

CREATE



# Project presentation

Compact REtrofit Advanced  
Thermal Energy storage

Dr. Wim van Helden



Event name

This project is supported by the European Commission under the Grant Agreement number: 680450.



# CREATE

Start date: 1st October 2015

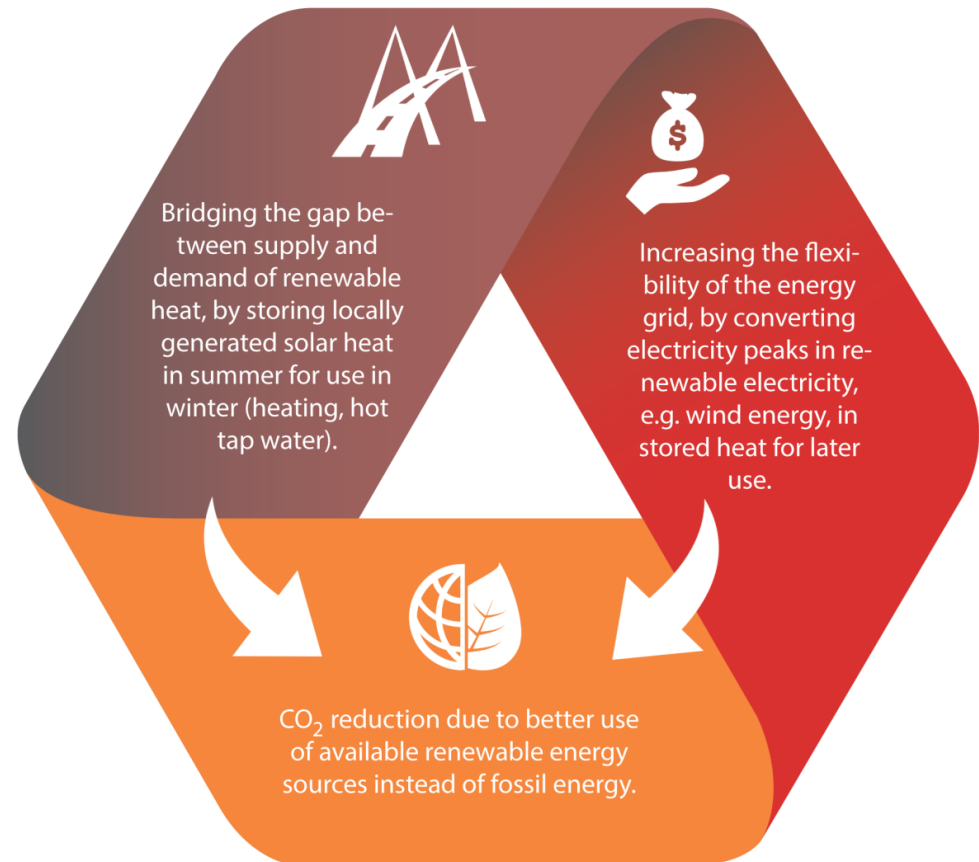
Duration: 48 months

## „Compact REtrofit Advanced Thermal Energy storage“

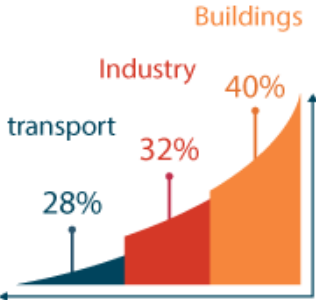


- CREATE is European Union research project under the topic EeB-06-2015 „Integrated solutions of thermal energy storage for building applications“.
- The Project aims to tackle the thermal energy storage challenge for the built environment by developing a **compact heat storage**.

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



# Introduction



Zero-energy buildings



Affordable and compact storage technology.



Heat battery



**ENERGY CONSUMPTION**

Buildings account for 40% of the European Union's total energy consumption.

**ENERGY STORAGE**

Transformation into zero-energy building environment requires storage of energy.

