Newsletter
December 2021

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 latest technology developments.

Over the past months, the HEAT-INSYDE consortium has welcomed two new partners and achieved the important milestone of assembling the first user-ready prototype of the heat battery.

In this newsletter, you will be introduced to all 14 project partners, learn what their key contributions are and what the highlight of 2021 was for each of them in the context of HEAT-INSYDE. You will also learn about how the components of the first user-ready prototype came together and the next steps that the partners will be working towards at the start of 2022.

If you're keen on the latest research and innovations in the areas of material engineering and sustainable energy, you might also be interested in the upcoming events summarised herein.

A global highlight of late October - early November 2021, was definitely the UN's Climate Change Conference of the Parties (COP26), where priorities were set also for the energy transition towards a clean, sustainable future.

Enjoy the read and look out for the next issue of this newsletter in early summer 2022!

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To keep up to date on the HEAT-INSYDE progress, visit our website and follow us on social media:

heat-insyde.eu
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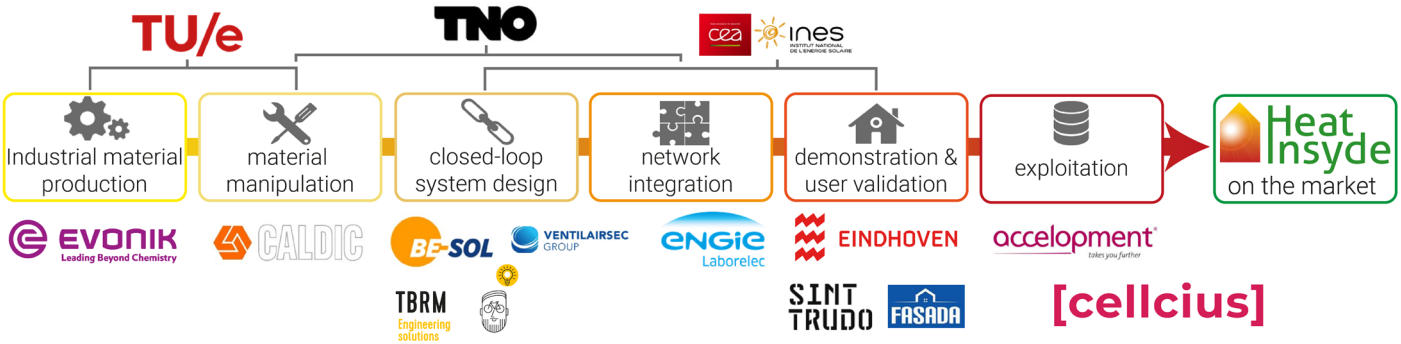
HEAT-INSYDE

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

MEET THE PARTNERS

HEAT-INSYDE brings together key players across the entire heat battery value chain to market:



Material and system

EVONIK Leading Beyond Chemistry

Based in Germany, Evonik Performance Materials GmbH supplies varying production grades of potassium carbonate, the termochemical material (TCM) used in the heat battery. EPM is part of the Evonik Group and contributes to the HEAT-INSYDE project with performance optimisation of the TCM tablets.

TU/e

Located in the high-tech region of the Netherlands, Eindhoven University of Technology (TUE) is ranked number 1 by the Times Higher Education Ranking for collaboration with industry. Researchers from TUE are responsible for the material optimisation and production for the HEAT-INSYDE technology.

CALDIC

As a top-10 chemical distributor in Europe, Caldic Nederland B.V. efficiently supports material manipulation within HEAT-INSYDE and contributes to defining the optimal production process for the heat battery's thermochemical material.

TNO

Nederlanese Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek (TNO) is an independent research and technology organisation in the Netherlands. The team at TNO coordinates the HEAT-INSYDE project and contributes to material manipulation, modelling and optimisation of the system components and network integration.

Highlights of 2021 from the partners:

It is exciting to see how an initial idea has grown into a greyish tablet that can be used to heat up a house.

