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To get the latest version of the scientific program on your cell phone please scan the QR-code or enter the URL:

<https://cms.shc2015.org/program>



Chairmen's Message



Bülent Yeşilata, Professor
*Harran University and GÜNDER
Scientific Chair of SHC 2015*



Pedro Dias
*ESTIF
Industry Chair of SHC 2015*



Daniel Mugnier
*IEA SHC
Conference Chair of SHC 2015*

Welcome to the 4th SHC conference in Istanbul, Turkey. Such a conference is a great challenge! The solar heating and cooling (SHC) sector, with its technology, policy, strategy and market, touches every part of human life in almost all countries. Starting from simple flat plate solar water heaters almost half a century ago, solar heating technologies have progressed and have developed, in terms of products and applications.

We've witnessed developments of collectors, be it flat plate, evacuated tubes or concentrating collectors. For instance, with lower production costs and few maintenance requirements, evacuated solar water heaters now share significant portions of total manufactured solar water heaters in a significant number of countries.

Today we don't think only about domestic hot water when we talk about solar thermal. We also think about space heating, district heating or even solar heat for industrial processes. And naturally we also think about solar cooling.

Even if solar cooling technologies had some drawbacks in recent years, they have still potential for development. Even if we can now think of drive compact/ split air conditioners supplied with PV at decreasing costs, this doesn't mean that solar thermally driven air-conditioning has lost the game; on the contrary, it stimulates tremendous innovative approaches and some are very close to being commercially available.

Energy efficiency strategies and regulations in both building and industry sectors have considerably contributed to the progress of SHC technologies. New developments in thermal storage technologies have opened a new era for solar heating and cooling applications as well. It is not surprising any more to use large scale solar thermal collector applications for district heating and cooling. Solar heating and/or cooling systems are also major components of smart buildings, districts and cities. Urban planning and urban transformation works give the first priority to these systems.

SHC 2015 will cover all of these new developments and new strategies with high-level papers, presentations and discussions. The conference received great attention from academia, industry and public bodies. Some 230 participants from more than 30 different countries will meet in Istanbul to discuss their high quality work. The conference will provide great opportunities for networking as well. The conference program is structured in an efficient way that leads to a very good balance between scientific, industrial and regulatory topics. Results of recent SHC Tasks will precisely put marks for future solar heating and cooling studies. A special topic addressed in the conference will be 'Market Developments and Opportunities in the MENA Region'. Turkey is for this region a strong interface in terms of the solar thermal market. Finally, the conference will offer the chance to discuss adaptation of solar energy markets into Sustainable Development Goals launched in September 2015 by the United Nations.

SHC 2015 will provide a strong set of guidance to strengthen the solar thermal academia, industry and public bodies as well as the links and cooperation between Turkey and the rest of the world.

Best wishes for a successful conference in Istanbul, Turkey. Let's meet where continents meet!

Bülent Yeşilata, Professor

Pedro Dias

Daniel Mugnier

Welcome to SHC 2015

The IEA Solar Heating and Cooling Programme and ESTIF are proud to welcome you to the 4th International Conference on Solar Heating and Cooling for Buildings and Industry in Istanbul.

This year's conference is taking place in Europe's leading country for solar thermal applications –second only to China in the world market. SHC 2015 will continue the strong cooperation between research and industry that has been the hallmark of all SHC conferences.

With the IEA SHC Programme, ESTIF and GÜNDER, we have a strong partnership for this year's conference. The conference will once again serve as a platform to build understanding, collaboration and strong cooperation between research and industry.

The global solar thermal market is diverse, and we can observe different market trends across the world. The global trend continues to be positive despite some difficult markets. There has been dynamic market development between 2000 and 2012 with annual sales increasing more than seven fold over that period in SHC member countries. The backbone of the market continues to be small-scale solar water heaters for residential hot water supply. However, the application of large-scale systems for industrial processes and district heating is increasingly being deployed to meet other heat needs.

Since 1977, the IEA Solar Heating & Cooling Programme has worked on collaborative research projects to expand the use of solar energy for heating and cooling. This worldwide network of 20 countries and 5 international organizations has completed more than 40 research and dissemination projects. The current 10 research projects include over 300 participants, of which more than 25% are from industry. These add to the more than 2,000 researchers from all continents who have contributed to that work over the past 35 years.

ESTIF, being the European trade association presenting the solar thermal sector in Europe since 2002, is strongly engaged in bringing the main players from the sector together, covering a broad range of topics, either addressing markets, support policies and framework conditions or backing standardization, research and innovation in the sector.

We are sure that SHC 2015 will be a catalyst of initiatives shaping the future of our sector. We strongly believe that you and the other SHC 2015 participants will be inspired by the conference sessions and discussions as well as by the developments in Turkey and that you will go away ready to help to deploy solar thermal technologies as a significant contributor to a clean energy future based on renewable energies.

We look forward to meeting you in Istanbul.



Ken Guthrie
IEA SHC Chairman



Robin Welling
ESTIF President

A handwritten signature in black ink, appearing to read 'Ken Guthrie'.

Ken Guthrie

A handwritten signature in black ink, appearing to read 'Robin Welling'.

Robin Welling

Committees

Conference Committee

Daniel Mugnier, France (Conference Chair)
Bülent Yeşilata, Turkey (Scientific Chair)
Pedro Dias, Belgium (Industry Chair)

Lex Bosselaar, The Netherlands
Peter Donat, Germany
Ken Guthrie, Australia
Tao He, China
Doug McClenahan, Canada
Pamela Murphy, United States
Matthias Rommel, Switzerland
Werner Weiss, Austria

Organizing Committee

Kemal Bayraktar, Turkey
Pedro Dias, Belgium
Beatrix Feuerbach, Germany
Daniel Mugnier, France
Bülent Yeşilata, Turkey

Reviewer

Serkan Abbasoğlu, Cyprus
Samuel Abreu, Brazil
Ahmet Korhan Binark, Turkey
Lex Bosselaar, The Netherlands
François Boudehenn, France
Christoph Brunner, Austria
Christian Budig, Germany
Hüsamettin Bulut, Turkey
Alberto Coronas, Spain
Yanjun Dai, China

Reviewer (cont.)

Claudia Dankl, Austria
Piero De Bonis, Belgium
Harald Drück, Germany
Andreas Eckmanns, Switzerland
Roberto Fedrizzi, Italy
Ken Guthrie, Australia
Andreas Häberle, Germany
Jean-Christophe Hadorn, Switzerland
Michel Haller, Switzerland
Andreas Hauer, Germany
Tao He, China
Arif Hepbaşlı, Turkey
Uli Jakob, Germany
Lun Jiang, United States
Henner Kerskes, Germany
Michael Köhl, Germany
Ana Lazaro, Spain
Roberto Lollini, Italy
Daniel Mugnier, France
Les Nelson, United States
Jan Erik Nielsen, Denmark
Philippe Papillon, France
Cedric Paulus, France
Elizabeth Pereira, Brazil
David Renné, United States
Matthias Rommel, Switzerland
Jean-Louis Scartezzini, Switzerland
Paul Strachan, United Kingdom
Costas Travarasos, Greece
Wim van Helden, Austria
Werner Weiss, Austria
Bülent Yeşilata, Turkey

Conference Topics

Systems and Components

- Solar Thermal Collectors
- Thermal Storage
- Other Innovative Components and Systems
- Performance Measurement, Durability and Reliability

Market Reports and Framework Conditions

- Market Reports
- Regional Development and SHC for MENA Region
- Standards and Certification

Applications

- Water Heating
- Solar Space Heating and Hybrid Applications
- District Heating
- Solar Heat for Industrial Processes
- Solar Refrigeration and Solar Air Conditioning
- Solar Architecture
- Building Integration and Building Renovation
- Urban Planning and Urban Transformation
- Solar Resource Assessment

Wednesday, December 02, 2015

09:00 am - Opening Session

09:45 am

ROOM: Sapphire C

Chairs: Ken Guthrie, IEA SHC and Lex Bosselaar, RVO.nl Netherlands Enterprise Agency

09:00 am

Welcome from IEA SHC

Ken Guthrie¹

¹ IEA SHC

09:05 am

Welcome from the Conference Chair

Daniel Mugnier¹

¹ TECSOL

09:10 am

Welcome from the Scientific Chair

Bülent Yeşilata¹

¹ Harran University

09:15 am

Welcome from ESTIF

Robin Welling¹

¹ ESTIF

09:20 am

Welcome from ISES

David Renné¹

¹ ISES

09:25 am

Welcome from GÜNDER

Kemal Gani Bayraktar¹

¹ GÜNDER

Jan Erik Nielsen

SolarKey International/PlanEnergi



Jan Erik Nielsen is senior expert in two specific fields of solar thermal:

Standards and certification: Operating Agent in IEA SHC Task 43. Involved in international standardisation since the mid '80ties; initiator of the European Solar Keymark around 2000 and now working on establishing the Global Solar Certification.

Solar District Heating: Operating Agent in IEA SHC Task 45. Since 2003 involved in the development of large scale solar district heating systems in Denmark.

Matthias Rommel

SPF Institute for Solar Technology,
 University of Applied Sciences
 Rapperswil



Prof. Matthias Rommel is Director of the Institute for Solar Technology SPF at the University of Applied Sciences in Rapperswil, Switzerland.

He studied physics at the universities in Darmstadt and in Freiburg, Germany. From 1984 to 2009 he worked in the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg, Germany. Since 2009 he is Director of the Institute for Solar Technology SPF which has about 40 permanently employed scientists and engineers. He gives lectures on solar radiation and solar thermal collectors and systems. The topics of his research work are large solar collector systems, solar process heat, solar thermal desalination and PVT collectors.

Daniel Mugnier

TECSOL SA.



