PRESS RELEASE

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The CHESTER project, after five years of scientific research, proves the theoretical and experimental validity of a smart and flexible renewable energy management system for the future.

During the past five years, the CHESTER consortium has been developing an innovative energy management system called compressed heat energy storage, or CHEST, which is a specific type of Carnot battery. This system is made up combining the three different technologies **high-temperature heat pump**, high temperature **thermal energy storage** and **organic Rankine cycle**.

In short, when excess electricity is available, the heat pump converts it into heat, which is stored in a thermal energy storage system until electricity is required. When needed, this heat is converted back into electricity using the Organic Rankine Cycle. Being a smart energy management system, able to efficiently manage different electrical and thermal sources, **makes the CHEST system a great asset** as it can be more than a purely electrical energy storage system. The system can effectively integrate renewable electricity sources such as wind and solar, as well as low-temperature waste heat and solar thermal energy. Furthermore, it is able to provide not only electricity, but currently, also heat at up to 125 degrees Celsius for, for example, industrial settings or district heating networks. All these features make the CHEST system a promising technology for industrial environments, since excess energy sources – electricity or heat – can be used later depending on demand in either electricity or heat. Within **the CHESTER project, the consortium has developed and successfully tested a first-of-its-kind CHEST laboratory prototype**.

Initial testing of all three components showed that the design goals were met and the prototypes are fully functional. The commissioning, testing and analysis of the full CHEST laboratory prototype has proven the feasibility and potential of this concept. Electricity input to the heat pump was at about 10 kW_{el}, and the organic Rankine cycle produced up to 9 kW_{el}. The combined latent and sensible storage system allowed for flexible adaption to varying operational parameters. Insight was gained for future improvements and developmental possibilities for the individual components as well as the system as a whole.

This novel prototype has successfully been commissioned and tested, demonstrating a stable operation of the first-of-its-kind CHEST system. Maider Epelde, coordinator of the CHESTER project has stressed that **“nowadays the CHESTER results are key towards a smart and flexible renewable energy management system for the future of Europe.”** However, further research and innovation are still necessary to bring the technology to real scale.

CONTACT:
Coordinator:
Maider Epelde Agirre, TECNALIA
maider.epelde@tecnalia.com

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