AEIT 1897 Sezione LIGURE

AEE Society AEIT per l'Energia Elettrica

Joint Online International Workshop

Technical insights in development of Thermal Energy Storage: from system integration to State of Charge determination

Wednesday Dec 10th, 2025
16:00 – 18:00 CET

Focus

Thermal Energy Storage (TES) technologies are emerging as a cornerstone of the modern energy transition, enabling greater flexibility, resilience and efficiency across a wide range of applications. By capturing thermal energy when it is abundant or inexpensive and releasing it when demand increases, TES systems support the decarbonisation of heating and cooling, enhance the performance of renewable generation, and facilitate the deployment of smart energy communities, industrial heat recovery solutions and next-generation district energy networks.

As TES solutions grow in scale and sophistication – ranging from sensible and latent heat storage to thermochemical systems – their successful **integration into broader energy infrastructures** becomes increasingly critical. System integration involves technical, operational and regulatory challenges, including matching storage technologies with diverse heat sources and sinks, ensuring compatibility with existing thermal loops, meeting dynamic load profiles, and optimising control strategies within hybrid energy systems. These complexities are further amplified when TES must interact with digital energy management platforms, demand-response schemes, or multi-vector energy hubs.

A central aspect of effective TES operation is the accurate and reliable determination of the system's **State of Charge (SOC)**. Unlike electrical batteries, the SOC of TES cannot always be inferred directly and often depends on multi-parameter estimations such as temperature distribution, phase-change progression, pressure, flow conditions or material degradation. Achieving precise SOC determination is key for improving system predictability, supporting advanced control algorithms, enabling real-time optimization and ensuring both safety and performance in integrated environments. Yet, SOC determination faces several challenges, from sensor limitations and non-uniform temperature fields to modelling uncertainties and the need for robust, data-driven approaches.

4 cutting-edge European projects showcase their complementary contributions to **TES** development: join to learn about advanced solutions and their integration into diverse energy-system contexts, from heavy industry to residential buildings. Conceived for a technical audience, this event offers key insights into system integration, control, monitoring and SoC determination, highlighting how TES technologies are moving from R&D to demonstration and integration in real systems.

In collaboration with:

ehpa european heat pump association

cet Partnership

Ordine Ingegneri Genova

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Programme

Welcome and introduction

LoCoMoSa – Low-Cost Molten Salt TES for industrial heat supply (temp 120-450 °C)
https://cetpartnership.eu/calls/funded-project/locomosa
"Concept evaluation of a novel three-layer steam generator for the industrial heat industry"
Francesca Valentini – INFN

ISSDEMO – Demonstration of ultra-dynamic high-temperature TES (250-500 °C) for process steam in industry
https://cetpartnership.eu/calls/funded-project/issdemo
"Thermal Discharge Behaviour of the ISSDEMO Storage System"
Jonas Reinholz – – UMSICHT FRAUNHOFER

BEST-Storage – Building-scale short- and long-duration TES solutions with high energy density, integrating smart controls
https://www.best-storage.eu/
"State-of-Charge Determination in Thermal Energy Storage – Outlooks for R&D and Scalability"
Louis Desgrosseilliers –– OST Ostschweizer Fachhochschule

HYSTORE – Novel TES concepts combining PCM/TCM and open-source aggregator platforms for multi-service buildings
https://www.hystore-project.eu/
"State of Charge analysis of PCM Heating solution for implementation in KTH Live-in-Lab"
Saman Nimali Gunasekara –– KTH
Aditya Singh Suswal –– KTH

Questions & Answers

Participation & Registration

PARTICIPATION IS FREE!

The online international workshop is in English only – no realtime translation is provided.

Registration is required !!!

► **CUSTOM FORM FOR VOCATIONAL TRAINING CREDITS (Ordine degli Ingegneri) !**
https://genova.ordinequadrocloud.it/ISFormazione-Genova/technical-insights-in-development-of-thermal-energy-storage-from-system-integration-to-state-of-char-corso-1234.xhtml#iscriversi

► **DEFAULT FORM FOR ALL OTHER ATTENDANTS!**
https://ehpa.org/all-events/technical-insights-in-development-of-thermal-energy-storage-from-system-integration-to-state-of-charge-estimation/

The link for the connection to the workshop will be sent by email only to registered participants, before the event.

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