



PROGRAM

Venue:

Universitat de Lleida
Campus de Cappont
c/ Jaume II, 67
25001 Lleida

WEDNESDAY, 28 MAY 2014

8:00 – 9:20 Registration
Room: CCCT entrance

9:20 – 10:00 Opening Ceremony
Room: Auditorium, CCCT

10:00 – 10:30 Coffee break
Room: Floor -1, CCCT

10:30 – 12:50 Parallel Session 1 **Systems I**
Chairs: Hiebler Stefan (ZAE Bayern, Germany) and Antoni Gil (CIC Energigune, Spain)
Room: Auditorium, CCCT

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|---------------|--------|--|
| 10:30 – 10:50 | 01-023 | Modeling of the heat transfer coefficient in fixed and fluidized beds with PCM
María Izquierdo-Barrientos, Celia Sobrino, Jose A. Almendros-Ibáñez |
| 10:50 – 11:10 | 01-035 | Numerical model of a cold storage tank containing paraffin as phase-change material
Javier Biosca-Taronger, José Miguel Corberán, Conchita Peñalosa, Ana Lázaro, Pablo Dolado, Jorge Payá |
| 11:10 – 11:30 | 01-046 | Numerical simulation and exergy analysis of latent thermal energy storage
Arthur Rudek, Frank Dammel, Peter Stephan |
| 11:30 – 11:50 | 01-053 | Experimental characterization of a PCM-based heat storage tank for domestic applications
Andrea Frazzica, Salvatore Santamaria, Marco Manzan, Roberta Padovan, Alessio Sapienza, Angelo Freni |
| 11:50 – 12:10 | 01-056 | Room Heat Exchanger with PCM as a Thermal Accumulation for Heating and Cooling of Buildings
Eneja Osterman, Vincenc Butala, Uroš Stritih |
| 12:10 – 12:30 | 01-074 | Numerical analysis of natural convection in a latent heat thermal energy storage system containing rectangular enclosures
Julian Vogel, Maik Johnson, Markus Eck, Dörte Laing |



10:30 – 12:50 Parallel Session 2 **Thermochemical Storage I**

Chairs: Dieter Boer (Univ. Rovira i Virgili, Spain) and Alenka Ristic (National Institute of Chemistry, Slovenia)

Room: Videoconference room, CCCT

- 10:30 – 10:50 01-014
Review on Thermochemical Reactors for building comfort applications
Aran Solé, Ingrid Martorell, Luisa F. Cabeza
- 10:50 – 11:10 01-040
Thermochemical Heat Transformation for Upgrade of Waste Heat
Marc Linder, Margarethe Molenda, Martin Bouché, Antje Wörner
- 11:10 – 11:30 01-049
Thermochemical Heat Storage with Magnesium Oxide and Reactor Concept
I. Meyer, S. Reil, M. Jakuttis, A. Hornung, J. I. Salazar Gomez, H. Lohmann,
B. Zeidler-Fandrich
- 11:30 – 11:50 01-051
Thermochemical heat storage for low temperature applications via thermo
reversible neutralization reactions
Stefano Bruzzano, Barbara Zeidler-Fandrich, Matthias Fischer, Maria
Tyukavina, Gorge Deerberg
- 11:50 – 12:10 01-064
Performance overview of different salt hydrates as thermochemical materials
for seasonal solar heat storage in a residential environment
Claire J. Ferchaud, Robert A. A. Scherpenborg, Luca Scapino, J.B.J. Veldhuis,
Herbert A. Zondag, Robert de Boer
- 12:10 – 12:30 01-071
Improving the performance of thermochemical heat storage at high
temperatures based on redox metal oxides
Alfonso J. Carrillo, David P. Serrano, Patricia Pizarro, Juan M. Coronado

13:00 – 15:00 Lunch

Room: Floor -1, CCCT

15:00 – 16:30 Poster Session 1

Chairs: Alvaro de Gracia (Univ. of Lleida, Spain) and Shane Colclough (Univ. of Ulster, UK)