**STATE-OF-THE-ART**

Heat storage has the potential to achieve this, but current state-of-the-art lacks affordable and compact storage technology.

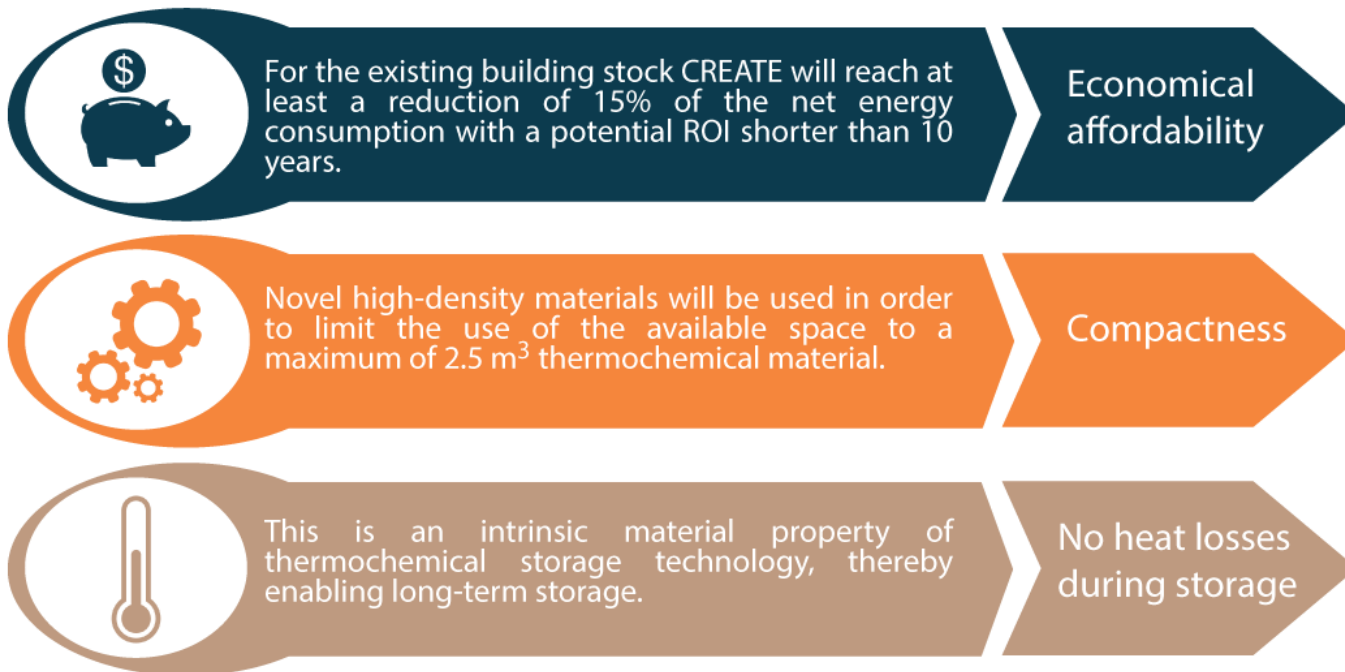
**CREATE PROJECT**

Breakthroughs on the level of storage materials and critical components with participation of the full value chain to create a heat battery.

