

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.



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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)

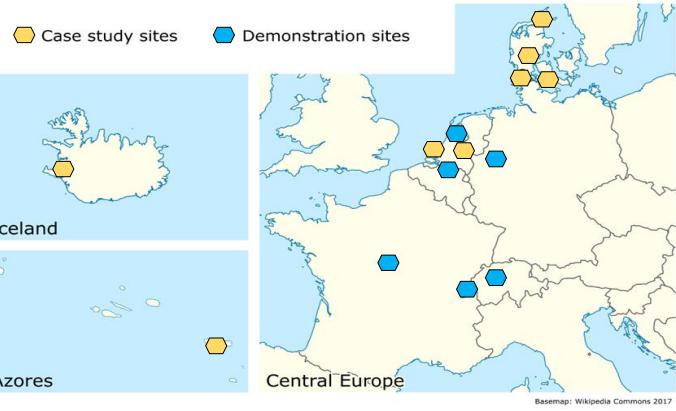


heatstore
High Temperature
Underground Thermal Energy Storage

GEOTHERMICA

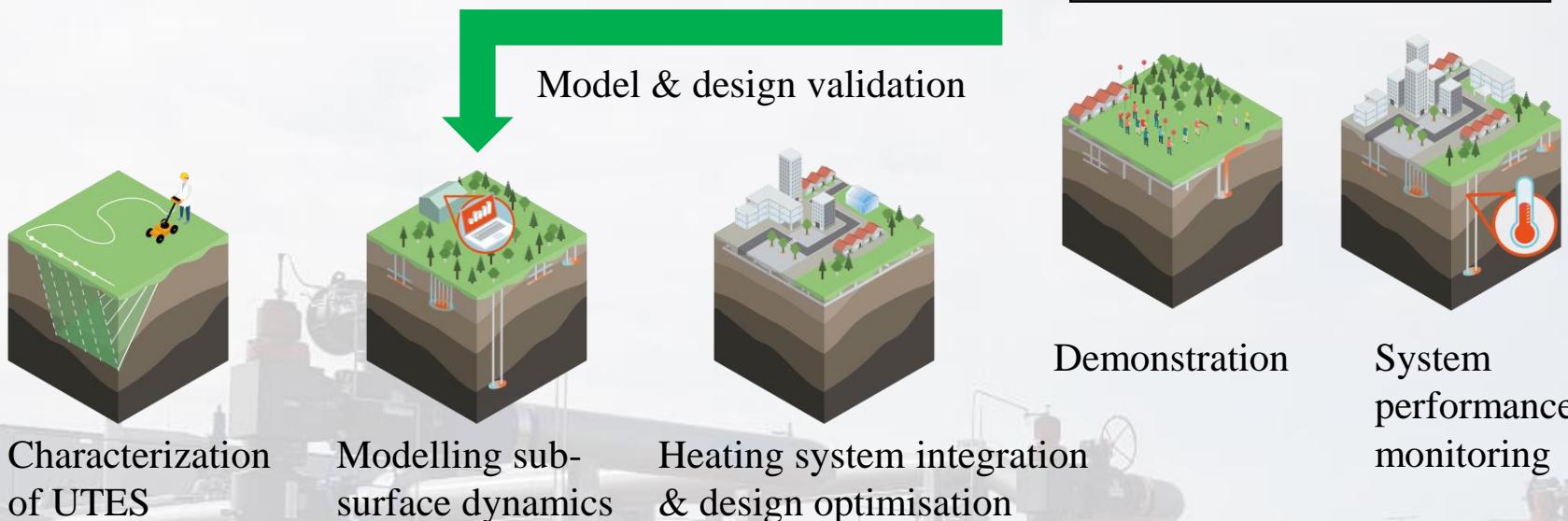
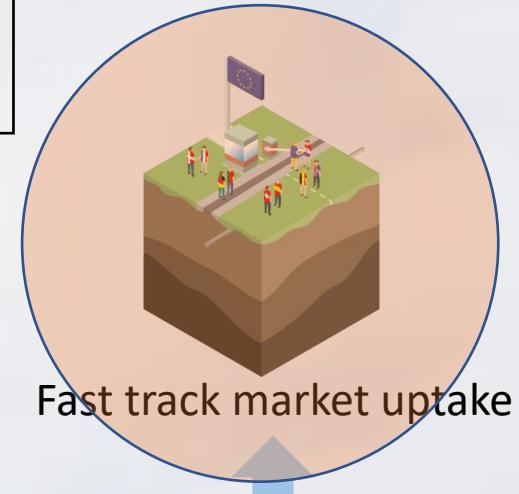