Room: Floor -1, CCCT

- 02-001
Thermal storage system with a condensable fluid governed by sliding pressure
Manuel Valdés, Antonio Rovira, Rubén Abbas, José M^e Martínez-Val
- 02-003
Metallic Foam in heat transfer enhancement
Zhang H.L., Pitié F., Degrève J. and Van Gerven T.
- 02-006
Competitiveness and Economic Efficiency of Thermal Energy Storage for
Balancing Renewable Electricity Generation
Henryk Wolisz, Denis Sepoetro, Rita Streblov, Dirk Müller
- 02-013
Thermal behavior of rammed earth in buildings with internal heat loads
compared to conventional brick facades: experimental study
Lidia Rincón, Susana Serrano, Albert Castell, Gabriel Pérez, Luisa F. Cabeza



02-015

Design of a thermochemical heat storage system for tap water heating in the built environment

M. Gaeini, E.C.J. de Jong, H.A. Zondag, C.C.M. Rindt

02-016

Thermodynamic Evaluation of Supercooled Seasonal Heat Storage at the Drake Landing Solar Community

Louis Desgrosseilliers, Dominic Groulx, Mary Anne White, Lukas Swan

02-019

Measurement setup to determine the thermal properties and dynamic thermal behavior of cooling ceilings with PCM

Felix Klinker, Harald Mehling, Christina Konstantinidou, Helmut Weinläder

02-022

In situ observation of the dehydration of $\text{Li}_2\text{SO}_4 \cdot \text{H}_2\text{O}$ monocrystals

Shuiquan Lan, Marc van Maris, Herbert Zondag, Camilo Rindt

02-025

Valorization of paraffin as low cost Phase Change Material. Characterization for using in Thermal Energy Storage

Conchita Peñalosa, Ana Lázaro, Mónica Delgado, Pablo Dolado, Belén Zalba

02-026

Screw heat exchanger in a latent storage for a 50 MW CSP plant – simulation results

Verena Zipf, Anton Neuhäuser, Werner Platzer

02-031

Experimental analysis of heat pump coupled to TES tanks using PCM for load shifting

Pere Moreno, Albert Castell, Cristian Solé, Gabriel Zsembinszki, Luisa F. Cabeza

02-032

Evaluation of the fresh state properties of gypsum with PCM using three different PCM inclusion methods

Susana Serrano, Camila Barreneche, Antonia Navarro, Laia Haurie, Alejandro Gallardo, Ana I. Fernandez, Luisa F. Cabeza

02-034

Experimental and numerical analysis of a chilly bin incorporating phase change material

Eduard Oró, Luisa F. Cabeza, Mohammed M. Farid

02-039

Operation modes and process integration of a thermochemical heat storage system based on $\text{CaO}/\text{Ca}(\text{OH})_2$

Matthias Schmidt, Christian Roßkopf, Marc Linder, Antje Wörner

02-048

Development of Encapsulated Phase Change Materials on Polymer Base for Application in mobile latent heat storages

Marco Deckert, Stefanie Reil, Michael Jakuttis, Samir Binder, Andreas Hornung

02-054

Thermal stability of D-mannitol as phase change material (PCM)

Hannah Neumann, Sophia Niedermaier, Aran Solé, Peter Schossig

02-061

Optimizing the incorporation of PCM-drywalls in air-conditioned lightweight steel framed residential buildings by coupling EnergyPlus and GenOpt



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Nelson Soares, Adélio Gaspar, Paulo Santos, José Costa
02-065

Eutectic Mg₄₉Zn₅₁ alloy as Phase Change Material for Direct Steam Generation Application

Elena Risueño, Javier Rodríguez-Aseguinolaza, Stefania Doppiu, Manuel Tello, Iñaki Loroño, Pablo Blanco-Rodríguez
02-068

