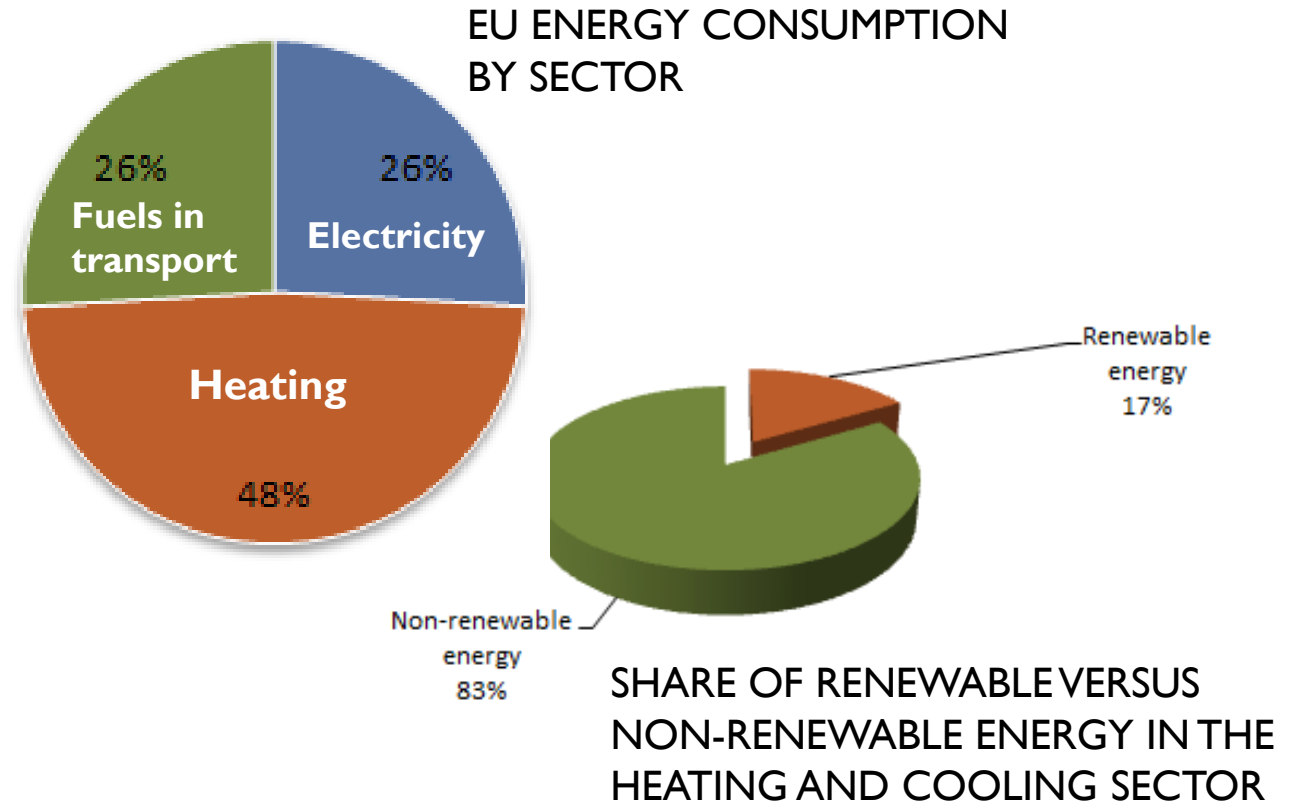
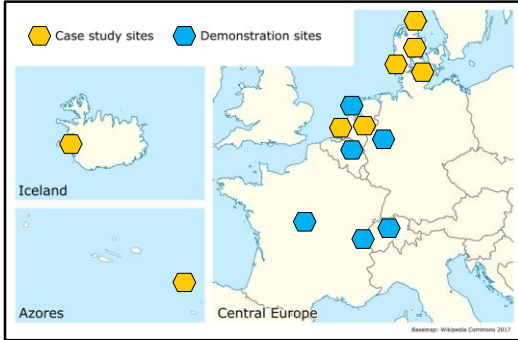


## CHALLENGE - TRANSITION IN THE HEATING AND COOLING SECTOR

- Heating and cooling is responsible for half of all consumed final energy in Europe.
- The vast majority – 83% – of the demand is fulfilled by fossil fuels, most notably natural gas.
- Challenge to minimize the use of gas and to increase the share of sustainable energy sources.
- Surplus of heat in summer, lack in winter.
- Seasonal Underground Thermal Energy Storage (UTES) is an important technology to support future energy consumption
- HEATSTORE adds to UTES knowledge