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- Best practice guidelines: Design & System integration | Business models | Regulatory framework | Stakeholder perception & engagement | Monitoring technical, economic and environmental performance

- Proof and operation of UTES and DSM technologies



Design

Demonstration

Replication and scale-up

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High Temperature Underground
Thermal Energy Storage

GEO THERMICA



HEATSTORE – 12 Oct. 2021

The role of UTES in the future EU energy system – a moderated table discussion



- Joris Koornneef (TNO): Convenor & Opening
- Jacopo Tosoni (EASE): The current role of energy storage in the EU
- Gonzalo Fernández Costa (European Commission – DG Ener): Energy storage in the EU – steps forward



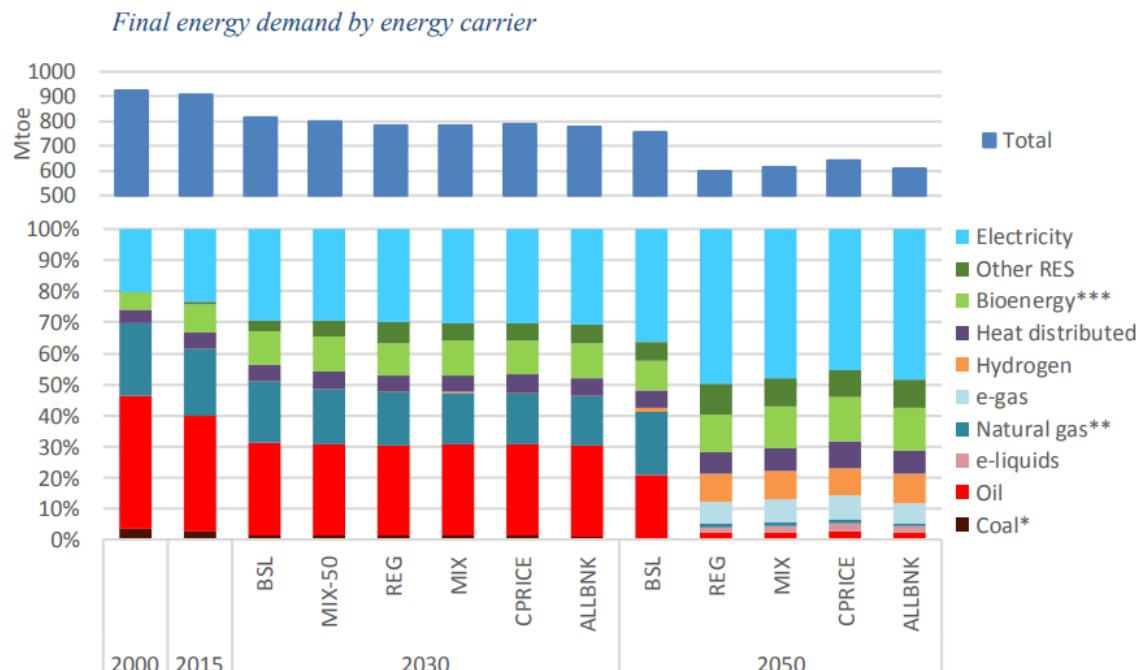
Energy storage in the European Union

Steps forward

How to Develop Underground Thermal Energy Storage (UTES) Projects
European HEATSTORE
12 October 2021

The EU to be climate neutral by 2050

- The **European Green Deal** provides an action plan for the EU to be climate neutral in 2050.
- The **European Climate Law** turns this political commitment into a legal obligation, including 55% net emission reduction by 2030.



Energy account for more than 75%
of the EU's GHG emissions

2030 → ~ 65% RES in the grid
2050 → ~ 85% RES in the grid

Role of energy storage

- Energy storage could offer **flexibility to the energy system**, facilitating **integration of RES**, lowering electricity prices during peak times, facilitating **electrification** of the economy and increasing **security of the energy system**.
 - Different energy storage technologies with different characteristics and maturity levels **compete and interact with each other and with other technologies**, such as flexible generation or demand side response.
 - Energy storage should be **market-based on a level playing field**.
- In July 2020 the European Parliament adopts a resolution on energy storage, which provides a comprehensive overview and explores the potential of energy storage in the EU (with a specific section on thermal storage).