Exergy, Energy Conversion and Domestic Hot Water Storage
Mark McClenaghan, Philip Griffiths, Neil Hewitt, David Redpath

16:30 – 17:00 Coffee Break
Room: Floor -1, CCCT

17:00 – 19:00 Parallel Session 3 **Systems II**
Chairs: Jorge Payá (UPV, Spain) and Uros Stritih (Univ. of Ljubljana, Slovenia)
Room: Auditorium, CCCT

- 17:00 – 17:20 01-075
Design and Retrofitting of a Cold Storage - Replacing Water with Phase Change Slurries
Tobias Kappels, Tobias Kohlen, Lucian George Hanu, Clemens Pollerberg
- 17:20 – 17:40 01-087
Numerical Simulation of Thermal Energy Storage with PCM
Rejane De Cesaro Oliveski, Davide Del Col
- 17:40 – 18:00 01-094
PCMFlux as a fully controllable dynamic latent heat storage system
Harald Pointner, Wolf-Dieter Steinmann, Markus Eck
- 18:00 – 18:20 01-103
Convection correlations analysis for air/PCM exchanger
Anne Duchez, Joseph Virgone, Damien David
- 18:20 – 18:40 01-109
Numerical modeling and experimental validation of encapsulated PCM Thermal Energy Storage tanks for Concentrated Solar Power Plants
Pedro Galione, C.D. Pérez-Segarra, Ivette Rodríguez, Oriol Lehmkuhl, Joaquim Rigola, Assensi Oliva

17:00 – 19:00 Parallel Session 4 **Thermochemical Storage II**
Chairs: Ingrid Martorell (Univ. of Lleida, Spain) and Juan M. Coronado (IMDEA, Spain)
Room: Videoconference room, CCCT

- 17:00 – 17:20 01-091
Improvement of water sorption capacity of composite sorbents for thermochemical heat storage
Alenka Ristić and Tadeja Birsa Čelič
- 17:20 – 17:40 01-093
Parameters effecting economy and heat density of sorption heat storage systems
Benjamin Fumey, Robert Weber, Paul Gantenbein, Xavier Daguene-Frick, Tommy Williamson, Viktor Dorer



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Advances in Thermal Energy Storage



17:40 – 18:00 01-099
Experimental tests on a solid sorption prototype for seasonal solar thermal storage

Wim van Helden, Waldemar Wagner, Verena Schubert, Christof Krampe-Zadler, Henner Kerskes, Florian Bertsch, Barbara Mette, Jochen Jänchen

18:00 – 18:20 01-107
Enhancement Reaction Performance of Chemical Heat Storage Material Mixed with Expanded Graphite for CaO/H₂O Chemical Heat Pump
Jun Kariya, Yukitaka Kato

21:00 Dinner at restaurant *La Llotja – Palau de congressos de Lleida*
Avinguda de Tortosa, 6, 25005 Lleida



THURSDAY, 29 MAY 2014

09:00 – 11:00 Parallel Session 1

Materials I

Chairs: Svetlana Ushak (Univ. of Antofagasta, Chile) and David Damien (University of Lyon)

Room: Videoconference room, CCCT

- 09:00 – 09:20 02-007
Investigation of Pinacone Hexahydrate as Phase Change Material
Christoph Rathgeber, Henri Schmit, Peter Hennemann, Stefan Hiebler
- 09:20 – 09:40 01-010
Combined DSC and T-History measurements for an improved characterisation of phase change materials
Laila Miró, Christoph Rathgeber, Stefan Hiebler, Luisa F Cabeza
- 09:40 – 10:00 01-017
Investigation of two novel eutectic phase change materials based on ternary salt hydrate mixtures
Henri Schmit, Christoph Rathgeber, Werner Pfeffer, Stefan Hiebler
- 10:00 – 10:20 01-020
Characterization of sugar alcohols as seasonal heat storage media – experimental and theoretical investigations
Huaichen Zhang, Roel M. J. van Wissen, Silvia V. Nedeá, Camilo C.C.M. Rindt
- 10:20 – 10:40 01-028
Salt-doped Mg(OH)₂ and Ca(OH)₂ as candidates for middle-temperature heat storage
Alexandr Shkatulov, Yuri Aristov
- 10:40 – 11:00 01-106
Round Robin Test of a Paraffin Phase Change Material
S. Vidi, H. Mehling, F. Hemberger, Th. Hausmann, A. Laube

