

1st International Conference on Solar Heating and Cooling for Buildings and Industry

(SHC 2012)

Energy Procedia Volume 30

**San Francisco, California, USA
9-11 July 2012**

Volume 1 of 2

Editors:

Andreas Haberle

**ISBN: 978-1-62748-439-8
ISSN: 1876-6102**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

Thermal-electrical Optimization of the Configuration a Liquid PVT Collector	1
<i>Niccolò Aste, Claudio Del Pero, Fabrizio Leonforte</i>	
Optimization of Solar Thermal Fraction in PVT Systems	8
<i>Niccolò Aste, Claudio Del Pero, Fabrizio Leonforte</i>	
Experimental and Two-dimensional Numerical Simulation of an Unglazed Transpired Solar Air Collector	19
<i>Messaoud Badache, Daniel Rousse, Stéphane Hallé, Guillermo Quesada, Yvan Dutil</i>	
An Experimental Assessment of the Energy Performance of Novel Concrete Walls Embedded with Mini Solar Collectors	29
<i>Larry A. Bellamy</i>	
Development of a 5 kW Cooling Capacity Ammonia-water Absorption Chiller for Solar Cooling Applications	35
<i>François Boudéhenn, Hélène Demasles, Joël Wytenbach, Xavier Jobard, David Chèze, Philippe Papillon</i>	
Experimental Model Validation of a Hybrid PV/thermal Air based Collector with Impinging Jets	44
<i>Sébastien A. Brideau, Michael R. Collins</i>	
Zero Energy Communities with Central Solar Plants using Liquid Desiccants and Local Storage	55
<i>Jay Burch, Jason Woods, Eric Kozubal, Aaron Boranian</i>	
Efficiencies of Flat Plate Solar Collectors at Different Flow Rates	65
<i>Ziqian Chen, Simon Furbo, Bengt Perers, Jianhua Fan, Elsa Andersen</i>	
Uniform Representation of System Performance for Solar Hybrid Systems	73
<i>Roberto Fedrizzì, Ivan Malenkovic, Patrizia Melograno, Michel Haller, Matthias Schickanz, Sebastian Herkel, Jörn Ruschenburg</i>	
Geometrical Assessment of Solar Concentrators using Close-range Photogrammetry	84
<i>Jesús Fernández-Reche, Loreto Valenzuela</i>	
Solar Water Heating is the ‘Red-headed Stepchild,’ but Metering Returns it to Good Favor	91
<i>Piper Foster</i>	
Combining Heat Pumps with Solar Energy for Domestic Hot Water Production	101
<i>Andreas Genkinger, Ralf Dott, Thomas Afjei</i>	
High Transmittance, Low Emissivity Glass Covers for Flat Plate Collectors: Applications and Performance	106
<i>Federico Giovannetti, Sebastian Föste, Nicole Ehrmann, Gunter Rockendorf</i>	
A Model of the Optical Properties of a Non-absorbing Media with Application to Thermotropic Materials for Overheat Protection	116
<i>Adam Gladen, Jane H. Davidson, Susan C. Mantell, Jihua Zhang, Yuwen Xu</i>	
IEA Solar and Heat Pump Systems Solar Heating and Cooling Task 44 & Heat Pump Programme Annex 38	125