Daniel Mugnier has professional experience in engineering solar thermal systems for large DHW applications and above all solar heating and cooling systems. Managing the solar cooling department of TECSOL - one of the French leading solar engineering companies - Daniel Mugnier is involved as well in numerous R&D projects on solar cooling at the national, European and international level. He is also author of several publications and presentations in international conferences on solar cooling. TECSOL has achieved more than 50 feasibility studies on solar cooling and designed 10 working installations at the moment since 1990 on solar heating and cooling. He is currently Vice Chairman of the European Solar Thermal Technology Platform and Operating Agent of the IEA Solar Heating and Cooling Programme.

09:45 am - Short Keynotes on IEA SHC Tasks

10:45 am

ROOM: Sapphire C

Chairs: Ken Guthrie, IEA SHC and Lex Bosselaar, RVO.nl Netherlands Enterprise Agency

09:45 am

IEA SHC Task 42 / ECES Annex 29 - Compact Thermal Energy Storage

Matthias Rommel¹

¹*Institut für Solartechnik SPF / University of Applied Sciences Rapperswil*

09:55 am

Outcome of IEA SHC Task 45 “Large Scale Solar Heating and Cooling Systems”

Jan Erik Nielsen¹

¹*SolarKey Int.*

10:05 am

State of the Art for Solar Thermal or PV Cooling and Refrigeration

Daniel Mugnier¹

¹*TECSOL*

10:15 am

Solar Process Heat - Recent Research Activities and Installed Large Scale Solar Systems

Christoph Brunner¹

¹*AEE INTEC*

10:25 am

Outcome of IEA SHC Task 43 “Solar Rating and Certification”

Jan Erik Nielsen¹

¹*SolarKey Int.*

10:35 am

Task 50 “Advanced Lighting Solutions for Retrofitting Buildings”

Jan de Boer¹

¹*Fraunhofer IBP*

Christoph Brunner

AEE INTEC



Christoph Brunner (MSc): since 2010 head of department at AEE INTEC: Industrial Processes and Energy Systems, project coordinator of several national and international projects as SolarFoods, GREENFOODS (IEE), SOLAR BREW (FP 7), EINSTEIN (IEE project for energy audits and training), operating agent in the IEA Task 49 - Solar Process Heat for Production and Advanced Applications. Expert for industrial energy efficiency and process intensification with focus on the food and beverage industry including the pinch analyses (PE2, SOCO, EINSTEIN) and involved in the Austrian and European work of standardization for energy audits (CEN), worked for UNIDO in field of energy efficiency for industry. Lector at the Applied Science in Pinkafeld for energy process engineering, solar thermal energy.

Jan de Boer

Fraunhofer IBP



1994: Diploma (M.Sc.) in Electrical Engineering at the University of Bochum. 1994-1995: Consulting engineer in a lighting design office. Since 1995: group manager Lighting Technology and Passive Solar Systems in the Department of Energy Efficiency and Indoor Climate at the Fraunhofer Institute for Building Physics in Stuttgart. 2004: PhD at the University of Stuttgart. Since 2005: teaching assignment at the University of Stuttgart. 2009: Master of Business Administration at the RWTH Aachen and HSG St. Gallen. Member and coordinator of several standardization commissions and working groups on energy efficient lighting. Speaker of the scientific technical Committee of the LiTG on the topic “Daylighting”. Operating agent IEA SHC Task 50 “Advanced Lighting Solutions for Retrofitting Buildings”.

10:45 am - Keynote Lectures

11:15 am ROOM: Sapphire C

Chairs: Ken Guthrie, IEA SHC and Lex Bosselaar, RVO.nl Netherlands Enterprise Agency

10:45 am How Solar Heating and Cooling Technologies Can Support a 100% Renewable Energy World
David Renné¹
¹ ISES

11:00 am Solar Heat Worldwide - State of Application and Major Trends
Werner Weiss¹
¹ AEE INTEC

11:15 am Coffee Break

11:45 am - Building Integration and Building Renovation

12:30 pm ROOM: Sapphire C

Chair: Andreas Eckmanns, Swiss Federal Office of Energy

11:45 am Innovative Integrated Building Energy System for Ultra-Efficient Buildings
Esam Elsarrag¹, Yousef Alhorr¹
¹ GORD Institute

David Renné

ISES



Dr. Renné has been President of the International Solar Energy Society since 2010. He is also the Operating Agent of an International Energy Agency Solar Heating and Cooling Programme Task 46 titled “Solar Resource Assessment and Forecasting”. He continues to serve as an Associate Editor of the Solar Energy Journal in the field of solar resource assessment.

Dr. Renné’s other current professional activities include a Senior Consultant to Clean Power Research, a small U.S. company that develops resource assessment and analytical software tools to support large-scale grid connected solar energy systems, and a Consultant to the World Bank’s Energy Sector Management Assistance Program’s (ESMAP)’s Resource Mapping Project.

Werner Weiss

AEE INTEC



Werner Weiss is director of AEE – Institute for Sustainable Technologies (AEE INTEC) in Austria. He was chairman of the Solar Heating and Cooling Programme of the International Energy Agency (IEA) from June 2010 to May 2014. Furthermore he is board member of the European Technology Platform on Renewable Heating and Cooling. He has been project coordinator of more than 50 national, European and international solar thermal energy projects.

His main research activities are on solar combi-systems and solar heat for industrial processes.

Since 2007 he is lecturer at Vienna University of Technology and faculty member of the continuing education centre.

12:00 pm Performance Evaluation of Lighting and Daylighting Retrofit: Results from IEA SHC Task 50

Marie-Claude Dubois¹, Fredrik Martens², Barbara Matusiak², Sophie Stoffers³,
Werner Osterhaus³, Cláudia Naves David Amorim⁴, Roman Jakobiak⁵, Niko Gentile¹
Presented by Niko Gentile¹

¹ Lund University; ² NTNU - Norwegian University of Science and Technology; ³ Aarhus University;

⁴ Universidade de Brasília; ⁵ Daylighting DE

12:15 pm Solar Thermal Systems – Towards a Systematic Characterization of Building Integration

Laura Aelenei¹, Werner Platzer²

¹ LNEG - National Energy and Geology Laboratory; ² Fraunhofer ISE

11:45 am - Market Report

12:30 pm ROOM: Zeus

Chair: Pedro Dias, ESTIF

11:45 am System Proposal of Advanced Thermal Energy Society

Kenji Takahashi¹

Presented by Wei Zheng²

¹ Yazaki Energy System Corporation; ² Yazaki Corporation

12:00 pm Entering the Market for High Temperature Solar Thermal Energy in Turkey

Ahmet Lokurlu¹, Deniz Lokurlu¹, Christian Gunkel¹

¹ SOLITERM Group

12:15 pm Promoting Multi-Family and Commercial Solar Thermal Systems : A French Initiative

Edwige Gautier¹

¹ ENERPLAN

11:45 am - District Heating

12:30 pm ROOM: Artemis

Chair: Jan Erik Nielsen, SolarKey Int.

11:45 am DHC Load Management Using Demand Forecast

Nicolas Perez-Mora¹, Vincent Canals²

¹ Sampol Ingenieria y Obras; ² University of Balearic Islands

12:00 pm Smart Heat Supply in Austria Within Pitagoras Project

Sabine Putz¹

¹ SOLID

12:15 pm Solar District Heating Systems for Small Districts with Medium Scale Seasonal Thermal Energy Stores

Dan Bauer¹, Harald Drück¹, Roman Marx¹

¹ ITW / University of Stuttgart

12:30 pm **Lunch**

01:30 pm - 02:30 pm Poster Session 1

ROOM: Foyer

The poster numbers are based on the topics:

| | | | |
|---|---|---|--|
| A | Solar Thermal Collectors | E | Regional Development and SHC for MENA Region |
| B | Thermal Storage | F | Water Heating |
| C | Other Innovative Components and Systems | G | District Heating |
| D | Performance Measurement, Durability and Reliability | | |

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|---|--|
| <p>A-01 A Multiscale Simulation Approach to Nanofluids for Volumetric Solar Receivers Annalisa Cardellini¹, Pietro Asinari¹, Matteo Fasano¹, Eliodoro Chiavazzo¹ Presented by Matteo Fasano¹ ¹ <i>Politecnico di Torino</i></p> <p>A-02 Investigation of Aluminium Grooved Heat Pipes for Buildings Integrated Solar Systems Sergii Khairnasov¹ ¹ <i>KPI</i></p> <p>A-03 Performance Comparison for Site-specific Solar Collector Heat Output Prediction by Using Collector Efficiency Equation-based Models Kyoung-ho Lee¹, Jae-hyeok Heo¹, Moon-change Joo¹, Soon-myung Lee¹ ¹ <i>KIER (Korea Institute of Energy Research)</i></p> <p>A-04 New Thermochromic Solar Collector (sol Pro Select) to Avoid Stagnation and Vaporization in Highly Efficient Solar Thermal Systems David Mercks¹, Marc Vigneron¹, Pierre Charles¹, Cédric Spagnolo¹, Robin Conseil¹ ¹ <i>Viessmann</i></p> <p>A-05 Study and Comparison of Control and Regulation Systems for Solar Thermal Plants Gioacchino Morosinotto¹ ¹ <i>University of Padua</i></p> <p>A-06 Performance Evaluation of a Solar Cooling Plant Applied for Greenhouse Thermal Control Giovanni Puglisi¹ ¹ <i>ENEA</i></p> | <p>A-07 Novel Solar Thermal Collector Systems in Polymer Design – Part 2: Development, Durability and Lifetime Assessment of PP Absorber Materials for Overheating Controlled Flat-Plate Collectors Gernot M Wallner¹, Thomas Ramschak¹, Reinhold W Lang¹, Markus Povacz¹, Michael Grabmann¹ Presented by Michael Grabmann¹ ¹ <i>University of Linz, JKU</i></p> <p>B-01 Thermal Energy Storage Characteristics of Palmitic Acid Encapsulated in PMMA Shell Cemil Alkan¹, Ahmet Sarı¹, Alper Biçer¹, Derya Kahraman Döğüşcü¹ ¹ <i>Gaziosmanpaşa University</i></p> <p>B-02 Adsorption Properties of Zeolites for Operating Range Enhancement of Adsorption Heat Pumps Through the Use of Organic Adsorptive Agents Thomas Herzog¹, Jochen Jänchen¹ ¹ <i>TH Wildau</i></p> <p>B-03 Rheological Investigations of Paraffin Based Phase Change Slurry Using a Capillary Viscosimeter Tobias Kappels¹, Lucian Hanu¹ Presented by Michael Joemann¹ ¹ <i>Fraunhofer UMSICHT</i></p> <p>B-04 Thermal Conductivity of Vacuum Insulation Materials for Thermal Energy Stores in Solar Thermal Systems Stephan Lang¹, Harald Drück¹, Dan Bauer¹, Markus Gerschitzka¹ ¹ <i>ITW / University of Stuttgart</i></p> |
|---|--|

B-05 Practical Test on a Closed Sorption Thermochemical Storage System with Solar Thermal Energy

Asnakech Lass-Seyoum¹, Timo Langhof², Simone Mack², Thomas Friedrich¹, Dimitry Borozdenko¹

¹ ZeoSys Zeolithsystem; ² Fraunhofer IGB

B-06 Retrofit of a Solar System in Sport Center in Mallorca

Andreu Moià-Pol¹, Ramon Pujol-Nadal¹, Victor Martinez-Moll¹

¹ Universitat de les Illes Balears

B-07 Stability of D-mannitol Upon Melting/Freezing Cycles Under Controlled Inert Atmosphere

Margarita M. Rodriguez-Garcia¹, Esther Rojas¹, Rocío Bayón¹

¹ CIEMAT-Plataforma Solar de Almería

B-08 SolSpaces – Testing and Performance Analysis of a Segmented Sorption Store for Solar Thermal Space Heating

Rebecca Weber¹, Harald Drück¹, Sebastian Asenbeck¹, Henner Kerskes¹

¹ Institute for Thermodynamics and Thermal Engineering

B-09 Experimental Researches of the Partition Composed of Two Layers of Different Types of PCM

Anna Zastawna-Rumin¹, Katarzyna Nowak¹

¹ Cracow University of Technology

C-01 Modeling and Simulation of a Tri-generation System Based on Solid Oxide Fuel Cells

Houssein Al Moussawi¹

¹ Lebanese University - The Doctoral School of Science and Technology + UCBN (France)

C-02 Field Test Results of an Innovative PV/T Collector for Solar Domestic Hot Water

Laetitia Brottier¹, Rachid Bennacer², Gaëlle Terrom¹, Viktor Veesser¹, Sébastien Naudin³

¹ DualSun; ² LMT / ENS-Cachan / CNRS / Université Paris Saclay; ³ Transenergie

C-03 A Thermal Assessment for an Innovative Passive Cooling System Designed for Flat Roofs in Tropical Climates

Ulises Chávez¹, Elba Haro², Juan Manuel Rodríguez³, Carlos Escobar¹

¹ Universidad de Colima; ² Turismo Extremo Volcán de Colima SPR de RL; ³ Universidad de Guanajuato

C-04 Steam Engine-pump for Solar Collector-based Hot Water Supply

Evtikhi Machavariani¹, Giorgi Gigineishvili¹

¹ Georgian Technical University

C-05 Design of a Helical Coil Dehumidifier for a Novel Gravity-driven Solar Distillation Unit

Varghese Panthalookaran¹, Varghese Parekkadan², Kiran Kudakasseril², Jerin Vadacherry², Divin Chettiyadan²

¹ Rajagiri School of Engineering & Technology;

² Rajagiri Research and Consultancy Center (RRCC)



Vitosol 200-FM with automatic ThermProtect collector shutdown

Simplified design and high operational reliability thanks to overheating protection:

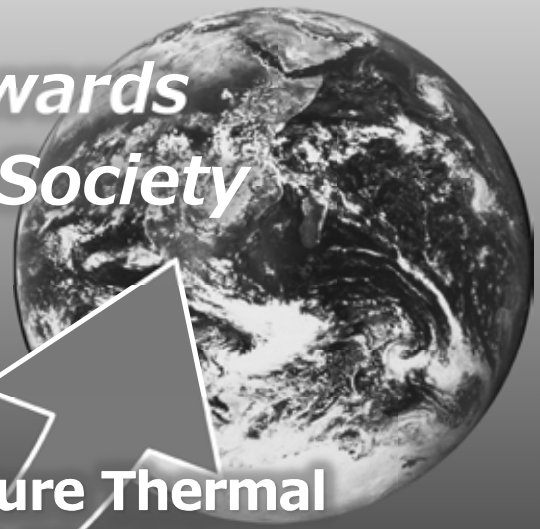
- Innovative absorber layer for temperature-dependent shutdown regardless of control unit settings, mechanical devices or power supply
- Reduced system load
- Increased system availability as the formation of steam is prevented

- C-06 Tårs 10000 m² CSP + Flat Plate Solar Collector Plant. Cost-Performance Optimization of the Design
Bengt Perers¹, Janne Dragsted¹, Jakob Berg Johansen¹, Federico Bava¹, Simon Furbo¹
¹ DTU Civil Engineering
- C-07 Methodology for TRNSYS Large Scale Simulation Studies Using Experimental Design
Noah Pflugradt¹, Jaume Salomon², Eduard Oró², Angel Carrera³, Òscar Càmarà³, Nirendra Lal Shrestha¹, Thorsten Urbaneck¹
 Presented by Thorsten Urbaneck¹
¹ Technische Universität Chemnitz; ² IREC BARCELONA; ³ AIGUASOL ENGINYERIA, Sistemes Avançats d'Energia Solar Tèrmica SCCL
- D-01 Durability Assessing of Modern Absorbers Used in Glazed and Unglazed Solar Thermal Collectors
Mihaela Dudita¹, Laurent Marot², Figen Kadirgan³, Bernard Thissen⁴, Matthias Rommel⁵, Stefan Brunold⁵, Paul Gantenbein⁵, Florian Ruesch⁵
¹ SPF Institute for Solar Technology, Hochschule für Technik HSR; ² University of Basel; ³ Istanbul Technical University; ⁴ Energie Solaire S.A.; ⁵ Institute for Solar Technologies SPF
- D-02 Findings from Monitoring and System Analysis of Combined Solar Thermal and Heat Pump Systems in Austria
Franz Helminger¹
¹ AIT Austrian Institute of Technology
- D-03 Influence of Thermal Losses on the McIntire Factorization Error
Julian Hertel¹, Ramon Pujol Nadal¹, Víctor Martínez Moll¹
 Presented by Andreu Moià-Pol¹
¹ University of the Balearic Islands
- D-04 Laboratory Testing of Solar Combi System with Compact Long Term PCM Heat Storage
Jakob Berg Johansen¹, Bengt Perers¹, Simon Furbo¹, Janne Dragsted¹, Jianhua Fan¹, Weiqiang Kong¹, Gerald Englmaier¹, Mark Dannemand¹
¹ Technical University of Denmark
- D-05 Degradation of Thermal Performance of Flat Plate Collectors Due to Different Climate and Operation Conditions
Philipp Kofler¹, Harald Drück¹, Stephan Fischer¹
 Presented by Stephan Fischer¹
¹ ITW University of Stuttgart
- E-01 Kuwait's Renewable Energy Vision by 2030
Eqbal Al-Tayyar¹
¹ Ministry of Electricity & Water
- F-01 Sunridge®: Orientation Independent Solar System
Aart Geus¹, Henk de Beijer², Lucienne Krosse³
¹ artenergy; ² RTB de Beijer; ³ KIC InnoEnergy
- F-02 Solar Water Heating Systems Applied in High-rise Residential Buildings in China
Zinian He¹
¹ Beijing Solar Energy Research Institute
- F-03 Research on Solar Heating System with Phase Change Thermal Energy Storage
Deli Ling¹
¹ Jiangsu Sunrain Solar Energy Co., Ltd.
- F-04 Introduction of Normative Construction Procedure for Solar Water Heating Systems Integrated in Buildings in China
Ruicheng Zheng¹, Tao He¹, Min Wang¹, Xinyu Zhang¹
¹ China Academy of Building Research
- G-01 Paradigm Shift in District Heating Supply for European Cities – 500,000 m² of Collector Area for 20% Solar Fraction in Large City Network for Graz
Hannes Poier¹, Patrick Reiter¹
¹ SOLID
- G-02 Distributed Solar Thermal “Net Metering” in Small-scale District Heating Systems
Giovanni Puglisi¹, Fabio Zanghirella¹, Biagio die Pietra¹
¹ ENEA



40 Years of Pioneering Solar Heating & Cooling

*Moving Towards
Sustainable Society*



**Future Thermal
& Electrical
Energy System**



**Various Thermal
Energy Usage**

First Solar Cooling House

YAZAKI's Thermal Energy Management Concept
"Think Earth"

Contact: YAZAKI Energy System Corporation
740 Higashi-machi, Minami-ku, Hamamatsu-city,
Shizuoka 430-0822, Japan
Phone: +81-53-426-3601

02:30 pm - Solar Thermal Collectors

04:00 pm

ROOM: Sapphire C

Chair: Matthias Rommel, Institute for Solar Technologies SPF

02:30 pm

Butane Heat Pipes for Stagnation Temperature Reduction of Solar Thermal Collectors

Sebastian Föste¹, Steffen Jack², Felix Katzer¹, Federico Giovannetti¹, Bert Schiebler¹

¹Institute for Solar Energy Research (ISFH); ²KBB Kollektorbau GmbH

02:45 pm

Innovative Smart Selective Coating to Avoid Overheating in Highly Efficient Thermal Solar Collectors

David Mercs¹, Marc Vigneron¹, Rolf Reineke-Koch², Sebastian Foeste², Alexandra Pazidis², Jean François Pierson³, Fabien Capon³, Aurélien Didelot¹, Bernd Hafner¹

¹Viessmann; ²Institute for Solar Energy Research (ISFH); ³Institut Jean Lamour

03:00 pm

Low-Emissivity Transpired Solar Collectors

Richard Hall¹, John Blower¹

¹Energy Transitions Limited

03:15 pm

Novel Solar Thermal Collector Systems in Polymer Design –System Definition and Component Performance Requirements

Thomas Ramschak¹, Reinhold W. Lang², Gernot Wallner², Alexander Thür³, Robert Hausner¹, Christian Fink¹

¹AEE INTEC; ²Linz University; ³Innsbruck University

03:30 pm

Solar Thermal Collectors for Medium Temperature Applications: A Comprehensive Review and Updated Database

Iñigo Iparraguirre¹, Jose Mari Vega de Seoane¹, Tiago Osório², Fabienne Sallaberry³, Pedro Horta⁴, Loreto Valenzuela Gutiérrez⁵, Aránzazu Fernández-García⁵, Ana Huidobro¹
 Presented by Asier Sanz Martínez¹

¹TECNALIA; ²Universidade de Évora; ³CENER - Centro Nacional de Energías Renovables;

⁴Fraunhofer ISE; ⁵CIEMAT-Plataforma Solar de Almería

03:45 pm

The Performance of First Transpired Solar Collector Installation in Turkey

Hacer Akhan¹, Dogan Eryener¹

¹Trakya University Engineering Faculty

02:30 pm - SHC Task 49 Workshop: Solar Process Heat

04:00 pm

ROOM: Zeus

Chair: Christoph Brunner, AEE INTEC

02:30 pm

IEA/SHC T49 Activities on Process Heat Collectors: Available Technologies, Technical-Economic Comparison Tools, Operation and Standardization Recommendations

Pedro Horta¹

Presented by Korbinian Kramer¹

¹Fraunhofer ISE

03:00 pm

Classification of Industrial Heat Consumers for Integration of Solar Heat

Bastian Schmitt¹

¹Institute Decentralised Energy Technologies

03:30 pm

Design Guidelines for Solar Process Heat – Tools, Monitoring and Best Practice Examples

Christoph Brunner¹

¹AEE INTEC

04:00 pm

Coffee Break

04:30 pm - Thermal Storage

06:00 pm

ROOM: Sapphire C

Chair: Sebastian Herkel, Fraunhofer ISE

04:30 pm The 4-Temperature-Approach – A Method to Evaluate New Materials for Thermochemical Heat Storage under Application Conditions

Andreas Hauer¹

¹ ZAE Bayern

04:45 pm An Advanced Desorption Concept for TES-Materials

Bernhard Zettl¹

¹ Austria Solar Innovation Center

05:00 pm Application of Phase Change Material in a Photovoltaic/Thermal System

Maria Browne¹, Sarah J. McCormack¹, Declan Quigley¹, Hanna R. Hard¹, Sarah Gilligan¹, Nadja Cardoso Campos Ribeiro¹, Nicholas Almeida¹

¹ Trinity College Dublin

05:15 pm Compact Thermal Energy Storage Using Multiple Phase-change Materials

Jan Diriken¹

¹ Vito NV

05:30 pm New Compact Thermal Storage Systems

Lucienne Krosse¹, Henk de Beijer², Aart de Geus³

¹ KIC InnoEnergy; ² SolabCool BV; ³ T2BEnergy

04:30 pm - SHC Task 45 Workshop: Solar District Heating

06:00 pm

ROOM: Zeus

Chair: Jan Erik Nielsen, SolarKey Int.

04:30 pm Introduction Into IEA SHC Task 45

Jan Erik Nielsen¹

¹ SolarKey Int.

04:35 pm Results of IEA SHC Task 45 Subtask A: Collectors and Collector Loop

Federico Bava¹

¹ Technical University of Denmark

05:00 pm Results of IEA SHC Task 45 Subtask B: Storages

Jan Erik Nielsen¹

¹ SolarKey Int.

05:25 pm Results of IEA SHC Task 45 Subtask C “Systems - Configurations, Operating Strategies, Financing Issues”

Sabine Putz¹, Anna Provasnek¹

¹ SOLID

05:50 pm General Questions and Answers and Discussion of Perspectives for Large Scale Solar Heating and Cooling Systems

Thursday, December 03, 2015

09:00 am - **Building Bridges for a Sustainable and Competitive Energy Future**

10:15 am

ROOM: Sapphire C

Chair: Nigel Cotton, European Copper Institute

09:00 am

The European Heat Strategy, Energy Security & the EU Neighbouring Policy (tbc)

09:15 am

Heating and Cooling Worldwide: Achievements and Trends (tbc)

09:30 am

Global Renewable Energy Development: The Place of Heating and Cooling

Hannah Murdock¹

¹REN21

09:45 am

Scenarios for Heating and Cooling in Europe by 2050

Sebastian Herkel¹

¹Fraunhofer ISE

10:00 am

Solar Heating and Cooling in the Future Energy Mix

Robin Welling¹

¹ESTIF

10:15 am - **Company Presentations**

11:00 am

ROOM: Sapphire C

Chair: Nigel Cotton, European Copper Institute

10:15 am

Yazaki Energy System Corporation, **Kazuo Shimizu**

10:30 am

ISIB Turkish Havac-R Exporters

11:00 am

Coffee Break

11:30 am - **Solar Heating and Cooling in the Future Home**

12:30 pm

ROOM: Sapphire C

Chair: Kemal Gani Bayraktar, GÜNDER

11:30 am

Retrofitting Buildings Into NZEB Concepts: Main Challenges for Space and Water Heating

Maarten de Groot¹

¹BPIE

11:45 am

(Solar) Heating Systems in the Smart Home Ecosystem – State of the Art and Future Opportunities

Uwe Trenkner¹

¹trenkner consulting

12:00 pm

Solar Resource Nowcasting in Relation to Building Energy Performance

David Renné¹

¹Clean Power Research

12:15 pm

Key Decision Factors for European Consumers: Five Market Studies

Stefano Lambertucci¹

¹ESTIF

11:30 am - Solar Thermal Collectors

12:30 pm

ROOM: Zeus

Chair: Korbinian Kramer, Fraunhofer ISE

11:30 am

Evaluating the Thermal and Electrical Performance of Several Uncovered PVT Collectors with a Field Test and Simulations

Corry de Keizer¹, Wiep Folkerts¹, Munish Katiyar², Tiago Mendes¹, Minne de Jong¹

¹ Solar Energy Application Centre (SEAC); ² Technical University Eindhoven

11:45 am

Flat Plate Collectors with Thermochromic Absorber Coatings to Reduce Loads During Stagnation

Sebastian Föste¹, Philippe Papillon², Antoine Leconte², Christine Delord², David Mercs³, Bernd Hafner⁴, Federico Giovannetti¹, Alexandra Pazidis¹, Rolf Reineke-Koch¹

¹ Institute for Solar Energy Research (ISFH); ² CEA INES; ³ Viessmann Faulquemont SAS;

⁴ Viessmann Werke GmbH & Co. KG

12:00 pm

Novel Solar Thermal Collector Systems in Polymer Design – Part 4: Development, Durability and Lifetime Assessment of an Integrated Storage Collector Based on Polyamide

Gernot M Wallner¹, Jörg Fischer¹, Thomas Ramschak², Harald Poscharnig³, Thomas Lüftinger⁴, Karl Schnetzinger⁵

Presented by Jörg Fischer¹

¹ University of Linz, JKU; ² AEE INTEC; ³ GREENoneTEC Solarindustrie; ⁴ Polytec Plastics Ebensee; ⁵ APC

12:15 pm

Novel Solar Thermal Collector Systems in Polymer Design – Part 5: Aging Characterization of Engineering PA Grades for Pressurized Integrated Storage Collectors

Jörg Fischer¹, Reinhold W. Lang¹, Gernot M. Wallner¹, Patrick R. Bradler¹

¹ University of Linz - Institute of Polymeric Materials and Testing

11:30 am - Thermal Storage

12:30 pm

ROOM: Artemis

Chair: Jean-Christophe Hadorn, BASE consultants SA

11:30 am

Laboratory Test of a Cylindrical Heat Storage Module with Water and Sodium Acetate Trihydrate

Mark Dannemand¹, Simon Furbo¹, Weiqiang Kong¹, Jakob Berg Johansen¹

¹ Technical University of Denmark

11:45 am

Optimal Connection of Heat Pump and Solar Buffer Storage Under Different Boundary Conditions

Jens Glembin¹

¹ Institute for Solar Energy Research (ISFH)

12:00 pm

Thermal Storage by Solar Assisted Geothermal Heat Pump System

Amir Mansour Golmohammadi¹

¹ Qom Gas Co.

12:15 pm

Thermochemical Heat Storage – From Reaction Storage Density to System Storage Density

Ard-Jan de Jong¹, Christophe Hoegaerts¹, Laurens van Vliet¹, Mark Roelands¹, Ruud Cuypers¹
Presented by Laurens van Vliet¹

¹ TNO

12:30 pm

Lunch

01:30 pm - 02:30 pm Poster Session 2

ROOM: Foyer

The poster numbers are based on the topics:

| | | | |
|---|--|---|--|
| H | Solar Space Heating and Hybrid Applications | L | Building Integration and Building Renovation |
| I | Solar Heat for Industrial Processes | M | Urban Planning and Urban Transformation |
| J | Solar Refrigeration and Solar Air Conditioning | N | Solar Resource Assessment |
| K | Solar Architecture | O | Market Reports |

| | | | |
|------|--|------|---|
| H-01 | Simulation of a Solar-ice System for Heating Applications. Part II: System Concept, Cost and LCA Analysis Daniel Philippen¹ , Daniel Carbonell ¹ , Michel Haller ¹ , Daniel Zenhäusern ¹ ¹ Institut für Solartechnik SPF, HSR Hochschule für Technik | H-07 | Energy End-use and Grid Interaction Analysis of Solar Assisted Ground Source Heat Pumps in Northern Canada Martin Kegel¹ , Roberto Sunye ¹ , Steven Wong ¹ , Justin Tamasauskas ¹ ¹ Natural Resource Canada, CanmetENERGY |
| H-02 | Model-Based Design of a Solar Driven Hybrid System for Space Heating and DHW Preparation of a Multifamily House Chiara Dipasquale¹ , Roberto Fedrizzi ¹ , Alessandro Bellini ¹ Presented by Roberto Fedrizzi ¹ ¹ EURAC Research - Institute of Renewable Energy | H-08 | Economic Feasibility of Flat Plate vs Evacuated Tube Solar Collectors in a Combisystem Mario Najera-Trejo¹ , Ignacio Martin-Dominguez ¹ ¹ Centro de Investigación en Materiales Avanzados |
| H-03 | Optimization of Hot and Cold Water Generation to Minimize the Primary Energy Demand of a District Heating and Cooling System Max Fette¹ ¹ Fraunhofer IFAM | H-09 | Façade-integrated Massive Solar-thermal Collectors Combined with Long-term Underground Heat Storage for Space Heating Benedikt Tanzer¹ , Christian Schweigler ¹ ¹ University of Applied Sciences Munich |
| H-04 | Development of Advanced Thermal Driven Water Fired Absorption Chiller Masahiro Ishimatsu¹ Presented by Kazuhide Ishida ² ¹ Yazaki Energy System Corporation; ² Yazaki | H-10 | Cost-optimal Sizing of Solar Thermal and Photovoltaic Systems for the Heating and Cooling Needs of a Nearly Zero-energy Building: Design Methodology and Model Description Daniele Testi¹ , Eva Schito ¹ , Paolo Conti ¹ ¹ University of Pisa, DESTEC |
| H-05 | 1to10 – A Cost-effective Heat Supply Concept with Low Primary Energy Consumption for Multi-family Houses and Small Residential Areas Natalie Gohl¹ , Harald Drück ¹ , Dan Bauer ¹ ¹ ITW / University of Stuttgart | H-11 | Cost-optimal Sizing of Solar Thermal and Photovoltaic Systems for the Heating and Cooling Needs of a Nearly Zero-energy Building: The Case Study of a Farm Hostel in Italy Daniele Testi¹ , Paolo Conti ¹ , Eva Schito ¹ Presented by Paolo Conti ¹ ¹ University of Pisa, DESTEC |
| H-06 | Experimental Study of Solar Assisted Ground Coupled Heat Pump System in Arid Zones Amir Mansour Golmohammadi¹ Presented by Mohammad Tabatabaei ² ¹ Qom Gas Co.; ² Aftab Engineering Co. | I-01 | Hardware-in-the-loop Test for a Parabolic Trough Collector Plant in the Meat Industry Ilyes Ben Hassine¹ , Dirk Pietruschka ¹ Presented by Dirk Pietruschka ¹ ¹ HFT Stuttgart |

- I-02 Transparent Insulation Equipped Solar Thermal Collectors with Collector-level Overheating Prevention for Low Temperature Industrial Process Heat
Zvika Klier¹
¹ TIGI
- I-03 Targeting Optimal Design and Operation for Constant Solar Heating Requirements of Industrial Processes: An Approach based on MILP
Anna Sophia Wallerand¹
¹ Ecole Polytechnique de Lausanne
- I-04 Targeting Optimal Design and Operation of Solar Heated Industrial Processes: A MILP Formulation
Anna Sophia Wallerand¹, Angelos Selviaridis², Francois Marechal¹, Araz Ashouri¹, Gianluca Ambrosetti²
¹ Ecole Polytechnique de Lausanne; ² Airlight Energy Holding SA
- I-05 Study of Applications of Parabolic Trough Solar Collector Technology in Mexican Industry
Pablo Tagle¹, Aldo Agraz², Carlos Rivera¹
Presented by Aldo Agraz²
¹ ITESM; ² Inventive Power
- J-01 Optimization of Standalone Solar Thermally Driven Absorption Chiller for Typical Australian Homes
Gazinga Abdullah¹, David Whaley¹, Martin Belusko¹, Wasim Saman¹
¹ University of South Australia
- J-02 A Trnsys Simulation of Solar Cooling System for Hot Climate of Pakistan
Muhammad Asim¹, Safwan Kanan¹, Jonathan Dewsbury¹
¹ University of Manchester
- J-03 Experimental Investigation on Characteristics of Advanced Porous Materials Used in Adsorption Cooling Systems
Nima Bonyadi¹, Derek Baker¹, Cemil Yamali¹
¹ Middle East Technical University
- J-04 Solar Assisted Absorption Machine for the Fermentation Cooling and Maceration Heating Processes in the Winemaking Industry
José Miguel Cardemil¹, Rodrigo Escobar¹, Gonzalo Quiñones²
¹ Fraunhofer Chile Research - CSET; ² Escuela de Ingeniería Industrial, Universidad Diego Portales
- J-05 Development of a Coupling Device of Photovoltaic Plant with Thermodynamic Chiller or Cooling System
Philippe Esparcieux¹, Christophe Marvillet², Thomas Treglia¹, Olivier Baup¹
¹ ATISYS Concept; ² CNAM/IFFI-Laboratoire de chimie moléculaire, génie des procédés chimiques et énergétiques
- J-06 Monitoring Results and Energy Performances Evaluation of Freescoo Solar DEC Systems
Pietro Finocchiaro¹, Vincenzo Gentile²
¹ UNIPA; ² Solarinvent SRL
- J-07 Solar Cooling: A Niche Market Waking Up from Hibernation?
Uli Jakob¹, Daniel Mugnier²
¹ dr. jakob energy research; ² TECSOL
- J-08 The Effect of Ground Conditions Under a Solar Pond on the Performance of a Solar Air Conditioning System
Safwan Kanan¹, Muhammad Asim¹, Jonathan Dewsbury¹, Gregory F.Lane-Serff¹
Presented by Muhammad Asim¹
¹ The University of Manchester
- J-09 Novel Packing Materials for Open Liquid Desiccant System
Bariş Kavasogullari¹, Hasan Demir¹, Ertugrul Cihan¹
¹ Osmaniye Korkut Ata University
- J-10 First Operation Year of World's Most Powerful Solar Cooling Operation in USA
Moritz Schubert¹
¹ SOLID
- J-11 LEED™ Platinum Awarded Arabian Green Building with Solar Heat Driven Cooling Technology
Tim Selke¹
¹ AIT Austrian Institute of Technology

- J-12 SHC Task 48 B2 - Three Good Practice of Solar Heat Driven Desiccant Evaporative Cooling Systems
Tim Selke¹, Subbu Sethuvenkatraman², Matteo Muscherà³, Antoine Frein³
¹AIT Austrian Institute of Technology; ²CSIRO Energy Flagship; ³Politecnico di Milano - Energy Department
- J-13 Feasibility of Solar-assisted Double- and Triple-effect Absorption Chillers for Air-conditioning Applications
Ali Shirazi¹, Graham Morrison¹, Stephen White², Robert Taylor¹
¹University of New South Wales; ²CSIRO Energy Centre
- J-14 Modeling and Experimental Study of an Ammonia-water Falling Film Absorber
Delphine Triché¹, Maxime Perier-Muzet², Hélène Demasles², Nadia Caney³, Sylvain Bonnot², François Boudéhenn²
¹CEA - ADEME; ²CEA; ³LEGI / CEA
- J-15 First Solar Thermal Cooling Plant in Jordan
Elke Zimmermann¹, Hussein Abu Khallaf², Christopher Paitazoglou³
¹GIZ; ²Millennium Energy Industries; ³TU Berlin
- K-01 Solar Optimization of Housing Development
Gabriele Lobaccaro¹, Viridiana Acosta¹, Stergios Chatzichristos¹
 Presented by Stergios Chatzichristos¹
¹NTNU - Norwegian University of Science and Technology
- K-02 Building Integrated Photovoltaic System for a Solar Infrastructure: Liv-lib' Project
Roberta Zarcone¹, Paolo Bernardoni², Donato Vincenzi², Maurizio Brocato¹
¹ENSA Paris Malaquais; ²University of Ferrara
- L-01 Assessment of Indoor Air Climate in Renovated Buildings of Liepāja Municipality
Līva Asere¹, Andra Blumberga¹, Toms Mols¹
¹Riga Technical University Institute of Energy Systems and Environment
- L-02 Building Integrated Solar Thermal Design: Assessment of Performances of a Low Cost Solar Wall in a Typical Italian Building
Marco Beccali¹, Simone Ferrari², Paola Caputo²
¹Università degli Studi di Palermo - DEIM; ²Politecnico di Milano - ABC Dpt
- L-03 S.M.O Solution: An Innovative Design Approach to Optimize the Output of BIPV Systems Located in Dense Urban Environments
Francesco Frontini¹, Vasco Medici¹, Gianluca Corbellini¹, Salim Bouziri¹
¹SUPSI, University of applied sciences and arts of southern Switzerland
- L-04 Towards Net Zero Energy Homes in the Lebanese Context
Fatima Harkouss¹, Pascal-Henry Biwolé², Farouk Fardoun³
¹Lebanese University; ²J.A. Dieudonne Laboratory/Nice Sophia Antipolis University; ³University Institute of Technology/Lebanese University
- L-05 Parametric Analysis of Concrete Solar Collectors
Richard O'Hegarty¹, Sarah McCormack¹, Oliver Kinnane²
¹Trinity College Dublin; ²Queen's University Belfast
- L-06 Shape and Cover Material Impact on a Greenhouse's Thermal Performance
Norma Alejandra Rodriguez-Muñoz¹, Ignacio Rarmiro Martin-Dominguez², Mario Najera-Trejo², Jorge Escobedo-Bretado², Juan Carlos Barragan-Medrano²
 Presented by Ignacio R. Martín-Domínguez²
¹Catedras CONACYT at Centro de Investigacion en Materiales Avanzados; ²Centro de Investigacion en Materiales Avanzados
- L-07 Thermal Evaluation of a Ventilated Building Using Dynamic Simulations
Norma Alejandra Rodriguez-Muñoz¹, Olivia Alarcon-Herrera², Mario Najera-Trejo², Ignacio Ramiro Martin-Dominguez²
 Presented by Ignacio R. Martín-Domínguez²
¹Catedras CONACYT at Centro de Investigacion en Materiales Avanzados; ²Centro de Investigacion en Materiales Avanzados
- L-08 Performance Improvement of Polycrystalline Solar PV System Using Solar Chimney Intergration
Atul Sagade¹, Nilkanth Shinde²
¹Renewable Energy Innovation and Research Foundation; ²Dept. of Energy Technology

L-09 Research Progress of One Program of Using Solar Indirect System Combined with Fresh Air Ventilation System with Heat Recovery in Passive Building in Cold Region and Severe Cold Region of China

Jing Yuan¹, Xuan Wang¹, Zhifeng Sun¹, Tao He¹
¹ China Academy of Building Research

M-01 Solar Radiation and Daylighting Assessment Using the Sky-view Factor (SVF) Analysis as Method to Evaluate Urban Planning Densification Policies Impacts

Cristina S. Polo López¹, Francesco Frontini¹, Salim Bouziri¹, Lavinia Chiara Tagliabue², Mariaemma Sala²
 Presented by Francesco Frontini¹
¹ SUPSI, University of applied sciences and arts of southern Switzerland; ² Politecnico di Milano Architecture, Built environment and Construction Engineering Department

M-02 Quantification of Glare from Reflected Sunlight of Solar Installations

Florian Ruesch¹
¹ SPF Institute for Solar Technology, Hochschule für Technik HSR

M-03 The Energy Performance Evaluation of Buildings in an Evolving Built Environment: An Operative Methodology

Lavinia Chiara Tagliabue¹, Francesco Frontini², Cristina Polo², Mariaemma Sala³, Giorgio Pansa³, Enrico De Angelis³
 Presented by Francesco Frontini²
¹ University of Brescia; ² SUPSI, University of applied sciences and arts of southern Switzerland; ³ Politecnico di Milano

N-01 The Solar Forecast Similarity Method: A New Method to Compute Solar Radiation Forecasts for the Next Day

Alexandre Boilley¹, Philippe Blanc², Etienne Wey¹, Claire Thomas¹
¹ Transvalor; ² MINES ParisTech - OIE

N-02 Solar Forecasting Requirements for Model Predictive Control of Net Zero Energy Buildings and Communities

Ricardo Enríquez Miranda¹
¹ CIEMAT

N-03 Analysis of the Long-term Evolution of the Solar Resource in China and its Main Contributors

Chao Liu¹, Philippe Blanc², Sébastien Pitaval¹, Lucien Wald², Christophe Vernay¹
 Presented by Christophe Vernay¹
¹ SOLAIS; ² MINES ParisTech

N-04 Exergy Analysis of Solar Radiation Energy Hitting Turkey

Hasan Yildizhan¹
¹ University

O-01 Analysis of Turkey's Solar Collector Market

Hasan Yildizhan¹, Mecit Sivrioğlu¹
¹ University



Testing and Development of Solar Collectors

- Hot Water Stores
- Solar Thermal Systems
- Solar Cooling Systems
- Combined Solar Thermal and Heat Pump Systems
- Multifunctional Building Components
- Advanced Thermal Energy Stores
- Solar Active Houses
- Seasonal District Heating Systems with Seasonal Heat Storage

Other Services

- Simulation and Monitoring of Solar District Heating Systems
- Simulation Studies
- Energy Concepts
- Eco-Assessment
- Elaboration of Long-Term Technology Strategies
- Development and Production of Solar Test Facilities
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01:30 pm - 03:15 pm **Opportunities for Market Development Worldwide and in the MENA Region**

ROOM: Sapphire C

Chair: Bülent Yeşilata, Harran University

01:30 pm Challenges for Price Reduction of Solar Thermal Systems (IEA SHC Task 54)

Michael Köhl¹

¹ *Fraunhofer ISE*

01:45 pm Trends in Solar Heating and Cooling Industry and Markets

Bärbel Epp¹

¹ *Solrico*

02:00 pm Energy Trends in the MENA Region: The Role of Heating and Cooling (tbc)

02:15 pm Turkey: The 2nd Solar Heating and Cooling Market Worldwide: Where Next?

Kemal Gani Bayraktar¹

¹ *GÜNDER*

02:30 pm Solar Heating and Cooling in the Arab Region: Challenges and Expectations

Ashraf Kraidy¹

¹ *Energy Department, League of Arab States*

02:45 pm Opportunities for Solar Heating and Cooling in the Gulf Region

Esam Elsarrag¹

¹ *GORD Institute*

02:30 pm - 03:15 pm **Solar Heat for Industrial Processes**

ROOM: Zeus

Chair: Werner Weiss, AEE INTEC

02:30 pm Analysis of a Medium Temperature Solar Thermal Installation with Heat Storage for Industrial Applications

Mircea Bunea¹, Stéphane Citherlet¹, Catherine Hildbrand¹, Sara Eicher¹, Lionel Péclat¹, Alexis Duret Duret¹

¹ *HEIG-VD / LESBAT*

02:45 pm Competing Heat Sources in Low-temperature Process Heat Networks with Solar Process Heat Systems

Holger Müller¹, Wilfried Zoerner¹

¹ *Institute of New Energy Systems*

03:00 pm SHIPcal: Solar Heat for Industrial Processes Online Calculator

Miguel Frasquet¹

¹ *CTAER*

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02:30 pm - Solar Cooling

03:15 pm

ROOM: Artemis

Chair: Daniel Mugnier, TECSOL

02:30 pm

Demonstrating of the Performance of a SolabCool® Units Applied in the Field

H.A. de Beijer¹, J. Duim¹

¹ SolabCool BV

02:45 pm

Development and Performances Overview of Ammonia-water Absorption Chillers with Cooling Capacities from 5 to 100 kW

François Boudéhenn¹, Florent Lefrançois¹, Maxime Perier-Muzet¹, Sylvain Bonnot¹,
 Hélène Demasles¹, Delphine Triché¹

Presented by Sylvain Bonnot¹

¹ CEA LITEN INES

03:00 pm

Life Cycle Cost of Standalone Solar Photovoltaic System Powering Evaporative Cooler and Heat Pump Water Heater for Australian Remote Homes

Gazinga Abdullah¹, David Whaley¹, Martin Belusko¹, Wasim Saman¹

¹ University of South Australia

03:15 pm

Coffee Break

03:45 pm - Global & Regional Certification

05:00 pm

ROOM: Sapphire C

Chair: Ken Guthrie, IEA SHC

03:45 pm

How does “Global Solar Certification” Work

Jan Erik Nielsen¹

¹ SolarKey Int.

04:00 pm

The Global Solar Certification Network

Harald Drück¹

¹ ITW University of Stuttgart

04:15 pm

SHAMCI, the Latest Developments in Certification for the Arab Region

Ashraf Kraidy¹

¹ Energy Department, League of Arab States

04:30 pm

Energy Labelling for Space and Water Heaters: A New Challenge for Solar Heating and Cooling in Europe: Status of Implementation

Pedro Dias¹

¹ ESTIF

03:45 pm - Solar Heat for Industrial Processes

05:00 pm

ROOM: Zeus

Chair: Uli Jakob, Green Chiller Association for Sorption Cooling e.V.

03:45 pm

First Year of Operational Experience with a Solar Process Steam System for a Pharmaceutical Company in Jordan

Michael Berger¹, Mirko Meyer-Grünefeldt², Dirk Krüger², Klaus Hennecke², Marwan Mokhtar¹,
 Christian Zahler¹

¹ Industrial Solar; ² German Aerospace Center (DLR)

04:00 pm Industrial Integration of Mid-temperature Solar Thermal Heat by Dynamic Simulation

Alois Resch¹

¹ Austria Solar Innovation Center

04:15 pm Large Scale Solar Process Heat Systems - Planning, Realization and System Operation

Dirk Pietruschka¹, Klemens Jakob², Robert Söll³, Francesco Orioli⁴, Roberto Fedrizzi⁵, Mariela Cotrado¹, Ilyes Ben Hassine¹

¹ HFT Stuttgart; ² SOLERA GmbH; ³ S.O.L.I.D. Gesellschaft für Solarinstallation und Design mbH; ⁴ SOLTIGUA; ⁵ EURAC

04:30 pm Modeling and Sizing of a MW Solar DSG Plant

Antoine Frein¹, Victor Tatay Rubio¹, Mario Motta¹, Lorenzo Pistocchini¹

¹ Politecnico di Milano - POLIMI

03:45 pm - Solar Cooling

05:00 pm

ROOM: Artemis

Chair: Sabine Putz, SOLID

03:45 pm Performance Analysis of Sorption Integrated Collector Solar Heating and Cooling Systems for Various Building Types

Corey Blackman¹

¹ Dalarna University

04:00 pm Performance and Economic Comparison of Solar Cooling Configurations

Roberto Gabbrielli¹, Francesco Del Medico¹, Piero Castrataro²

¹ Università di Pisa; ² Glayx Tech srl

04:15 pm Process Steam and Chilled Water Production with CPC-collectors, Steam Jet Ejector Chiller and Latent Heat Storages