# INFOGRAPHIC HEATSTORE



**23 partners | 9 EU countries**

**6 Demonstration projects**

- 3 Aquifer thermal energy storage proj.
- 1 Borehole thermal energy storage proj.
- 1 Mine thermal energy storage proj.
- 1 Demand Side Management of a DHN

**8 case studies**

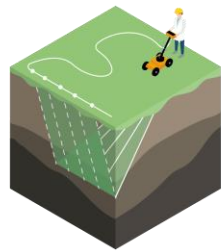
- Technical future potential UTES and DSM in Europe
- New business models
- Stakeholder engagement
- Roadmap for fast track uptake

- Detailed design
- Operation of UTES and DSM technologies
- Proof of technology
- Monitoring technical, economic and environmental performance
- Stakeholder engagement on project level



Fast track market uptake

Model & design validation



Characterization SOTA of UTES



Modelling subsurface dynamics



Heating system integration & UTES design optimisation



Demonstration



System performance monitoring

**Best practice guidelines:**

- Design & System integration
- Business model
- Regulatory framework
- Stakeholder perception & engagement
- Monitoring & Environmental performance

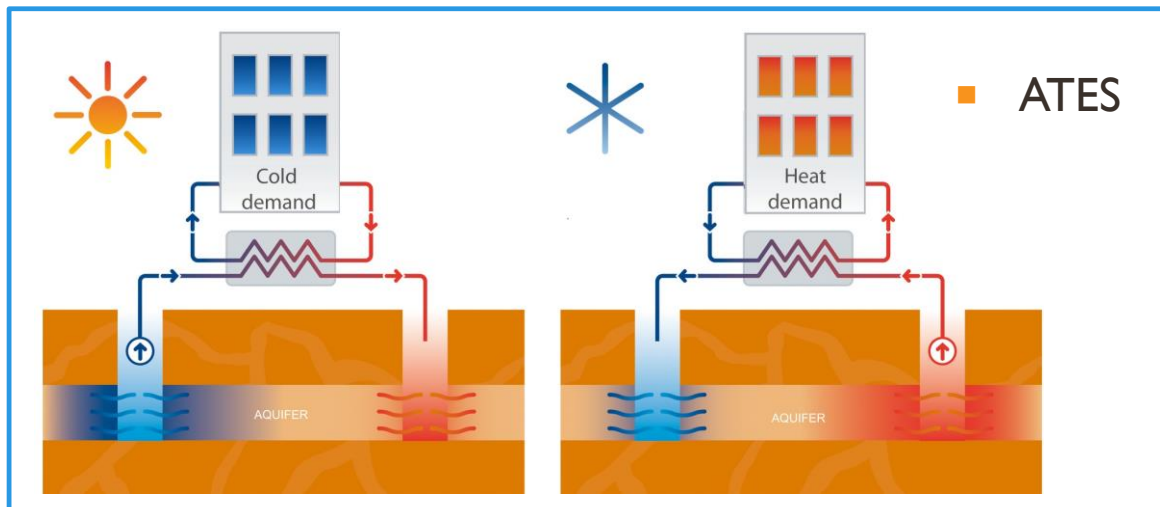
**Design**



**Demonstration**



**Replication and scale-up**

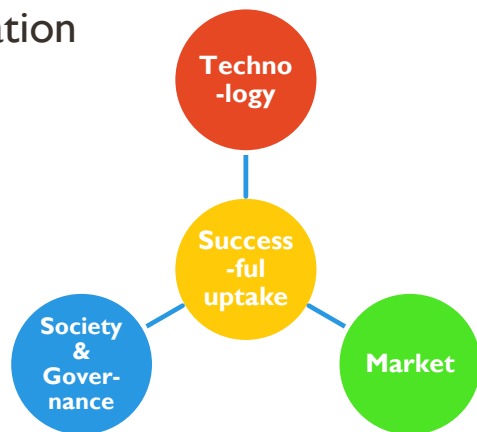


■ ATEs






■ Roadmap towards implementation

■ Success factors

- Regulatory framework
- Business cases
- Stakeholder perception
- Environmental impacts



■ IMPACTS

-  Improved performance and economics of UTES technologies
-  Advanced system integration using UTES and smart demand side management
-  Significantly higher integration of sustainable and surplus heat sources in heating networks (geothermal, solar and industrial surplus heat)
-  Bringing multiple underground thermal energy storage concepts and demand side management techniques further,
-  Key advancements in the science related to challenges identified in earlier pilot projects for the demonstrated concepts, including environmental impacts

■ HEATSTORE = GEOTHERMICA ERA-NET co-fund project

■ 16.3 M€ | 23 partners in 9 EU countries

■ Coordination: Dr. Holger Cremer | [holger.cremer@tno.nl](mailto:holger.cremer@tno.nl) | +31 6 5280 3590 (TNO Netherlands Organization for Applied Scientific Research)