09:00 – 11:00 Parallel Session 2

Buildings I

Chairs: Yeliz Konuklu (Nigde University, Turkey) and Gabriel Pérez (Univ. of Lleida, Spain)

Room: Auditorium, CCCT

- 09:00 – 09:20 01-004
Thermo active structure with night evaporative cooling system
Antonio Villanueva, Javier Rey, Jon Zubiaurre, Ramón Gutiérrez
- 09:20 – 09:40 01-018
Multi-objective optimization applied to thermal modeling of cubicles
Joan Carreras, Dieter Boer, Gonzalo Guillén-Gosálbez, Laureano Jiménez, Marc Medrano, Luisa F. Cabeza
- 09:40 – 10:00 01-029
Green roofs for building energy savings. A comparative study
Julià Coma, Piero Bevilacqua, Marilena De Simone, Gabriel Pérez, Luisa F. Cabeza
- 10:00 – 10:20 01-105
Application of thermal storage in a hybrid CHP/solar thermal heating system for residential buildings
Markus Schumacher, Sebastian Stinner, Rita Streblov, Dirk Müller
- 10:20 – 10:40 01-113
The EINSTEIN Project and Integrating Seasonal Thermal Energy Storage into the Heating Systems of Existing Buildings
Shane Colclough, Maria Victoria Cambronero Vazquez, Philip Griffiths



10:40 – 11:00 01-119
Efficiency indicators of thermal energy storage in building solutions with PCM
José Antonio Tenorio Ríos, José Manuel Salmerón Lissén, José Sánchez Ramos,
Servando Álvarez Domínguez

11:00 – 11:30 Coffee Break
Room: Floor -1, CCCT

11:30 – 12:50 Parallel Session 3 **Materials II**
Chairs: Jay Khodadadi (Auburn Univ., USA) and Robert Weber(EMPA, Switzerland)
Room: Videoconference room, CCCT

11:30 – 11:50 01-044
Monitoring of thermal properties of a composite material used in thermochemical heat storage
Pierre D'Ans, Wolfgang Hohenauer, Emilie Courbon, Marc Frère, Marc Degrez, Gilbert Descy

11:50 – 12:10 01-057
Increment of specific heat of Solar Salt with SiO₂ and Al₂O₃ nanoparticles
Rosa Mondragon, P. Andreu-Cabedo, Leonor Hernandez, Luis Cabedo, Raul Martinez-Cuenca, Salvador Torro, J. Enrique Julia

12:10 – 12:30 01-090
Thermophysical characterization of new molten salt formulation for Direct Thermal Energy Storage Systems in Parabolic Trough Plants
A.G. Fernández, S. Ushak, H. Galleguillos

12:30 – 12:50 01-041
Development of a cementitious material for the thermal energy storage at low temperature
Khadim Ndiaye, Stéphane Ginestet, Martin Cyr

11:30 – 12:50 Parallel Session 4 **Latent Storage Overview**
Chairs: Robert de Boer (ECN, Netherlands) and Eduard Oró (IREC, Spain)
Room: Auditorium, CCCT

11:30 – 11:50 01-027
PCM-Based Thermal Storage System Research at Dalhousie University: A Review
Dominic Groulx, Mary Anne White, Alain Joseph

11:50 – 12:10 01-042
Analysis of the phase change solid-liquid – new insights on the processes at the atomic and molecular level
Harald Mehling

12:10 – 12:30 01-092
Overview of Phase Change Thermal Storage Systems investigated by the University of South Australia
N.H.S. Tay, M. Belusko, M. Liu, F. Bruno

12:30 – 12:50 01-110
New developments in modeling of close-contact melting
Yoram Kozak, Tomer Rozenfeld, Gennady Ziskind

13:00 – 15:00 Lunch
Room: Floor -1, CCCT



15:00 – 16:30 Poster Session 2

Chairs: *Angel Fernández (Univ. of Angofagasta, Chile) and Jose Julià (Univ. Jaume I, Spain)*

Room: Floor -1, CCCT

02-069

Development of a Prototype System for Seasonal Solar Heat Storage Using an open Sorption Process

Robert de Boer, Simon Smeding, Herbert Zondag, Guido Krol

02-072

Simulation and experimental results of the CellFlux storage concept

Christian Odenthal, Wolf-Dieter Steinmann, Markus Eck

02-082

Microencapsulation of fatty acid with polystyrene for thermal energy storage

Yeliz Konuklu, Murat Ünal, Halime Ö. Paksoy, Süleyman Konuklu

02-083

CFD modeling of a TES system based on a packed bed of natural rocks

Simone A. Zavattoni, Maurizio C. Barbato, Andrea Pedretti, Giw Zanganeh

02-095

A thermo-mechanical model for packed bed heat storages

Volker Dreißigacker, Stefan Zunft, Torsten Baumann

02-096

Experimental Investigation on a Moving Bed Heat Exchanger used for discharge of a particle-based TES for CSP

Torsten Baumann, Stefan Zunft

02-101

Comparative study of embodied energy using different thermal insulation materials

Salvador Sol, Gabriel Pérez, Susana Serrano, Camila Barreneche, Inés Fernández, Luisa F. Cabeza

02-108

Numerical modeling and experimental validation of Thermal Energy Storage tanks for propulsion systems under cryogenic conditions

Santiago Torras, Jesús Castro, Joaquim Rigola, Sergio Morales, Pedro Galione, Oriol Lehmkuhl, Assensi Oliva

02-111

Phase-change processes in concentric finned storage units

Tomer Rozenfeld, Yoram Kozak, Ron Hayat, Gennady Ziskind

02-112

Application of wall PCM in price based control system

Reza Barzin, Mohammed Farid, Brent Young, John Chen

02-118

Potential of phase change materials to reduce cooling demand in buildings in Spain

Álvaro Ruiz-Pardo, José Antonio Tenorio, José Manuel Salmerón, Servando Álvarez Domínguez

02-120

The effect of molecular length on the values of thermal conductivity and interfacial thermal conductance between the layers of long chain n-alkanes

Rouzbeh Rastgarkafshgarkolaei and J. M. Khodadadi



02-121

Reducing heating and cooling energy needs through an innovative daily storage based solution

Servando Álvarez Domínguez, Rafael Salmerón Lissén, Álvaro Ruiz-Pardo, José Sanchez Ramos

02-123

Development and implementation of a 3D numerical code for designing and predicting performances of PCM thermal energy storage systems

Simone Arena, Giorgio Cau, Chiara Palomba

02-124

Thermochemical seasonal energy storage: system design and integration

Carol Pascual, Asier Martinez, Florian Kagerer, Laurens Van Vliet, Ard-Jan de Jong

02-125

Computer modelling activities for the development and validation of a heat storage device based on phase-change materials for the thermal-control of micro-satellites

Haritz Vallejo, Miguel Seco, Unai Morales, Iñaki Garmendia

02-127

Corrosion of Aluminium for use in PCM energy storage

Gerard Ferrer, Aran Solé, Camila Barreneche, Ingrid Martorell, Luisa F. Cabeza

02-128

MERITS Project: A comparative study of four different PCM energy storage systems for domestic hot water (DHW) applications

Jaume Gasia, Laia Miró, Aran Solé, Ingrid Martorell, Mary Kelly, Boris Bauer, Johan Van Bael, Jan Diriken, Philip Griffiths, David Redpath, Luisa F. Cabeza

