An Innovative Pathway for PhD research in Thermal Energy Storage

January 2016

Welcome to the second 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. For further information and updates please check our website www.inpathtes.eu.

INPATH-TES Update

The first general meeting of the INPATH-TES project took place in Perugia, Italy from October 19th to 20th, 2015 at the CIRIAF Research Centre (University of Perugia). The board meeting was followed by the workshop '*Instructional workshop for all intended educational providers inside the project*' which was held on October 21st at CIRIAF, Perugia. The workshop concentrated on methods of communication and information dissemination of course material.

Doctorate Room of the University of Perugia where the meeting of INPATH-TES partners was held, October 20th 2015 (L-R: Gabriel Zsembinszki, Inés Fernández, Anna Laura Pisello, Luisa F. Cabeza, Yusuf Yusufoglu, Luís Bragança, Teresa Botargues, Mercé Segarra and Mary Trapani)

"Program Horizon 2020 *in Latvia - Achievements and Opportunities"*

In order to assess the progress of Latvian participants in the European Union Framework Programme *Horizon 2020* and highlight future opportunities and challenges, on Thursday, 10 December the State Education Development Agency (SEDA) held a practical conference "Program *Horizon 2020* in Latvia - Achievements and Opportunities". The conference was dedicated to assessing the progress of Latvian participants in *Horizon 2020* including identification of challenges to be overcome to increase participation. It focused on support activities necessary to increase participation in project tenders, on motivation and opportunities of entrepreneurs to take part in the tenders. Prof Diana Bajare from Riga Technical University presented the INPATH-TES project.

Prof. Diana Bajare, Riga Technical University, representing INPATH-TES

Participate in our 3-minutes survey on needs and future demands in TES technologies

We invite you to participate in an online survey which can be found at https://www.soscisurvey.de/test078662/. The main purpose of the survey is to determine the needs and future demands of the industry and get feedback on the proposed content of the INPATH TES PhD programme. Use this unique opportunity to influence the potential education of your future employees!

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Annex 30 - TES for Energy Management and CO_2 Mitigation

The objective of Annex 30 is to identify and enable the potential for the implementation of thermal energy storage as a cross-sectoral technology. This will involve improving energy efficiency and process integration, increasing system flexibility as well as expanding utilization of renewable heating and cooling resources, ultimately with the creation of a methodology for characterization and evaluation of thermal energy storage systems. This approach will be focused on 4 sectors: industry, power plant applications, non-residential buildings and transport. The methodology will be applied to various case studies originating from demonstration projects where thermal energy storage systems are applied in a real environment. Industrial involvement is critical to this annex and the crucial goal of harmonizing research and industrial needs will be endeavoured. A workshop is scheduled for May 2-4, 2016 in Frankfurt, Germany. For more information please contact the Annex Manager, Duncan Gibb, at duncan.gibb@dlr.de.

Participants of Annex 30 Workshop in Stockholm, 2015

Profiles of INPATH-TES Partners

Arçelik

Arçelik; founded in 1955; is the third largest home appliances manufacturer in Europe with a consolidated turnover of EUR 4.2 Billion in 2014. Arçelik has 15 production plants in 6 countries and 26 sales and marketing companies worldwide and is serving its customers in 130 countries with its ten different brands including Beko and Grundig. Arçelik has 10 R&D centres in Turkey, UK and Taiwan with over 1000 personnel and is Turkey's leading producer of technology and patents. Arçelik owns more than 1/3 of the patents produced in Turkey. Arçelik is actively participating in EUREKA and EU Framework Programmes since 1993. In this project Arçelik will involve in developing a joint PhD programme between universities and research centres, on the topic of Thermal Energy Storage (TES).

GREA – University of Lleida, Spain

GREA was founded in 1999; it is a multidisciplinary group of reference in concurrent engineering at an international level, but related to the environment of the University of Lleida. The main objectives of GREA are to help increase the competitiveness of enterprises through collaborative development of new products and technological advisory services to improve existing knowledge in our fields of work by means of research and innovation. The group collaborates with a large variety of companies, from local SME to multinationals. Innovation support tasks, technology transfer, and collaboration in calls of financed projects are offered. GREA participates in different European projects (MERITS, REWASTEE, INNOSTORAGE, and INPATH-TES) and belongs to various national and international networks (TECNIO, XaRMAE, Spanish Thematic Network of Thermal Energy Storage, ECES-IEA, European Technology Platform on Renewable Heating & Cooling, etc.). GREA has a wide expertise in the field of energy engineering and building engineering, and also offers specialised training aimed at companies. Supported by its infrastructures, different research activities are performed at GREA at lab scale, for building applications, and for high temperature application.

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Profiles of PhD Graduates

Dr. Jessica Giró Paloma was awarded a PhD from University of Barcelona in November 2015. Her research entitled 'Characterization of polymers and Microencapsulated Phase Change Materials used for Thermal Energy Storage in buildings' explores chemical, physical, thermal, mechanical and environmental characterization of PCM, MPCM (microencapsulated phase change materials), and PCS (phase change slurries). The main purpose was to perform an exhaustive characterization of these materials because several scientific studies have highlighted that MPCM can suffer leakage in service. (Supervisors: Dr. Ana Inés Fernández and Dr. Mònica Martínez)

Dr. Jean-François Hoffmann was awarded his PhD in December 2015 from UPVD, Perpignan University, France. The title of his work was 'Thermal storage for CSP with natural or recycled materials' which concentrated on thermal energy storage as well as its two essential components: the heat transfer fluid (HTF) and the thermal energy material. The alternative for HTF consists of the use of vegetable oils. Regarding thermal energy material, many natural and recycled materials can be used. The analysis of the thermal storage with filler material is achieved through experimental and numerical approaches. (Supervisors: X. Py and V. Goetz)

Dr. Aran Solé was awarded her PhD in December 2015 from University of Lleida, Spain. The title of her thesis was 'Phase change materials (PCM) characterization and thermochemical materials (TCM) development and characterization towards reactor design for thermal energy storage/ Thermal energy storage' and the project focused on four main areas; PCM non-conventional characterization techniques, study of thermal cycling stability of sugar alcohols, development of enhanced TCM, high conductive graphite composites and corrosion studies between TCM and metals under different conditions. (Supervisors: Prof. Luisa F. Cabeza and Dr. Ingrid Martorell)

Dr. Christian Odenthal was awarded a PhD from University of Stuttgart, Germany in December 2015. The title of his project was 'Analysis and Demonstration of the Cell Flux Storage Concept '. The Cell Flux concept consists of a regenerator-type storage volume and a finned tube heat exchanger. Heat is transferred from a primary heat transfer fluid to air, CO_2 or steam acting as a gaseous intermediate working fluid, which then transfers the heat in direct contact to the storage volume, made of low-cost storage materials. Cost reduction is one focus of the system – high versatility and modularity are others, with many storage cells being combined to build a system. (Supervisor: Prof. Andre Thess)

PhD Opportunities in TES

Ulster University's Centre for Sustainable Technologies is seeking applications for funded PhD positions that will commence in September 2016. PhD proposals are invited across the whole range of energy topics, especially Compact Thermal Energy Storage. Information can be found at: http://adbe.ulster.ac.uk/graduateschool/opportunities.php and follow the link to CST. Applicants will need to outline their project proposal in their application. The deadline for proposal submissions is 26 February 2016.

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