



Self-Consumption Of Renewable  
Energy by hybrid Storage systems

# SCORES project presentation

**Sustainable Places 2018**

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TNO



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# SCORES PROJECT



SCORES combines and optimizes the **multi-energy generation, storage and consumption** of **local renewable energy** (electricity and heat) and **grid supply**. Via the development of compact hybrid storage technologies, integrated through a smart Building Energy Management System, the project will optimize the self-consumption in residential buildings, bring new sources of flexibility to the grid, and enable **reliable operation** with a **positive business case** in Europe's building stock.



**12 Partners**



**9 Work Packages**



**Budget €6M**



**48 Months**

# PARTNERS

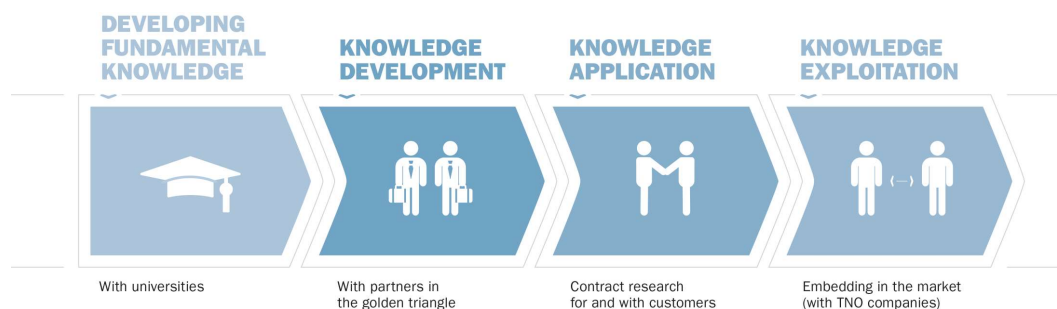


## ABOUT TNO

TNO connects people and knowledge to create innovations that boost the sustainable competitive strength of industry and well-being of society.



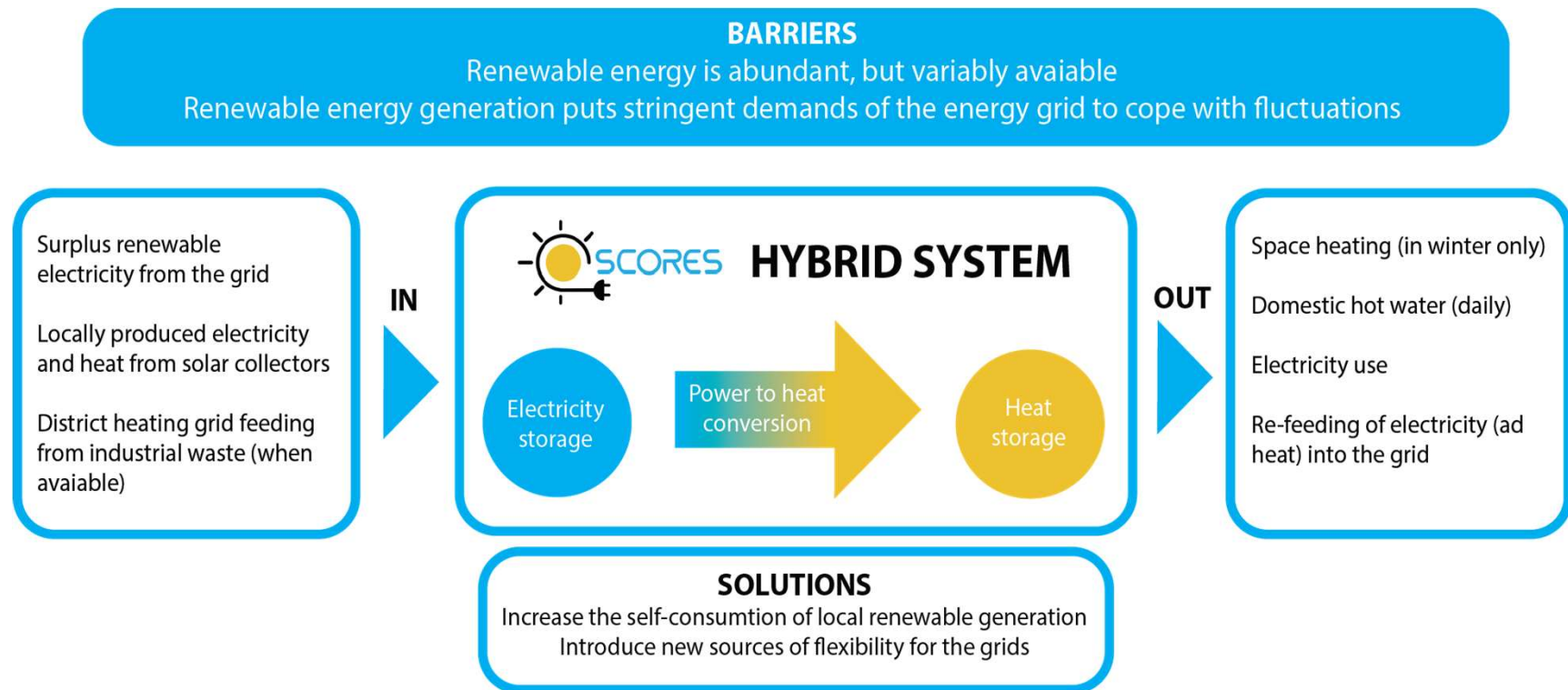
## 'INNOVATION FOR LIFE'



