

# Compacte warmteopslag

**Enabler voor de energietransitie**

Huub Keizers, TNO, Oktober 2019

## › Centrale & decentrale oplossingen (TRL & opslag dichtheid)



**Sensible**

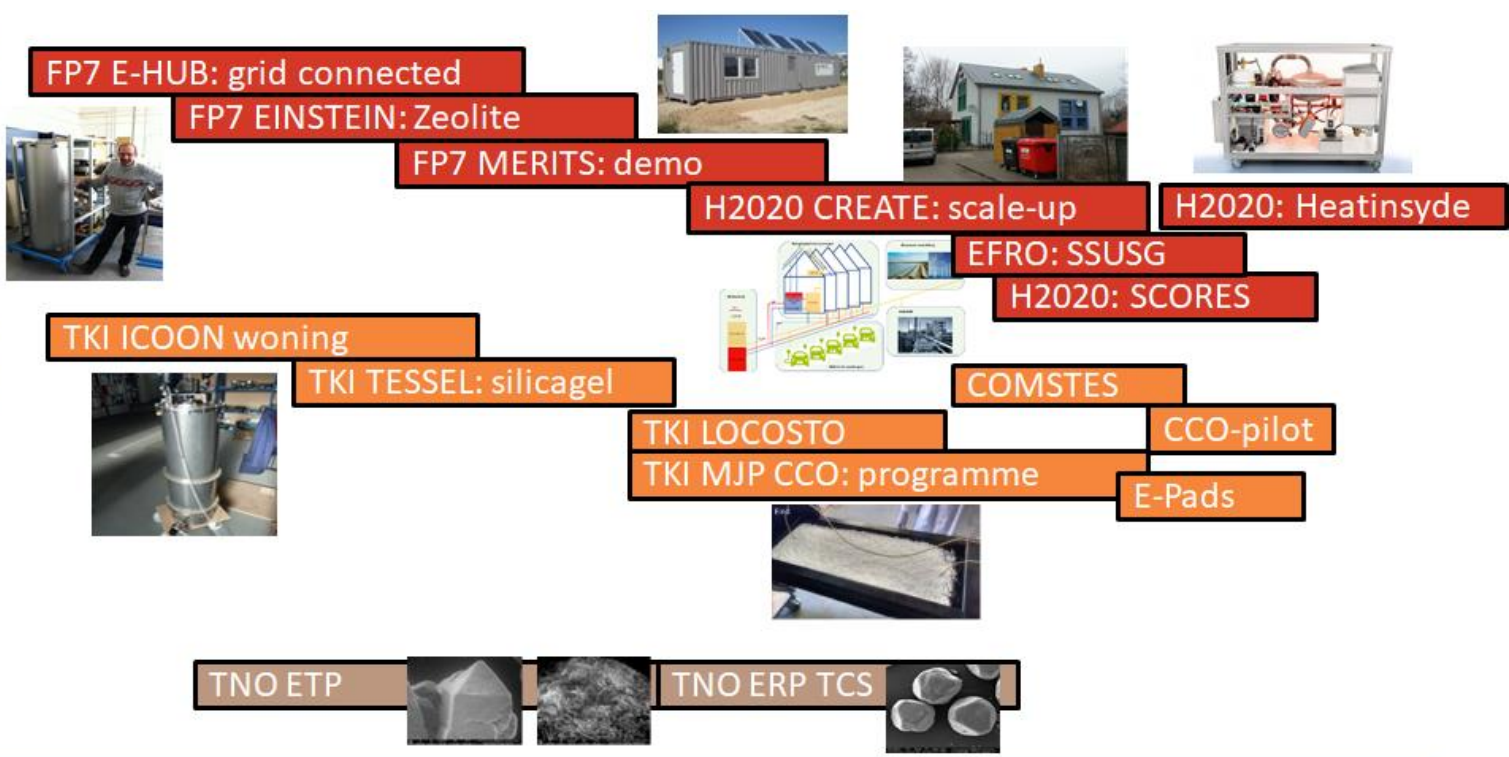
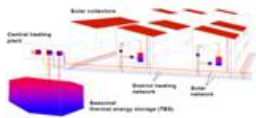
**Latent**

