

Contents

Volume 1

Session: Sustainability in Energy and Buildings

1	Transformational Role of Lochiel Park Green Village	1
	<i>Stephen Robert Berry</i>	
2	Evaluation and Validation of an Electrical Model of Photovoltaic Module Based on Manufacturer Measurement	15
	<i>Giuseppe M. Tina, Cristina Ventura</i>	
3	Evolution of Environmental Sustainability for Timber and Steel Construction	25
	<i>Dimitrios N. Kaziolas, Iordanis Zygomas, Georgios E. Stavroulakis, Dimitrios Emmanouloudis, Charalambos C. Baniotopoulos</i>	
4	Using the Energy Signature Method to Estimate the Effective U-Value of Buildings	35
	<i>Gustav Nordström, Helena Johnsson, Sofia Lidelöw</i>	
5	Two Case Studies in Energy Efficient Renovation of Multi-family Housing; Explaining Robustness as a Characteristic to Assess Long-Term Sustainability	45
	<i>Vahid Sabouri, Paula Femenías</i>	
6	Exploring the Courtyard Microclimate through an Example of Anatolian Seljuk Architecture: The Thirteenth-Century Sahabiye Madrassa in Kayseri	59
	<i>Hakan Hisarligil</i>	

7	Analysis of Structural Changes of the Load Profiles of the German Residential Sector due to Decentralized Electricity Generation and e-mobility	71
	<i>Rainer Elsland, Tobias Boßmann, Rupert Hartel, Till Gnann, Massimo Genoese, Martin Wietschel</i>	
8	The Impact of Hedonism on Domestic Hot Water Energy Demand for Showering – The Case of the Schanzenfest, Hamburg	85
	<i>Stephen Lorimer, Marianne Jang, Korinna Thielen</i>	
9	The Process of Delivery – A Case Study Evaluation of Residential Handover Procedures in Sustainable Housing	95
	<i>David Bailey, Mark Gillott, Robin Wilson</i>	
10	Sustainable Renovation and Operation of Family Houses for Improved Climate Efficiency	107
	<i>Ricardo Ramírez Villegas, Björn Frostell</i>	
11	Solar Collector Based on Heat Pipes for Building Façades	119
	<i>Rassamakin Boris, Khairnasov Sergii, Musiy Rostyslav, Alforova Olga, Rassamakin Andrii</i>	
12	ICT Applications to Lower Energy Usage in the Already Built Environment	127
	<i>Anna Kramers</i>	
13	Using Dynamic Programming Optimization to Maintain Comfort in Building during Summer Periods	137
	<i>Bérenger Favre, Bruno Peuportier</i>	
14	Assisting Inhabitants of Residential Homes with Management of their Energy Consumption	147
	<i>Michael Kugler, Elisabeth André, Masood Masoodian, Florian Reinhart, Bill Rogers, Kevin Schlieper</i>	
15	Raising High Energy Performance Glass Block from Waste Glasses with Cavity and Interlayer	157
	<i>Floriberta Binarti, Agustinus D. Istiadji, Prasasto Satwiko, Priyo T. Iswanto</i>	
16	A New Model for Appropriate Selection of Window	167
	<i>Abdolsalam Ebrahimpour, Yousef Karimi Vahed</i>	
17	Improved Real Time Amorphous PV Model for Fault Diagnostic Usage	179
	<i>Mehrdad Davarifar, Abdelhamid Rabhi, Ahmed EL Hajjaji, Jerome Bosche, Xavier Pierre</i>	

18	An Investigation of Energy Efficient and Sustainable Heating Systems for Buildings: Combining Photovoltaics with Heat Pump	189
	<i>Arefeh Hesaraki, Sture Holmberg</i>	
19	Assessment of Solar Radiation Potential for Different Cities in Iran Using a Temperature-Based Method	199
	<i>Farivar Fazelpour, Majid Vafaeipour, Omid Rahbari, Mohammad H. Valizadeh</i>	
20	A Decision Support Framework for Evaluation of Environmentally and Economically Optimal Retrofit of Non-domestic Buildings	209
	<i>Taofeeq Ibn-Mohammed, Rick Greenough, Simon Taylor, Leticia Ozawa-Meida, Adolf Acquaye</i>	
21	Modeling, From the Energy Viewpoint, a Free-Form, High Energy Performance, Transparent Envelope	229
	<i>Luis Alonso, C. Bedoya, Benito Lauret, Fernando Alonso</i>	
22	A Mathematical Model to Pre-evaluate Thermal Efficiencies in Elongated Building Designs	239
	<i>Alberto Jose Fernández de Trocóniz y Revuelta, Miguel Ángel Gálvez Huerta, Alberto Xabier Fernández de Trocóniz y Rueda</i>	
23	Effect of Reaction Conditions on the Catalytic Performance of Ruthenium Supported Alumina Catalyst for Fischer-Tropsch Synthesis	251
	<i>Piyapong Hunpinyo, Phavanee Narataruksa, Karn Pana-Suppamassadu, Sabaithip Tungkamani, Nuwong Chollacoop, Hussanai Sukkathanyawat</i>	
24	Integration of Wind Power and Hydrogen Hybrid Electric Vehicles into Electric Grids	261
	<i>Stephen J.W. Carr, Kary K.T. Thanapalan, Fan Zhang, Alan J. Guwy, J. Maddy, Lars-O. Gusig, Giuliano C. Premier</i>	
25	Analysis of Thermal Comfort and Space Heating Strategy: Case Study in an Irish Public Building	271
	<i>Oliver Kinnane, M. Dyer, C. Treacy</i>	
26	Protection of Ring Distribution Networks with Distributed Generation Based on Petri Nets	281
	<i>Haidar Samet, Mohsen Khorasany</i>	
27	Real-Time Optimization of Shared Resource Renewable Energy Networks	289
	<i>Stephen Treado, Kevin Carbonnier</i>	