Philip Heinrich, Evonik

It was great to see how we could make a big step in the 'power output' of the materials based on fundamental understanding of the physics of the discharging process.

Henk Huinink, TUE

When producing 1 m^3 of TCM, we learn a lot about the challenges of going from laboratory into industrial production.

Henry van der Meer, Caldic

I enjoy and have fun in being the not-technical "platform" of the consortium. It makes me proud to see how far we went in 2 years and I cannot wait to see our battery installed in the demo sites.

Francesco Pizzocolo, TNO

System design and integration

In close collaboration with partners, we have designed and developed a new concept of evaporator/condenser which is now pending a patent.
Gilbert Descy, Be-Sol

Be-Sol is dedicated to R&D&Innovation in renewable energy. In HEAT-INSYDE they leads the design and optimisation of the components which are the key elements in a closed-loop system. At its facilities in Belgium, Be-Sol sucessfully designed, enginereed and manufactured the component box of the heat battery.

We finalised the design of the centralised air heating system that will be used to distribute the heat generated by the battery and ensure thermal comfort and clean fresh air renewal.
Louis Stephan, Ventilairsec

The French SME Ventilairsec is specialised in the improvement of the indoor environment quality of buildings. Ventilairsec collaborates closely with project partners and home owners to identify the best way to integrate the heat battery into the system at the demo locations.

We are happy to become a partner in HEAT-INSYDE and contribute our expertise in engineering and manufacturing to make a success of the heat battery.
Patrick Smulders, TBRM

Based in the Netherlands, TBRM Engineering solutions is a new addition to the HEAT-INSYDE consortium. With its expertise of analysis of thermal systems as well as innovative engineering and hardware solutions, TBRM contributes to the development of the TCM module.

It was exciting and challenging to bring together the work of many different companies in one single system, which we are now testing at our facilities in Chambery.
Louison Boulier, CEA

The French Institute of Solar Energy (CEA) has strong experience in the development and demonstration of thermal systems. Within HEAT-INSYDE, CEA contributes to the system design and heat battery integration at the demo sites. With its well-equipped facilities, the heat battery performance can be analysed in a dynamic enviroment.

We closely collaborated with project partners to model the heat battery in representative environments and measure its real potential for future customers.
Sébastien Dubois, Engie

Engie Laborelec is a Belgian expertise and research centre for electrical power technology. With its focus on the energy transition, Engie leads the technology and market assessments for HEAT-INSYDE, including its cost effective ranking.

Validation and exploitation

EINDHOVEN

Eindhoven is one of the five large cities of the Netherlands and, with its Brainport Foundation, is recognised as an innovation hotbed. Through the local Living lab approach, Eindhoven acts as one of the living lab cities in the HEAT-INSYDE and demonstrates thermal storage technologies in a real urban context.

FASADA

Przedsiębiorstwo Robót Elewacyjnych FASADA is a construction company from Poland experienced with retrofitting and construction of new buildings aiming at their sustainability. Within the HEAT-INSYDE project, FASADA coordinates the demonstration of a heat battery prototype in Gdynia with a possible introduction of our technology to the polish market.

We have been analysing all technical details to be well prepared for the pilot installation of the heat battery demonstrator in Poland in 2022.

Marek Giluń, FASADA

SINT TRUDO

Stichting Sint Trudo is the representative of 'het Duurzaamheidspact Eindhoven' (Sustainability pact Eindhoven) in which the housing associations, the municipality and tenants work together on accelerating the sustainability of housing in the city. Sint Trudo contributes to the HEAT-INSYDE with two demo houses selected for testing the heat battery in the residential area of Eindhoven.

We look forward to launching the demo site in the Netherlands in 2022! With this we will contribute to the development of the heat battery and further to the energy transition.