Michael Joemann¹, Michael Kauffeld², Tunay Oezcan², Clemens Pollerberg¹

¹ Fraunhofer UMSICHT; ² Hochschule Karlsruhe

04:30 pm Solar Cooling for Mediterranean Region as a Crop Storage Technology

Olexiy Buyadgie¹

¹ V.S. Martynovsky Institute of Refrigeration, Cryogenic Technologies and Eco Energetics/Wilson

04:45 pm Performance Evaluation of a Novel Building Integrated PV/T Collector Combined with a Liquid Desiccant Enhanced Indirect Evaporative Cooling System

Mahmut Sami Buker¹, Saffa Riffat¹

¹ University of Nottingham

05:00 pm - Drivers of Solar Heating and Cooling Success in Main World Markets

06:00 pm

ROOM: Sapphire C

Friday, December 04, 2015

09:00 am - Solar Architecture, Urban Planning and Innovative Components

10:45 am ROOM: Sapphire C

09:00 am Living Houses with an Energy-Autonomy – Results of Monitoring

Thomas Storch¹, Ulrich Gross¹, Stephan Riedel², Timo Leukefeld³

¹ *Institute of Thermal Engineering / TU Bergakademie Freiberg*; ² *MR SunStrom GmbH*; ³ *Fa. Timo Leukefeld - Energie verbindet*

09:15 am Design Analysis of Sustainable Solar Skyscraper in Cold and Dry Climate of Urmia City, Iran

Zohreh Cyrus¹, Manoochehr Riahi²

¹ *Urmia Branch, Islamic Azad University*; ² *Jolfa International Branch, Islamic Azad University*

09:30 am Smart City: A Systematic Approach Towards a Sustainable Urban Transformation

Laura Aelenei¹, Carlos Silva², Helder Gonçalves³

¹ *LNEG - National Energy and Geology Laboratory*; ² *IST*; ³ *LNEG*

09:45 am Solar Hybrid Heating & Cooling Systems on District Level

Philip Horn¹, Florian Judex¹, Stefan Hauer¹, David Kreulitsch¹, Tim Selke¹

¹ *AIT Austrian Institute of Technology*

10:00 am Adaptive Façade: Concept, Applications, Research Questions

Laura Aelenei¹, Catarina Viera², Daniel Aelenei²

¹ *LNEG - National Energy and Geology Laboratory*; ² *FCT-UNL*

10:15 am Experimental Study on Cooling of Solar Collectors Using Air-water Mixture

Varghese Panthalookaran¹, Jino George²

¹ *Rajagiri School of Engineering & Technology*; ² *Rajagiri Research and Consultancy Center (RRCC)*

09:00 am - SHC Task 48 Workshop: Solar Cooling

10:30 am ROOM: Zeus

Chair: Daniel Mugnier, TECSOL

09:00 am Introduction Into IEA SHC Task 48

Daniel Mugnier, TECSOL

09:10 am Quality for Solar Cooling on Component Level

Marco Calderoni¹

Presented by Patrizia Norina Melograno¹

¹ *Politecnico di Milano*

09:30 am Quality Assurance and Support Measures for Solar Cooling on System Level

Alexander Morgenstern¹

¹ *Fraunhofer ISE*

09:50 am Market Support Measures

Daniel Neyer¹

¹ *Universität Innsbruck*

10:10 am Dissemination and Policy Advice Tools for Solar Cooling

Uli Jakob¹

¹ Green Chiller Verband für Sorptionskälte e.V.

09:00 am - Thermal Storage

10:45 am ROOM: Artemis

Chair: Wim van Helden, AEE INTEC

09:00 am New Type of Valve for Solar Thermal Storage Tank Stratification

Nico van Ruth¹

¹ Conico Valves bv

09:15 am Reaction of Calcium Chloride and Magnesium Chloride and Their Mixed Salts with Ethanol for Thermal Energy Storage

Kathrin Korhammer¹, Wolfgang K. L. Ruck¹, Christina Apel¹, Thomas Osterland¹

¹ Leuphana University Lueneburg

09:30 am SolSpaces – Concept Verification of a New Solar Heating System with Sorption Store

Henner Kerskes¹, Harald Drück¹, Sebastian Asenbeck¹, Rebecca Weber¹

¹ Institute for Thermodynamics and Thermal Engineering

09:45 am Testing of PCM Heat Storage Modules with Solar Collectors as Heat Source

Gerald Englmaier¹, Jakob Berg Johansen¹, Weiqiang Kong¹, Janne Dragsted¹, Jianhua Fan¹, Simon Furbo¹, Mark Dannemand¹

¹ Technical University of Denmark

10:00 am Seasonal Thermal Energy Storage with Aqueous Sodium Hydroxide – Experimental Assessments of the Heat and Mass Exchanger Unit

Xavier Daguene-Frick¹, Kanishka Goonesekera², Robert Weber³, Benjamin Fumey³, Paul Gantenbein¹

¹ Institute for Solar Technology SPF - HSR; ² Kingspan Renewables Ltd.; ³ EMPA;

10:15 am Thermal Storage Stratification Efficiency: A New Test Method Reveals Large Differences Between Six Combistores

Michel Haller¹, Andreas Reber¹, Patrick Persdorf¹, Robert Haberl¹

¹ Institut für Solartechnik SPF / University of Applied Sciences Rapperswil

10:45 am Coffee Break

11:15 am - Solar Space Heating

12:45 pm

ROOM: Sapphire C

Chair: Andreas Häberle, PSE AG

11:15 am

Austrian Solar Brick House 2020 – Energy and Comfort Assessment Report Based on a 30 Month Monitoring Period

Tim Selke¹

¹AIT Austrian Institute of Technology

11:30 am

Build-up and Experimental Investigation of a Novel Solar Thermal Roof for Heat Pump Operation

Mahmut Sami Buker¹, Saffa Riffat¹

¹University of Nottingham

11:45 am

Design of a Simple Control Strategy for a Community Size Solar Heating System with a Seasonal Storage

Hassam ur Rehman¹, Kai Siren¹, Janne Hirvonen¹

¹Aalto University

12:00 pm

Simulation and Evaluation of Solar Thermal Combi Systems with Direct Integration of Solar Heat Into the Space Heating Loop

Jens Glembin¹

¹Institute for Solar Energy Research (ISFH)

12:15 pm

Simulation of a Solar-ice System for Heating Applications. Part I: System Validation with One Year of Monitoring Data

Daniel Carbonell¹, Michel Haller¹, Martin Granzotto¹, Daniel Philippen¹

¹Institut für Solartechnik SPF, HSR Hochschule für Technik

11:15 am - SHC Task 42 Workshop: Solar Thermal Storage

12:45 pm

ROOM: Zeus

Chair: Matthias Rommel, Institute for Solar Technologies SPF

11:15 am

Introduction Into IEA SHC Task 42

Matthias Rommel¹

¹Institut für Solartechnik SPF / University of Applied Sciences Rapperswil

11:20 am

IEA SHC Task 42 / ECES Annex 29 – WG A1: Engineering and Processing of PCMs, TCMs and Sorption Materials

Alenka Ristic¹, Jochen Jänchen², Gunther Munz³, Holger Rammelberg⁴, Halime Paksoy⁵, Yeliz Konuklu⁶, Gerard Ferrer⁷, Camila Barreneche⁸, Christoph Rathgeber⁹, Stefan Gschwander³, Thomas Haussmann³, Saman N. Gunasekara¹⁰, Cemil Alkan¹¹, Gonzalo Diarce¹², Laurent Zalewski¹³, Mónica Delgado¹⁴, Ana Lazaro¹⁴, Hermann Schranzhofer¹⁵, Simon Furbo¹⁶

¹National Institute of Chemistry Slovenia; ²TH Wildau; ³Fraunhofer ISE; ⁴Leuphana University Lueneburg; ⁵Cukurova University; ⁶Niğde University; ⁷Universitat de Lleida; ⁸University of Barcelona; ⁹ZAE Bayern; ¹⁰KTH Sweden; ¹¹Gaziosmanpaşa University; ¹²University of the Basque Country UPV/EHU; ¹³Université d'Artois; ¹⁴University of Zaragoza; ¹⁵Graz University of Technology; ¹⁶Technical University of Denmark

11:35 am

Standardization of PCM Characterization via DSC

Stefan Gschwander¹, Ana Lazaro², Mónica Delgado², Harald Mehling³, Peter Hennemann³, Christoph Rathgeber³, Alenka Ristic⁴, Daniel Lager⁵, Wolfgang Hohenauer⁵, Gonzalo Diarce⁶, Liusa F. Cabeza⁷, Camila Barreneche⁷, Georg Hagelstein¹, Thomas Haussmann¹

¹Fraunhofer ISE; ²University of Zaragoza; ³ZAE Bayern; ⁴National Institute of Chemistry Slovenia; ⁵Austrian Institute of Technology; ⁶University of the Basque Country UPV/EHU; ⁷University of Lleida

11:50 am Advanced Numerical Modelling Techniques to Tune the Properties of Heat Storage Materials for Optimal Reactor Performance

Silvia V. Gaastra-Nedeá¹, Frédéric Kuznik², Erwin Franquet³, Ana Lazaro⁴, Pablo Dolado⁴, Andreas Haagen⁵, Camilo Rindt¹

¹ Technical University Eindhoven; ² ISNA Lyon; ³ University of Pau; ⁴ University of Zaragoza; ⁵ University of Bayreuth

12:05 pm Applications and System Integration of Compact Thermal Storages

Wim van Helden¹, Xavier Daguene-Frick², Paul Gantenbein², Rebekka Köll¹, Waldemar Wagner¹, Hermann Schranzhofer³, Frédéric Kuznik⁴, Ruud Cuyper⁵, Álvaro Campos⁶, Andreas Haagen⁷, Bernhard Zettl⁸, Christoph Rathgeber⁹, Henner Kerskes¹⁰, Simon Furbo¹¹, Benjamin Fumey¹², Robert Weber¹², Motoi Yamaha¹³