<i>Jean-Christophe Hadorn</i>	
Development of the Prototype IP-Solar: A Web-based Monitoring and Diagnostics Tool for Solar Thermal Systems	134
<i>Christian Holter, Bernhard Gerardts, Philip Ohnwein, Angela Dröscher, Franz Feichtner, Klaus Schgaguler, Ernst Meißner, Peter Luidolt, Alice Köstinger, Richard Heimrath, Wolfgang Streicher</i>	
The Experimental Performance of an Unglazed PV-thermal Collector with a Fully Wetted Absorber	144
<i>Jin-Hee Kim, Jun-Tae Kim</i>	
Investigation of Thermal Performance of Flat Plate and Evacuated Tubular Solar Collectors According to a New Dynamic Test Method	152
<i>Weiqiang Kong, Zhifeng Wang, Jianhua Fan, Bengt Perers, Ziqian Chen, Simon Furbo, Elsa Andersen</i>	
IEA-SHC Task 43: Research and Standardization on Solar Collector Testing and Towards a Global Certification Scheme	162
<i>Enric Mateu Serrats, Peter Kovacs, Korbinian Kramer, Jan Erik Nielsen, Les Nelson</i>	
Simulation of Annual Energy Saving Benefit of Solar Collector	172
<i>Wang Xuan, Wang Min, He Tao, Zheng Ruicheng, Li Zhong, Zhang Xinyu, Feng Airong</i>	
A Study of Design Options for a Building Integrated Photovoltaic/thermal (BIPV/T) System with Glazed Air Collector and Multiple Inlets	177
<i>Tingting Yang, Andreas K. Athienitis</i>	
Methods for Medium Temperature Collector Development Applied to a CPC Collector	187
<i>Christoph Zauner, Florian Hengstberger, Wolfgang Hohenauer, Christoph Reichl, Andreas Simetzberger, Gerald Gleiss</i>	
A Finite Difference Model of a PV-PCM System	198
<i>Giuseppina Ciulla, Valerio Lo Brano, Maurizio Cellura, Vincenzo Franzitta, Daniele Milone</i>	
Development of a Seasonal Thermochemical Storage System	207
<i>Ruud Cuyppers, Nazli Maraz, Jacco Eversdijk, Christian Finck, Ellemieke Henquet, Henk Oversloot, Hans Van’T Spijker, Aart De Geus</i>	
The Effect of Discharge Configurations on the Thermal Behaviour of a Multi-tank Storage System	215
<i>Ryan M. Dickinson, Cynthia A. Cruickshank, Stephen J. Harrison</i>	
Thermal Energy Storage by PCM-air Heat Exchangers: Temperature Maintenance in a Room	225
<i>Pablo Doladoa, Ana Lazaro, Monica Delgado, Conchita Peñalosa, Javier Mazo, Jose Maria Marin, Belen Zalba</i>	
Low Temperature Chemical Reaction Systems for Thermal Storage	235
<i>Baerbel Egenolf-Jonkmanns, Stefano Bruzzano, Goerge Deerberg, Matthias Fischer, Thomas Marzi, Maria Tyukavina, Jorge Salazar Gomez, Holger Wack, Barbara Zeidler-Fandrich</i>	
Thermal Behavior of a Heat Exchanger Module for Seasonal Heat Storage	244
<i>Jianhua Fan, Simon Furbo, Elsa Andersen, Ziqian Chen, Bengt Perers, Mark Dannemand</i>	

On Vacuum Insulated Thermal Storage	255
<i>Benjamin Fuchs, Klaus Hofbeck, Martin Faulstich</i>	
Development of Seasonal Heat Storage based on Stable Supercooling of a Sodium Acetate Water Mixture	260
<i>Simon Furbo, Jianhua Fan, Elsa Andersen, Ziqian Chen, Bengt Perers</i>	
Model Predictive Control for a Smart Solar Tank Based on Weather and Consumption Forecasts	270
<i>Rasmus Halvgaard, Peder Bacher, Bengt Perers, Elsa Andersen, Simon Furbo, John B. Jørgensen, Niels K. Poulsen, Henrik Madsen</i>	
Novel Sorption Materials for Solar Heating and Cooling	279
<i>Stefan K. Henninger, Felix Jeremias, Harry Kummer, Peter Schossig, Hans-Martin Henning</i>	
Adsorption Properties of Porous Materials for Solar Thermal Energy Storage and Heat Pump Applications	289
<i>Jochen Jänchen, Helmut Stach</i>	
Chemical Energy Storage Using Reversible Solid/gas-reactions (CWS) – Results of the Research Project	294
<i>Henner Kerskes, Barbara Mette, Florian Bertsch, Sebastian Asenbeck, Harald Drück</i>	
Concentrated Heat Storage for Solar Heating	305
<i>Adil Lari</i>	
Transfer of Laboratory Results on Closed Sorption Thermo- Chemical Energy Storage to a Large-scale Technical System	310
<i>Asnakech Lass-Seyoum, Mike Blicher, Dimitry Borozdenko, Thomas Friedrich, Timo Langhof</i>	
Concepts of Long-term Thermochemical Energy Storage for Solar Thermal Applications – Selected Examples	321
<i>Barbara Mette, Henner Kerskes, Harald Drück</i>	
Experimentation of a LiBr-H₂O Absorption Process for Long Term Solar Thermal Storage	331
<i>Kokouvi Edem N'Tsoukpoe, Nolwenn Le Pierrès, Lingai Luo</i>	
Thermal Loads Inside Buildings with Phase Change Materials: Experimental Results	342
<i>Lidia Navarro, Alvaro De Garcia, Cristian Solé, Albert Castell, Luisa F. Cabeza</i>	
Thermally Enhanced Paraffin for Solar Applications	350
<i>Halime Paksoy, Nurten Sahan</i>	
Mass Transfer During Sensible Charging of a Hybrid Absorption/Sensible Storage Tank	353
<i>Josh A. Quinnell, Jane H. Davidson</i>	
Hydration and Dehydration of Salt Hydrates and Hydroxides for Thermal Energy Storage - Kinetics and Energy Release	362
<i>Holger Urs Rammelberg, Thomas Schmidt, Wolfgang Ruck</i>	
Performance Characterization of PCM Impregnated Gypsum Board for Building Applications	370
<i>Nitin Shukla, Ali Fallahi, Jan Kosny</i>	
Parameters to Take Into Account When Developing a New Thermochemical Energy Storage System	380
<i>Aran Solé, Xavier Fontanet, Camila Barreneche, Ingrid Martorell, A. Inés Fernández, Luisa F. Cabeza</i>	
Parametric Studies of Thermochemical Processes for Seasonal Storage	388
<i>Gwynnyn Tanguy, Foivos Marias, Sylvie Rouge, Joël Wytenbach, Philippe Papillon</i>	
Validation of Heat Transfer Models for PCMs with a Conductivimeter	395
<i>Aitor Urresti, Jose María Sala, Ana García-Romero, Gonzalo Diarce, Cesar Escudero</i>	
Comparative Energy and Economic Performance Analysis of an Electrochromic Window and Automated External Venetian Blind	404
<i>Niccolò Aste, Junia Compostella, Manlio Mazzon</i>	
Unglazed PVT Collectors As Additional Heat Source in Heat Pump Systems with Borehole Heat Exchanger	414
<i>Erik Bertram, Jens Glembin, Gunter Rockendorf</i>	
Vacuum Insulation Panels – A Promising Solution for High Insulated Tanks	424
<i>Benjamin Fuchs, Klaus Hofbeck, Martin Faulstich</i>	
Characterization of the Optical Properties of a PCM Glazing System	428
<i>Francesco Goia, Michele Zinzi, Emiliano Carnielo, Valentina Serra</i>	
Black Pigmented Polypropylene Materials for Solar Absorbers	438
<i>Markus Kurzböck, Gernot M. Wallner, Reinhold W. Lang</i>	
Solar Heat Flux Reduction Through Roof Using Porous Insulation Layer	446
<i>Atish Mozumder, Anjani Kumar Singh</i>	
Green Roofs As Passive System for Energy Savings When Using Rubber Crumbs As Drainage Layer	452
<i>Gabriel Pérez, Julià Coma, Cristian Solé, Albert Castell, Luisa F. Cabeza</i>	
Stabilized Rammed Earth Incorporating PCM: Optimization and Improvement of Thermal Properties and Life Cycle Assessment	461
<i>Susana Serrano, Camila Barreneche, Lidia Rincón, Dieter Boer, Luisa F. Cabeza</i>	
Thermotropic Glazings for Overheating Protection	471
<i>Andreas Weber, Katharina Resch</i>	
Modelling and Control Optimization of a Solar Desiccant and Evaporative Cooling System Using an Electrical Heat Pump	478
<i>Marcello Aprile, Rossano Scoccia, Mario Motta</i>	
Performance Assessment for Solar Heating and Cooling System for Office Building in Italy	490
<i>Osama Ayadi, Alberto Mauro, Marcello Aprile, Mario Motta</i>	
A Review of Solar Cooling Technologies for Residential Applications in Canada	495
<i>Christopher Baldwin, Cynthia A. Cruickshank</i>	
Demonstration of the New ESP-r and TRNSYS Co-simulator for Modelling Solar Buildings	505
<i>Ian Beausoleil-Morrison, Michaël Kummert, Francesca Macdonald, Romain Jost, Timothy McDowell, Alex Ferguson</i>	

Numerical Evaluation on Performances of AHU Equipped with a Cross Flow Heat Exchanger in Wet and Dry Operation	515
<i>Marco Beccali, Pietro Finocchiaro</i>	
Advanced Performance of an Open Desiccant Cycle with Internal Evaporative Cooling	524
<i>Constanze Bongs, Alexander Morgenstern, Hans-Martin Henning</i>	
Performance Analysis of Transparent Perforated Solar Collectors for Air Preheating, for Three Different Building Claddings	534
<i>Geneviève Bussières</i>	
Performance Evaluation of a Liquid Desiccant Solar Air Conditioning System	542
<i>Lisa Crofoot, Stephen Harrison</i>	
Validation of the Numerical Model of a Turnkey Solar Combi + System	551
<i>Matteo D'Antoni, Gabriele Ferruzzi, Davide Bettoni, Roberto Fedrizzi</i>	
System Evaluation of Combined Solar & Heat Pump Systems	562
<i>Ralf Dott, Andreas Genkinger, Thomas Afjei</i>	
Solar Assisted Heat Pump for Domestic Hot Water Production	571
<i>Sara Eicher, Catherine Hildbrand, Jacques Bony, Mircea Bunea, Jean-Christophe Hadorn, Stéphane Citherlet</i>	
Analysis of a Solar Office Building at the South of Spain Through Simulation Model Calibration	580
<i>Ricardo Enriquez, María José Jiménez, María Del Rosario Heras</i>	
Direct Coupling Solar and Heat Pump at Large Scale: Experimental Feedback From an Existing Plant	590
<i>Carolina Fraga, Floriane Mermoud, Pierre Holtmuller, Eric Pampaloni, Bernard Lachal</i>	
Simulation and Evaluation of Different Boiler Implementations and Configurations in Solar Thermal Combi Systems	601
<i>Jens Glembin, Mario Adam, Jörn Deidert, Kati Jagnow, Gunter Rockendorf, Hans Peter Wirth</i>	
Review of Component Models for the Simulation of Combined Solar and Heat Pump Heating Systems	611
<i>Michael Y. Haller, Erik Bertram, Ralf Dott, Thomas Afjei, Fabian Ochs, Jean-Christophe Hadorn</i>	
Experimental and Numerical Investigations on a Combined Biomass-Solar Thermal System	623
<i>Michael Hartl, Stefan Aigenbauer, Franz Helminger, Andreas Simetzberger, Ivan Malenkovic</i>	
Solar Systems for Heating and Cooling of Buildings	633
<i>Hans-Martin Henning, Jochen Döll</i>	
Assessment of a Solar Assisted Air Source and a Solar Assisted Water Source Heat Pump System in a Canadian Household	654
<i>Martin Kegel, Justin Tamasauskas, Roberto Sunye, Antoine Langlois</i>	
A Simplified Heat Pump Model for use in Solar Plus Heat Pump System Simulation Studies	664
<i>Bengt Perers, Elsa Anderssen, Roger Nordman, Peter Kovacs</i>	
High Potential of Full Year Operation with Solar Driven Desiccant Evaporative Cooling Systems	668
<i>Anita Preisler, Markus Brychta</i>	
Innovative and Energy Efficient Concept for Solar Cooling (DHW/Cooling Hybrid Strategy): Practical First Results	676
<i>Romain Siré, Daniel Mugnier</i>	
Solar Heating and Air-Conditioning by GSHP Coupled to PV System for a Cost Effective High Energy Performance Building	683
<i>Lavinia Chiara Tagliabue, Mario Maistrello, Claudio Del Pero</i>	
Energy Saving Through the Sun: Analysis of Visual Comfort and Energy Consumption in Office Space	693
<i>Lavinia Chiara Tagliabue, Michela Buzzetti, Barbara Arosio</i>	
Experimentation and Simulation of a Small-Scale Adsorption Cooling System in Temperate Climate	704
<i>Sébastien Thomas, Samuel Hennaut, Stefan Maas, Philippe Andre</i>	