Marcel van Dooremalen, Sint Trudo

accelopment takes you further

Based in Switzerland, accelopment assists companies, universities and other organisations in EU project management as well as in the dissemination and exploitation of project results. In HEAT-INSYDE, they support the management team in coordinating and exploring the exploitation pathways of the project results.

It's motivating to see the interest from our growing number of followers on LinkedIn, how they are engaged and curious about how the heat battery will work.

Emily Rose Ciscato, accelopment

[cellcius]

Cellcius is a spin-off company of the TNO from the Netherlands, that recently joined the HEAT-INSYDE consortium. Dedicated to commercialisation of the HEAT-INSYDE solution, Cellcius contributes with a business case to ensure that developed technology will reach the market and become widely available.

I enjoy that the ideas we had at the start of the project are developed in a full scale demo, developed with an enthusiastic group of engineers.

Pim Donkers, Cellcius

TECHNOLOGY HIGHLIGHTS

In the first issue of this newsletter, we briefly summarised the concept behind the HEAT-INSYDE heat battery. Over the last few months, a major achievement was reached, as all key components of the heat battery were joined together and tested in the first user-ready prototype.

First tests of the connected TCM module (left) and the component box (right)

The thermochemical material (TCM) module, developed by TNO in close collaboration with Be-Sol and CEA, was designed as a modular system, to be easily transported and assembled in the basement, utilities room or garden of a house. It consists of 60 stainless steel boxes that can each contain ca. 20 kg of the TCM in a 16l volume. The boxes are connected by a valving system and the module itself connects to the component box.

The component box containing the evaporator/condenser, fans and heat exchangers was designed, engineered and manufactured at Be-Sol. Its role is to send heat into the TCM module when energy will need to be stored (charging) and extract heat from the TCM module to make energy available for use (discharging). For this charging-discharging to be seamless, all water connections and electronics within and between the TCM module and component box must work smoothly. This was recently successfully tested at the Cellcius facilities, prior to filling the TCM module with potassium carbonate tablets.

TCM tablets ready to fill the battery for further test

Potassium carbonate, a harmless and stable salt that releases heat upon absorbing water, is the heart of the battery and was jointly optimised by Evonik, Caldic, TU/e and TNO to store up to 800 MJ of heat in 1 m^3 of tablets. Assuming an energy demand of 50 MJ/day, the heat battery could store a 2-week supply of energy for a typical 4-person household. Before installing the heat battery in real houses, however, further testing is needed. The filled TCM module connected to the component box, i.e., the first user-ready prototype, are now at CEA's well-equipped test facility to analyse the performance of the heat battery.

To keep up to date on the next steps, follow us on the HEAT-INSYDE social media channels:

@HeatInsyde HEAT-INSYDE

HEAT-INSYDE INSIGHTS

On the 26 - 27 October 2021, two years since the project's kick-off in Eindhoven, most of the HEAT-INSYDE consortium finally met in person for its hybrid 5th General Assembly. After months of remote collaboration, the meeting hosted by CEA in Chambery was a refreshing opportunity to update on the progress across all aspects of the project and visit the CEA facilities where the current heat battery prototype will undergo testing.

Highlights of the meeting included welcoming new team members to the consortium and considering making use of the heat battery's modular design to downsize the dimensions of the next generation of prototypes. Our project coordinator tells us more in the interview below.

What are you the most pleased with in HEAT-INSYDE this year?

We really built the first prototype of a modular, 200kWh heat battery. This is a major achievement considering that in 2019 we only had the first research demonstrator. We're at the stage where we can start producing the thermochemical material tablets at an industrial scale. I've been involved in developing this technology for ten years now and seeing this prototype come to life and the progress achieved so far makes me feel proud.

What were the main challenges for HEAT-INSYDE this year?

In a consortium with so many players and key hardware components being prepared at three different locations with suppliers across Europe, remote collaboration was tough. But we moved forward by optimally using the resources available and intensifying our communication. It was very good to finally exchange ideas in person in Chambery and welcome our new partners Cellcius and TBRM.