**Thermochemical**

**Opslag heeft een grote potentie om duurzame energie gebruik te maximaliseren (kort-midden-lange termijn verschuiven van energie) en vereiste flexibiliteit te leveren**

# LOKAAL WARMTEOPSLAG ONDERZOEK @ TNO

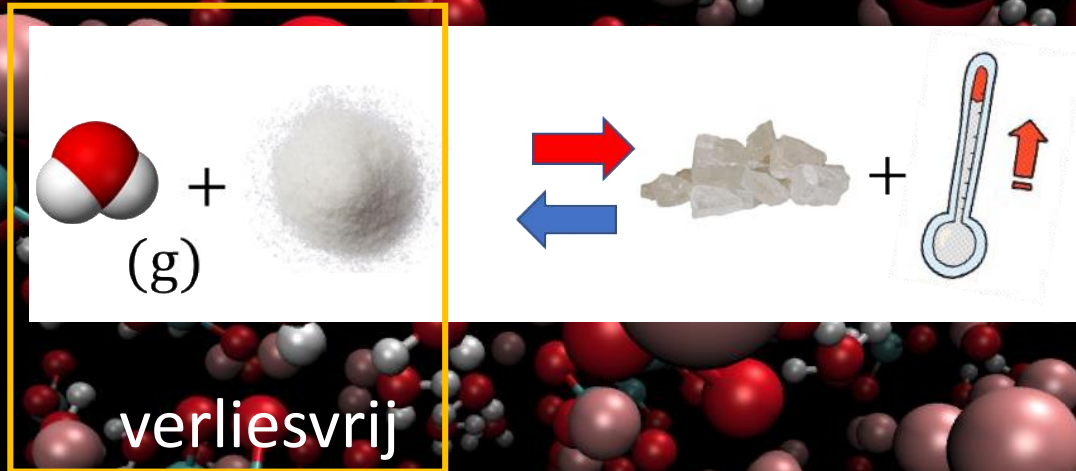
**TNO** innovation for life



'14 '2008 '09 '10 '11 '12 '13 '14 '15 '16 '17 '18 '19 '20 '21 '22

# compact en verliesvrij

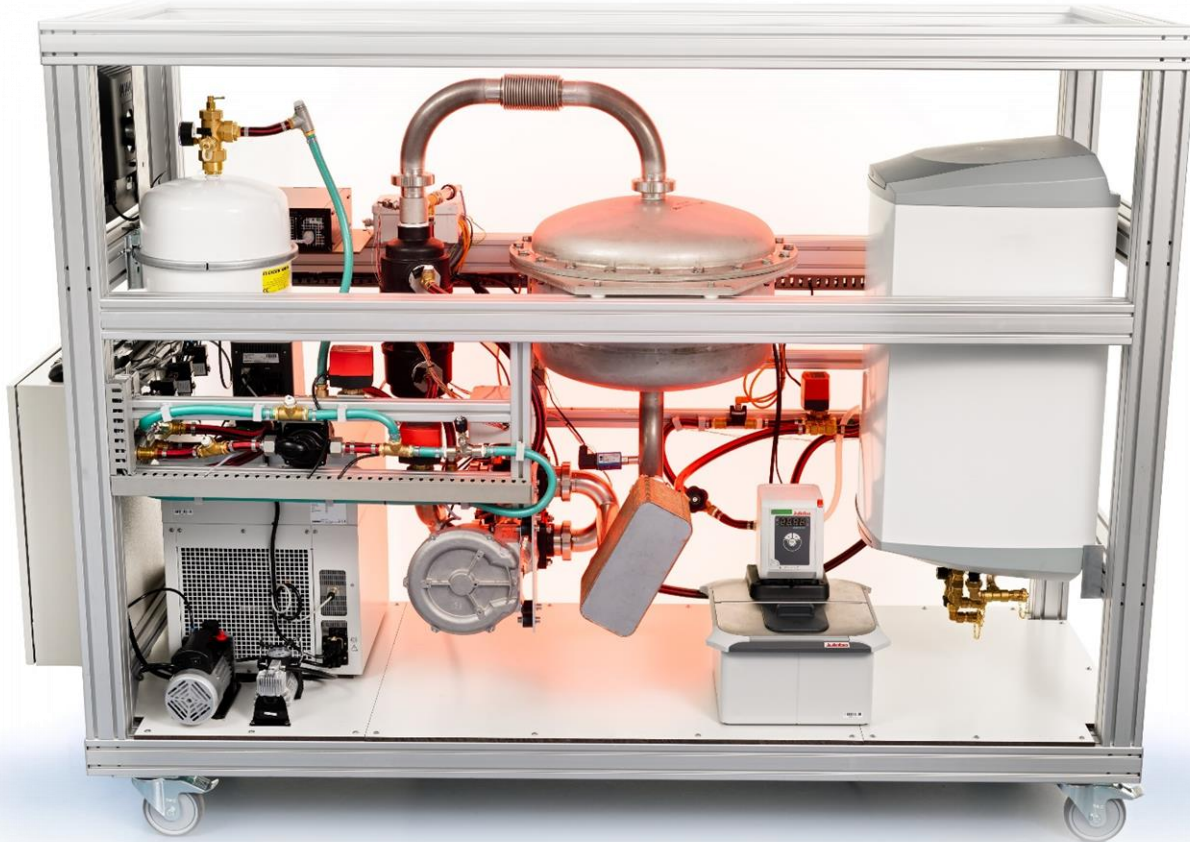
het thermochemische principe



verliesvrij

Hoge energiedichtheid

# the first domestic heat battery



# unique selling points



- **compact and loss-free**  
refrigerator size: 2 weeks heat
