhayim, S. Fundaminsky, L. Oshry-Frenkel</i>	644
11. Modular passively-cooled social housing using recycled ISO shipping containers; a proposal for Limassol, Cyprus <i>M. Menikou, G.P. Keeffe</i>	654
12. The social housing and sustainable design: a teaching experience <i>S. Mikami G. Pina, D.C.C.K. Kowaltowski, V.T. de Paiva, A.M.G. de Monteiro, C.R. Arias, E.T. Donadon</i>	659
13. A comprehensive approach to comfort and energy efficiency for cooling and heating: results of thermal dynamic simulation of a bioclimatic massive building in Mediterranean climate <i>A. Mingozzi, S. Bottiglioni, M. Medola</i>	664
14. Bioclimatic architecture: the case study of the sustainable residential settlement in Pieve di Cento <i>A. Mingozzi, S. Bottiglioni</i>	669
15. Passive architectural cooling principles for arid climates <i>S.M. Mofidi</i>	674
16. PREA Promoting Renewable Energies in Africa <i>H. F.O. Müller, K. Byabato</i>	678
17. A study of the application of the BRE Average Daylight Factor formula to rooms with window areas below the working plane <i>M. Naeem, M. Wilson</i>	682
18. Occupant Indoor Environmental Quality (IEQ): Results of a survey in office buildings in Iran <i>N. Nasrollahi, I. Knight, P. Jones</i>	687
19. Solar air conditioning and its role in alleviating the energy crisis of the Mediterranean hotels <i>P. Naukkarinen</i>	692
20. An investigation into parameters affecting an optimum ventilation design of high density cities <i>E. Ng</i>	697

21. Performance of natural, hybrid and mechanical ventilation systems in urban canyons	702
<i>K. Niachou, M. Santamouris, S. Hassid</i>	
22. Allowing for thermal comfort in free-running buildings in the new European Standard EN15251	708
<i>F. Nicol, L. Pagliano</i>	
23. Characterising the use of windows in thermal simulation	712
<i>F. Nicol, H. Rijal, M. Humphreys, P. Tuohy</i>	
24. Contribution of shading in improving the energy performance of buildings	718
<i>T. Nikolaou, G. Stavrakakis, I. Skias, D. Kolokotsa</i>	
25. Measurement of natural ventilation rate in Japanese residential building	723
<i>S. Nishizawa, T. Sawachi, H. Habara, H. Seto</i>	
26. Solar gains in the glazing systems with sun-shading	729
<i>G. Oliveti, N. Arcuri, R. Bruno, M. De Simone</i>	
27. Variable flow rate summer air-conditioning systems with low energy consumption for small buildings	734
<i>G. Oliveti, N. Arcuri, R. Bruno</i>	
28. An analysis of the (BRE) average daylight factor and limiting depth guidelines as design criteria	739
<i>S. Pagani Guazzugli Bonaiuti, M. Wilson</i>	
29. Dynamic sensation of comfort in buildings: the temperature changes effects	746
<i>M. Palme, A. Isalgué, H. Coch, R. Serra, I. Marincic, A. Fanchiotti</i>	
30. Combining cooled soil and natural night ventilation to achieve moderate tempered houses in Andalusia, Spain	751
<i>O. Pankratz, L.M. Avila, C. Buxbaum, A. Seiler</i>	
31. Rating systems for counting buildings' environmental performance	754
<i>A.M. Papadopoulos, E. Giama</i>	
32. Applying the EP label tools for energy certification of buildings in Greece	759
<i>M. Papaglastra, M. Santamouris, R. Cohen</i>	
33. Pythagoras: An innovative training package on Indoor Environment Quality	763
<i>M. Papaglastra, M. Santamouris, E. Mouriki, A. Geranios, G. Mihalakakou, D. Matthopoulos, I. Deligiannakis, V. Tsezos, E. Doulka, A. Papadopoulos, E. Giama, A. Aristotelis, G. Stavrakakis, T. Nicolaou, D. Kolokotsa, S. Kephelopoulos, A. Katsoyiannis</i>	
34. The influence of the wind speed on the heat island phenomenon in Athens, Greece	767
<i>N. M. Papanikolaou, I. Livada, M. Santamouris</i>	