02-129

Recovering waste heat using thermal energy storage technologies

Laia Miró, Camila Barreneche, Sarah Brückner, A. Inés Fernandez, Luisa F. Cabeza

16:30 – 17:00 Coffee Break

Room: Floor -1, CCCT

17:00 – 19:00 Parallel Session 5 **Mixtures, Slurries and Microencapsulation**

Chairs: Wim Van Helden (Wim Van Helden Renewables, Netherlands) and Mònica Martínez (Univ. of Barcelona, Spain)

Room: Videoconference room, CCCT

17:00 – 17:20

01-033

Addition of microencapsulated PCM into single layer mortar: Physical and thermal properties and fire resistance

Laia Haurie, Susana Serrano, Montserrat Bosch, Ana I. Fernandez, Luisa F. Cabeza

17:20 – 17:40

01-052

Enhancing the thermoregulating properties of lightweight gypsum composites

Ana M. Borreguero, Ignacio Garrido, Antonio de Lucas, Juan F. Rodríguez, Manuel Carmona



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Advances in Thermal Energy Storage



- 17:40 – 18:00 01-060
Thermal Cycle Feasibility of Phase Change Slurry
Jessica Giro-Paloma, Mónica Delgado, Camila Barreneche, Mònica Martínez,
Luisa F. Cabeza, Ana Inés Fernández
- 18:00 – 18:20 01-080
Micro-nanoencapsulation of caprylic acids for thermal energy storage
Yeliz Konuklu, Murat Ünal, Halime Ö. Paksoy, Süleyman Konuklu
- 18:20 – 18:40 01-115
Design of Inorganic mixtures to be used in PCM domestic hot water heating
A. Gutierrez, M.Grageda, S. Ushak

17:00 – 19:00 Parallel Session 6 **Buildings II**
Chairs: Philip Griffiths (Univ. of Ulster, UK) and Steven Tay (Univ. of South Australia, Australia)
Room: Auditorium, CCCT

- 17:00 – 17:20 02-011
Numerical study of using PCM in a versatile ventilated facade
Alvaro de Gracia, Lidia Navarro, Albert Castell, Luisa F. Cabeza
- 17:20 – 17:40 01-078
Boda mill – A Meeting Point for Renewable Energy systems
Angela Sasic Kalagasidis, Bijan Adl-Zarrabi, Helén Jansson
- 17:40 – 18:00 02-030
Thermal characterization of different materials for extensive green roofs
Julià Coma, Piero Bevilacqua, Marilena de Simone, Alvaro de Gracia, Gabriel Pérez, Luisa F.Cabeza
- 18:00 – 18:20 02-036
Development of measurement setup to determine the dynamic thermal behavior of building components with PCM
Christina Konstantinidou, Annegret Göbel, Kamola Kenisarina, Frank Hemberger, Helmut Weinläder, Harald Mehling
- 18:20 – 18:40 02-059
Phase change materials in central HVAC systems
Thomas Haussmann, Tao Xu, Stefan Gschwander

21:00 Gala Dinner at River
Xalet dels Camps Elisis s/n
25001 Lleida



FRIDAY, 30 MAY 2014

09:00 – 11:00 Parallel Session 1 **Enhanced Materials**

Chairs: Harald Mehling (ZAE Bayern, Germany) and Camilo Rindt (Univ. of Eindhoven, Netherlands)