# Project objectives

2

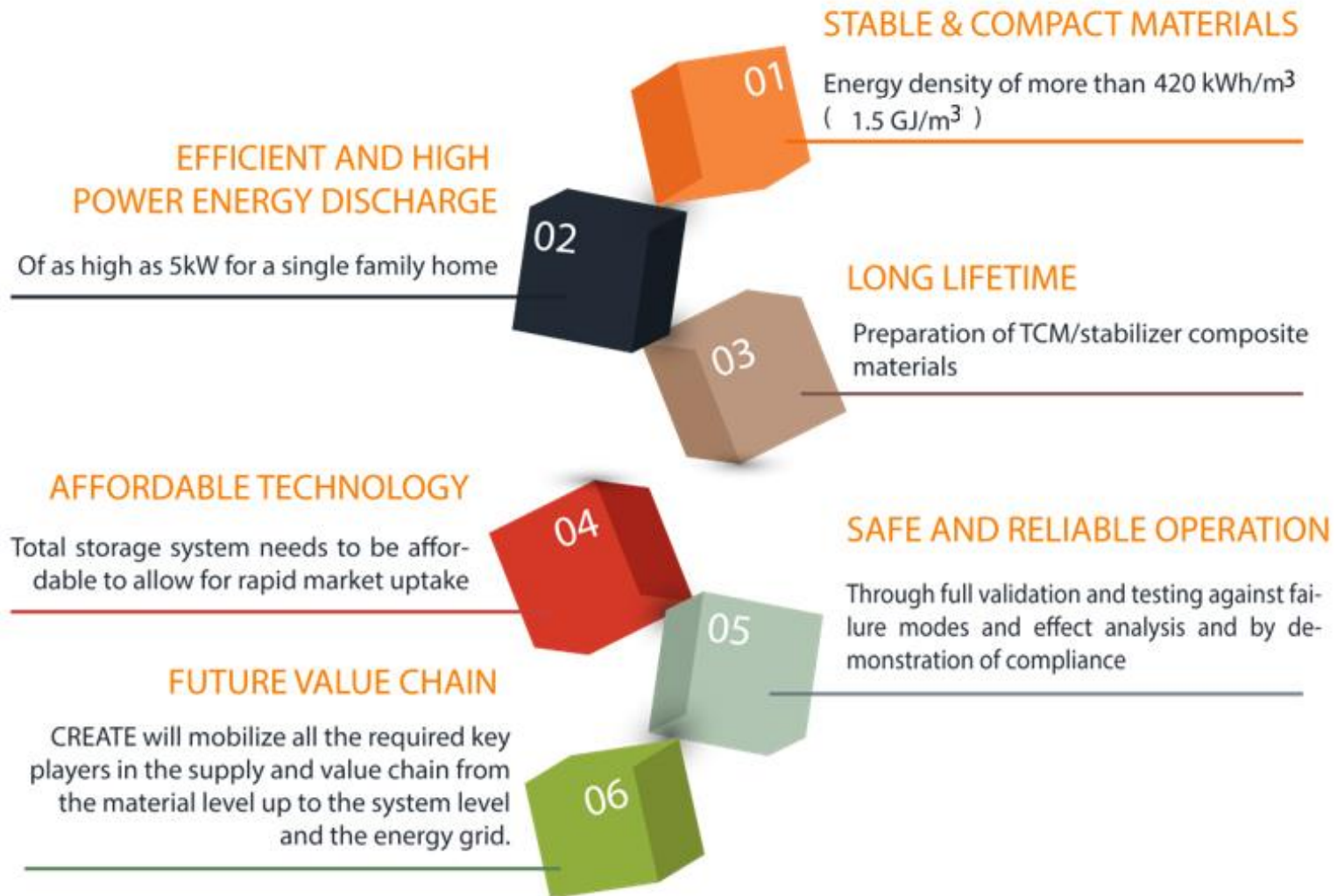
- To develop and demonstrate a **heat battery**, i.e. an advanced thermal storage system based on Thermo-Chemical Materials (TCMs), that enables:



- 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

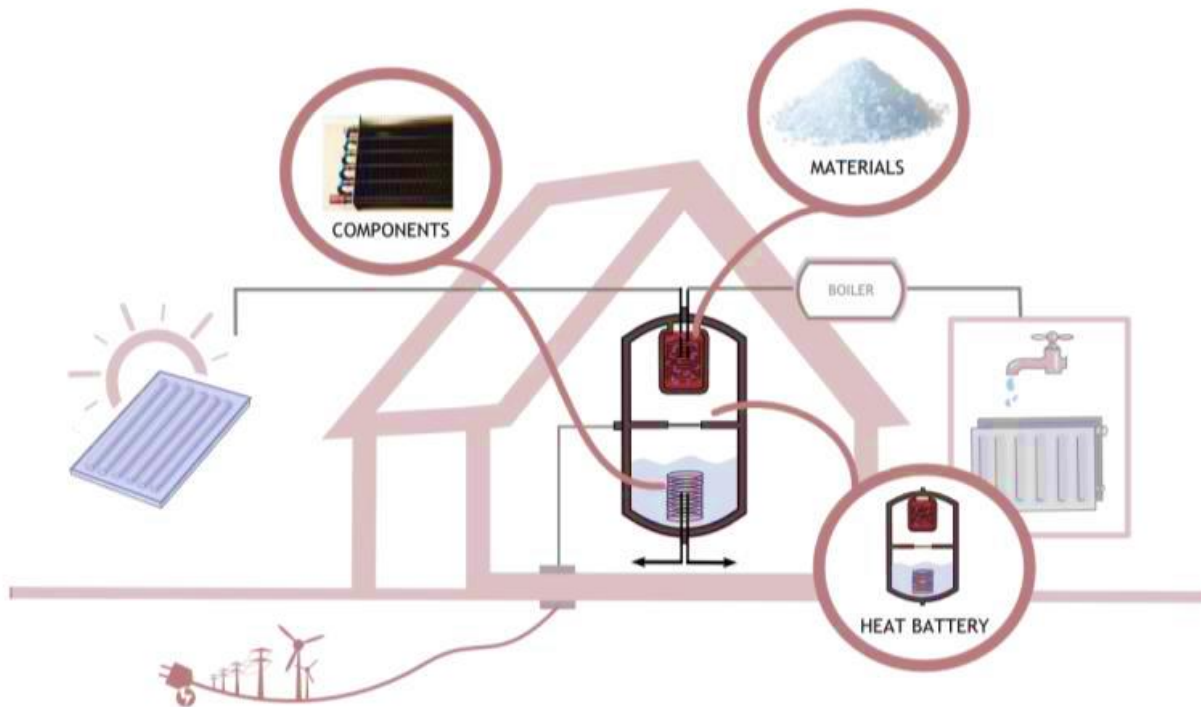
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# CREATE concept

