Project presentation

Compact REtrofit Advanced Thermal Energy storage

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AEE INTEC

Event name

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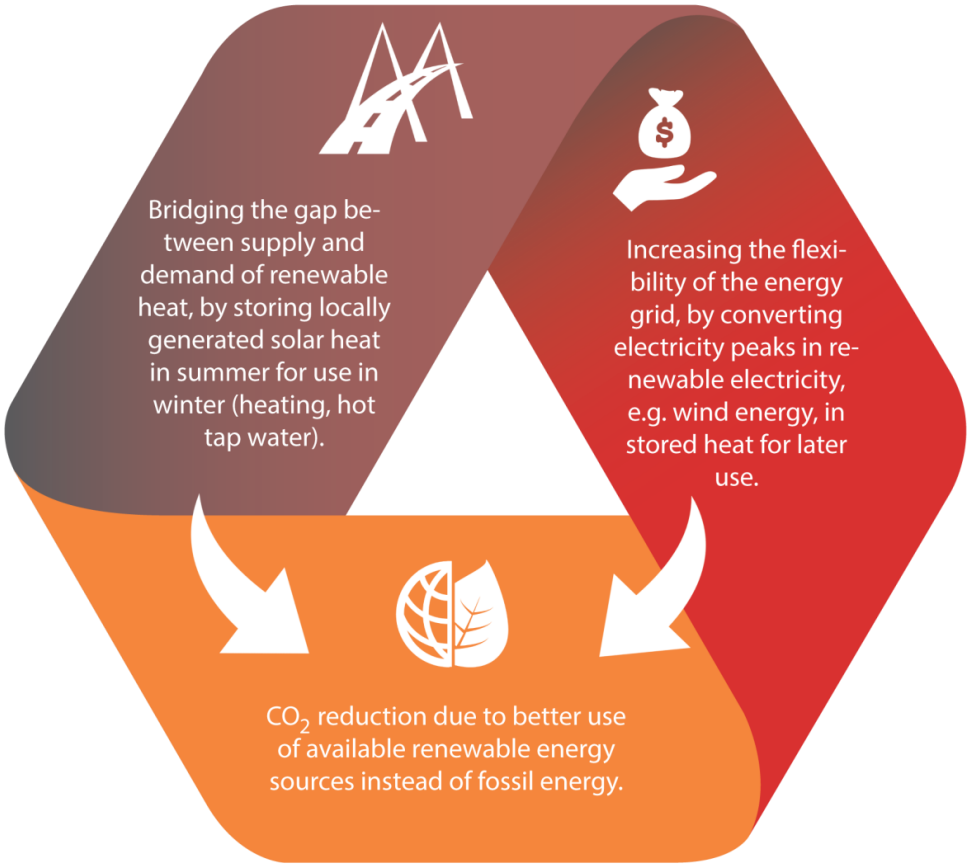
CREATE

Start date: 1st October 2015
Duration: 56 months

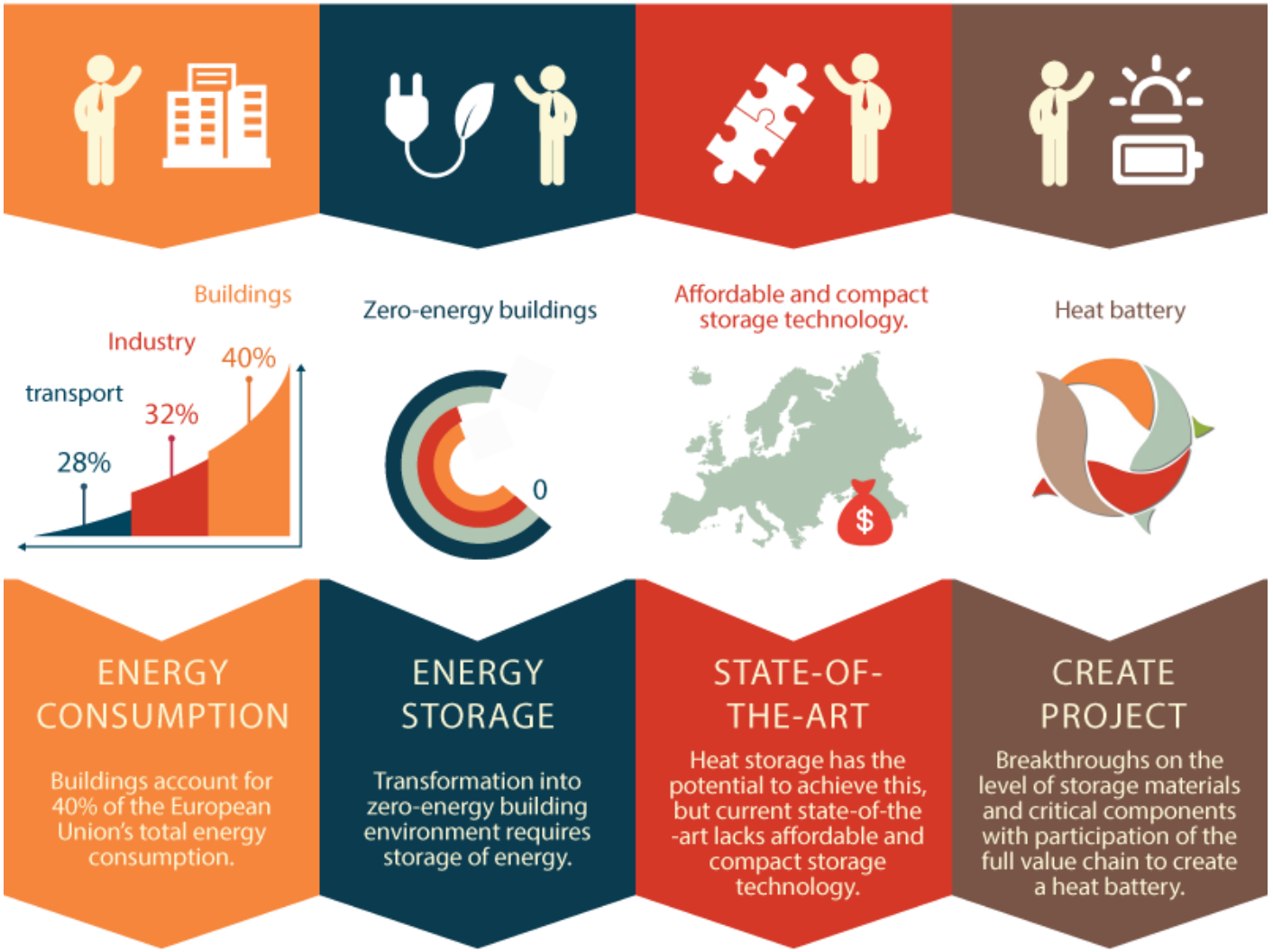
„Compact REtrofit Advanced Thermal Energy storage“

- CREATE is European Union research project under the topic EeB-06-2015 „Integrated solutions of thermal energy storage for building applications“.
- The Project aims to tackle the thermal energy storage challenge for the built environment by developing a **compact heat storage**.

The heat battery allows for better use of available renewables in two ways:



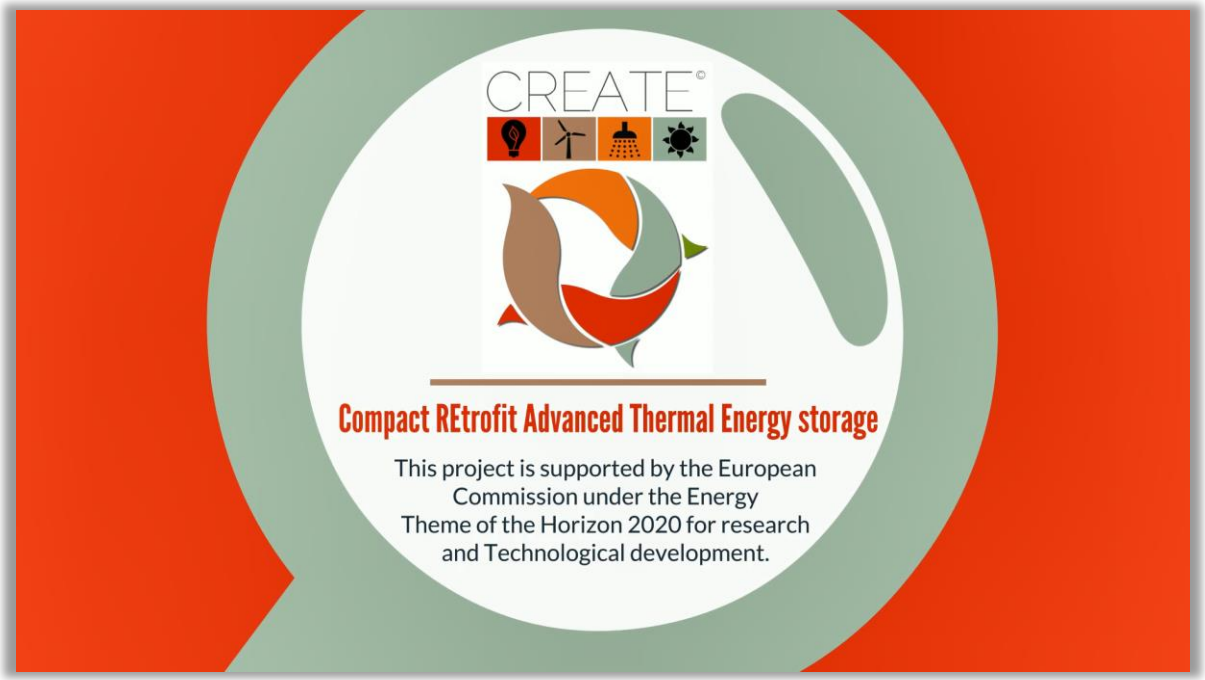
Introduction



Introduction

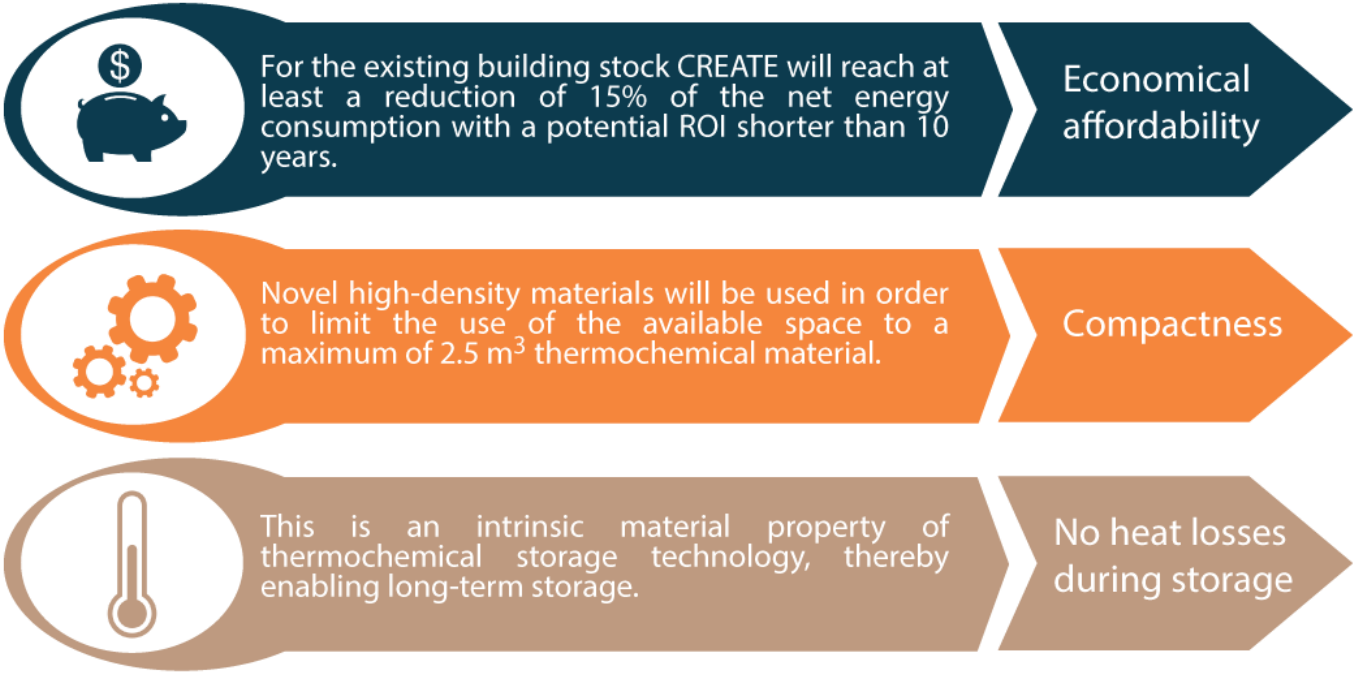
- Watch the project introduction video:

https://www.youtube.com/watch?v=qUxTxCqksEA&t



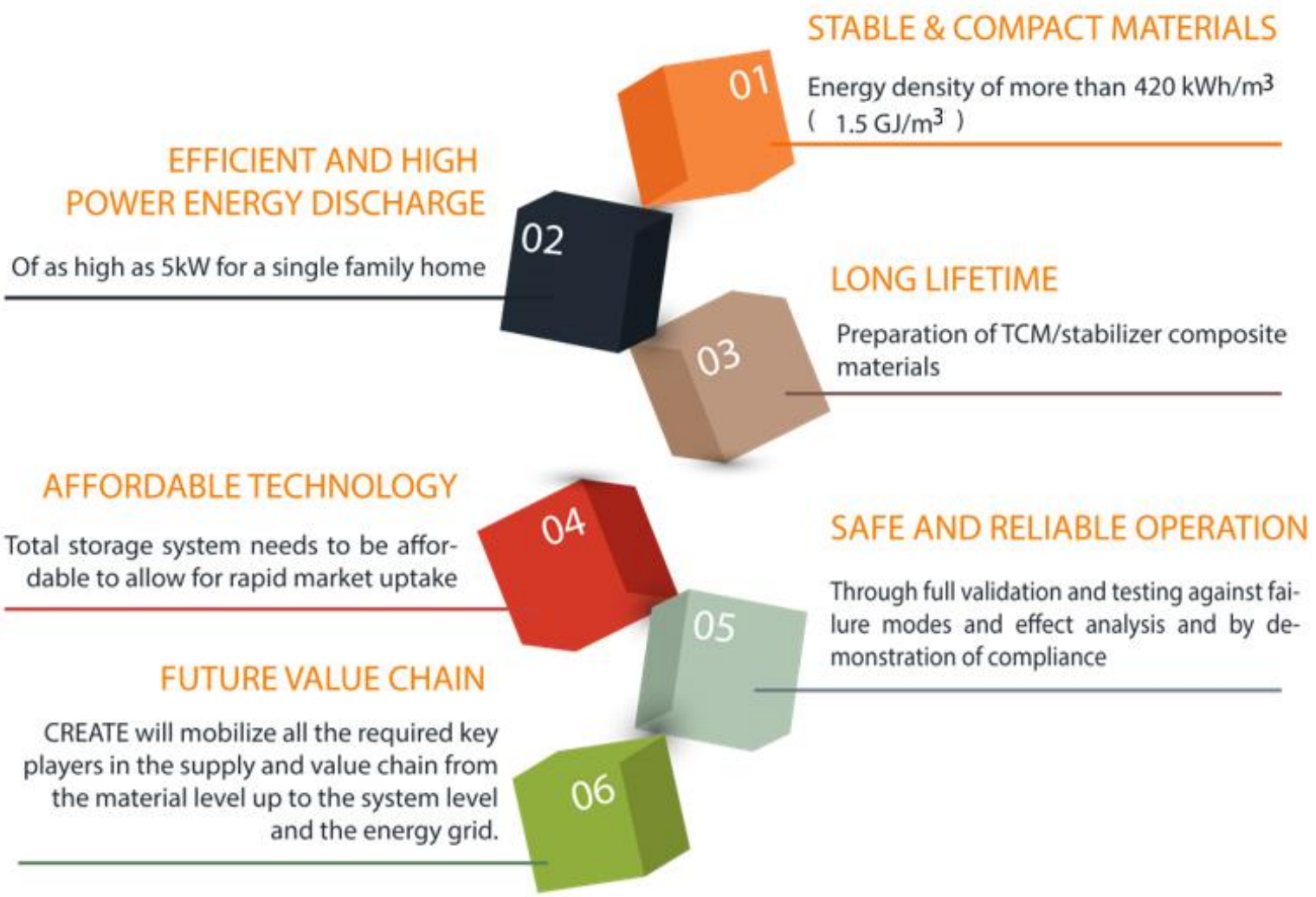
Project objectives

- To develop and demonstrate a **heat battery**, i.e. an advanced thermal storage system based on Thermo-Chemical Materials (TCMs), that enables:



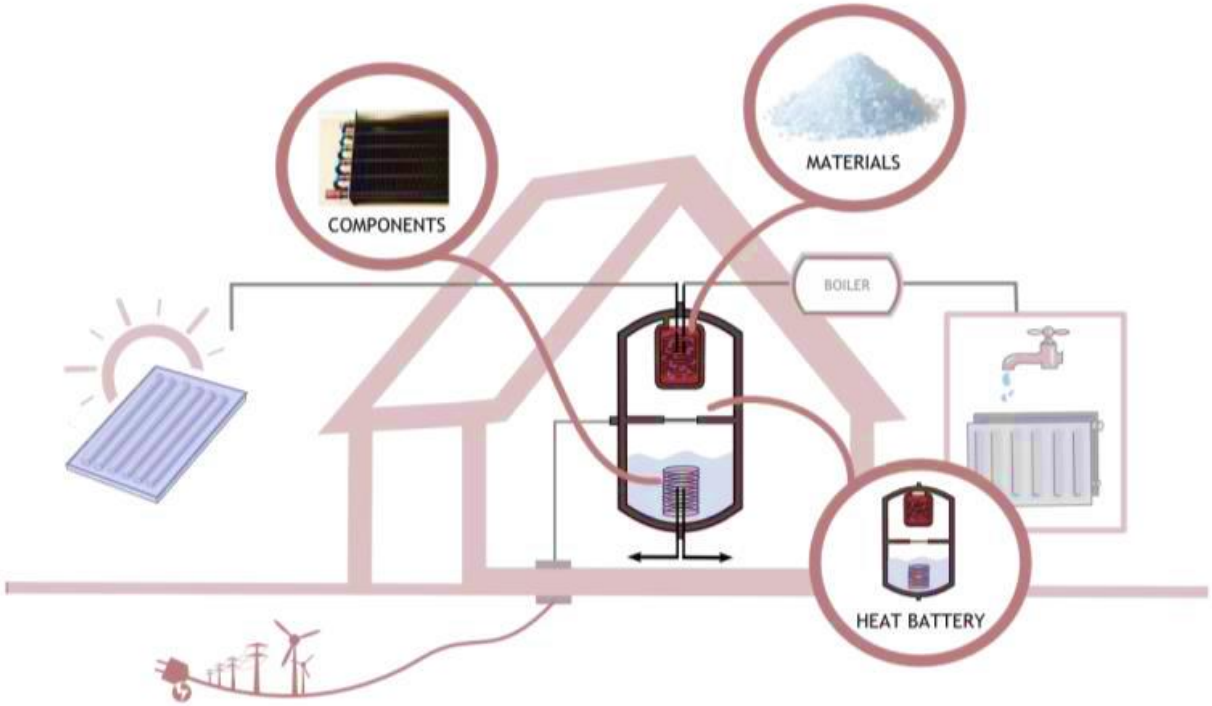
- To develop stabilized storage materials with high storage density, improved stability and low price, and package them in optimized heat exchangers, using optimized storage modules.

Sub-objectives



CREATE concept

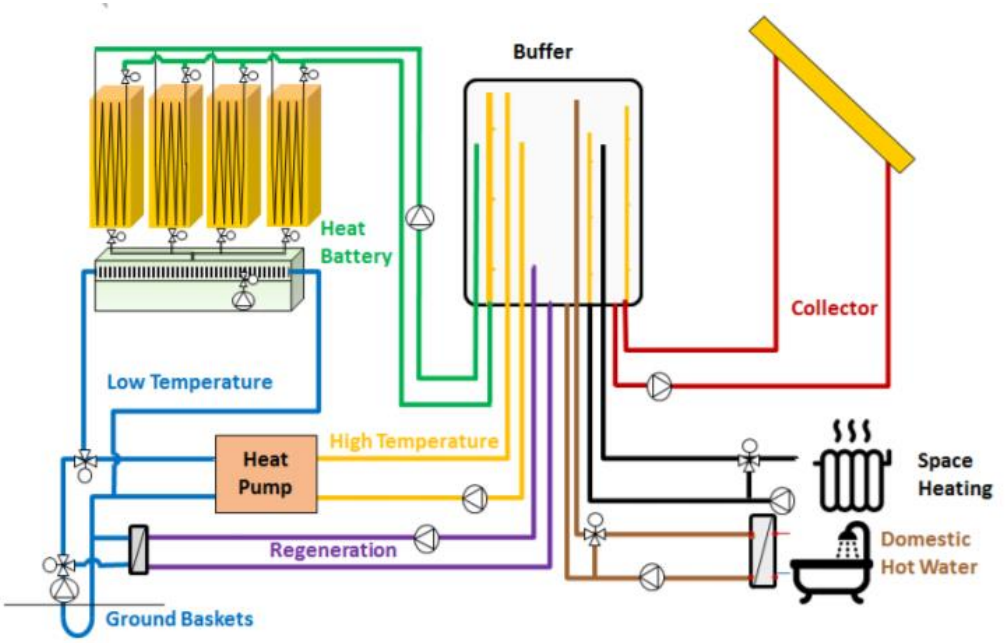
- The heart of the system is the heat storage module, i.e. the heat battery.
- Different sources for heat supply exist (heat generated by solar collectors on the building or heat-pumps fed by excess electricity from the grid).



Technology

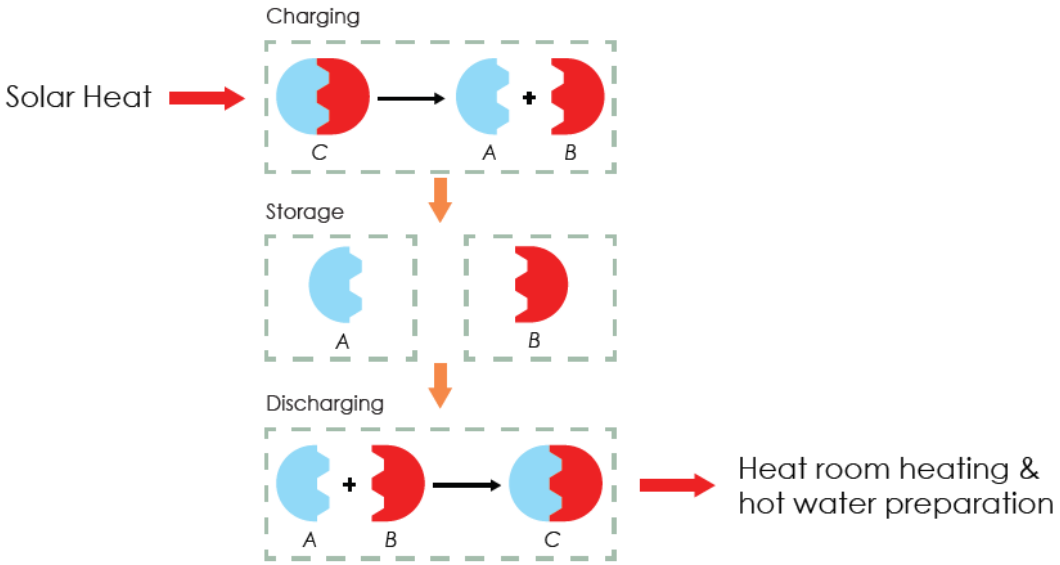
The CREATE demo storage system design consists of the following main components:

- **Heat Battery** (seasonal storage)
  - Absorber modules with thermochemical material
  - Central evaporator/condenser with water reservoir
- **Buffer Storage** (diurnal storage)
- **Heat Pump**
- **Solar Thermal Collector**
- **Ground Source**



Thermochemical Heat Storage

A thermochemical storage is a reversible system which releases or absorbs thermal energy when two substances/components are combined or separated. If the components are stored separately, the corresponding reaction can be used to store heat. The basis for thermochemical heat storage is therefore the selection of a reaction system suitable for the desired storage temperature.



Material development

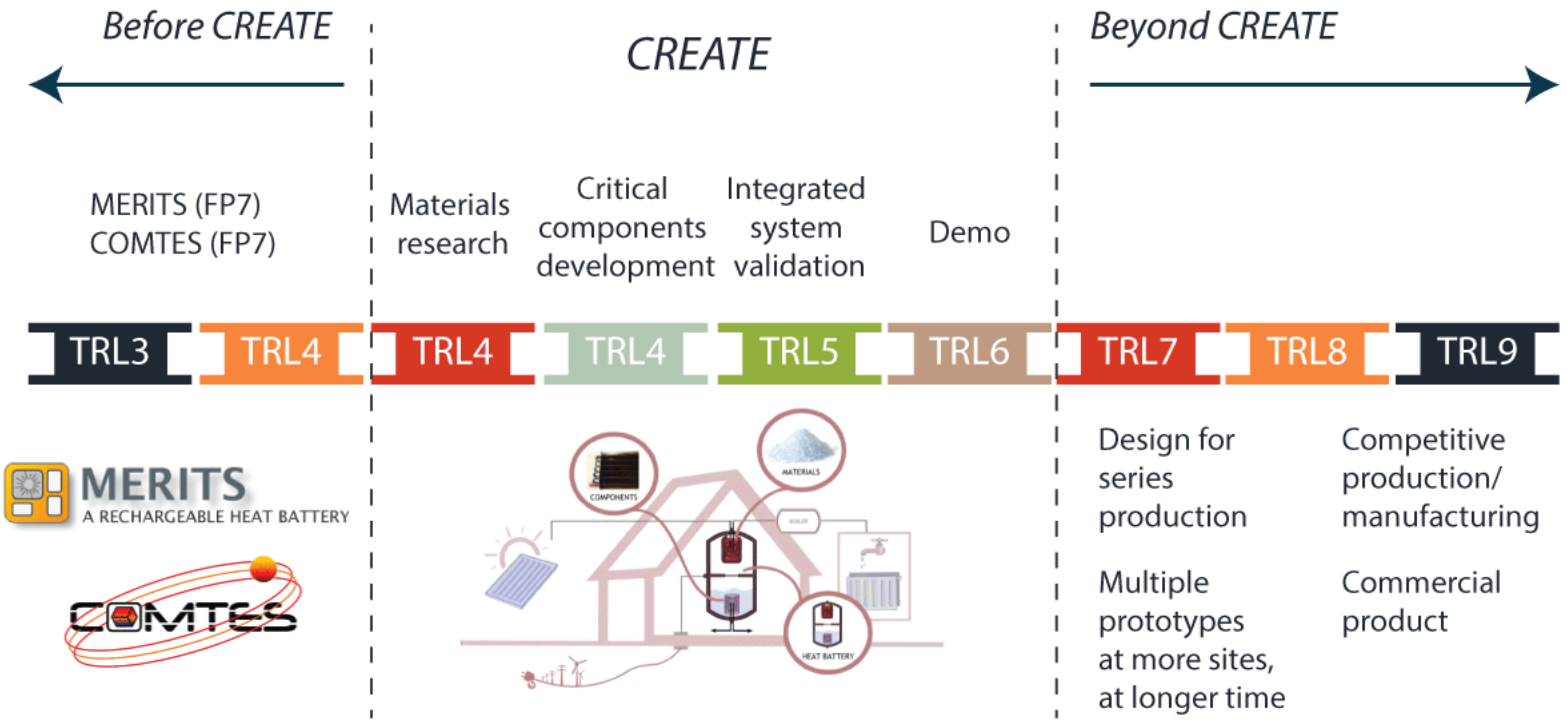
- A database of 600 hydrate reactions of salt hydrates based on material´s characteristics (energy density and the (un)loading temperatures) - K_2CO_3 selection
- 20 different TCM composites of K_2CO_3 tested in a lab-scale
- Selection of the composite with the highest energy density in particle beds
- Further upscaling up to 100kg scale batches (suitable for industrial production)

Figure 1: The intermediate form of the composite salt

Figure 2: The final shape used in the 1 kg reactor which will be used in the functional scale module (FSM)

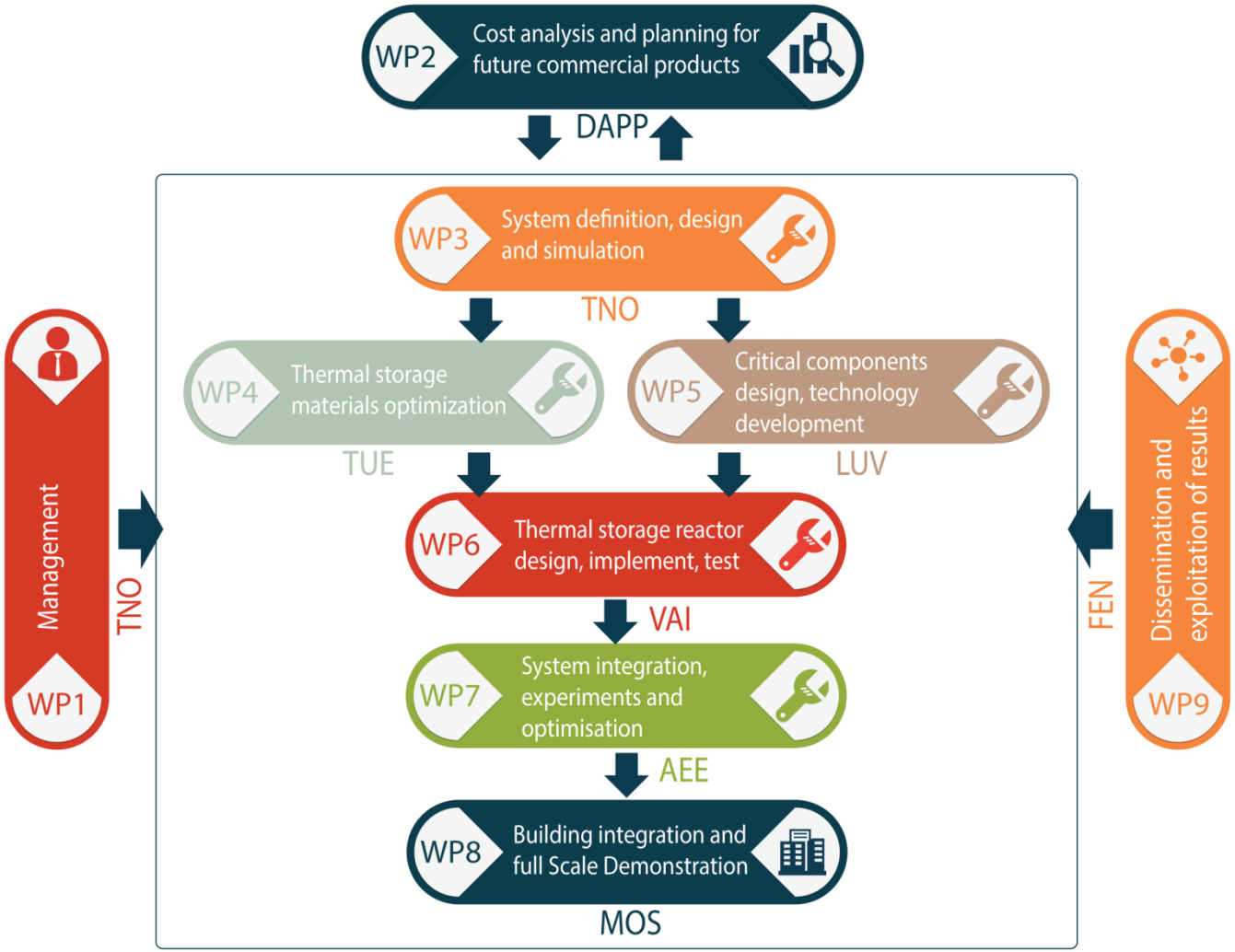
Perspective

- MERITS and COMTES cover R&D up to TRL 4 (lab-validated technology).
- CREATE delivers a demonstration of thermochemical storage for dwelling (TRL 6).
- Based on CREATE results, multiple prototypes to be tested, the design for series manufacturing and competitive production for commercialization will take place.



Workpackages

- The R&D work divided in 6 technical Work Packages (WPs).
- Additionally WPs for the project management, for commercial aspects and for dissemination.



Demonstration

- Implementation of the CREATE concept foreseen in typical European dwellings.
- Full scale solar Termochemical storage (TCS) system has been installed into a single family house in Warsaw, Poland by MOSTOSTAL.
- Demonstration of the TCS solution applicability and its operation in real life conditions (Polish land climate delivers both cold winters and warm summers).

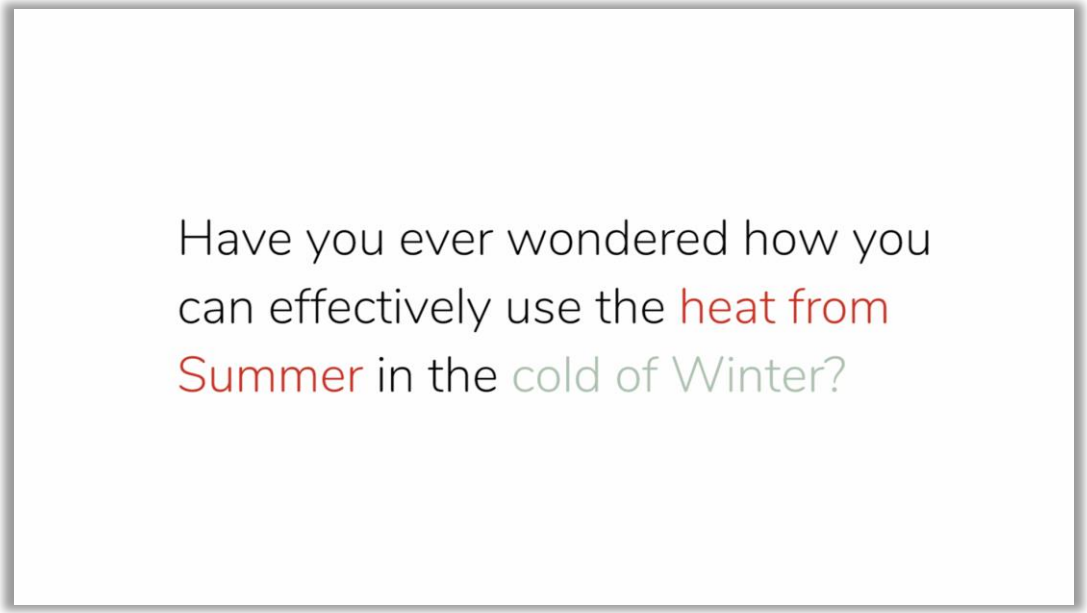
Demonstration - Progress

- The demo site has been equipped with a **ground heat exchanger** as a low-temperature source of energy.
- The **solar collectors** on the roof have been installed and a new **hot water tank** and **buffer storage** have been added to the building´s boiler room. Everything has been connected to the **CREATE heat battery**.
- Now is the time for **monitoring and testing**.

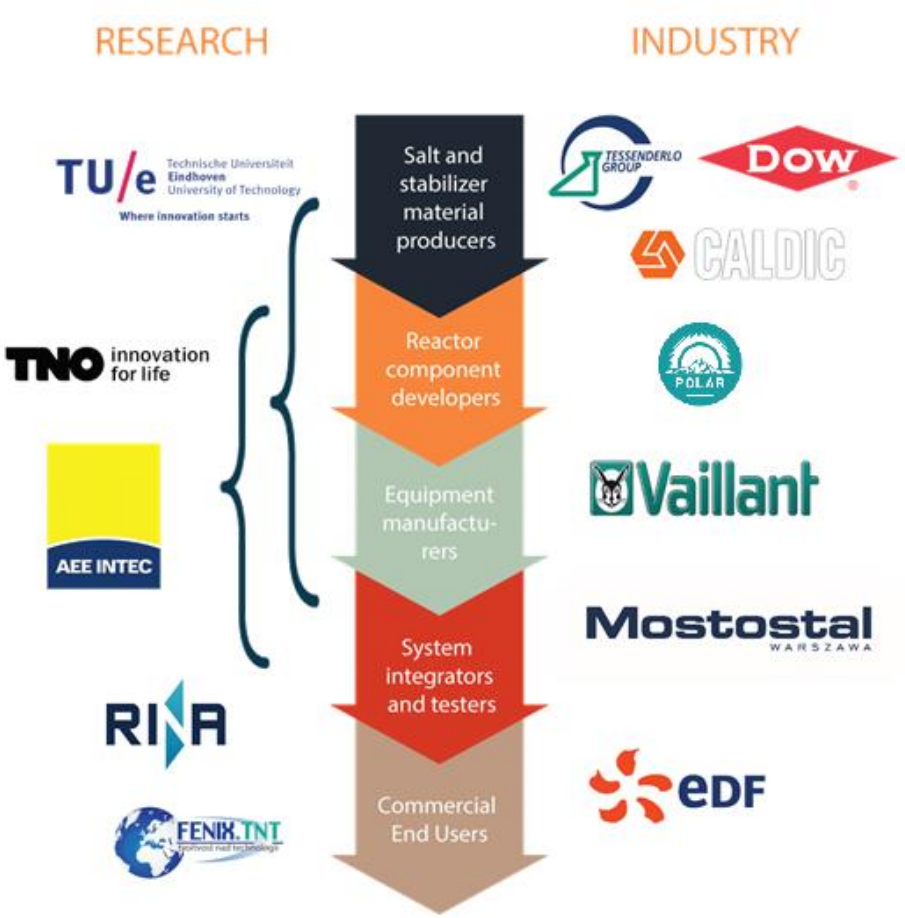
Project final video

- Watch the project final video showcasing the project progress:

https://www.youtube.com/watch?v=4wDAlRBNkWA



Partners



- To ensure successful exploitation, the full knowledge, value, and supply chain are mobilized in the present consortium.
- The consortium consists of multidisciplinary parties, from universities, RTO's, material suppliers and end-user companies, enabling the necessary approach to scale up and commercialization.

Contact info

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