35. Improvement of the energy performance of greenhouses	771
<i>K. Pavlou, A. Sfakianaki</i>	
36. Study on the thermal performance of a solar chimney	774
<i>K. Pavlou, M. Santamouris</i>	
37. Study of a new photocatalytic air cleaner applied to the management of the microbiological indoor air quality	777
<i>P. Petinga, P. Petit, P.-J. Vialle, S. Delaby, E. Robine, E. Gehin</i>	
38. Refurbishment and monitoring of a print office building in Karlsruhe, Germany	782
<i>J. Pfaffertott, D. Kalz, A. Wagner, T. Knapp</i>	
39. The Passivhaus standard in southern Europe	788
<i>A. Pindar, P. Zangheri, L. Pagliano, J. Schnieders</i>	
40. Analysis of the façades surface temperatures – Artificial neural networks application	792
<i>P. R. Pizarro, L. Chebel Labaki</i>	
41. Double skin façade glazed office buildings; a parametric study for optimized energy and thermal comfort performance	797
<i>H. Poirazis</i>	
42. Nightcooling: practical experiences in offices and the need for standard implementation into energy performance legislations	802
<i>I. Pollet, P. Renson</i>	
43. Comparison of energy load demand and thermal comfort levels in Athens, Greece and London, UK	806
<i>B. E. Psiloglou, C. Giannakopoulos, S. Majithia</i>	

44. An investigation into developing an urban climatic map for high density living—initial study in Hong Kong	811
<i>C. Ren, E. Ng, L. Katzchner</i>	
45. Categorising the existing Welsh housing stock in terms of heating and cooling demand and thermal storage capacity	818
<i>M. Rhodes, I. Knight, F. Agyenim</i>	
46. HVAC system for experimental research and educational applications	825
<i>F. Richieri, J. Blanc Gonnet, P. Michel, G. Guarracino</i>	
47. Performance of domestic ventilation systems: A simulation study	830
<i>I. Ridley, M. Davies, D. Mumovic, M. Orme, G. Pane, J. Palmer</i>	
48. Resilient hospital design: the zero carbon cooling challenge	835
<i>S. Roaf</i>	
49. The Minewaterproject Heerlen - low exergy heating and cooling in practice	839
<i>E. Roijen, P. Op 't Veld, E. Demollin-Schneiders</i>	
50. Sustainable recommendations for the faculty of technology of the University of Brasilia – Brazil	845
<i>M. Romero</i>	
51. Potential of passive design strategies using the free-running temperature	850
<i>L. Rosales, M. E. Hobaica, C. Ghiaus, F. Allard</i>	
52. Double enclosure: application for a commercial building in Athens, Greece	855
<i>V. Sagia</i>	
53. Residential active cooling toward snowy cold region in Japan and human temperature sensitivity for passive and low energy cooling	860
<i>M. Saito</i>	
54. Supervisory control of an intelligent building in Greece using EIB – KONNEX technology for energy performance improvement	865
<i>J. K. Sakellaris, P. Romanos, C. J. Koinakis</i>	
55. On the relation between the energy and social characteristics of the residential sector	870
<i>M. Santamouris, K. Kapsis, D. Korres, I. Livada, C. Pavlou, M. N. Assimakopoulos</i>	
56. Indoor air quality in fifty residences in Athens	876
<i>M. Santamouris, K. Argiroudis, M. Georgiou, K. Pavlou, M. Assimakopoulos, K. Sfakianaki</i>	
57. Data driven and fuzzy techniques for wind speed calculation inside urban canyons	880
<i>M. Santamouris, Ch. Georgakis</i>	
58. Aspects of CFD modeling of fan and pad evaporative cooling System in Greenhouses	885
<i>A. Sapounas, C. Nikita – Martzopoulou, T. Bartzanas, C. Kittas</i>	
59. State of the art on macroscopic models for the determination of thin films optical properties	889
<i>G. Saridakis, D. Kolokotsa, M. Santamouris</i>	
60. Natural ventilation and building low energy cooling as new culture for city planning design	894
<i>F. Sartogo, V. Calderaro</i>	
61. Estimation on the effectiveness of the cross ventilation as a passive cooling method for houses	899
<i>T. Sawachi, S. Nishizawa, H. Habara, H. Miura</i>	
62. EULEB – European High Quality Low Energy Buildings	904
<i>J. Schlenger, H. Müller</i>	
63. Interdisciplinary development of a modular façade system with decentralised building services	908
<i>H. G. Schuster, H. F.O. Mueller</i>	
64. User behavior in relation to his short- and long-term thermal background	913
<i>M. Schweiker, M. Shukuya</i>	
65. Control of temperatures in air-conditioned indoor spaces using reduced order model	919
<i>A. Sempey, C. Inard, C. Ghiaus, C. Allery</i>	
66. Reduced order model for air temperature control in indoor spaces	924
<i>A. Sempey, C. Inard, C. Ghiaus, C. Allery</i>	
67. Ventilation strategies for good indoor air quality and energy efficiency	929
<i>O. Seppänen</i>	
68. Bioclimatic design for cooling in Mediterranean buildings. The effectiveness of mass increase	936
<i>D. Serghides</i>	

69. On the selection of shape and orientation of a greenhouse for composite climates 941
V. P. Sethi
70. Analyzing air-tightness measurements using fan pressurization method on forty residential houses in Athens, Greece 946
K. Sfakianaki, K. Pavlou, M.N. Assimakopoulos, M. Santamouris, I. Leivada, N. Karkoulas, J. Mamouras
71. Energy and environmental rehabilitation of a listed neoclassic building in Athens, Greece 950
K. Sfakianaki, K. Vassilakopoulou, M.N. Assimakopoulos, K. Pavlou, P. Doukas, N. Gaitani, M.Santamouris
72. Investigating and analyzing the thermal behavior of the “green roof system” installed in two buildings in Athens, Greece 954
K. Sfakianaki, K. Pavlou, M. Santamouris, E. Pagalou
73. The combination of clay and nanotube carbon as an innovative and sustainable material 959
P. Shahmohamadi, F. Soflaee
74. Air distribution effectiveness for different mechanical ventilation systems 964
M. Sherman, I. S. Walker
75. Environmental effect of courtyard in sustainable architecture of Iran (Cold Regions) (Case study: courtyard houses in Tabriz) 969
M. Shokouhian, F. Soflaee, F. Nikkhah
76. Research and development with full scale research dwellings 974
N.C. Sijpbeer, E.J. Bakker, R. Schuitema, F.A.T.M. Ligthart, I.J. Opstelten
77. Floor cooling and air-cooling, the effects on thermal comfort of different cooling systems 977
N.C. Sijpbeer, E.J. Bakker, R. Schuitema, F.A.T.M. Ligthart, I.J. Opstelten
78. Evaluation of the thermal behavior of two systems of ceilings: reinforced concrete and wather layer 981
A.C. Silva, E. M. V. Matos, N. R. A. J. Cabral, G. C. Nolasco, J. L. J. Albores
79. Climatic Responsive Architecture of Tabriz 984
M. Singery, S. M. Mofidi
80. Environmental effect of courtyard in sustainable architecture of Iran (Hot-arid regions, meso-climate BWks) (Case study: courtyard houses in Isfahan & Kerman) 988
F. Soflaee, M.Shokouhian
81. The effect of plant use on the reduction of volatile organic compounds for environmental improvement 995
J.E. Song, J.Y. Sohn, Y.S. Kim
82. Refrigeration in open spaces by means of evaporative systems 1000
S. Soutullo, C. San Juan, R.Olmedo, R. Enriquez, S. Palero, J.A. Ferrer, M^a.R. Heras
83. Urban heat islands and electrical energy consumption in a Brazilian city 1005
L.C. L. Souza, C. P. Postigo, A. P. Oliveira, C. M. Nakata
84. Comparative studies on different type of roof ponds for cooling purposes: literature review 1009
A. Spanaki
85. A heat island study of Athens using high-resolution satellite imagery and measurements of the optical and thermal properties of commonly used building and paving materials 1016
M. Stathopoulou, A. Synnefa, C. Cartalis, M. Santamouris, H. Akbari H.
86. Utilizing simulation to predict natural ventilation and wind flow 1021
M. Tahsildoost, N. Deldar
87. Accuracy of a neural network for the prediction of wind pressure coefficient 1029
M. Tajima, T. Sawachi
88. Knowledge extraction from energy certification of buildings – Results from the ENPER-EXIST project 1034
K. E. Thomsen, K.B. Wittchen, O. M. Jensen, S. Aggerholm
89. Visualization of air conditioning and ventilation processes: The apperiance of humid air diagram within a short period at three distant places on a globe 1038
B. Todorovic
90. Building integrated PV water heating and air conditioning in the special hospital of the SPA Rusanda 1042
M. Todorović, O.Ećim, I. Zlatanovic

91. Reflections on the skins of different objects and the use of climate modifiers <i>A. N. Tombazis</i>	1049
92. Design aspects and perspectives for solar control of buildings with aesthetic and efficient solar thermal collectors and photovoltaics <i>Y. Tripanagnostopoulos, M. Tripanagnostopoulou</i>	1052
93. Energy performance and energy rating procedures of buildings in Southern Europe <i>A. Tsave, T. Nikolaou, D. Kolokotsa, D. Dasenakis, N. Zografakis</i>	1057
94. Sustainable master planning and urban design for the “buffer zone” of Nicosia <i>A. Tsolaki, A. Trombadore, M. Santamouris</i>	1061
95. Daylight and luminaire control in a perimeter zone using an automated venetian blind <i>A. Tzempelikos, B. O’Neill, A. Athienitis</i>	1065
96. The impact of shading on thermal comfort conditions in perimeter zones with glass facades <i>A. Tzempelikos, M. Bessoudo, A. Athienitis, R. Zmeureanu</i>	1072
97. Air to air heat recovery: assessment of temperature efficiency <i>P. Van den Bossche, C. Delmotte, L. Vandaele, D. Van Orshoven</i>	1078
98. Policy instruments to promote sustainable summer comfort in buildings <i>M. Varga, K. Leutgöb, L. Pagliano, P. Zangheri, R. Cavelius</i>	1083
99. Cooling effect of PCM inserted in the walls: non linear phenomenon analysis <i>J. Virgone, J.-J. Roux, F. Kuznik, J. Noël</i>	1088
100. Energy multiplier <i>T. Vucetic</i>	1093
101. A convenient coupled simulation method for thermal environment prediction in naturally ventilated buildings <i>L. Wang, N. H. Wong</i>	1097
102. Discussion of strategies for UK zero energy building design <i>L. Wang, J.A. Gwilliam</i>	1103
103. Monitoring and simulation of two operational buildings integrating active thermal mass strategies <i>D.J. Warwick, A.J. Cripps, M. Kolokotroni</i>	1109
104. Innovative cooling method in a school environment. <i>H. Wigö</i>	1114
105. Measuring the luminance and chromaticity distribution of the sky <i>R. Wilkins</i>	1117
106. GIS-based and computer simulation evaluation on NUS campus master plan <i>N. H. Wong, S. K. Jusuf</i>	1121
107. GIS-based urban heat island study in University campus <i>N. H. Wong, S. K. Jusuf</i>	1127
108. Assessment of innovative systems/technologies in the context of EPBD regulations (illustrated with the assessment of an innovative ventilation system in the Belgian context) <i>P. Wouters, N. Heijmans, A. Janssens, N. Van Den Bossche, S. Roels</i>	1132
109. Pressure-drop and energy-saving analysis of TBAB clathrate hydrate slurry as a latent heat transportation media <i>R. Xiao, S.H. He, C. Huang, Z.P. Feng</i>	1137
110. The impact of exterior environmental comfort on residential behaviour from the insight of building energy conservation: a Case study on lower Ngau Tau Kok estate in Hongkong <i>Y. Xiong</i>	1141
111. Dynamic structures <i>S. Yannas</i>	1146
112. Measurement method of multi-zone air flow rate using human expiration <i>H. Yoshino, M. Fujikawa, R. Takaki, H. Okuyama, M. Hayashi, M. Sugawara</i>	1152
113. Case study of the weighed factors of stack effect and the reduction alternatives in tall complex building <i>J.Y. Yu, D.W. Cho, K.H. Yu, K.D. Song</i>	1157
114. Estimation of outdoor illuminance for passive solar architecture in Malaysia <i>A. Zain-Ahmed, H. Omar, M.Y. Alwi, M. Omar, S. Ahmed</i>	1163

115. Energy towers	1167
A renewable energy technology for producing electricity and desalinated water in arid climates	
<i>D. Zaslavsky, R. Guetta, S. Hassid</i>	
116. Ventilation of Dutch schools presently insufficient; an integral approach to improve design	1172
<i>W. Zeiler, G. Boxem</i>	
117. Field study on the performance of hybrid ventilation with HRHC in schools	1177
<i>W. Zeiler, G. Boxem, R. Scholten</i>	
118. An integral approach to façades: a conceptual comparison between different types of facades	1182
<i>W. Zeiler, J. Verdonschot, G. Boxem</i>	
119. Simulation of a solar absorption cooling system	1187
<i>G. Zidianakis, Th. Tsoutsos, N. Zografakis</i>	
120. A simplified tool for the energy certification of Italian existing dwellings. Comparative and sensitivity analyses	1195
<i>M. Zinzi, B. Barozzi, L. Danza, R. Lollini</i>	
121. Properties and performance of an innovative reflective painting to reduce the cooling loads in buildings and mitigate the heat island effect in urban areas	1200
<i>M. Zinzi, G. Fasano, E. Manilia</i>	