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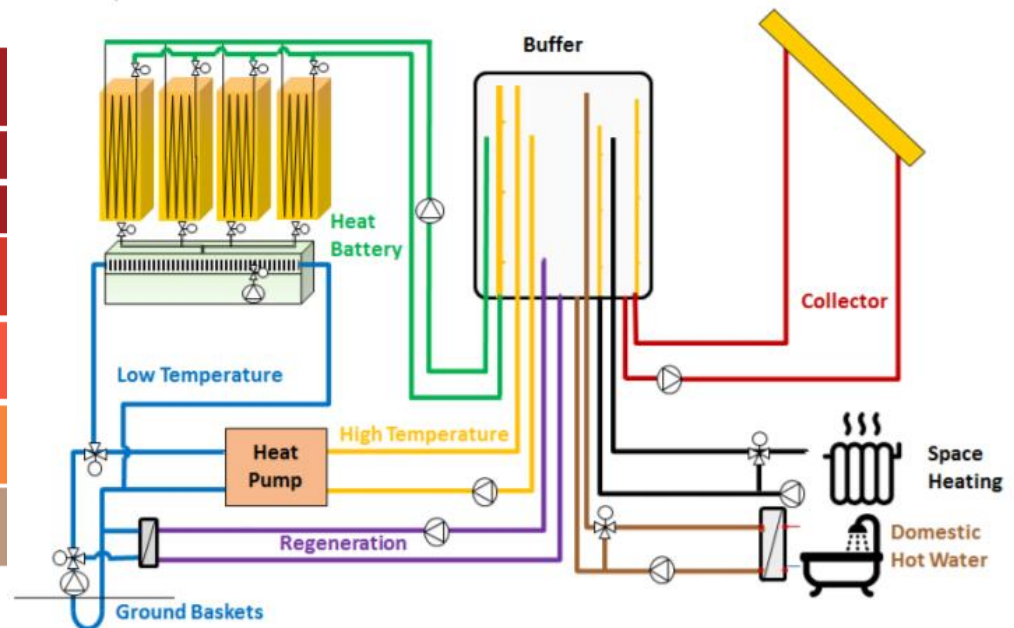
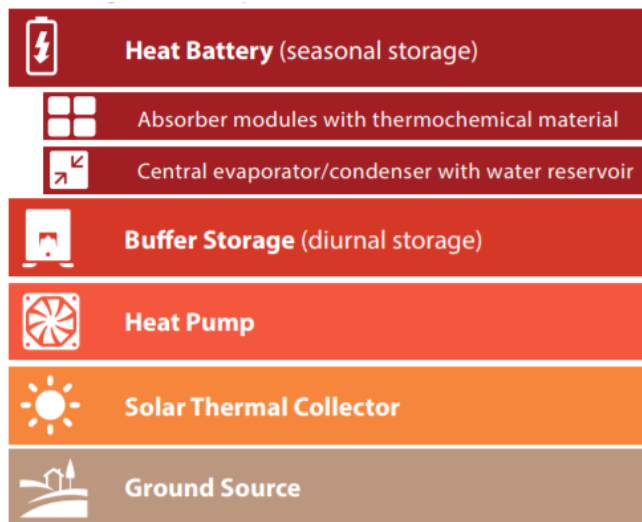
- The heart of the system is the heat storage module, i.e. the heat battery.
- Different sources for heat supply exist (heat generated by solar collectors on the building or heat-pumps fed by excess electricity from the grid).



