Newsletter

May 2024

Bringing advanced heat batteries in residential heat & electric systems closer to market through real-life demonstration in different climates

Learn more about the HEAT-INSYDE project and its heat battery demonstration sites

As we approach the last year of the project, the beginning of 2024 has seen a strong emphasis on preparing the heat battery prototypes. Our three demo sites are being readied and undergoing thorough real-world testing to guarantee their effectiveness. Simultaneously, the three residences housings are completing final adjustments to integrate the heat storage systems seamlessly.

These and other pivotal updates were thoroughly deliberated by all HEAT-INSYDE partners during our last General Assembly. This gathering took place in the vibrant Tricity of Poland, comprising the coastal cities of Gdańsk, Gdynia, and Sopot, on December 7-8th.

Explore the current activities at our demonstration sites and the fresh perspectives on our project in the upcoming sections. We gathered a list of forthcoming events tailored to heat storage technology enthusiasts, so remember to save the dates.

We look forward to you exploring these updates and eagerly await sharing more news about the demonstration sites and project progress. Remember to **subscribe** to receive it in your inbox!

IN THIS ISSUE

To stay in the loop with HEAT-INSYDE updates, swing by our website and give us a follow on social media!

heat-insyde.eu

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HEAT-INSYDE

SUBSCRIBE

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869810.

BRINGING HEAT-INSYDE

HEAT-INSYDE is on the last stage to demonstrate the development of an affordable, compact and sustainable heat storage solution. Renewable energy generation, e.g., through wind turbines and solar panels, has a major disadvantage: it is weather dependent, meaning that supply does not always meet demand. The HEAT-INSYDE technology brings a solution to make use of renewable energy also on windless and cloudy days, storing energy for on-demand use. The basic principle of such a technology is to use a TCM that is dehydrated to store energy, which it can release upon hydration.

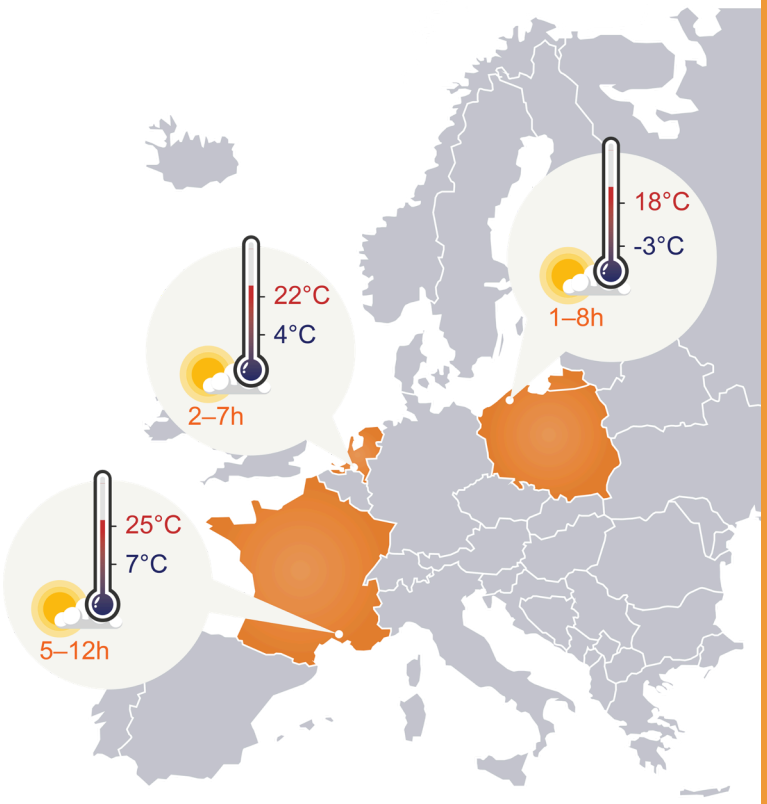
The ground-breaking solution of HEAT-INSYDE is contained in the reactor and consists of a layer o f grains of a special salt through which the fan blows hot, dry air. The energy needed for this process can be supplied by roof-mounted solar PV panels, for instance.

In the words of HEAT-INSYDE coordinator Olaf Adan (**TNO**) ***"The battery's simplicity is its biggest attraction"***.

Thanks to the rigorous work of the consortium the heat battery is currently being tested in three European countries with different climates and heating needs.

The simplicity of the battery stands out in this project

Olaf Adan, **TNO**



TO REAL LIFE APPLICATIONS

In which application areas can the HEAT-INSYDE system be interesting?

Citing the words of the HEAT-INSYDE partner Pim Donkers (**CELLCIUS**) ***"The HEAT-INSYDE heat storage system can be an interesting asset in different scenarios".***

Pim Donkers, **CELLCIUS**

- District heating and cooling - New generation systems work at HEAT-INSYDE's operating temperatures. The latter can act as a buffer for both heating and cooling. Its high energy density reduces the floor surface required for the implementation of seasonal storage.

