



An Innovative Pathway for PhD research in Thermal Energy Storage

July 2017

Welcome to the Fifth INPATH-TES Newsletter, which includes the latest on INPATH-TES progress and development, profiles of recently graduated PhDs, news updates of conferences and seminars on TES, and a summary of participants of the project. Upcoming conferences are “The 3rd International Conference: Innovative Materials, Structures and Technologies (IMST 2017)”, organised by our partner in Riga Technical University, Latvia, which will take place on September 27 – 29, 2017, and “14th International Conference on Energy Storage”, organised by our partner in Çukurova University, Turkey, which will take place on April 25 – 28, 2018 in Adana, Turkey. For further information and updates please check our website www.inpathtes.eu.

INPATH-TES Update

The 5th general meeting of the INPATH-TES project took place at Ulster University, Belfast, United Kingdom on March 01 - 03, 2017. The board meeting was followed by the 2nd Stakeholders Advisory Board (SHAB) meeting, where Ms. Gundula Weber presented the main objectives of the meeting and the progress of the project. The 6th general meeting of the INPATH-TES project took place in Warsaw from June 19-21, 2017 at the Warsaw University of Technology, Poland.



INPATH-TES Consortium at Ulster University, UK during the 5th General Board Meeting, March 2017



INPATH-TES Consortium at Warsaw University of Technology, Poland during the 6th General Board Meeting, June 2017

Annex 30 – Thermal Energy Storage for Energy Management and CO₂ Mitigation

As introduced in earlier newsletters, the main objective of Annex 30 is the identification and enabling of the potential of thermal energy storage as a cross-sectoral technology, specifically focusing on industry, power plants, non-residential buildings and transportation. The 4th Annex 30 workshop was held from April 24-26, 2017 in Lleida, Spain. On the final day, members of the Spanish thermal energy storage community joined participants in Annex 30 and EERA’s subprogramme on TES to discuss current research issues and potential in a Joint Workshop – *TES International: Networking and Research Activities*. INPATH-TES project was presented at this workshop by Dr. Gabriel Zsembinski. The annex runs until the end of June 2018 and will continue with application of a process analysis methodology, definitions of technical parameters for TES and analysis of case studies for determination of key performance indicators.



This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 657466





An Innovative Pathway for PhD research in
Thermal Energy Storage

Profiles of INPATH-TES Partners

Arçelik A.Ş., Central R&D, Materials Technologies Department, Polymers&Chemistry

Having operations in durable consumer goods industry with production, marketing and after-sales services, Arçelik A.Ş. offers products and services around the world with its 30,000 employees, 18 different production facilities in six countries (Turkey, Romania, Russia, China, South Africa, Thailand, and Pakistan), its sales and marketing companies all over the world and its 10 brands (Arçelik, Beko, Grundig, Blomberg, ElektraBregenz, Arctic, Leisure, Flavel, Defy, Altus, Dawlence) serving products and services in more than 130 countries.

Developing its own technology and maintaining the advantages of international competition, Arçelik A.Ş. focuses on R&D as a part of its strategy. The company's vision "Respects the Globe, Respected Globally" forms the essence of its R&D strategy. R&D activities are shaped in parallel with Arçelik A.Ş.' strategy and growing objectives. Within this framework, the products of target markets are supported with competitive technologies, optimized design and environmentalist approaches (energy and water consumption, noise level). Having more than 25 years of R&D experience and operating laboratories equipped with state-of-the-art technology, Arçelik A.Ş. has made its mark in lots of innovations and presented environment-friendly, energy-efficient new and advanced products to the consumers. As a part of our strategy, we focus on energy efficiency in appliances. One way to do this is through thermal energy storage by using Phase Change Materials (PCMs). We have our formulations for both low temperature and high temperature PCMs. We would like to make our mark in lots of innovations and present eco-friendly, new and advanced products to the customers.



INPATH-TES Partner - Arçelik A.Ş., Central R&D, Materials Technologies Department Team

14th International Energy Storage Conference – EnerSTOCK 2018 (The Earth Cannot Wait!)

INPATH-TES partner, Çukurova University will host the 14th International Energy Storage Conference in Adana, Turkey on 25th-28th April 2018. STOCK Conferences bring leading-edge storage experts together. It is the only global storage conference that has been held since 1985. STOCK conferences have become the "Storage Olympics" organized every 3 years by one member country of the International Energy Agency Energy Conservation through Energy Storage (IEA ECES). For further information and registration please visit <http://www.enerstock2018.org/>.



This project has received funding from the
European Union's Horizon 2020 research and
innovation programme under grant agreement
No 657466





An Innovative Pathway for PhD research in Thermal Energy Storage

Profiles of PhD Graduates



Dr. Lidia Navarro was awarded her PhD in October 2017 from University of Lleida, Spain. The title of her thesis was “Thermal energy storage in buildings through phase change materials (PCM) incorporation for heating and cooling purposes”. The TES applications in buildings were reviewed and the necessity of their integration in building components or structure was highlighted to achieve better acceptance in the building sector. In this context, an innovative system of concrete slab with PCM inside its hollows was presented as a storage unit and a heating and cooling supply. The thermal performance of this system was experimentally studied and analysed under real conditions. Also, the potential in reducing the energy consumption for heating and cooling of the new system proposed was evaluated. (Supervisors: Prof. Dr. Luisa F. Cabeza and Dr. Albert Castell).

Dr. Julià Coma was awarded his PhD in December 2016 from University of Lleida, Spain. The title of his thesis was “Green roofs and vertical greenery systems as passive tools for energy efficiency in buildings”. During last decade, green infrastructures have become popular when applied on building envelopes with promising contributions in reducing the energy demand and CO₂ emissions in the built environment. Within this context, the energy efficiency of two different extensive green roofs and two different vertical greenery systems was experimentally evaluated to quantify their potential as a passive energy saving systems. Also, the noise insulation capacity of vertical greenery systems was tested at both laboratory and real scale. On the other hand, besides providing quantitative data and with the aim to study the sustainability of extensive green roofs, an environmental performance analysis was performed comparing these greenery construction systems with typical insulated flat roofs. (Supervisors: Prof. Dr. Luisa F. Cabeza and Dr. Gabriel Pérez).



Dr. Susana Serrano was awarded her PhD in December 2016 from University of Lleida, Spain. The title of her thesis was ‘Reduction of the energy consumption of buildings by acting in the building envelope: materials and passive construction systems’. Trends in H&C energy consumption of buildings and the energy used to manufacture conventional high embodied energy materials demonstrate the necessity of improving the building envelope through the materials improvement and selection. Two possible strategies to reduce the energy consumption of buildings have been addressed that consist of developing building materials with improved thermal properties using phase change materials (PCM) for latent thermal energy storage and sustainable materials to be placed in building envelopes as passive systems. (Supervisors: Prof. Dr. Luisa F. Cabeza and Dr. Antonia Navarro).

Dr. Kemal Cellat was awarded his PhD in February 2017 from Çukurova University, Turkey. The title of his thesis was ‘Development and Application of Novel Concrete Mixtures Storing Solar Energy with Phase Change Materials for Energy Saving in Buildings’. The objective was to develop new generation concrete mixtures with PCM, improve thermal performance of concrete and possibility of more efficient solar gain in passive buildings. Thermal energy gains via direct and microencapsulated mixing of different PCM candidates were studied. The results revealed that PCMs with and without microencapsulation enhanced thermal properties of concrete, kept its mechanical strength within acceptable limits and did not affect the corrosion rate of reinforcement steel. Heating loads could be reduced by up to 13% by using the novel PCM-concrete mixtures in passive mode. (Supervisor: Prof. Halime Paksoy).



InPath TES



Project Coordinator: Prof. Dr. Luisa F. Cabeza
Director of GREA, University of Lleida, Spain
E-mail: lcabeza@diei.udl.cat



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 657466

