# 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 High Temperature Underground Thermal Energy Storage

GEOTHERMICA

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# 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)

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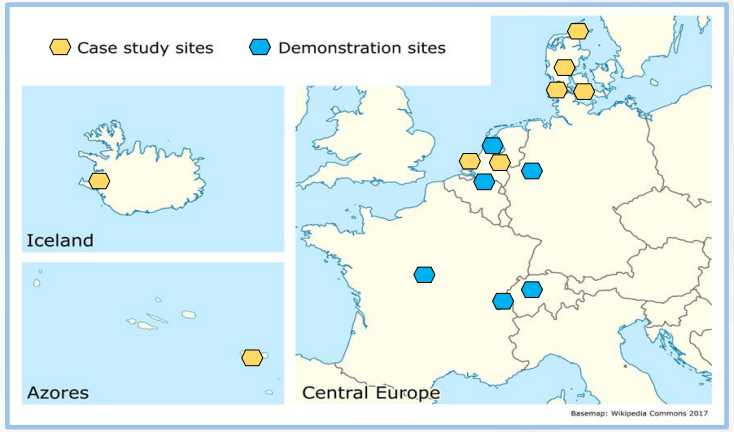


- **Best practice guidelines:** Design & System integration | Business models | Regulatory framework | Stakeholder perception & engagement | Monitoring technical, economic and environmental performance

- Proof and operation of UTES and DSM technologies

Fast track market uptake

Model & design validation

Characterization of UTES

Modelling sub-surface dynamics

Heating system integration & design optimisation

Demonstration

System performance monitoring

- **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**

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# 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

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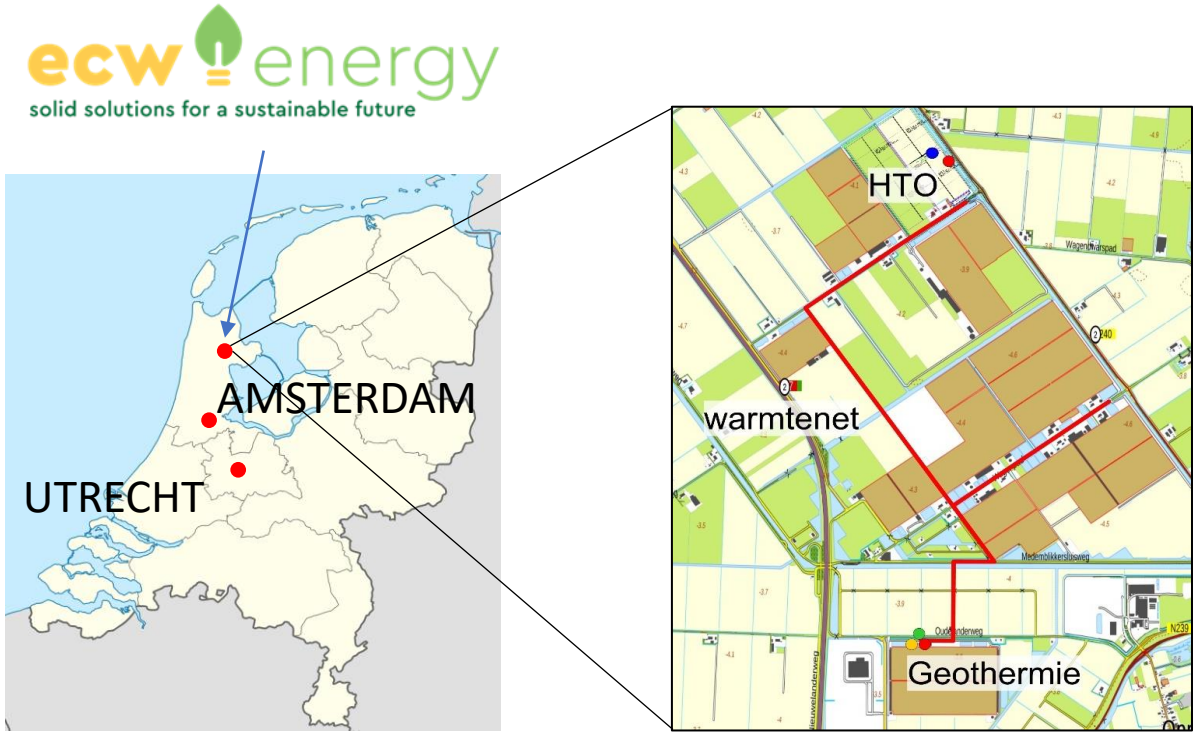
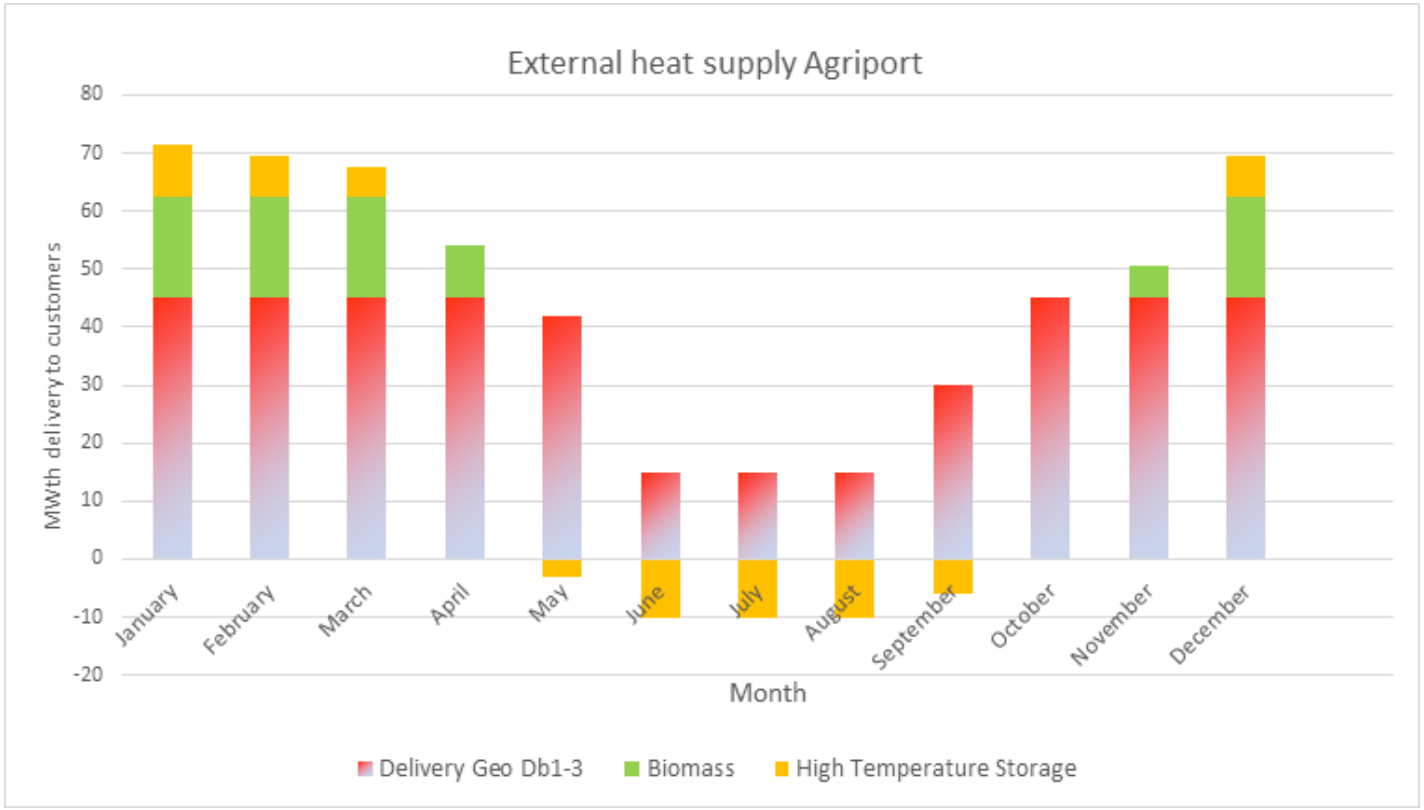
# Demonstration project ECW




# Production scheme Geothermal energy for Agriport



# Energy transition

- Geothermal energy is for the greenhouse horticulture a source for heat but also to reduce natural gas consumption and therefore $CO_2$ reduction.
- A geothermal system operates with a COP between 15 and 20. which means 1 MW electricity creates 20 MW of heat.
- Per geothermal system 30 mln $m^3$ natural gas can be saved. On Agriport this is roughly 90 mln $m^3$ and thus a $CO_2$ reduction of 160,000 ton annual.
- Expectation on efficiency HTO is between 70 and 75%. During load season we aim for 16 MW and during production 12 MW. $CO_2$ reduction based on heat is 15,000 ton annual.

# From mechanical engineering point of view

- High opex geothermal system
  - Due to high failure rate of ESP systems. (up and down adjustments puts pressure on the lifespan)
  - Imbalance in the heat supply what causes side effects. (a geothermal well is a combination of steel and cement)

- For a reliable Geothermal heat system we focus on a production proces that is as gradual as possible with as few fluctuations as possible.