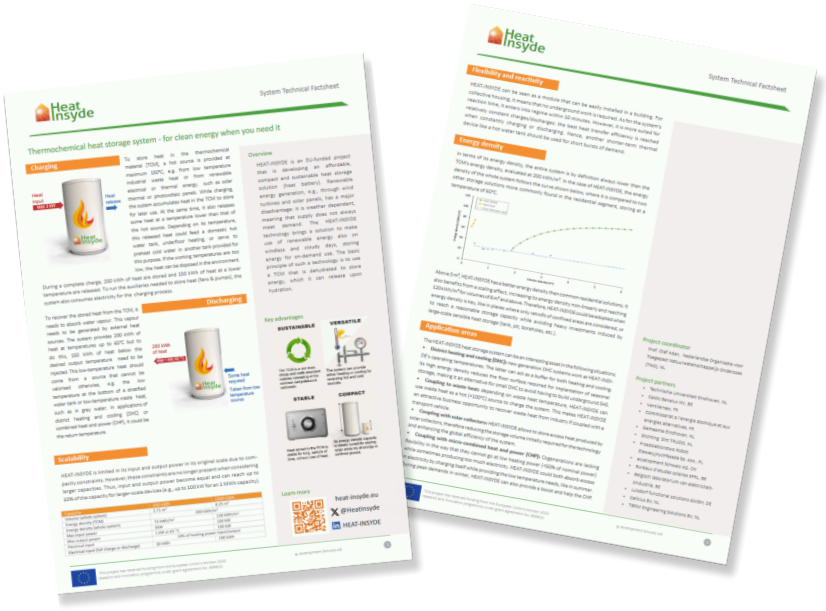
- Coupling to waste heat - Depending on waste heat temperature, HEAT-INSYDE can use waste heat as a hot source to charge the system. This makes HEAT-INSYDE an attractive business opportunity to recover waste heat from industry if coupled with a transport vehicle.

- Coupling with solar collectors - HEAT-INSYDE allows to store excess heat produced by solar collectors, reducing the storage volume initially required for the technology and enhancing the global efficiency of the system.

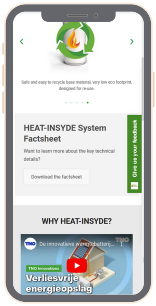
- Coupling with micro-combined heat and power - Cogenerations are lacking flexibility in the way that they cannot go at low heating power while sometimes producing too much electricity. HEAT-INSYDE could both absorb excess in electricity by charging itself while providing the low temperature needs, like in summer.

Want to learn more about the key technical details?

Download the factsheet



Want to contribute with your outlook?



Give Us Your Feedback

The project consortium needs expert feedback regarding the potential application of the technology for other use cases

Answer the questionnarie

Eindhoven, Netherlands

The demo site in Eindhoven is a social house owned by HEAT-INSYDE partner Trudo. The building was constructed in 1948 and renovated in 2022. The HEAT-INSYDE system for this house consists of the heat battery combined with a heat pump and heat panels in a so-called heat shed located in the garden of the house. The storage system provides the house with domestic hot water and space heating.

The heat shed containing the HEAT-INSYDE heat battery, heat pump and heat panels was delivered to the backyard of the house in December 2022 and the full installation of the system is now complete. The heat battery is now connected to the heating system of the house via underground tubing and the heat battery is ready to be turned on for testing over the next weeks.

The HEAT-INSYDE system installed in Eindhoven

MARCEL VAN DOOREMALEN

TRUDO

"Although the battery hasn't operated as expected in this first demo-site, we learned a lot about how it performs in "real life" and used that knowledge to improve the batteries in the next demo-houses. That's why demo's are so important."

A new video of this demo is live!

Heating needs

7,000 kWh/y

Solar PV resource

199 kWh/m².y

Cadenet, France

The demo site in France is a private house constructed in 1984 and located in Cadenet, where our HEAT-INSYDE partner CEA is the main point of contact and oversees the preparation of the site to host the heat battery. As for the demo site in Poland, the HEAT-INSYDE system for this house will consist of the heat battery combined with an air-water heat pump and photovoltaic panels. The storage system aims at providing the house with both domestic hot water and space heating.

The heat battery was installed in the basement of the house in late winter. A major challenge in this demonstrator was to adjust the battery and the required systems to fit with the limited space available. Moreover, adaptations were made to allow space heating furniture from the heat battery to the already existing heating system and to a new hot air blowing system, for which our partner VMI has developed and installed in the house an innovative concept. The heat battery itself is now operational and final changes are underway to optimize the interface between the battery and the heat distribution.

LOUISON BOULIER

cea ines INSTITUT NATIONAL DE L'ENERGIE SOLAIRE

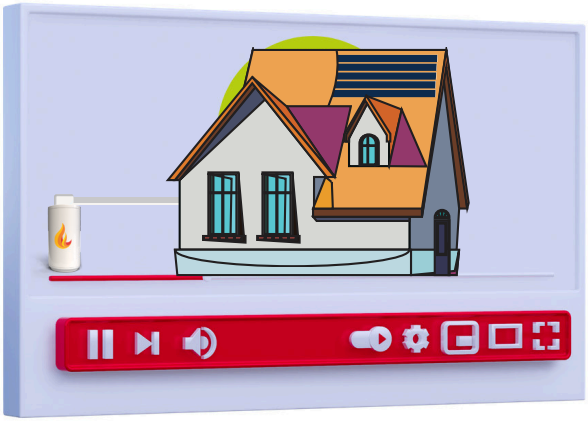
"Designing a prototype in a lab is one thing, but preparing it for autonomous use in a lived-in house is quite another matter. And we are making strides in that direction."