Study on energy storage

Contribution to the security of the electricity supply in Europe

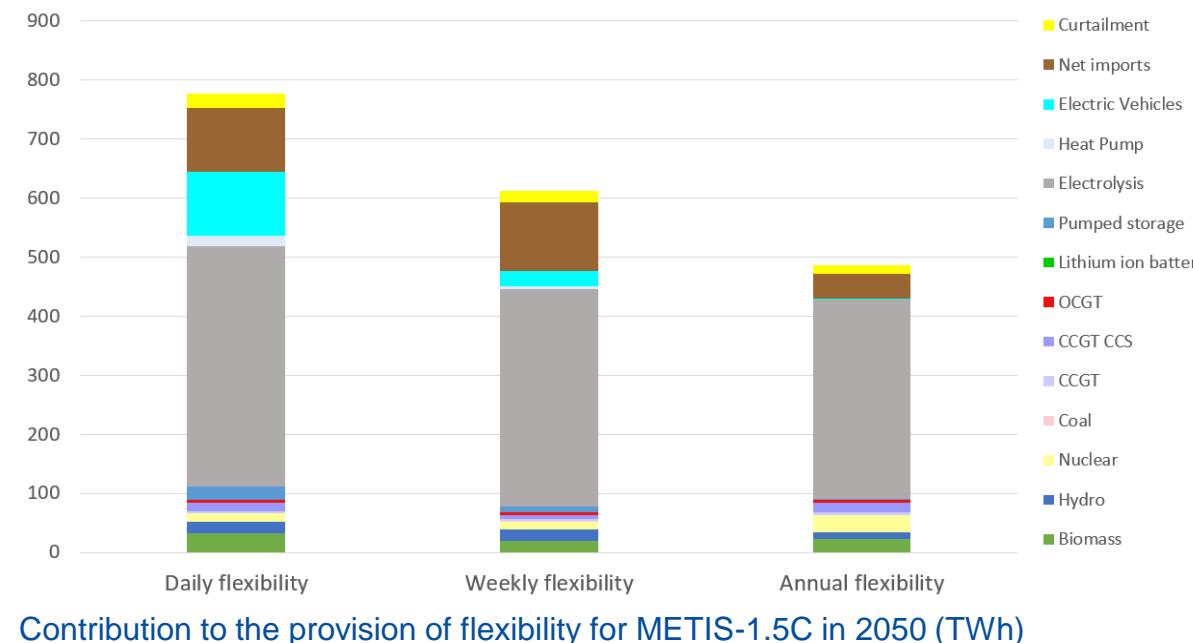
- Study on energy storage, published in May 2020:
 - Creating a first **database** of storage facilities in the EU.
 - Assessing EU **flexibility needs** for 2030 and 2050 in the electricity system.
 - Identifying regulatory **barriers** and providing **recommendations** in the EU.



Study on energy storage

Increase need for system flexibility in 2030 and 2050

- Several technologies compete to provide flexibility to the energy system:
 - Key role of **batteries** and **pumped-hydro** storage in the short term.
 - Key role of **electrolysers** in the long term, driven by the need to decarbonize different sectors.
 - High potential of **electric vehicles** and **thermal storage** to provide daily flexibility.



EU regulation - Clean Energy Package

- Electricity market design adopted in 2019:
 - Energy storage **definition**, accommodating the different storage technologies.
 - Participation of energy storage in all energy markets at a **level playing field** with other energy resources.
 - Competitive, consumer-centred, flexible and non-discriminatory electricity **markets**. Including the promotion of aggregation, dynamic prices and storage for active consumers.
 - **Limited role for system operators**, which can be involved in storage activities to ensure reliable and secure operation but only under certain conditions.

Cross-cutting matter

- Energy **system integration** and **hydrogen** strategies.
 - Renovation wave and performance of **buildings**.
 - **Electromobility** and alternative fuel infrastructure (V2G services).
 - Second life and recycling of **batteries**.
 - Attention to critical **supply chains** for energy technologies.
 - **Research and innovation** funding under H2020, Horizon Europe and Innovation Fund.
 - **Taxonomy** and **Energy taxation** (contributor to climate change adaptation and mitigation).
 - Eligible to receive **public funds** from the Recovery and Resilience Facility and from Invest EU.
- *Fit for 55 proposal (July 2021): ETD (taxation); RED (thermal energy storage as a source of flexibility); or EED (encourage demand response and storage).*
- *Horizon Europe WP 2021-2022: calls for geothermal and thermal energy storage solutions (for electricity load shifting, optimisation of on-site RES generation, or integration with district heating).*

Next steps

- Dedicated **workshops** to identify financing difficulties, adequate economic signals and specific regulatory barriers for energy storage.
 - *EUSEW session “Energy Storage – Financing and economic signals” (27 October)*

Thank you

Contact:

**European Commission
DG ENER – B4**

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