# OVERALL CONCEPT



The SCORES concept is based on a hybrid system combining effectively and efficiently solutions that **harvest electricity** and heat from the sun, **store electricity**, **convert electricity into heat**, **store heat**, and **manage the energy flows** in the building.

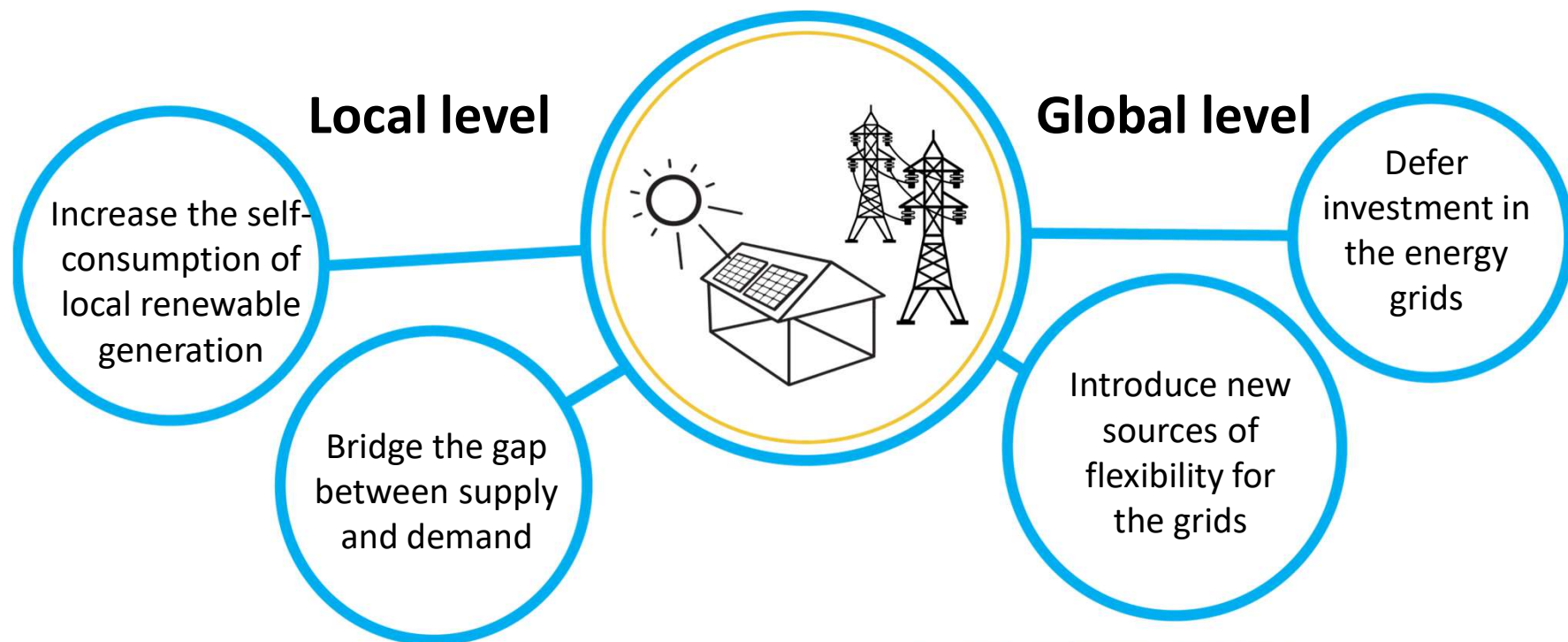




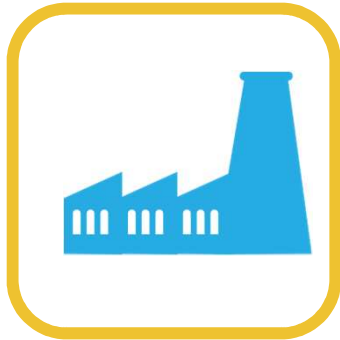
# OBJECTIVES



Demonstrate in the field the integration, optimization and operation of a building energy system including **new compact hybrid storage technologies**, that optimize supply, storage and demand of electricity and heat in residential buildings and that increases self-consumption of local renewable energy in residential buildings at the lowest cost.



# PURPOSE



**Competitive  
industry**



**Grid stability**



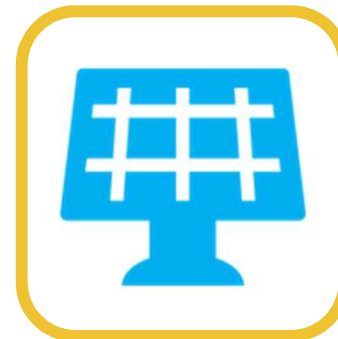
**Energy  
Independency**



**CO<sub>2</sub> reduction**



**Jobs Creation**



**More  
renewables**

# GOALS



1

- Develop a technology of second life Li-ion batteries

2

- Electric driven heating with intraday PCM heat storage

3