28	Evaluation of the LCA Approaches for the Assessment of Embodied Energy of Building Products	299
	<i>Ayşen Ciravoğlu and Gökçe Tuna Taygun</i>	
29	Exergetic Life Cycle Assessment: An Improved Option to Analyze Resource Use Efficiency of the Construction Sector	313
	<i>Mohammad Rashedul Hoque, Xavier Gabarrell Durany, Gara Villalba Méndez, Cristina Sendra Sala</i>	
30	Methodology for the Preparation of the Standard Model for Schools Investigator for the Sustainability of Energy Systems and Building Services	323
	<i>Hisham Elshimy</i>	
31	Latin-American Buildings Energy Efficiency Policy: The Case of Chile	337
	<i>Massimo Palme, Leônidas Albano, Helena Coch, Antoni Isalgué, José Guerra</i>	
32	Thermal Performance of Brazilian Modern Houses: A Vision through the Time	347
	<i>Leônidas Albano, Marta Romero, Alberto Hernandez Neto</i>	

Short Papers

33	Energetic and Exergetic Performance Evaluation of an AC and a Solar Powered DC Compressor	357
	<i>Orhan Ekren, Serdar Çelik</i>	
34	Effectiveness of Sustainable Assessment Methods in Achieving High Indoor Air Quality in the UK	367
	<i>Gráinne McGill, Menghao Qin, Lukumon Oyedele</i>	
35	A Comprehensive Monitoring System to Assess the Performance of a Prototype House	373
	<i>Oliver Kinnane, Tom Grey, Mark Dyer</i>	

Session: Smart Buildings, Smart Grids

Invited Sessions

36	Smart Consumers, Smart Controls, Smart Grid	381
	<i>Catalina Spataru, Mark Barrett</i>	
37	A Qualitative Comparison of Unobtrusive Domestic Occupancy Measurement Technologies	391
	<i>Eldar Nagijew, Mark Gillott, Robin Wilson</i>	

38	Review of Methods to Map People's Daily Activity – Application for Smart Homes	401
	<i>Stephanie Gauthier, David Shipworth</i>	
39	Optimizing Building Energy Systems and Controls for Energy and Environment Policy	413
	<i>Mark Barrett, Catalina Spataru</i>	
40	Towards a Self-managing Tool for Optimizing Energy Usage in Buildings	425
	<i>Naveed Arshad, Fahad Javed, Muhammad Dawood Liaqat</i>	
41	A Library of Energy Efficiency Functions for Home Appliances	435
	<i>Hamid Abdi, Michael Fielding, James Mullins, Saeid Nahavandi</i>	
42	Smart Energy Façade for Building Comfort to Optimize Interaction with the Smart Grid	445
	<i>Wim Zeiler, Rinus van Houten, Gert Boxem, Joep van der Velden</i>	
43	Building for Future Climate Resilience: A Comparative Study of the Thermal Performance of Eight Constructive Methods	453
	<i>Lucelia Rodrigues, Mark Gillott</i>	

Session: Assessment and Monitoring the Environmental Performance of Buildings

44	Exploring Indoor Climate and Comfort Effects in Refurbished Multi-family Dwellings with Improved Energy Performance	463
	<i>Linn Liu, Josefin Thoresson</i>	
45	Occupancy-Driven Supervisory Control Strategies to Minimise Energy Consumption of Airport Terminal Building	479
	<i>D. Abdulhameed Mambo, Mahroo Eftekhari, Thomas Steffen</i>	
46	An Investigation into the Practical Application of Residential Energy Certificates	491
	<i>Alan Abela, Mike Hoxley, Paddy McGrath, Steve Goodhew</i>	
47	Post-Occupancy Evaluation of a Mixed-Use Academic Office Building	501
	<i>Katharine Wall, Andy Shea</i>	
48	The Human as Key Element in the Assessment and Monitoring of the Environmental Performance of Buildings	511
	<i>Wim Zeiler, Rik Maaijen, Gert Boxem</i>	
49	The Effects of Weather Conditions on Domestic Ground-Source Heat Pump Performance in the UK	521
	<i>Anne Stafford</i>	