Room: Videoconference room, CCCT

- 09:00 – 09:20 01-002
Latent heat storage with tube-encapsulated phase change materials (PCMs) and inserted metallic foams
Zhang H.L., Baeyens J., Degrève J. and Pitié F.
- 09:20 – 09:40 02-126
Overall thermal transmittance in carbon nanotube networks for thermal storage systems and composite materials
Matteo Fasano, Masoud Bozorg Bigdeli, Mohammad Rasool Vaziri Sereshk, Eliodoro Chiavazzo, Pietro Asinari
- 09:40 – 10:00 01-102
Experimental and numerical investigation of melting of NePCM inside different container shapes subject to a constant heat flux
Nabeel S. Dhaidan, J.M. Khodadadi, Tahseen A. Al-Hattab, Saad M. Al-Mashat
- 10:00 – 10:20 01-012
Experimental study of a prefabricated concrete slab with PCM
Lidia Navarro, Alvaro de Gracia, Albert Castell, Servando Álvarez, Luisa F. Cabeza
- 10:20 – 10:40 02-122
High temperature latent heat thermal energy storage using finned heat pipes
Saleh Almsater, Wasim Saman, Frank Bruno

09:00 – 11:00 Parallel Session 2 **Sensible Storage**

Chairs: A. Inés Fernández (UB, Spain) and M. Linder (DLR, Germany)

Room: Auditorium, CCCT

- 09:00 – 09:20 01-009
On the impact of realistic domestic hot water demand profiles on thermal storage stratification and energy efficiency
Elena Fuentes, Detta Schaefer, Jaume Salom
- 09:20 – 09:40 01-037
Design and operation of a direct solar absorption sensible heat thermal energy storage system
Ityona Amber, Tadhg. S. O'Donovan
- 09:40 – 10:00 01-045
Energy cost reduction by optimal control of ideal sensible thermal energy storage in domestic space heating
Brecht Baeten, Frederik Rogiers, Lieve Helsen
- 10:00 – 10:20 01-085
Thermal behaviors of sensible high temperature thermal energy storages with porous media in air concentrated solar systems
A Andreozzi, B Buonomo, O Manca, P Mesolella, S Tamburrino
- 10:20 – 10:40 01-089
Analysis of Large Thermal Energy Storage for Solar District Heating
Mateo Guadalfajara, Miguel Angel Lozano, Luis María Serra



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10:40 – 11:00 01-117
Heat extraction from salinity gradient solar ponds using a lateral heat exchanger and compared with traditional heat extraction method
Aurora Alcaraz, César Valderrama, Adriana Farran, José Luis Cortina, Carlos Aladjem

11:00 – 11:30 Coffee Break
Room: Floor -1, CCCT

11:30 – 13:10 Plenary Session **Global Analysis**
Chairs: Yukiata Kato (Tokyo Institute of Technology, Japan) and Camila Barreneche (UB, Spain)
Room: Auditorium, CCCT

11:30 – 11:50 01-063
Heat Pumps, Demand Side Management and Thermal Energy Storage – Challenges and Observations
Neil Hewitt

11:50 – 12:10 01-066
Characterization of a by-product from steel industry applied to thermal energy storage in Concentrated Solar Power
Antoni Gil, Nicolas Calvet, Iñigo Ortega, Elena Risueño, Abdessamad Faik, Pablo Blanco, Javier Rodríguez-Aseguinolaza

