

HEATSTORE WEBINAR SERIES

HOW TO DEVELOP UNDERGROUND THERMAL ENERGY STORAGE (UTES) PROJECTS?

Learnings from the European HEATSTORE project

Host: TNO, The Netherlands



7, 14, 21, 28 Sept. and 5, 12 Oct. 2021 | all 15-16 h (CEST)

Register on www.heatstore.eu

HEATSTORE WEBINAR SERIES 2021

All webinars are at 15 – 16 h CEST

Tuesday 7 Sept. (Holger Cremer, TNO): Challenges in Underground Thermal Energy Storage (UTES)

Tuesday 14 Sept. (Thomas Driesner, ETH Zurich): Advances in subsurface characterization and simulation

Tuesday 21 Sept. (Koen Allaerts, VITO): Integrating UTES and DSM in geothermal district heating networks

Tuesday 28 Sept. (Florian Hahn, Fraunhofer IEG): Abandoned coal mines – promising sites to store heat in the underground

Tuesday 5 Oct. (Bas Godschalk, IF Technology): The ECW Energy HT-ATES project in the Netherlands

Tuesday 12 Oct. (Joris Koornneef, TNO): The role of UTES in the future EU energy system – a moderated table discussion.

HEATSTORE

- HEATSTORE = GEOTHERMICA ERA-NET co-fund project
- 16.3 M€ | 23 partners in 9 EU countries
- 6 demonstration sites, 8 case studies.
- Coordination: TNO Netherlands Organization for Applied Scientific Research)



TNO innovation
for life



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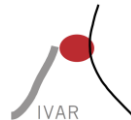
ETH zürich



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PlanEnergi

OR
Reykjavik Energy



brgm
Géosciences pour une Terre durable

delta h
Ingenieurgesellschaft

**KEMPENS
WARMTEBEDRIJF**
groene warmte uit de regio

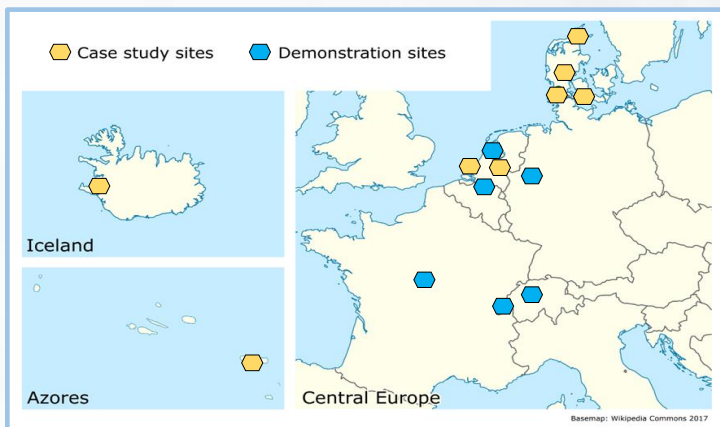
SPiE

heatstore
High Temperature
Underground Thermal Energy
Storage

GEOTHERMICA



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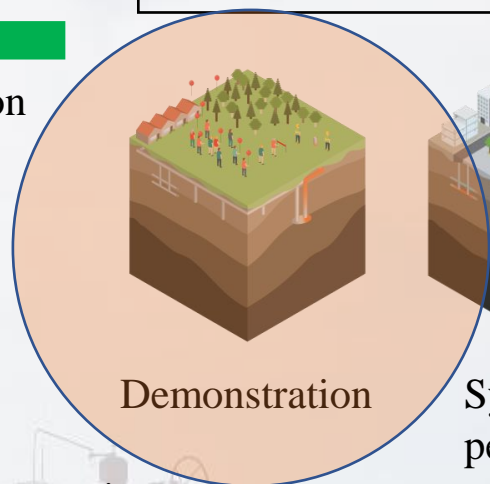
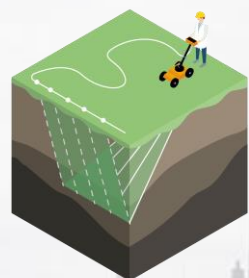