VOLUME 2

Application of the ESP-r/TRNSYS Co-Simulator to Study Solar Heating with a Single-House Scale Seasonal Storage	715
<i>Adam Wills, Cynthia A. Cruickshank, Ian Beausoleil-Morrison</i>	
Developing Situation and Energy Saving Effects for Solar Heating and Cooling in China	723
<i>Zheng Ruicheng, He Tao, Zhang Xinyu, Huang Zhulian, Deng Yu</i>	
Application of Solar Cooling System in a Campus Library in Hainan, China	730
<i>Li Zhong, Nie Jingjing, Zhang Xinyu, Li Guoli, Li Changling, Wei Lifeng, Zheng Ruicheng</i>	
Using A Double-Pass Solar Drier For Jerky Drying	738
<i>Jan Banout, Iva Kucerova, Stepan Marek</i>	
Assessment of Medium Temperature Collectors for Process Heat	745
<i>Víctor Martínez, Ramon Pujol, Andreu Moia</i>	
Demonstration of Three Large Scale Solar Process Heat Applications with Different Solar Thermal Collector Technologies	755
<i>Dirk Pietruschka, Roberto Fedrizzi, Francesco Orioli, Robert Söll, Reiner Stauss</i>	
Sensitivity Analysis of Saturated Steam Production in Parabolic Trough Collectors	765
<i>Loreto Valenzuela, David Hernández-Lobón, Eduardo Zarza</i>	
Solar Process Heat for Sustainable Automobile Manufacturing	775
<i>Christian Zahler, Oliver Iglauer</i>	
Fracture Behavior of Degraded Polyethylene Thin Films for Solar Thermal Applications	783
<i>Hanxiao Ge, Gyanender Singh, Susan C. Mantell</i>	

A Review of Strategies for the Control of High Temperature Stagnation in Solar Collectors and Systems	793
<i>Stephen Harrison, Cynthia A. Cruickshank</i>	
Aging Tests of Components for Solar Thermal Collectors	805
<i>Thomas Kaltenbach, Mathis Kurth, Christoph Schmidt, Tobias Meier, Michael Köhl, Karl-Anders Weib</i>	
Venting and Degasification of Solar Circuits	815
<i>Karin Rühling, Martin Heymann, Felix Panitz</i>	
Test Result Analysis of the Stagnation Effect on the Thermal Performance of Solar Collector	824
<i>Zhang Xinyu, You Shijun, Xu Wei, Zheng Xuejing, He Tao, Huang Zhulian, Zhang Lei, Deng Yu</i>	
District Heating: Results of a Monitoring Campaign in Lombardy Region	829
<i>Niccolò Aste, Paola Caputo, Michela Buzzetti</i>	
Evaluation of the Potential of Large Solar Heating Plants in Spain	839
<i>Mateo De Guadalfajara, Miguel A. Lozano, Luis M. Serra</i>	
IEA-SHC Task 45: Large Solar Heating/Cooling Systems, Seasonal Storage, Heat Pumps	849
<i>Jan Erik Nielsen</i>	
The Performance of a High Solar Fraction Seasonal Storage District Heating System – Five Years of Operation	856
<i>Bruce Sibbitt, Doug McClenahan, Reda Djebbar, Jeff Thornton, Bill Wong, Jarrett Carriere, John Kokko</i>	
Stadtwerk: Lehen _Solar Energy in Urban Community in City of Salzburg, Austria	866
<i>Di Helmut Strasser, Mag. Norbert Dorfinger, Boris Mahler</i>	
Solar Cooling Systems Utilizing Concentrating Solar Collectors - An Overview	875
<i>Osama Ayadi, Marcello Aprile, Mario Motta</i>	
Analysis of the Performance of a GAX Hybrid (Solar - LPG) Absorption Refrigeration System Operating with Temperatures from Solar Heating Sources	884
<i>Mario A. Barrera, Roberto Best, Victor H. Gómez, Octavio García- Valladares, Nicolaz Velázquez, Jorge Chan</i>	
Life Cycle Assessment Performance Comparison of Small Solar Thermal Cooling Systems with Conventional Plants Assisted with Photovoltaics	893
<i>Marco Beccali, Maurizio Cellura, Pietro Finocchiaro, Francesco Guarino, Sonia Longo, Bettina Nocke</i>	
Solar Driven Cold Rooms for Industrial Cooling Applications	904
<i>Michael Berger, Matthias Weckesser, Christine Weber, Jochen Döll, Alexander Morgenstern, Andreas Häberle</i>	
Solar Cooling Technologies Using Ejector Refrigeration System	912
<i>Dmytro Buyadgie, Olexiy Buyadgie, Oleksii Drakhnia, Sergey Artemenko, Andrey Chamchine</i>	
Solar Cooling with Adsorption Chillers	921
<i>Ingo Dabler, Walter Mittelbach</i>	
Nocturnal Radiation Cooling Tests	930
<i>John Hollick</i>	
Calculation of Performance Indicators for Solar Cooling, Heating and Domestic Hot Water Systems	937
<i>Julia Nowag, François Boudéhen, Amandine Le Denn, Franck Lucas, Olivier Marc, Mihai Radulescu, Philippe Papillon</i>	
Thermal Energy Storage Implementation Using Phase Change Materials for Solar Cooling and Refrigeration Applications	947
<i>Eduard Oró, Antoni Gil, Laia Miró, Gerard Peiró, Servando Álvarez, Luisa F. Cabeza</i>	
Latent Heat and Cold Storage in a Solar-Driven Steam Jet Ejector Chiller Plant	957
<i>Clemens Pollerberg, Michael Kauffeld, Tunay Oezcan, Matthias Koffler, Lucian George Hanu, Christian Doetsch</i>	
Dimensioning a Small-Sized PTC Solar Field for Heating and Cooling of a Hotel in Almería (Spain)	967
<i>Manuel Quirante, Loreto Valenzuela</i>	
Operational Performance Results of an Innovative Solar Thermal Cooling and Heating Plant	974
<i>Manuel Riepl, Felix Loistl, Richard Gurtner, Martin Helm, Christian Schweigler</i>	
Solar Absorption in a Ventilated Façade with PCM. Experimental Results	986
<i>Alvaro De Gracia, Lidia Navarro, Albert Castell, Álvaro Ruiz-Pardo, Servando Álvarez, Luisa F. Cabeza</i>	
A Control Algorithm for Optimal Energy Performance of a Solarium/Greenhouse with Combined Interior and Exterior Motorized Shading	995
<i>Diane Bastien, Andreas K Athienitis</i>	
A Case Study of Solar Technologies Adoption: Criteria for BIPV Integration in Sensitive Built Environment	1006
<i>Francesco Frontini, Massimiliano Manfren, Lavinia Chiara Tagliabue</i>	
A Simulation Study of Air-Type Building-Integrated Photovoltaic-Thermal System	1016
<i>Jin-Hee Kim, Jun-Tae Kim</i>	
Evaluation of Turbulence Models for Airflow and Heat Transfer Prediction in BIPV/T Systems Optimization	1025
<i>Siwei Li, Panagiota Karava</i>	
Solar Heating and Cooling with Transparent Façade Collectors in a Demonstration Building Original Research Article	1035
<i>Christoph Maurer, Thibault Pflug, Paolo Di Lauro, Joze Hafner, Friderik Knez, Sabina Jordan, Michael Hermann, Tilmann E. Kuhn</i>	
Solar Integrated Roof: Electrical and Thermal Production for a Building Renovation	1042
<i>Niccolò Aste, Rajendra Singh Adhikari, Lavinia Chiara Tagliabue</i>	
LowEx Solar Building System: Integration of PV/T Collectors into Low Exergy Building Systems	1052
<i>Marc Baetschmann, Hansjürg Leibundgut</i>	
Renovation of an UNESCO Heritage Settlement in Southern Italy: ASHP and BIPV for a “Spread Hotel” Project	1060
<i>Lavinia Chiara Tagliabue, Fabrizio Leonforte, Junia Compostella</i>	
The Influence of Energy Conservation on the Performance of Solar Thermal Systems – A Cold Country Case Study	1069
<i>Jörgen Wallin, Diane Bastien, Joachim Claesson</i>	