- Optimize a high performance water to water heat pump supplied by hybrid PV and solar collectors

4

- Improve and optimize compact loss freeheat storage technology

5

- Develop an integrated building energy management system

6

- Assess the economical potential of the hybrid system



# DEMONSTRATION



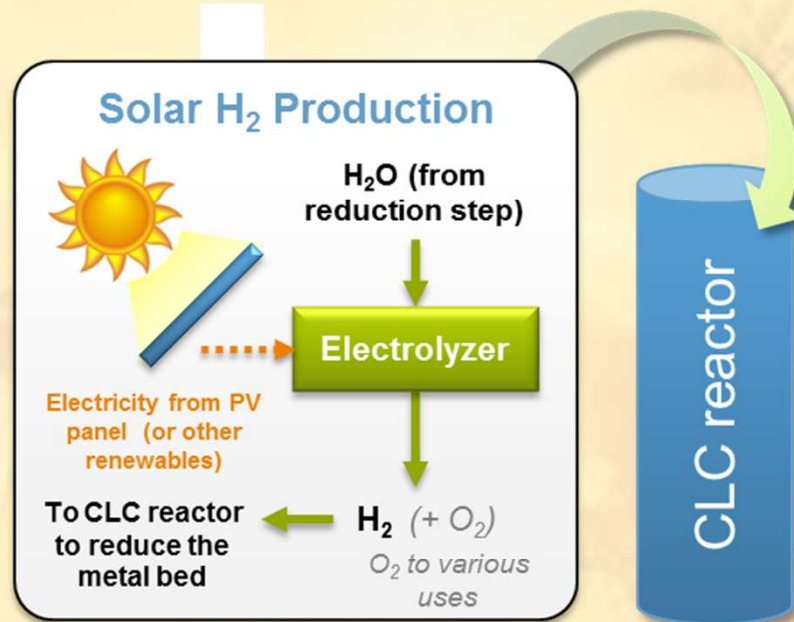
Demonstration of the integrated hybrid energy system will take place in **two real buildings** representative of different climate and energy system configurations for 3 cases, in Northern Europe (**Austria**) with and without a heat grid, and in Middle/Southern Europe (**France**) without a heat grid.





## SCORES: Loss free heat store concept

### Energy storage



**Bed reduction:** Solar energy from summer is stored as chemical energy, without losses, until the heat is needed

### Heat supply



**Bed oxidation:** Running air through the reactor oxidizes the bed and provides heat all winter long

# CONTACT INFO



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# THANK YOU FOR ATTENTION!

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