- **Best practice guidelines:** Design & System integration | Business models | Regulatory framework | Stakeholder perception & engagement | Monitoring technical, economic and environmental performance

- Proof and operation of UTES and DSM technologies



Model & design validation



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

Design

Demonstration

Replication and scale-up

heatstore
High Temperature Underground Thermal Energy Storage

GEO THERMICA



HEATSTORE – 5 Oct. 2021

The ECW Energy HT-ATES project in the Netherlands



- Bas Godschalk (IF Technology): Convenor & Opening
- Wim Bos (ECW Energy): Why ECW is applying a HT-ATES?
- Peter Oerlemans (IF Technology): The Dutch HT-ATES project: hydro-geological & legal challenges with developing a full-scale HT-ATES system
- Nico Franco Pinto (IF Technology): The Dutch HT-ATES project: design & realisation challenges with developing a full-scale HT-ATES system

HIGH TEMPERATURE UNDERGROUND THERMAL ENERGY STORAGE IN A GREENHOUSE AREA MIDDENMEER IN THE NETHERLANDS



Wim Bos

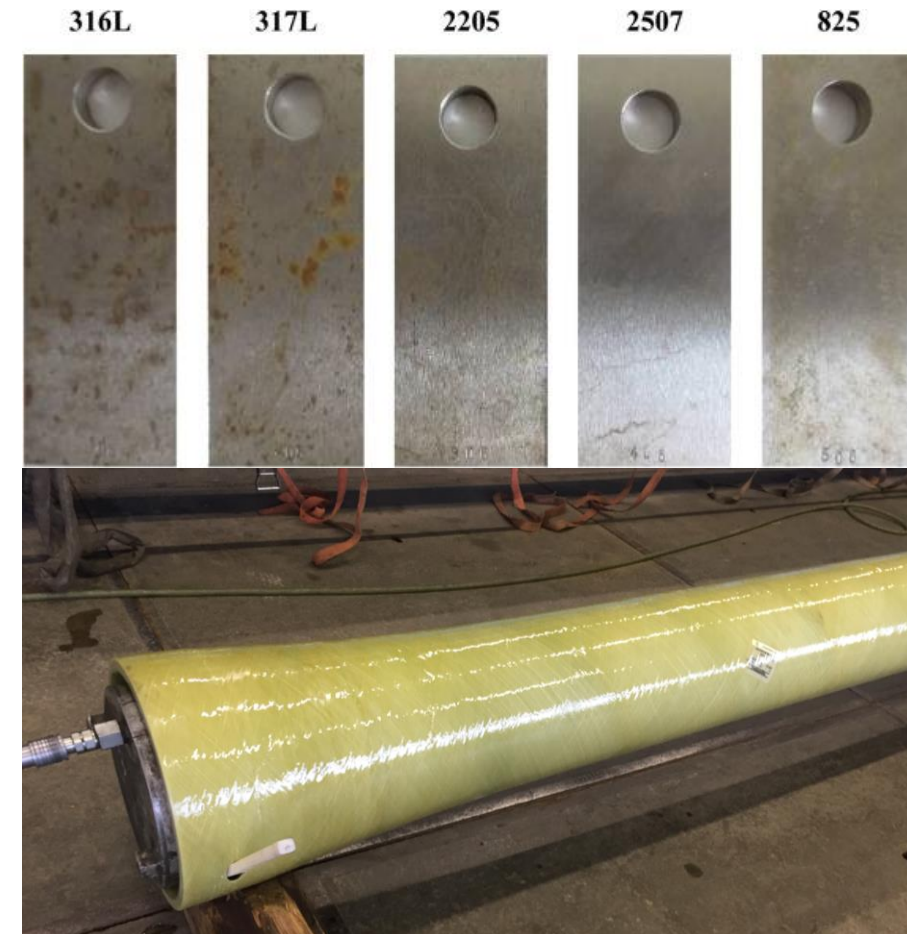


Bas Godschalk
Peter Oerlemans
Nico Franco Pinto

Webinar Heatstore, October 5th, 2021

MECHANICAL DESIGN CHALLENGES FULL-SCALE HT-ATES SYSTEM

- Materials selection
- Merging technologies from different fields
- Achieving wide flow range
- Increasing partial pressure CO₂
- Performing maintenance on a heated well
- Designing for thermal expansion