An Algorithm for Designing Dynamic Solar Shading System	1079
<i>Niccolò Aste, Rajendra Singh Adhikari, Claudio Del Pero</i>	
Making Toronto Solar Ready: Proposing Urban Forms for the Integration of Solar Strategies	1090
<i>Andrew Colucci, Miljana Horvat</i>	
Office Buildings Cooling Need in the Italian Climatic Context: Assessing the Performances of Typical Envelopes	1099
<i>Simone Ferrari, Valentina Zanotto</i>	
Trombe Walls for Lightweight Buildings in Temperate and Hot Climates. Exploring the Use of Phase-change Materials for Performances Improvement	1110
<i>Francesco Fiorito</i>	
Tools and Methods for Solar Design—An Overview of IEA SHC Task 41, Subtask B	1120
<i>Miljana Horvat, Marie-Claude Dubois</i>	
To Examine the Energy Conservation Potential of Passive & Hybrid Downdraught Evaporative Cooling: A Study for Commercial Building Sector in Hot and Dry Climate of Ahmedabad	1131
<i>Mansi Jayswal</i>	
Solar Energy as a Design Parameter in Urban Planning	1143
<i>Jouri Kanters, Miljana Horvat</i>	
The Design Process known as IDP: A Discussion	1153
<i>Jouri Kanters, Miljana Horvat</i>	
District Geometry Simulation: A Study for the Optimization of Solar Façades in Urban Canopy Layers	1163
<i>Gabriele Lobaccaro, Francesco Fiorito, Gabriele Maserà, Tiziana Poli</i>	
SolarPW: A New Solar Design Tool to Exploit Solar Potential in Existing Urban Areas	1173
<i>Gabriele Lobaccaro, Francesco Frontini, Gabriele Maserà, Tiziana Poli</i>	
Spectral Light Transmission Measure and Radiance Model Validation of an innovative Transparent Concrete Panel for Façades	1184
<i>Andrea Giovanni Mainini, Tiziana Poli, Michele Zinzi, Stefano Cangiano</i>	
Criteria for Architectural Integration of Active Solar Systems IEA Task 41, Subtask A	1195
<i>Mariacristina Munari Probst, Christian Roecker</i>	
Assessment of Climate Adaptation of Youth Club in Tozeur, South of Tunisia	1205
<i>Djamel Ouahrani</i>	
Experimental PIV Techniques Applied to the Analysis of Natural Convection in Open Joint Ventilated Facades	1216
<i>Christina Sanjuan, Maria Nuria Sánchez, Ricardo Enriquez, Maria Del Rosario Heras Celemín</i>	
Comfort Evaluation in an Urban Boulevard by Means of Evaporative Wind Towers	1226
<i>Sylvia Soutullo Castro, Cristina Sanjuan Guaita, Maria Nuria Sánchez Egido, Luis F. Zarzalejo, Ricardo Enriquez Miranda, Maria Del Rosario Heras Celemín</i>	
Energy Performance of Greenhouse for Energy Saving in Buildings	1233
<i>Lavinia Chiara Tagliabue, Michela Buzzetti, Giorgia Marenzi</i>	
Cooling Demand and Daylight in the New Tallinn Town Hall Buildings the Influence of Facade Design	1243
<i>Hendrik Volla, Erkki Seinre</i>	
Achieving Solar Energy in Architecture-IEA SHC Task 41	1250
<i>Maria Wall, Maria Cristina Munari Probst, Christian Roecker, Marie-Claude Dubois, Miljana Horvat, Olaf Bruun Jørgensen, Karin Kappel</i>	
Towards Solar Urban Planning: A New Step for Better Energy Performance	1261
<i>Miguel Amado, Francesca Poggi</i>	
Assessment of SUNY Version 3 Global Horizontal and Direct Normal Solar Irradiance in Canada	1274
<i>Reda Djebbar, Robert Morris, Didier Thevenard, Richard Perez, James Schlemmer</i>	
Design Methodology of Solar Neighborhoods	1284
<i>Caroline Hachem, Andreas Athienitis, Paul Fazio</i>	
Dynamic Testing of Systems—Use of TRNSYS As an Approach for Parameter Identification	1294
<i>Patrícia Almeida, Ricardo Amorim, Maria João Carvalho, João Farinha Mendes, Vitor Lopes</i>	
International Standards for Solar Heating Collectors and Systems	1304
<i>Ken Guthrie, Jim Huggins, He Zinian, Erandi Chandrasekare</i>	
Interaction of Regulation and Innovation: Solar Air Heating Collectors	1311
<i>Korbinian Kramer</i>	
Solar Combisystem Characterization with a Global Approach Test and a Neural Network Based Model Identification	1322
<i>Antoine Leconte, Gilbert Achard, Philippe Papillon</i>	
Field Study of Solar Domestic Water Heaters in Quebec	1331
<i>Alain Moreau, François Laurencelle</i>	
Towards Global Certification of Solar Collectors	1339
<i>Jan Erik Nielsen, Les Nelson, Jaime Fernández González-Granda, Jim Huggins</i>	
Testing of Solar Thermal Collectors Under Transient Conditions	1344
<i>Tiago Osório, Maria João Carvalho</i>	
A Tool for Standardized Collector Performance Calculations Including PVT	1354
<i>Bengt Perers, Peter Kovacs, Marcus Olsson, Martin Perssonb Ulrik Pettersson</i>	
Test Method and Compact Facility for Thermal Performance and Energy Efficiency Grades of Compact Solar Water Heaters	1365
<i>He Tao, Zhang Lei, Deng Yu, Huang Zhulian, Wang Xuan, Wang Min, Zhang Xinyu, Zheng Ruicheng</i>	
Financing of Large Solar Thermal Systems for Cooling and Process Heat	1372
<i>Josef Buchinger, Christian Holter, Harald Blazek</i>	

