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The first high-performance thermal storage system for residential use starts demonstration in Spain

Santiago de Compostela hosts one the five units validating the MiniStor concept, a minimal-size, high-capacity solution for all climates and home configurations

MiniStor, a European research project, is presenting its high-density thermal energy storage solution in Santiago de Compostela, Spain, on April 24. The unofficial ceremony will take place a day after the multi-national consortium gathers for its fourth meeting with external reviewers. Conceived for residential use, MiniStor provides heating and cooling in an integrated yet flexible unit, with a thermal storage density well over 10 times that of water.

Seventeen partners across the European Union and Switzerland, coordinated by IERC, began working in 2019 in a sustainable solution to harness the energy efficiency potential of the European building stock. Funded by the Horizon 2020 programme, MiniStor has delivered a thermal storage system for all climates and home configurations, thanks to its minimal size and modular design. Both existing and new buildings can benefit from its flexibility, leveraging the availability of renewable energy sources and operating year-round.

Simply put, MiniStor is a fusion of novel technologies: an efficient thermochemical storage based on calcium chloride and ammonia salts, a phase-change material that stores latent heat, unique hybrid photovoltaic thermal solar collectors, and a smart digital tool assisted by an Internet of Things platform to handle the operation and assist the user in long-term decisions. It is a human-centric approach that provides comfort while saving thermal energy and electricity until they are in short supply. Its capacity and reliability increase the use of renewable energy sources, moving the Europe closer to a decarbonised residential sector.

The MiniStor solution was deployed and evaluated in an operational environment of real-life conditions in a total of one pre-pilot and four demonstration sites, following the most rigorous standards in the European Union. These five sites represent residential usage, from social dwelling to student apartments, having diverse climatic conditions, thermal load needs, energy realities, expectations and regulations. They are located in Greece, Hungary, Spain and Ireland.

The system was delivered to Santiago de Compostela in 2024 alongside the solar field. In this temperate climate with Atlantic Ocean influence sits a 80m² flat of the university hall with rooms and apartments for students and guest visitors. After the initial connection and tests of the components, the unit will now operate under the responsibility of the University of Santiago de Compostela, with a series of performance indicators measured against the expected impacts of the system, taking into account end-user experience, and validating its replication potential.



It is expected that MiniStor technologies will operate beyond the 20-year lifespan specified in the funding call, as part of a circular business model to ensure that the system is supported throughout its life cycle, and recycled if it is no longer needed. MiniStor has advocated for new and more suitable standards for thermal energy storage in residential use, supporting adequate performance certificates as well as improved regulations for the installation, maintenance and recycling of the system.

To know more about the project: ministor.eu

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