# Technology

5

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



# Material development

6

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



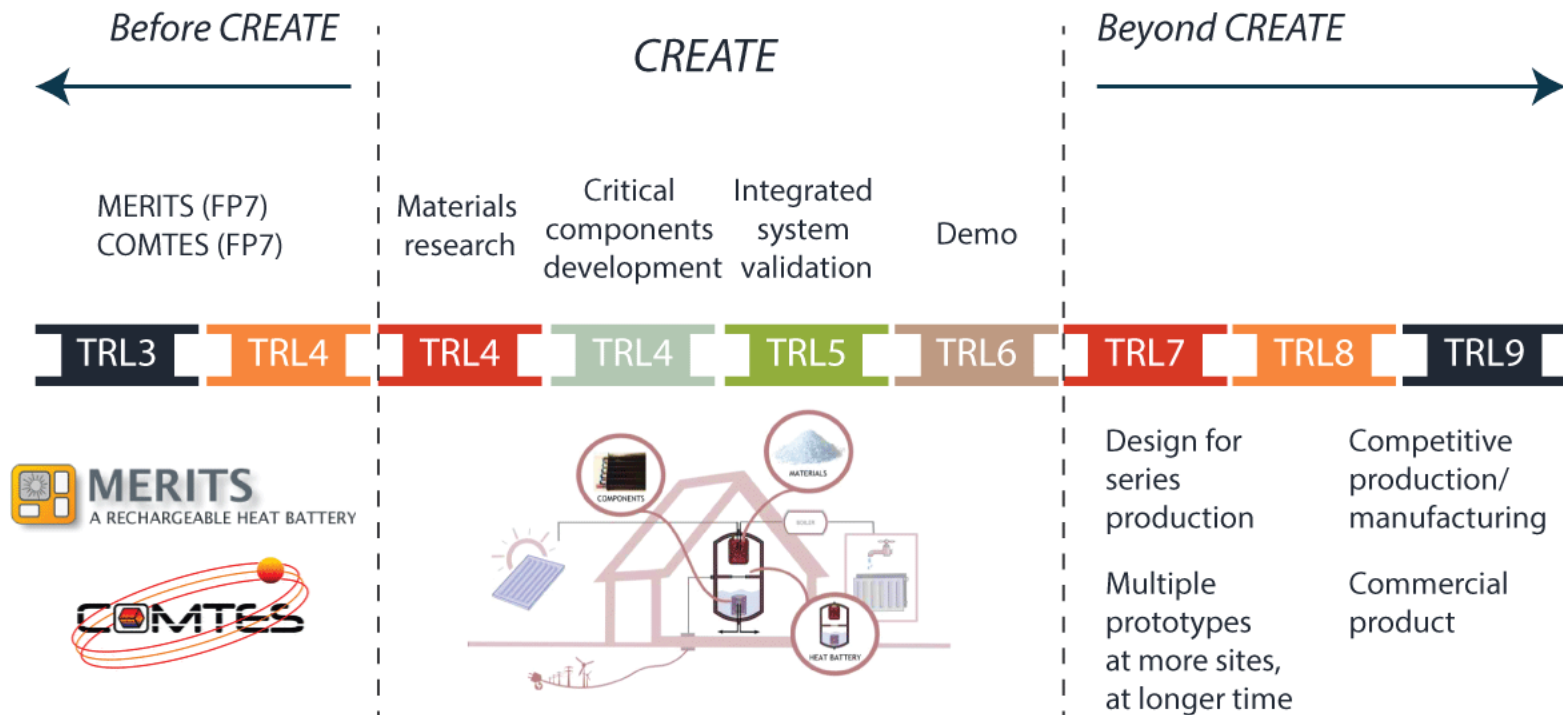
Figure 2: The final shape used in the 1 kg reactor which will be used in the functional scale module (FSM)