50 Asset and Operational Energy Performance Rating of a Modern Apartment in Malta 531
Charles Yousif, Raquel Mucientes Diez, Francisco Javier Rey Martínez

51 Low Carbon Housing: Understanding Occupant Guidance and Training 545
Isabel Carmona-Andreu, Fionn Stevenson, Mary Hancock

Volume 2

52 Embodied Energy as an Indicator for Environmental Impacts – A Case Study for Fire Sprinkler Systems 555
Tom Penny, Michael Collins, Simon Aumônier, Kay Ramchurn, Terry Thiele

53 Understanding the Gap between as Designed and as Built Performance of a New Low Carbon Housing Development in UK 567
Rajat Gupta, Dimitra Dantsiou

54 Preliminary Evaluation of Design and Construction Details to Maximize Health and Well-Being in a New Built Public School in Wroclaw 581
Magdalena Baborska-Narozny, Anna Bac

55 Comparison of Design Intentions and Construction Solutions Delivered to Enhance Environmental Performance and Minimize Carbon Emissions of a New Public School in Wroclaw 591
Magdalena Baborska-Narozny, Anna Bac

56 An Exploration of Design Alternatives Using Dynamic Thermal Modelling Software of an Exemplar, Affordable, Low Carbon Residential Development Constructed by a Registered Social Landlord in a Rural Area of Wales 601
Simon Hatherley, Wesley Cole, John Counsell, Andrew Geens, John Littlewood, Nigel Sinnett

57 Basic Energy and Global Warming Potential Calculations at an Early Stage in the Development of Residential Properties 613
Nils Brown

58 Passive Cooling Strategies for Multi-storey Residential Buildings in Tehran, Iran and Swansea, UK 623
Masoudeh Nooraei, John Littlewood, Nick Evans

59 An (un)attainable Map of Sustainable Urban Regeneration 637
Linda Toledo, John R. Littlewood

Session: Methodology for Renewable Energy Assessment

- 60 LCA in The Netherlands: A Case Study** 649
Wim Zeiler, Ruben Pelzer, Wim Maassen
- 61 Comparative Life-Cycle Assessment of Residential Heating Systems, Focused on Solid Oxide Fuel Cells** 659
Alba Cánovas, Rainer Zah, Santiago Gassó

Session: Improving Office Building Energy Performance

- 62 A Sustainable Energy Saving Method for Hotels by Green Hotel Deals** 669
Hamid Abdi, Doug Creighton, Saeid Nahavandi
- 63 The Role of Building Energy and Environmental Assessment in Facilitating Office Building Energy-Efficiency** 679
Emeka E. Osaji, Subashini Suresh, Ezekiel Chinyio
- 64 Improved Personalized Comfort: A Necessity for a Smart Building** 705
Wim Zeiler, Gert Boxem, Derek Vissers
- 65 Reducing Ventilation Energy Demand by Using Air-to-Earth Heat Exchangers: Part 1 - Parametric Study** 717
Hans Havtun, Caroline Törnqvist
- 66 Reducing Ventilation Energy Demand by Using Air-to-Earth Heat Exchangers: Part 2 System Design Considerations** 731
Hans Havtun, Caroline Törnqvist
- 67 The Green Room: A Giant Leap in Development of Energy-Efficient Cooling Solutions for Datacenters** 743
Hans Havtun, Roozbeh Izadi, Charles El Azzi
- 68 The Impacts of Contributory Factors in the Gap between Predicted and Actual Office Building Energy Use** 757
Emeka E. Osaji, Subashini Suresh, Ezekiel Chinyio

Session: Multi-Energy Sources

- 69 Improving Multiple Source Power Management Using State Flow Approach** 779
Aziz Naamane, Nacer Msirdi
- 70 Technical-Economic Analysis of Solar Water Heating Systems at Batna in Algeria.** 787
Aksas Mounir, Zouagri Rima, Naamane Aziz

71 Design and Control of a Diode Clamped Multilevel Wind Energy System Using a Stand-Alone AC-DC-AC Converter 797
Mona F. Moussa, Yasser G. Dessouky

Session: Technologies and Applications of Solar Energy

72 Analyzing the Optical Performance of Intelligent Thin Films Applied to Architectural Glazing and Solar Collectors 813
Masoud Kamalisarvestani, Saad Mekhilef, Rahman Saidur