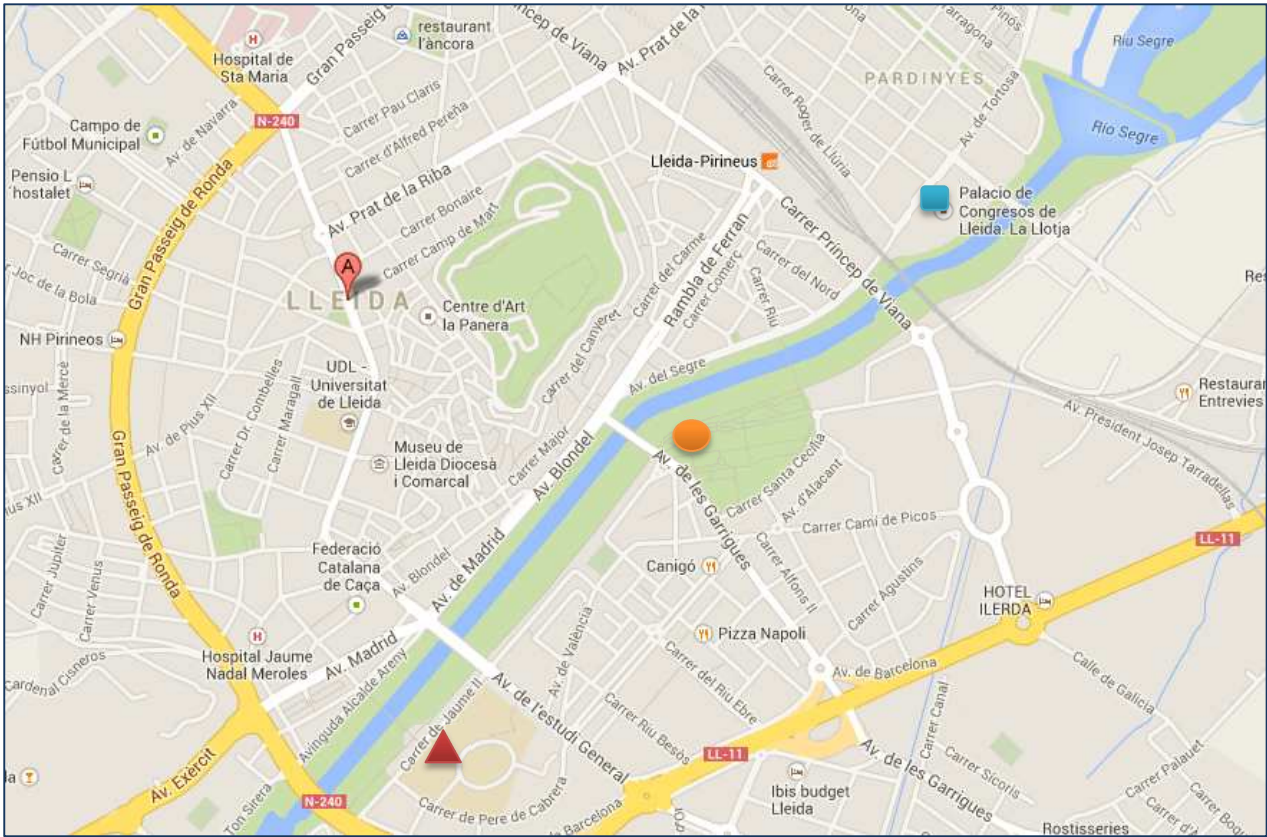
12:10 – 12:30 01-077
Exergetic analysis of thermal energy storages in thermodynamic systems
Andreas König-Haagen, Fabian Rösler, Dieter Brüggemann

12:30 – 12:50 02-021
Using big thermal storages in buildings to increase energy efficiency and flexibility
Sebastian Stinner, Henryk Wolisz, Rita Streblov, Dirk Müller


12:50 – 13:10 01-084
A control strategy for reducing electricity cost in detached houses using tank and PCM
Christian Brembilla


13:10 – 13:30 Closing Ceremony
Room: Auditorium, CCCT


13:30 – 15:00 Lunch
Room: Floor -1, CCCT



Lleida City

-  **Universitat de Lleida**
Campus de Cappont
c/Jaume II, 67
25001 Lleida

-  **Palau de Congressos de Lleida. La Llotja**
Avinguda de Tortosa, 6
25005 Lleida

-  **River**
Xalet dels Camps Elisis s/n
25001 Lleida



University of Lleida, Campus Cappont

1. CCTT: Centre de Cultures i Cooperació Transfronterera. Floor 0: Auditorium and videoconference room.
2. EPS: Escola Politècnica Superior – Polytechnic School
3. AULARI: Edifici Polivalent – Multi-use building
4. FDE: Facultat de Dret i Economia – Law and Economy Faculty
5. R: Residència Universitària – Students Residence
6. CREA: Centre de Recerca en Energia Aplicada – Research Center
7. FCCE: Facultat de Ciències de l'Educació – Faculty of Educational Sciences