# Perspective

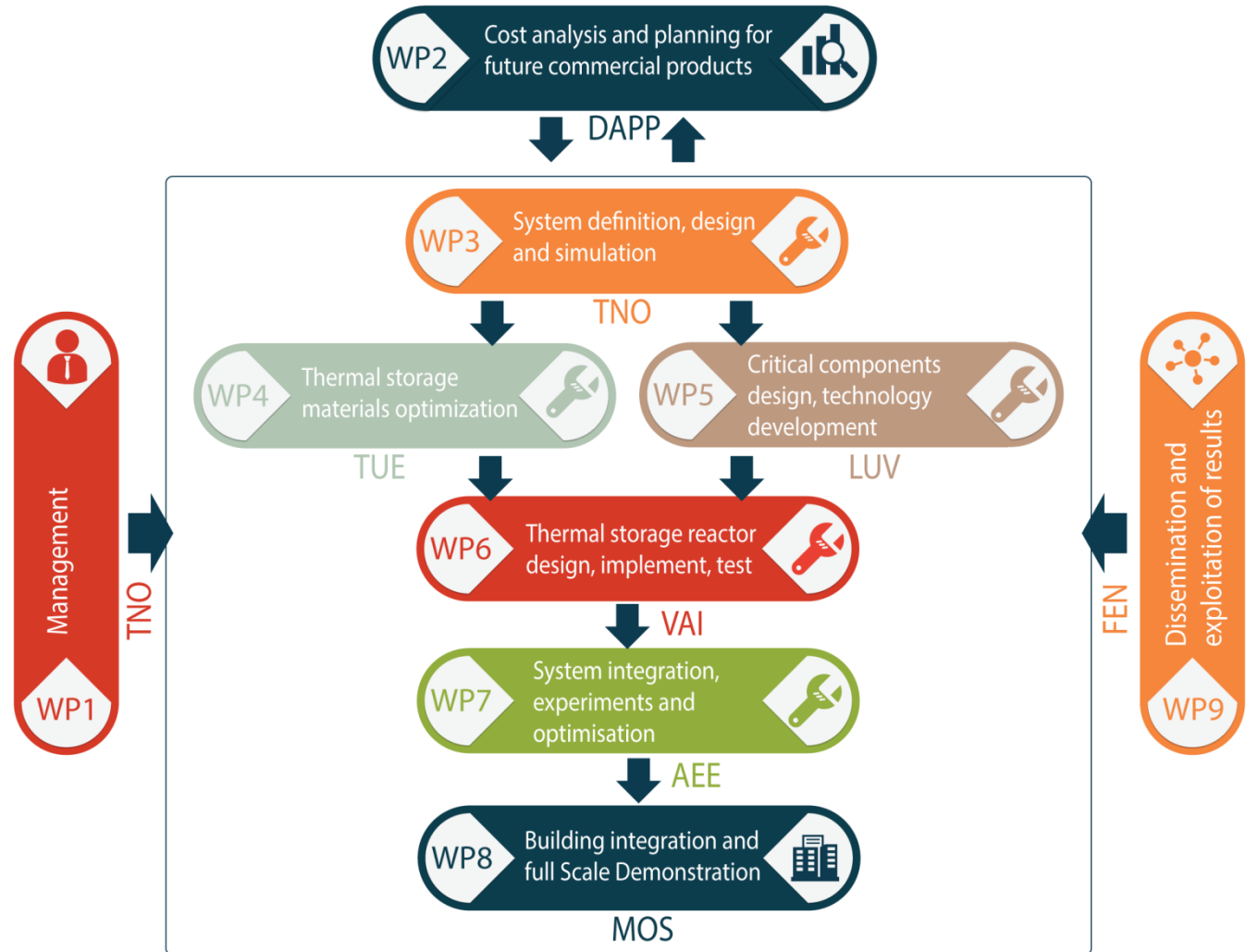
7

- 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.



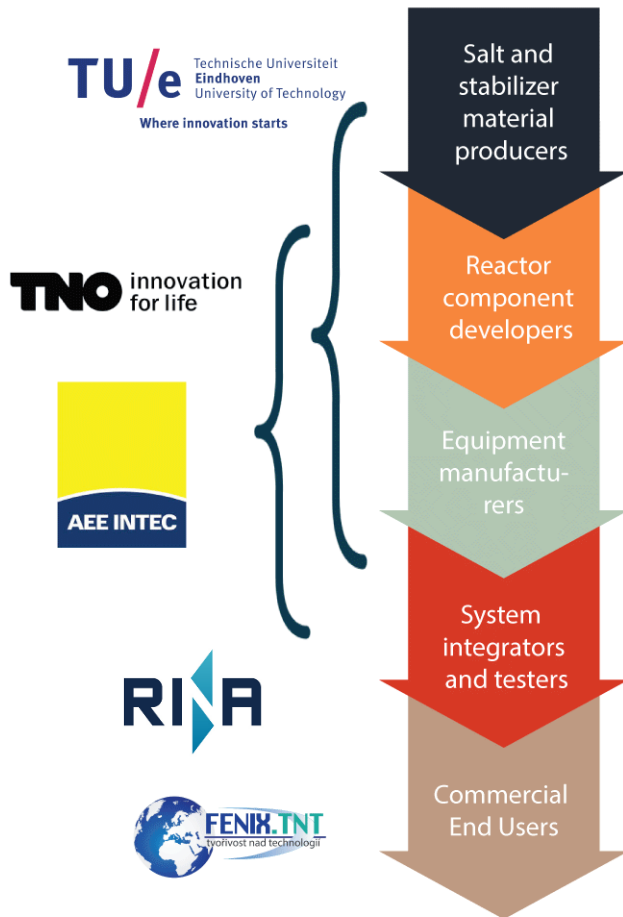
# Demonstration

9

- Implementation of the CREATE concept foreseen in typical European dwellings.
- Full scale solar Thermochemical storage (TCS) system to be 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).



## RESEARCH



## INDUSTRY



- 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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11

For further project information, please contact:



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