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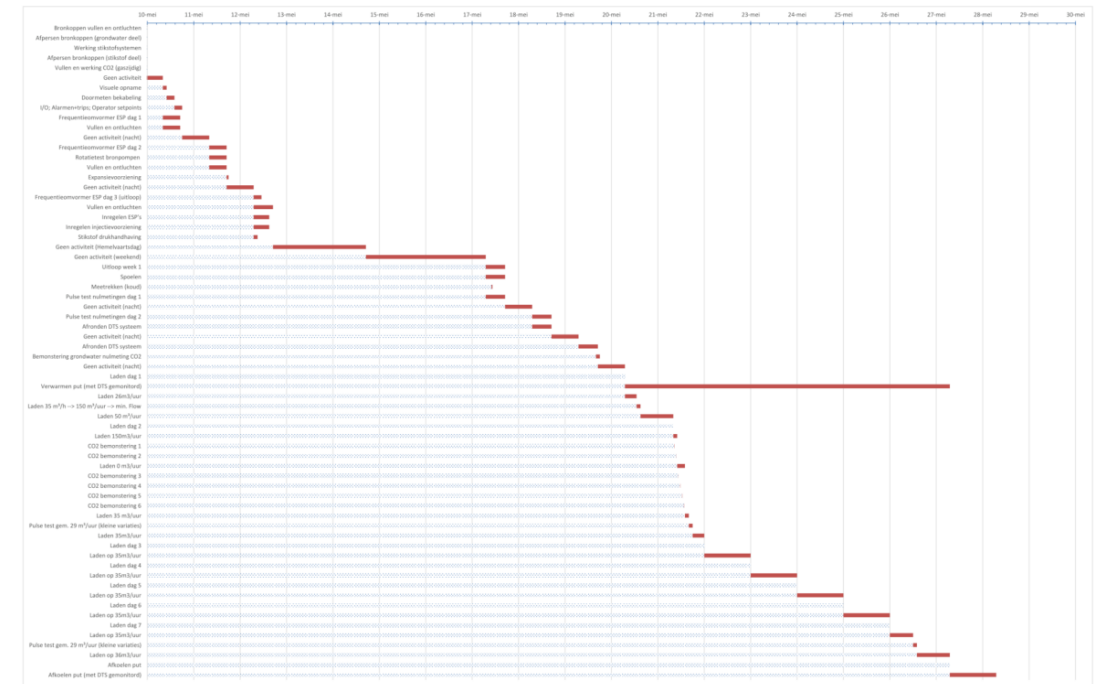
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COMMISSIONING CHALLENGES FULL-SCALE HT-ATES SYSTEM

- Making a (tight) schedule that mostly fits all involved
- Keeping the schedule going, despite setbacks
- What can the system actually do?
 - Low drawdown → ESP dynamics better than expected
 - Low extraction temperature → flow limitation first year
 - Maximal injection resistance → minimum flow
 - CO₂: Currently works as intended. Future dosage yet to be determined.
 - Software for switching of injection valves works, but has limitations.



THANK YOU FOR YOUR ATTENTION

www.heatstore.eu



HEATSTORE (170153-4401) is one of nine projects under the GEOthermica – ERA NET Cofund aimed at accelerating the uptake of geothermal energy by 1) advancing and integrating different types of underground thermal energy storage (UTES) in the energy system, 2) providing a means to maximise geothermal heat production and optimise the business case of geothermal heat production doublets, 3) addressing technical, economic, environmental, regulatory and policy aspects that are necessary to support efficient and cost-effective deployment of UTES technologies in Europe. The three-year project will stimulate a fast-track market uptake in Europe, promoting development from demonstration phase to commercial deployment within two to five years, and provide an outlook for utilisation potential towards 2030 and 2050.

The GEOthermica project is supported by the European Union's HORIZON 2020 programme for research, technological development and demonstration under grant agreement No 731117.