What are the next steps ahead for 2022?

We need to keep working towards better characterising the heat battery's market potential, but we will also need to complete tests on the current prototype and its next generation. We're considering making a step towards a smaller battery in view of market potential and user acceptance. This would ease the integration of the heat battery into different houses while still allowing to validate the technology. We're ready for 2022!

Olaf Adan (TNO)
Coordinator of HEAT-INSYDE

UPCOMING EVENTS

On-site event
5 - 7 April 2022
Graz, Austria

ISEC 2022 - 2nd International Sustainable Energy Conference

This conference for renewable heating and cooling in integrated rban and industrial energy systems is intended to be a forum for teh exchange betwee research, industry and energy policy. Early-bird registration is open until 31 January 2022.

On-site event
6 - 10 April 2022
Wels, Austria

WSED 2022 - World Sustainable Energy Days

Over five days, WSED includes 6 conferences dedicated to specific aspects of energy effciency and also hosts a tradeshow focused on renewable energy and energy efficiency. Registration is open, but the programme is subject to change due to COVID-19.

On-site event
20 - 22 September 2022
Düsseldorf, Germany

IRES 2022 - 16th International Renewable Energy Storage Conference

IRES 2022 will focus on the current state of research and the social, political and legal framework conditions of energy storage, through two themes: Science and Research (IRES) and Economics and Finance (ESE). Abstract submission closes on 31 March 2022.

Hybrid event
27 - 29 September 2022
Darmstadt, Germany and online

MSE 2022 - Materials Science Engineering

The biannual MSE is one of the largest English-speaking congresses in the field of Material Science and Engineering across Europe. The technical programme is currently in preparation. Check the website for the upcoming call for abstracts and deadlines.

Online event
dates announced in 2022
online

HEAT-INSYDE Q&A hour

We're planning a series of thematic online Q&A hours during the course of 2022, during which the HEAT-INSYDE partners will be available to answer your questions and share the project's latest progress. Further details will be communicated via the HEAT-INSYDE website and social media channels, so keep an eye out for the next announcements in 2022.

HEAT STORAGE AT COP26

COP26, the United Nations Climate Change Conference of the Parties, was held this year in Glasgow, UK, from the 31 October to 12 November. As the global summit on climate change, the main aim of COP26 was to accelerate action towards the goals of the Paris Agreement, which was born from COP21 held in Paris in 2015. With the Paris Agreement, every country agreed to work together to limit global warming to 1.5 degrees, by setting Nationally Determined Contributions (NDC), i.e., national plans for reductions in emissions that would be updated every 5 years. COP26 was the time to update such plans.

The main outcome of COP26 is the Glasgow Climate Pact, in which almost 200 countries agreed to revisit and strengthen their current emissions targets to 2030 in 2022, to be able to keep the target of 1.5 degrees in reach. This includes commitments to phase down coal power, halting and reversing deforestation, speeding up the switch to electric vehicles and reducing methane emissions.

The Global Coal to Clean Power Transition Statement is one of the key outcomes of COP26 and clearly states the need to scale-up clean power generation, energy efficiency measures, technologies, policies and investments towards sustainable, clean energy. This is where heat storage can make a difference. Indeed these technologies were discussed at the publicly accessible COP26 Green Zone as key enablers towards decarbonisation. Thus, the playing field is definitely favourable for the HEAT-INSYDE technology and hopefully increased subsidies for the installation of heat storage systems and heat batteries will follow as national measures in suport of the Glasgow Climate Pact.

Why do we need to phase out coal as energy source?

Globally, the power sector accounts for a quarter of greenhouse gas emissions and coal is the biggest contributor to human created climate change.

Read the full Glasgow Climate Pact here:
ukcop26.org/COP26-Presidency-Outcomes-The-Climate-Pact

Lear more about COP26 and its outcomes:
ukcop26.org

UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY