



BRINGING ADVANCED **HEAT** BATTERIES **IN** RESIDENTIAL HEAT
AND ELECTRIC **S**YSTEMS CLOSER TO MARKET
THROUGH REAL LIFE **DE**MONSTRATION IN DIFFERENT CLIMATES

<https://www.heat-insyde.eu/>

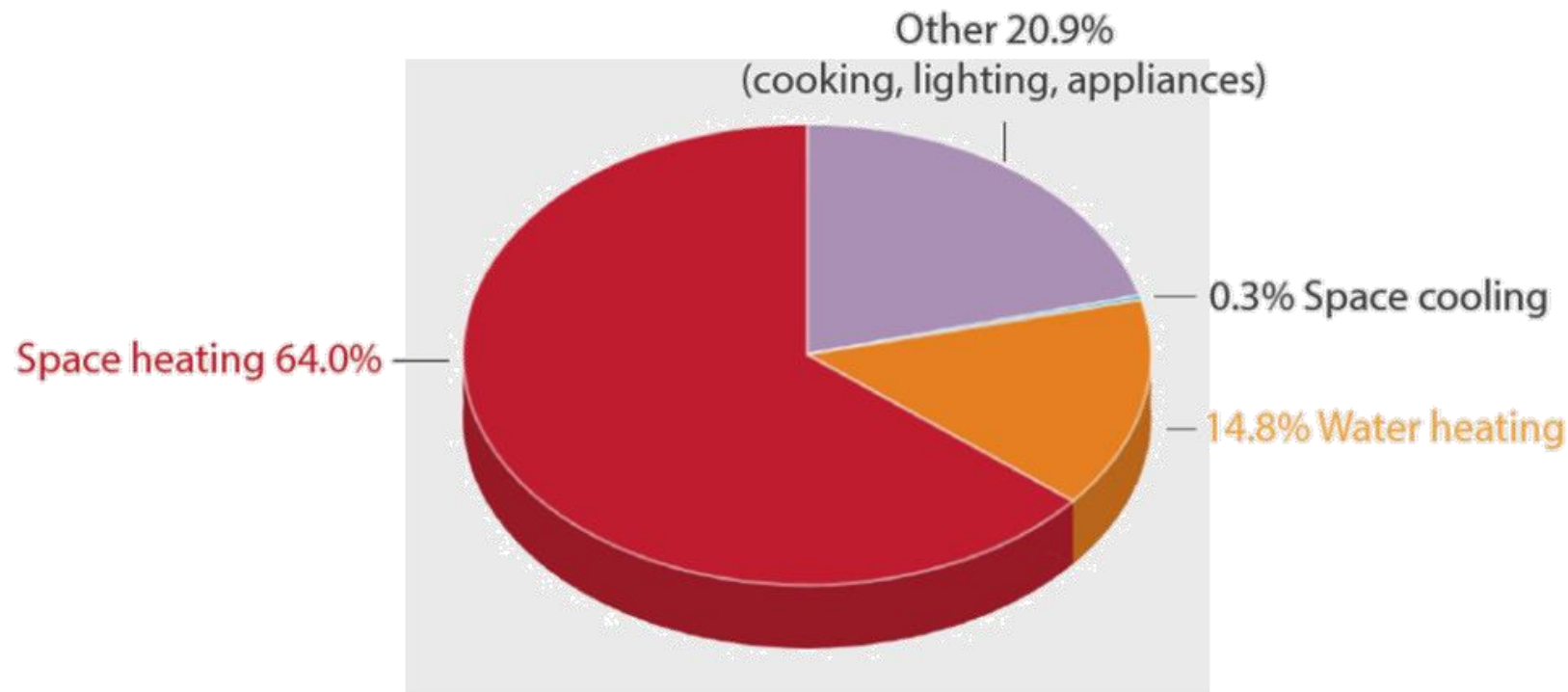


**SUSTAINABLE
PLACES**

October 29th, 2020

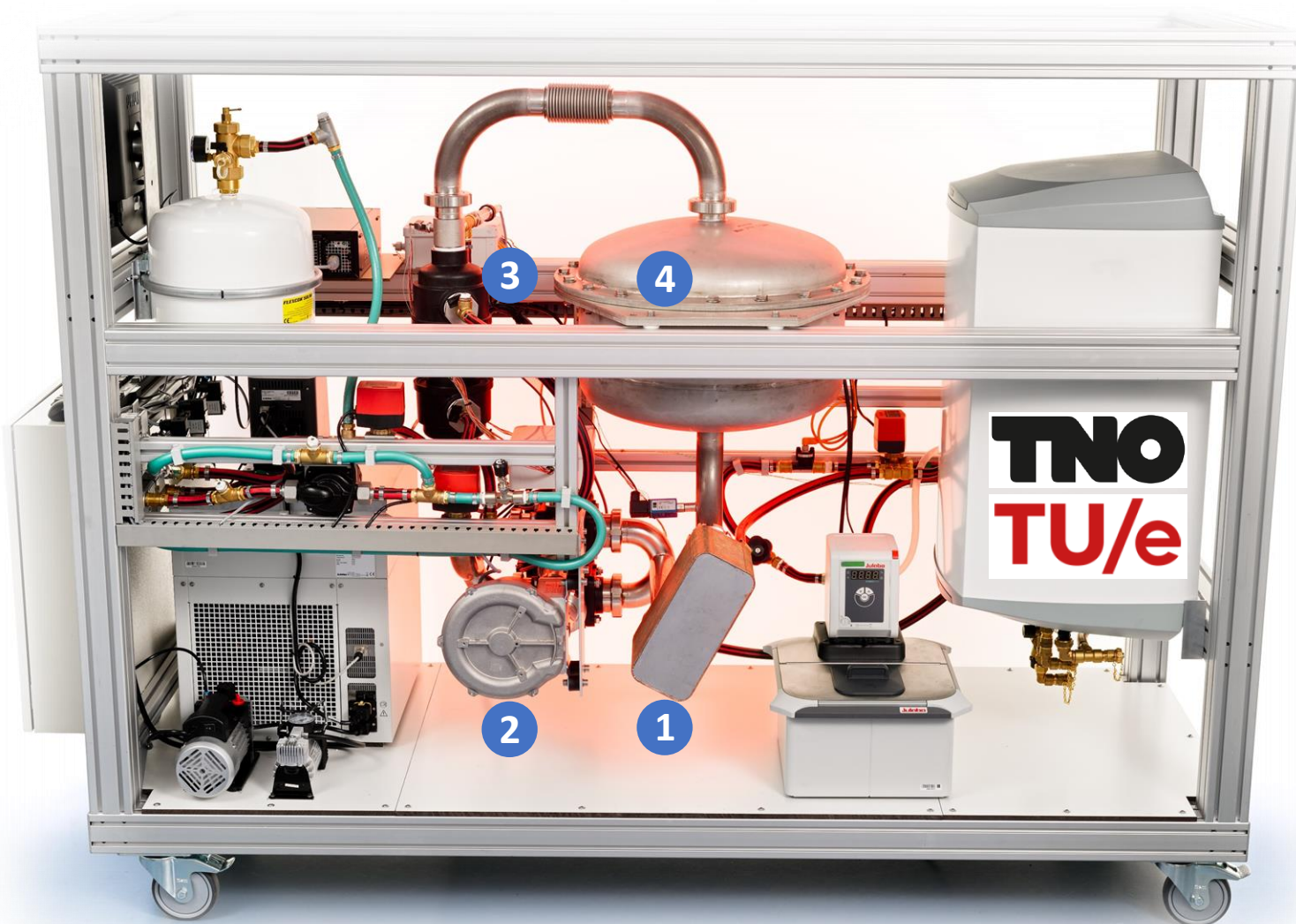


- The EU aims to increase the energy **share** of renewable energy systems **to 32% by 2030**. This transition comes with **large fluctuations** in supply and demand so it is essential to store energy that can be delivered when needed.
- The **main use** of energy by European households is **for heating**, but no compact and affordable solution is available to efficiently store and supply heat energy based on user demand.



Main objectives of HEAT-INSYDE, a H2020 Innovation Action (IA) :

- **Advances a ground-breaking closed-loop **heat storage** concept** to Technology Readiness Level 7.
- **Real-life validation** in 3 different European climate zones.
- Delivers an **affordable** (8.2 k€), **highly compact** solution ($< 1 \text{ m}^3$) with **robust** (> 25 years) performance.
- **Hybrid functionality** combining compact storage with a highly efficient heat pump effect ($\text{COP} > 10$).
- Configuration in both **heat and electricity systems**, creating new opportunities for **grid flexibility**.



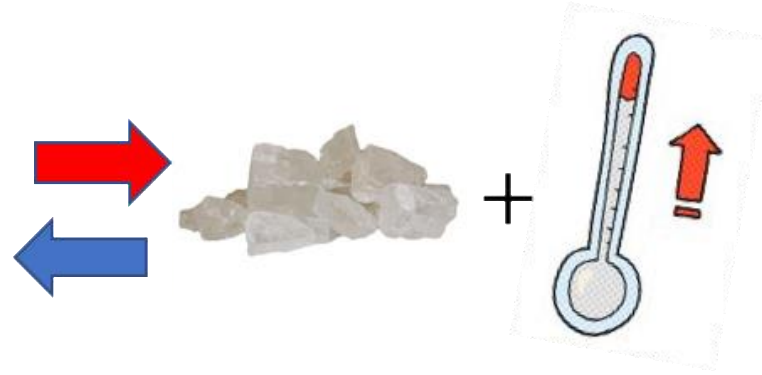
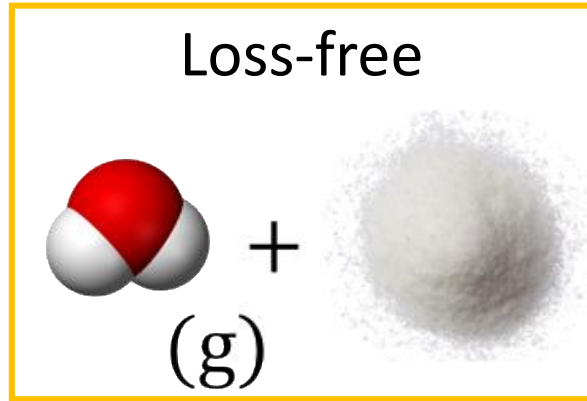
Breakthroughs

Stable thermochemical material

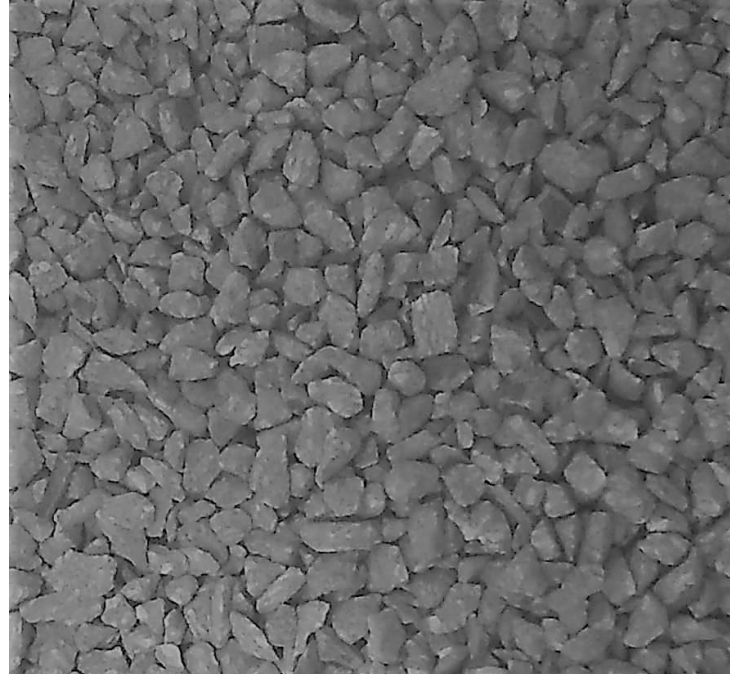
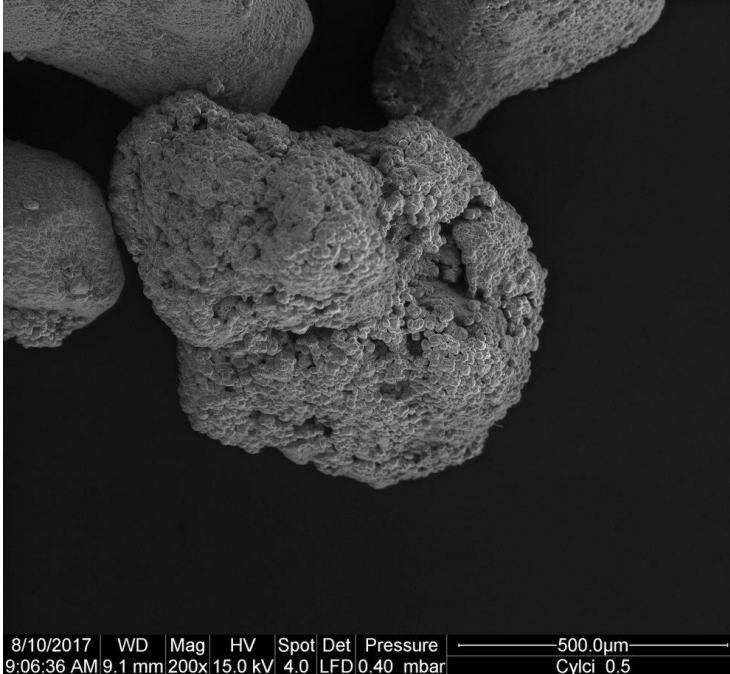
'Closed-loop' reactor concept

- 1 Heat Exchanger
- 2 Ventilator
- 3 Evaporator/Condensor
- 4 Reactor

The thermo-Chemical principle

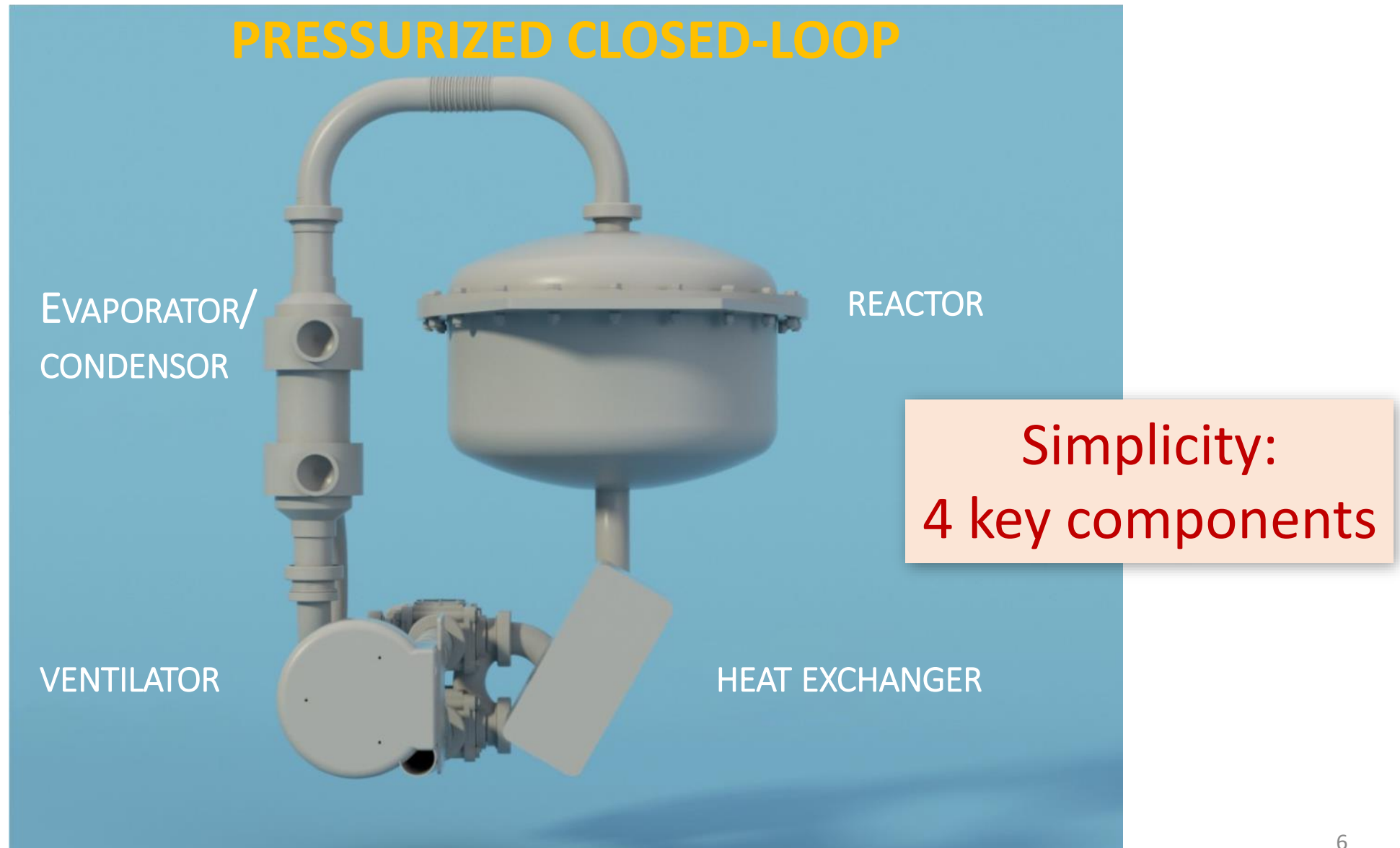


High energy density
 $\sim 1.3 \text{ GJ/m}^3$ (*crystal*)

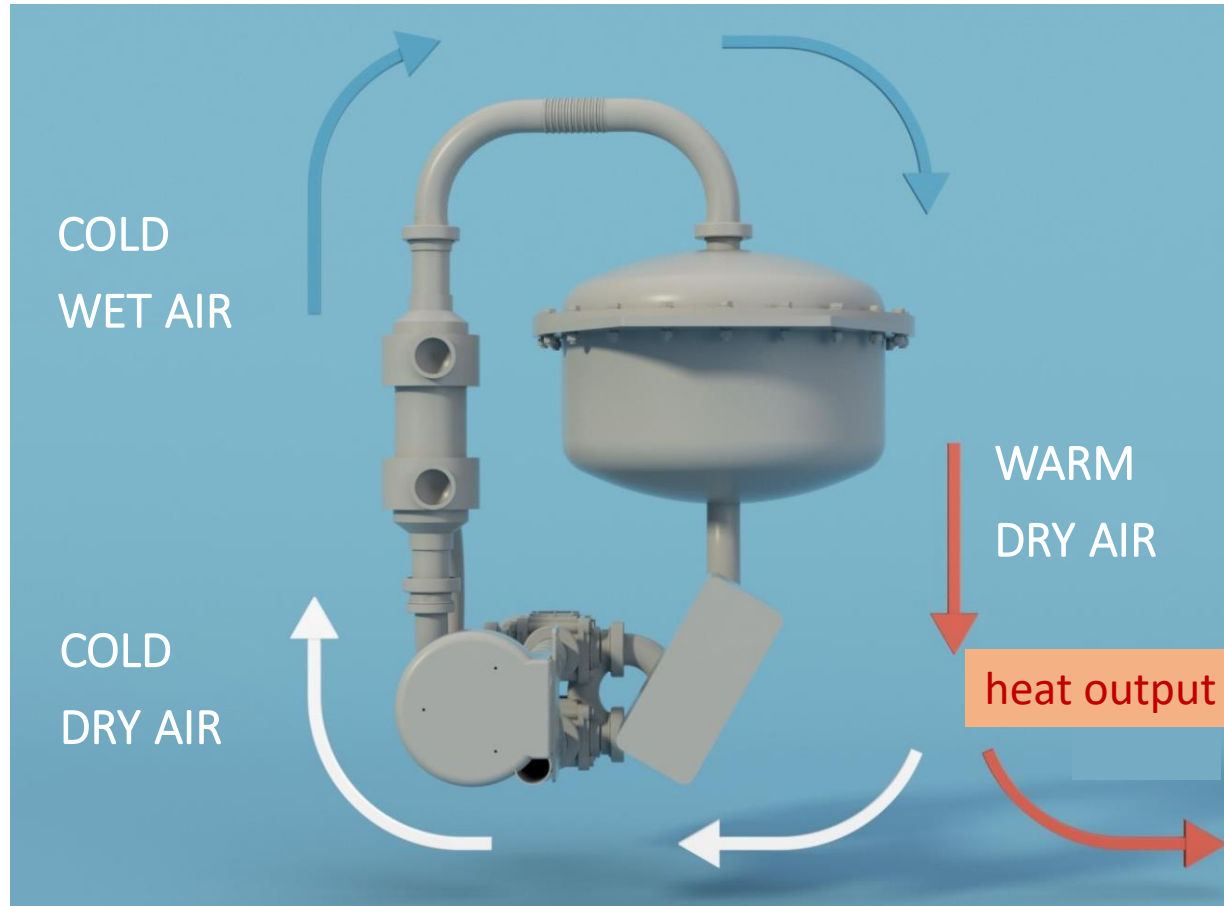
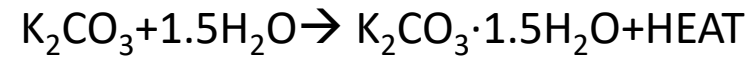


K_2CO_3 - Composite

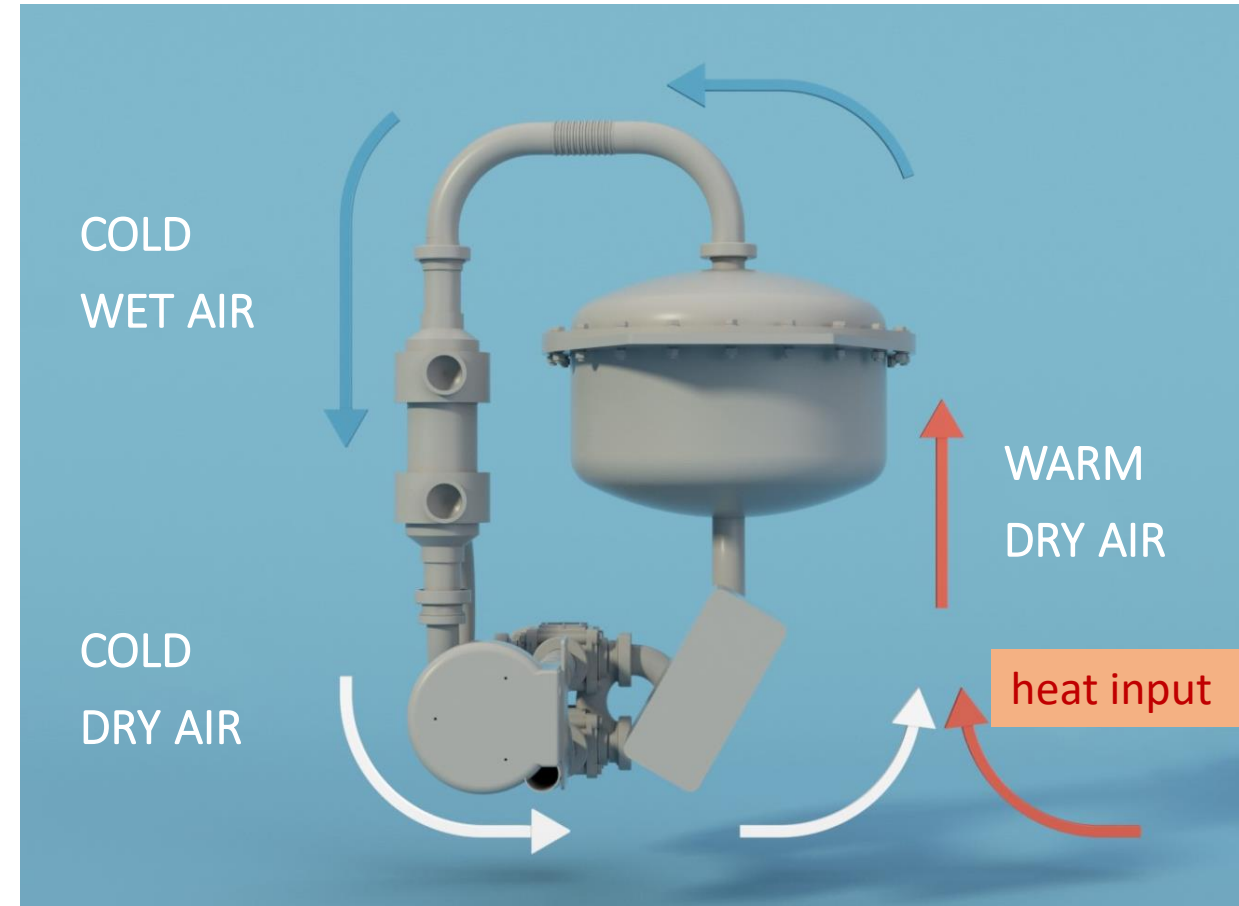
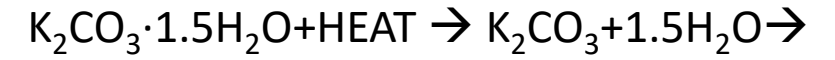
- Stable
- Sufficient power
- Robust
- Chargeable at low T



How does it work?



Discharge



Charge

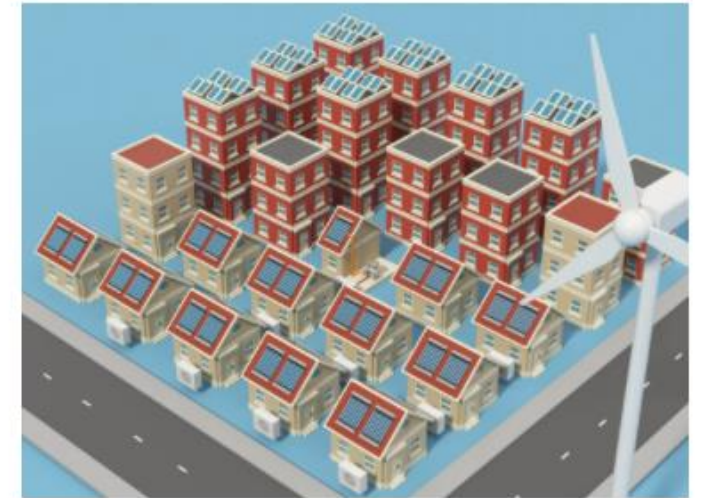
Multicyclic stable thermochemical material



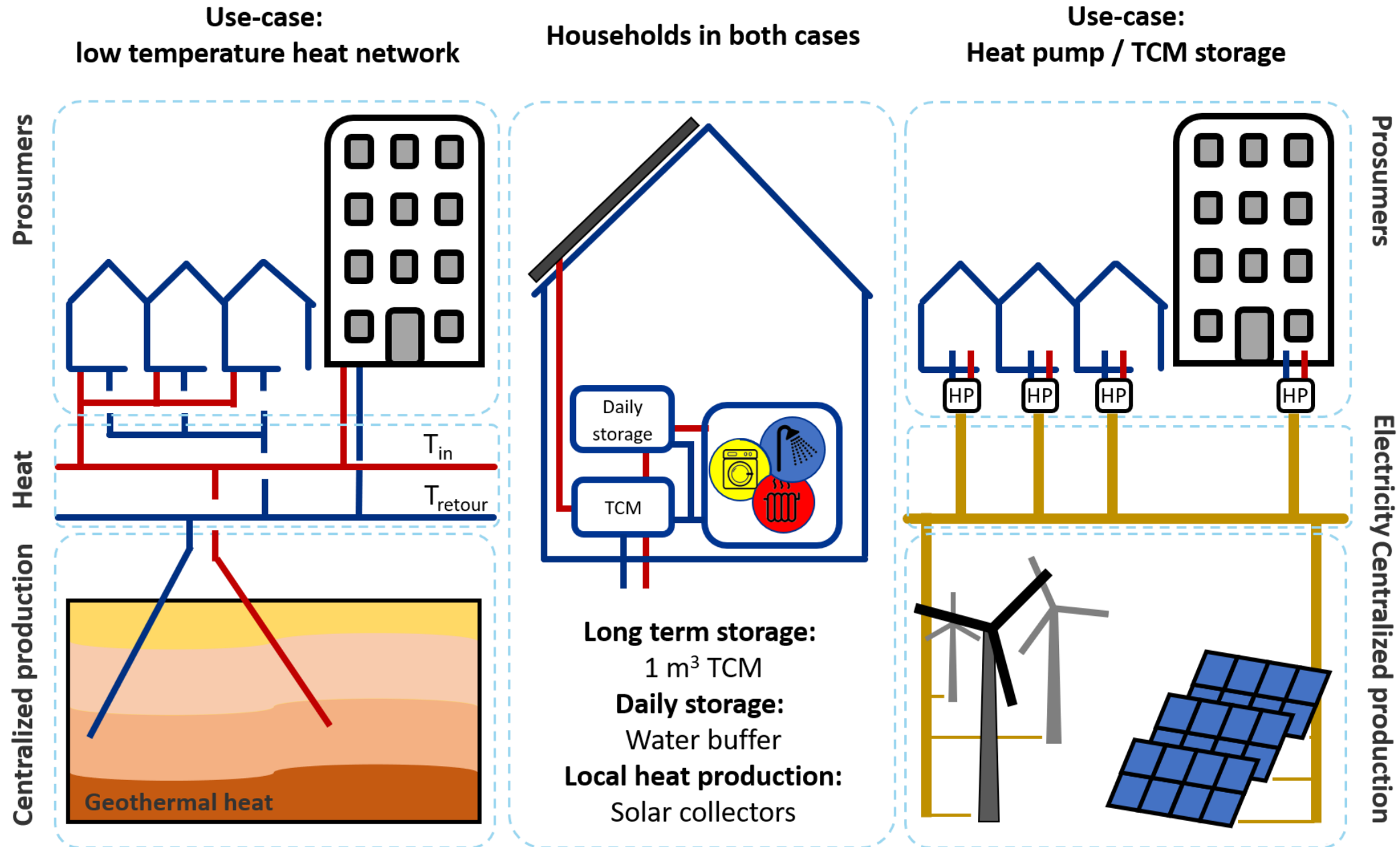
Compact thermochemical heat storage systems



Energy management and interfacing



2 Main application concepts: Heat & Electricity



3 Pilot Demonstrations in different climates

A prototype of the new HEAT-INSYDE heat battery will be demonstrated in three European countries with different climates.

Netherlands



Temperatures: 4°C to 22°C

Hours of sunlight per day: 2 to 7

France



Temperatures: 7°C to 25°C

Hours of sunlight per day: 5 to 12

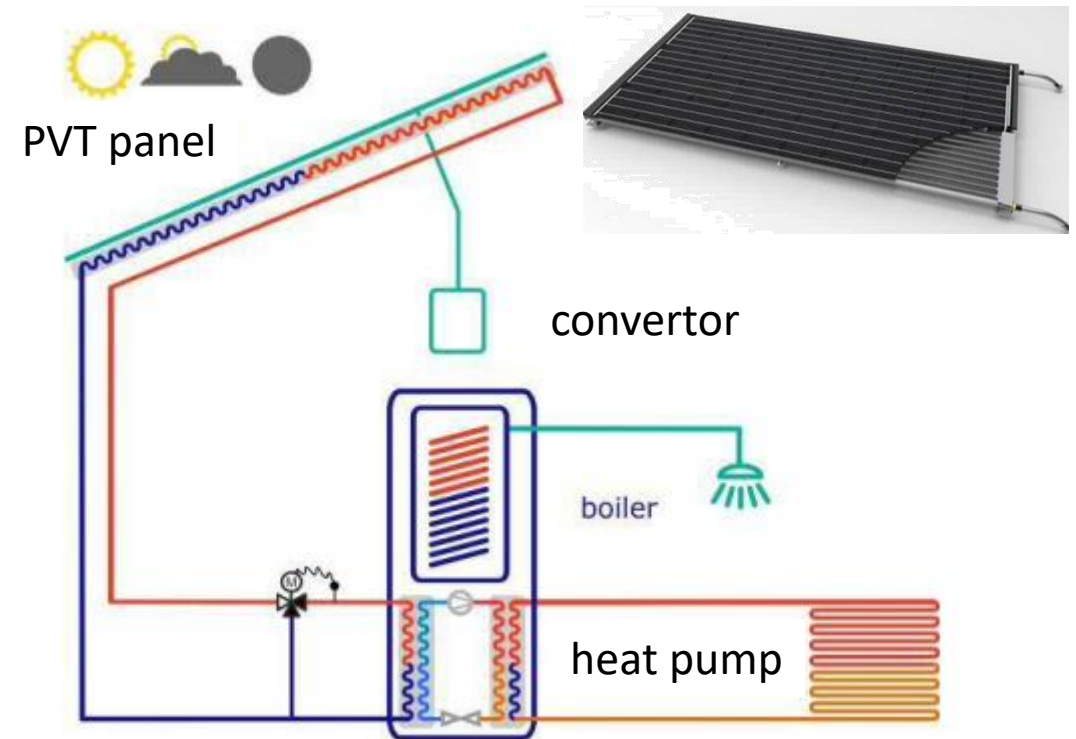
Poland



Temperatures: -3°C to 18°C

Hours of sunlight per day: 1 to 8

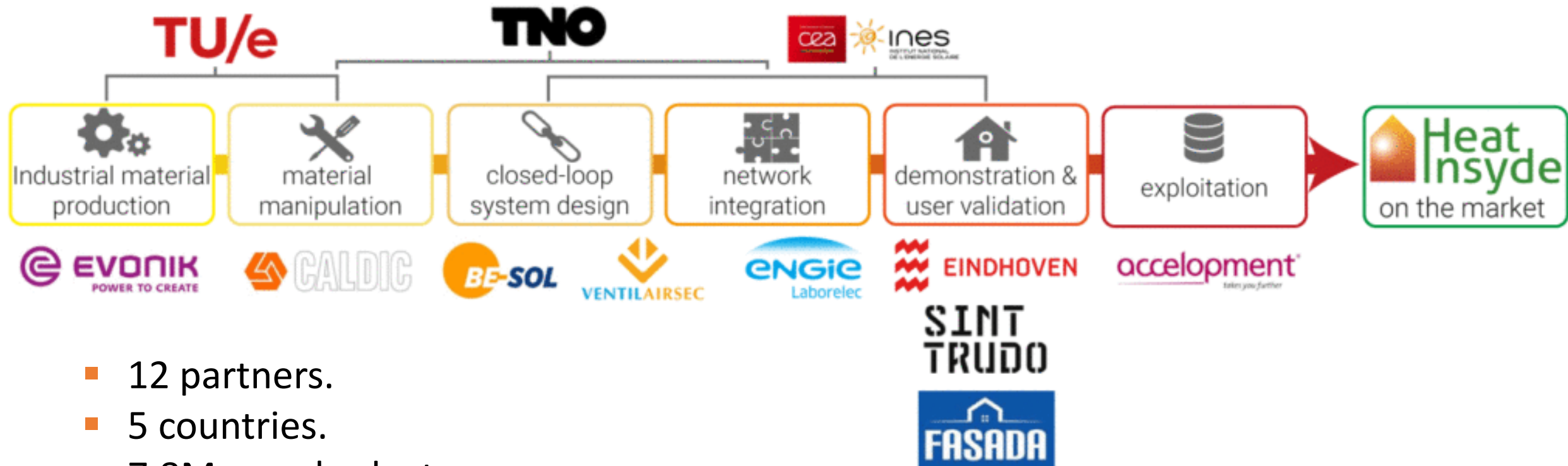
- Solar panels as pre-heater
- Air side of heat pump combined in solar panels
- Smart integration of condensor side in heating system
- Direct electrical charging



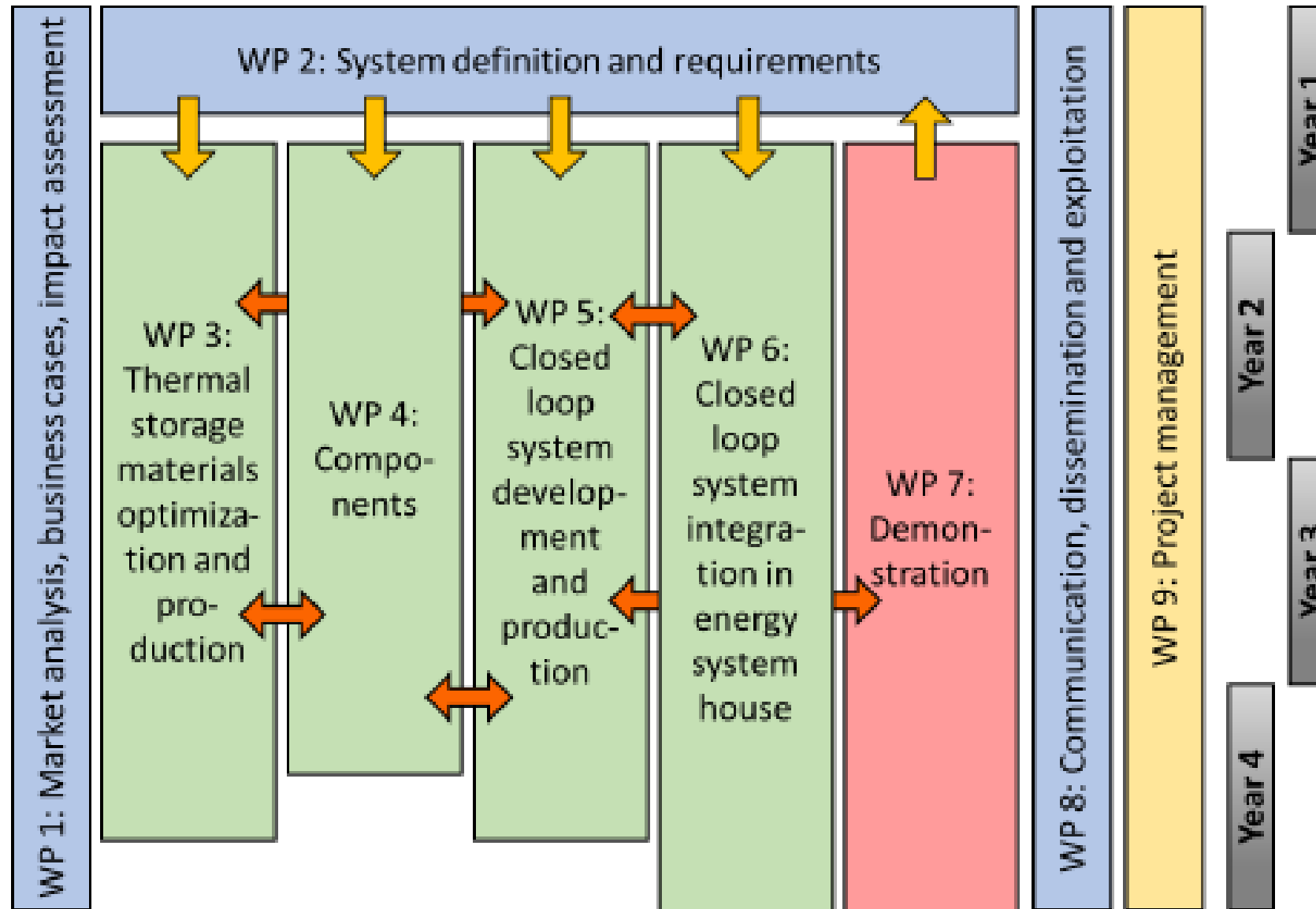
DEVELOPMENT:

- Selection of concept adapted on demo-location.
- Integration of battery with existing system.
- Testing under end-user conditions.
- ROI, safety, business case.

HEAT-INSYDE mobilizes all key players relevant to the future manufacturing and distribution chain of our solution.



- 12 partners.
- 5 countries.
- 7,8M euro budget.
- From October 2019 until March 2023.



<https://www.heat-insyde.eu/>

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