- **€ competitive**  
10 €/MJ
- **long service life**  
> 20 years

**1<sup>st</sup> user ready product: 3 years**

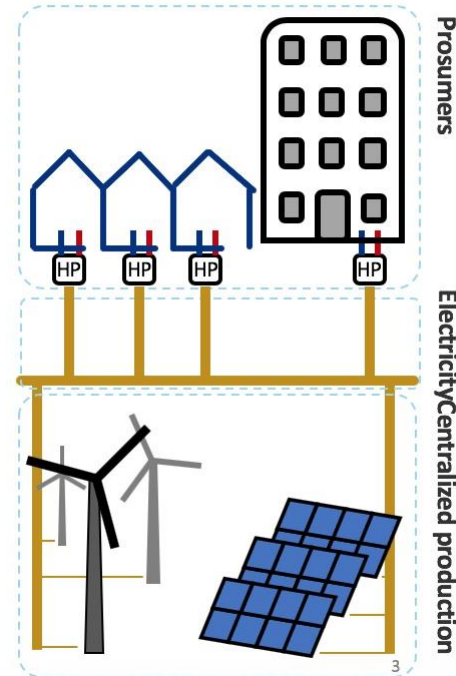
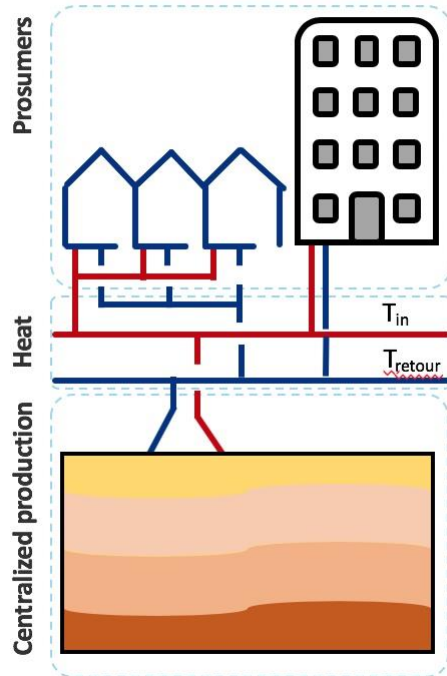
# Use cases in the built environment

temperature booster in  
*low-temperature* heat network

heat pump-heat battery in  
electric network

## Boosting heat networks

- ✓ lower temperature (i.e. 40-25 C)
- ✓ higher CO<sub>2</sub> reduction



## Boosting Heat Pumps

- ✓ Drastic increase of COP
- ✓ Peak shaving: no/limited net upgrade

# VOOR NADERE INFORMATIE

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