¹ AEE INTEC; ² Institute for Solar Technologies SPF; ³ Graz University of Technology; ⁴ University de Lyon; ⁵ TNO; ⁶ University of the Basque Country UPV/EHU; ⁷ University of Bayreuth; ⁸ ASiC Austria Solar Innovation Center; ⁹ ZAE Bayern; ¹⁰ ITW / University of Stuttgart; ¹¹ Technical University of Denmark; ¹² EMPA; ¹³ Chubu University

12:20 pm IEA SHC Task 42 / ECES Annex 29 – WG C: Economic Evaluation of Thermal Energy Storages

Christoph Rathgeber¹, Andreas Hauer¹, Eberhard Lävemann¹, Stefan Hiebler¹

¹ ZAE Bayern

11:15 am - Performance Measurement

12:45 pm

ROOM: Artemis

Chair: Michael Köhl, Fraunhofer ISE

11:15 am Comparative Analysis of High Temperature Stagnation Prevention Strategies for Photovoltaic-thermal (PV-T) Systems

Pedro Magalhães¹

¹ FCT-UNL

11:30 am Effects of Measurement Conditions on Operating Limits of Solar Horizontal Heat Pipes

Katharina Morawietz¹

¹ Fraunhofer ISE

11:45 am Field Test for Polymeric Collector Models in Different Climatic Locations

Andreas Piekarczyk¹, Nicolai Peglow¹, Michael Köhl¹, Karl-Anders Weiß¹

Presented by Michael Köhl¹

¹ Fraunhofer ISE

12:00 pm Novel Solar Thermal Collector Systems in Polymer Design – Part 3: Aging Behavior of PP Absorber Materials

Gernot M Wallner¹, Reinhold W Lang¹, Michael Grabmann¹, Markus Povacz¹

Presented by Michael Grabmann¹

¹ University of Linz, JKU

12:15 pm A Simplified LCA Tool for Solar Heating and Cooling Systems

Marco Beccali¹, Daniel Mugnier², Tim Selke³, Sonia Longo¹, Maurizio Cellura¹

¹ Università degli Studi di Palermo - DEIM; ² Tecsol; ³ AIT Austrian Institute of Technology

12:30 pm Simulation of Very High Snowloads on Solar Thermal Collectors

Andreas Bohren¹, Walter Gubler², Ozan Türk²

¹ SPF Institute for Solar Technologies; ² SPF Institute for Solar Technology

12:45 pm **Lunch**

01:45 pm - Solar Thermal Collectors

03:00 pm ROOM: Sapphire C

Chair: Zinian He, Beijing Solar Energy Research Institute

01:45 pm Enameled Glass Panels for Solar Thermal Building Envelopes

Federico Giovannetti¹

¹ Institute for Solar Energy Research (ISFH)

02:00 pm Performance Analysis of a Flat Plate Solar Field for Process Heat

Marco Cozzini¹, Ilyes Ben Hassine², Dirk Pietruschka², Mauro Pipiciello¹
 Presented by Roberto Fedrizzi¹

¹ EURAC; ² zafh.net Research Center

02:15 pm Pure VO₂ Thermochromic Coating: An Industrial Process for Smart Solar Thermal Collectors

Fabien Capon¹, David Mercs², Jean-François Pierson¹, Alan Corvisier¹

¹ Institut Jean Lamour; ² Viessmann Faulquemont SAS

02:30 pm A PVT Collector Concept with Variable Film Insulation

Manuel Lämmle¹

¹ Fraunhofer ISE

02:45 pm Simulation Analysis of Different Types of Solar Thermal Receiver Using Ray-Tracing and CFD Techniques

Ahmed Daabo¹

¹ University of Birmingham

01:45 pm - Solar Resource Management

03:00 pm ROOM: Zeus

Chair: David Renné, Dave Renné Renewables

01:45 pm Key Outcomes from IEA SHC Task 46 to Support the Solar Heating and Cooling Community

David Renné¹

¹ Clean Power Research

02:00 pm Solar Incidence Diagram with Aperture and Shading Profiles

Sebastian Kazimierski¹

¹ Warsaw University of Technology

02:15 pm Validation of HelioClim-3 version 4, HelioClim-3 version 5 and MACC-RAD using 14 BSRN stations

Claire Thomas¹, Mireille Lefèvre², Lucien Wald², Philippe Blanc², Etienne Wey¹

¹ Transvalor; ² MINES ParisTech - OIE

02:30 pm A Literature Review of Methodologies Used to Assess the Energy Flexibility of Buildings

Daniel Aelenei¹, João Martins², Rui Lopes²

¹ UNINOVA; ² FCT-UNL

02:45 pm Polyvinyl Alcohol-salt Hydrate Mixtures as Passive Thermal Energy Storage Systems

Cemil Alkan¹, Arvind Kumar², Axel Gottschalk³, Derya Kahraman Döğüşcü¹

¹ Gaziosmanpaşa University; ² Indian Institute of Technology; ³ Bremerhaven University of Applied Sciences

01:45 pm - Performance Measurement

03:00 pm ROOM: Artemis

Chair: Doug McClenahan, Natural Resources Canada

01:45 pm METHODIQA - Development of a Quality Assurance Methodology for Renewable Heat Systems Based on Intelligent Operational Monitoring

Philip Ohnewein¹, Daniel Tschopp¹, Harald Schrammel¹

¹ AEE INTEC

02:00 pm Microscopic Measurement and Analysis of Soiling Behavior of Surfaces with Standardized and Real Dust – a Parameter Study

Elisabeth Klimm¹

Presented by Michael Köhl¹

¹ Fraunhofer ISE

02:15 pm Quality Level Assessment of Sorption Chillers Installed in Solar Cooling Plants

Patrizia Norina Melograno¹, Jochen Döll², François Boudéhenn³

¹ Politecnico di Milano; ² Fraunhofer ISE; ³ CEA Tech INES

02:30 pm Wood Pellet and Solar Heating System Benchmarking

Jan-Olof Dalenbäck¹, Tomas Persson², Patrik Ollas³

¹ Chalmers University of Technology; ² Dalarna University; ³ SP Technical Research Institute of Sweden

03:00 pm - Closing Ceremony

03:30 pm ROOM: Sapphire C

Chair: Ken Guthrie, IEA SHC

03:00 pm Conference Wrap-up
Bülent Yeşilata, Harran University

03:10 pm Conference Wrap-up
Pedro Dias, ESTIF

03:20 pm Farewell
Ken Guthrie, IEA SHC

General Information

Certificate of Attendance

Certificates of attendance for conference participants will only be available on-site at the registration desk and cannot be issued after the conference.

Conference Proceedings

Accepted papers, which were presented at the conference, will be published online in Elsevier's Energy Procedia. Energy Procedia is an open-access online platform of Elsevier. All papers published in Energy Procedia feature individual DOI numbers and are therefore fully citable.

Before publication in Energy Procedia, access to the non-reviewed papers will be available on the restricted download area of the conference website, which is accessible to all conference participants with a login and password provided after their conference registration.

Currency

The local currency in Istanbul is Turkish Lira (TRY). On November 4, 2015 1 US Dollar equaled 2.842 TRY; 1 Euro equaled 3.103 TRY. You are advised to check the conversion rate at xe.com for the days of your visit.

Language

The conference language is English.

List of Participants

Registered conference participants can download a full list of participants on the conference website, www.shc2015.org. The login and password sent to you during registration will be required to gain access to the download area.

Posters

Please mount your poster on the first conference day before the start of the poster session.

Do not remove your poster until the end of the conference. The posters are an important part of the scientific program and should be displayed the whole time. Please remove your poster after the closing session on Friday, December 4, before you leave. Any posters left behind will be discarded.

Registration

Each participant must register in person at the registration desk to collect a conference bag and name badge before attending any sessions. Please make sure to wear your badge for admission to all sessions and social events.

Registration times are on Wednesday, December 2, from 8:00 am and during conference hours at the WOW Convention Center in Istanbul.

Speaker Information

All presentations must be handed in at the Media Upload Desk, located beside the Registration Desk at the main entrance, at least one hour before your oral session. You will not be able to display your presentation directly from your laptop computer or memory stick. Our technical support team will welcome you at the Media Upload Desk during all conference days from 8:00 am on.

Please meet your session chair inside the conference room at least 10 minutes prior to the beginning of your session to get familiar with the technical equipment.

Venue

WOW Istanbul Convention Center
Yesilkoy Mahallesi Ataturk Cad. 34149 No: 15-17-19
Bakirkoy, Istanbul Turkey

<http://www.wowhotelsistanbul.com/>

WiFi Internet Access

WiFi is complimentary in the WOW Convention Center. Please enter the password "05150805". However, access may vary depending on the density of users in one location during the conference.

Conference Dinner with SHC 2015 Solar Award Ceremny

The SHC 2015 conference dinner will take you to the Develi restaurant, a well-known and popular place in Istanbul.

With an experience of over 100 years, the family restaurant offers the unique flavors of Turkish cuisine in a green and modern environment. Enjoy Turkish hospitality and delicious food with your friends and colleagues in a convivial and relaxed atmosphere.

During the dinner the "SHC Award" for outstanding achievements in the field of solar heating and cooling will be conferred.

Date: December 03, 2015

Location: Develi Florya Restaurant

Bus shuttle: The bus leaves at 6:45 pm in front of the WOW Convention Center and returns after 10pm.

Fee: 65 €, pre-registration is required

Address:

Develi Florya

Çiroz Mevkii Istanbul Asfaltlı Petekevler içi Florya/istanbul (Florya Büyükşehir Sosyal Tesisleri Yanı)

Phone: 0212 662 50 00 pbx

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