The HEAT-INSYDE demonstration site in Cadenet, France

Heating needs
5,900 kWh/y

Solar PV resource
250 kWh/m².y

Watch the video to learn more



Gdynia, Poland

The demo site in Poland is a social house in Gdynia, owned by the city of Gdynia and provided for testing in the HEAT-INSYDE project by our partner Fasada. The building was constructed in 1943 and renovated in 2016. The HEAT-INSYDE system for this house will consist of the heat battery combined with an air-water heat pump and photovoltaic panels. The storage system will provide the house with domestic hot water.

HEAT-INSYDE consortium visiting the demonstration site in Gdynia

While the General Assembly in Poland, HEAT-INSYDE consortium visited the social housing building owned by the Municipality of Gdynia. The partners had the opportunity to see the photovoltaics installation and the air-water heat pump together with the representatives of Energy Department of the Gdynia City Hall.

Since 2014, Gdynia's Energy Department has been at the forefront of energy sustainability. Committed to a greener future, they provide grants for cityzen investments in renewables, striving to eliminate solid fuel boilers. Through impactful projects, the Energy Department leads the way in promoting energy efficiency and environmental education in Gdynia.

Representatives of Energy Department of Gdynia: Hanna Górecka-Banasik (Head of Energy Department), Bożena Żuławska and Alicja Szczepańska

MAREK GILUŃ

FASADA

"We are pleased to announce the completion of the final step in the HEAT-INSYDE project: the installation of the heat battery. With the integration of PVs and the heat pump, supported by the heat battery, our demonstration building is now equipped with cutting-edge energy solutions.

As an SME engaged in building renovation, we found the assembly of the heat battery relatively straightforward. We're excited to see how the heat battery perform in real life during testing. Thanks to HEAT-INSYDE project, Poland is advancing towards a greener future, reducing carbon footprint and promoting eco-friendly heating technologies."

Heating needs

9,700 kWh/y

Solar PV resource

197 kWh/m².y

A sneak peek about Gdynia's demo

Hybrid event
23-25 September 2024
Luxembourg, France

On-site event
18 – 20 September 2024
Madeira, Portugal

On-site event
15 – 17 October 2024
Brussels, Belgium

HENK HUININK
TU/e

SCAN ME

UPCOMING EVENTS

SP2024 - Sustainable Places 2024

SP2024 will be held over three days and HEAT-INSYDE partners will organise a Workshop titled *"A compact and sustainable heat storage solution for clean energy"* to disseminate our heat storage solution. SP2024 prides on being an ideal platform for the dissemination of research, the conduct of workshops, EU project clustering, and networking opportunities.

SEB-24 - Conference on Sustainability in Energy & Buildings

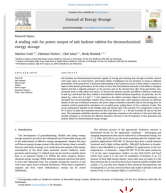
This international conference aims to bring together researchers, government and industry professionals to discuss the future of energy in buildings, neighbourhoods and cities from a theoretical, practical, implementation and simulation perspective.

ESGC 2024 - Energy Storage Global Conference

ESGC is an international conference known for bringing latest insights on energy storage policy, market technologies and applications. An annual event to discover the latest cutting-edge energy storage technologies and engage in technical discussions with experts.

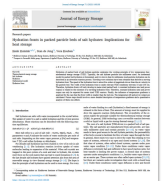
LATEST OUTPUTS

Hydration fronts in packed particle beds of salt hydrates: Implications for heat storage



"This publication opens the door for simple and justified design rules for thermochemical energy storage systems. The reaction of a packed bed of salt particles with water vapor is directly coupled with the reaction kinetics of the individual salt particles. It is predicted under which conditions the storage will discharge with constant power output and when this will occur with a decreasing power output."

A scaling rule for power output of salt hydrate tablets for thermochemical energy storage



"Through this paper, HEAT-INSYDE partners show that the power output of particles for thermochemical energy storage is not a matter of the intrinsic reaction kinetics. What matters is the internal structure of these particles, which is closely related to the manufacturing process".

Investigation into the Hydration Behavior of K2CO3 Packed Beds: An NMR Study

"For the first time the discharging process of a packed bed of TCM materials could be followed real life. With MRI, used in hospitals for diagnoses, here the hydration of K2CO3 tablets was visualized and followed over time."

LATEST NEWS

This is how salt will warm up your house - New video is live!

In this insightful footage featured by Universiteit van Nederland, Joey Aarts, PhD Candidate at TU Eindhoven delves into the innovative realm of salt battery technology and its potential to revolutionize home heating systems.