Collaboration Opportunities in Advanced Housing Renovation	1380
<i>Erwin Mlecnik, Irena Kondratenko, Johan Cré, Jeroen Vrijders, Pieter Degraeve, Joeri Aleksander Van Der Have, Trond Haavik, Synnøve A. Aabrekk, Matilde Grøn, Sanne Hansen, Svend Svendsen, Olli Stenlund, Satu Piiho</i>	
Solar Thermal Plants for Industrial Process Heat in Tunisia: Economic Feasibility Analysis and Ideas for a New Policy	1390
<i>Marco Calderoni, Marcello Aprile, Salvatore Moretta, Aristotelis Aidonis, Mario Motta</i>	
Learning from Interventions Aimed at Mainstreaming Solar Hot Water in the Australian Market	1401
<i>David Ferrari, Ken Guthrie, Sonja Ott, Robert Thomson</i>	
From Demonstration Projects to Volume Market of Sustainable Construction	1411
<i>Trond Haavik, Erwin Mlecnik, Are Rødsjø</i>	
Development of a Technology Roadmap for Solar Thermal Cooling in Austria	1422
<i>Anita Preisler, Tim Selke, Hilbert Focke, Nicole Hartl, Georg Geissegger, Erich Podesser, Alexander Thür</i>	
Policy Pitfalls of SWH	1432
<i>Ernst Uken</i>	
Author Index	