73 A Sunspot Model for Energy Efficiency in Buildings 827
Yosr Boukhris, Leila Gharbi, Nadia Ghrab-Morcos

74 Towards 24/7 Solar Energy Utilization: The Masdar Institute Campus as a Case Study 837
Mona Aal Ali, Mahieddine Emziane

75 Effect of Selective Emitter Temperature on the Performance of Thermophotovoltaic Devices 847
Mahieddine Emziane, Yao-Tsung Hsieh

76 New Tandem Device Designs for Various Photovoltaic Applications 859
Mahieddine Emziane

77 GIS-Based Decision Support for Solar Photovoltaic Planning in Urban Environment 865
Antonio Gagliano, Francesco Patania, Francesco Nocera, Alfonso Capizzi, Aldo Galesi

78 Infrared Thermography Study of the Temperature Effect on the Performance of Photovoltaic Cells and Panels 875
Zaoui Fares, Mohamed Becherif, Mahieddine Emziane, Abdennacer Aboubou, Soufiane Mebarek Azzem

79 Integrating Solar Heating and PV Cooling into the Building Envelope 887
Sleiman Farah, Wasim Saman, Martin Belusko

Session: Energy Planning in Buildings and Policy Implications

80 Risk and Uncertainty in Sustainable Building Performance 903
Seyed Masoud Sajjadian, John Lewis, Stephen Sharples

81 Potential Savings in Buildings Using Stand-Alone PV Systems 913
Eva Malevit, Christos Tsitsiriggos

Session: Sustainable Energy Systems and Building Services

- 82 The Application of LCCA toward Industrialized Building Retrofitting – Case Studies of Swedish Residential Building Stock** 931
Qian Wang, Ivo Martinac
- 83 A Proposal of Urban District Carbon Budgets for Sustainable Urban Development Projects** 947
Aumnad Phdungsilp, Ivo Martinac
- 84 A Study of the Design Criteria Affecting Energy Demand in New Building Clusters Using Fuzzy AHP** 955
Hai Lu, Aumnad Phdungsilp, Ivo Martinac
- 85 Cooling Coil Design Improvement for HVAC Energy Savings and Comfort Enhancement** 965
Vahid Vakiloroaya, Jafar Madadnia
- 86 Sustainable Integration of Renewable Energy Systems in a Mediterranean Island: A Case Study** 975
Domenico Costantino, Mariano Giuseppe Ippolito, Raffaella Riva_Sanseverino, Eleonora Riva_Sanseverino, Valentina Vaccaro

Session: Sustainable and Healthy Buildings

- 87 Mobile Motion Sensor-Based Human Activity Recognition and Energy Expenditure Estimation in Building Environments** 987
Tae-Seong Kim, Jin-Ho Cho, Jeong Tai Kim
- 88 Cost and CO₂ Analysis of Composite Precast Concrete Columns** 995
Keun Ho Kim, Chaeyeon Lim, Youngju Na, Jeong Tai Kim, Sunkuk Kim
- 89 A Field Survey of Thermal Comfort in Office Building with a Unitary Heat-Pump and Energy Recovery Ventilator** 1003
Seon Ho Jo, Jeong Tai Kim, Geun Young Yun
- 90 An Analysis of Standby Power Consumption of Single-Member Huseholds in Korea** 1011
JiSun Lee, Hyunsoo Lee, JiYea Jung, SungHee Lee, SungJun Park, YeunSook Lee, JeongTai Kim
- 91 A Classification of Real Sky Conditions for Yongin, Korea** 1025
Hyo Joo Kong, Jeong Tai Kim
- 92 Influence of Application of Sorptive Building Materials on Decrease in Indoor Toluene Concentration** 1033
Seonghyun Park, Jeong Tai Kim, Janghoo Seo

93 Perceived Experiences on Comfort and Health in Two Apartment
Complexes with Different Service Life 1043
Mi Jeong Kim, Myung Eun Cho, Jeong Tai Kim

94 Impact of Different Placements of Shading Device on Building
Thermal Performance 1055
Hong Soo Lim, Jeong Tai Kim, Gon Kim

95 Daylighting and Thermal Performance of Venetian Blinds in an
Apartment Living Room 1061
Ju Young Shin, Yoon Jeong Kim, Jeong Tai Kim

96 Environmentally-Friendly Apartment Buildings Using a Sustainable
Hybrid Precast Composite System 1071
*Ji-Hun Kim, Won-Kee Hong, Seon-Chee Park, Hyo-Jin Ko,
Jeong Tai Kim*

97 A System for Energy Saving in Commercial and Organizational
Buildings 1083
Hamid Abdi, Michael Fielding, James Mullins, Saeid Nahavandi

Session: Special Selection

98 A Comparative Analysis of Embodied and Operational CO₂
Emissions from the External Wall of a Reconstructed Bosphorus
Mansion in Istanbul 1093
Fatih Yazicioglu, Hülya Kus

Author Index 1107