HEATSTORE WEBINAR SERIES

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

Learnings from the European HEATSTORE project

Host: TNO, The Netherlands

heatstore High Temperature Underground Thermal Energy Storage

GEOTHERMICA

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 = 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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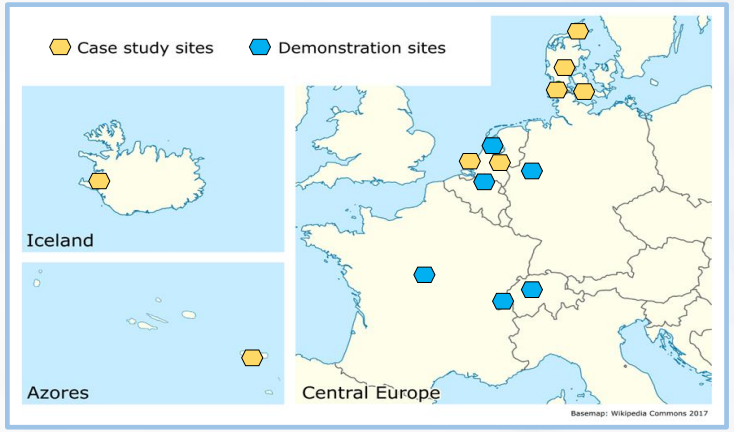
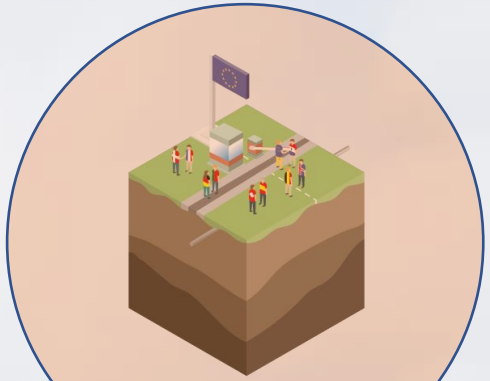


- **Best practice guidelines:** Design & System integration | Business models | Regulatory framework | Stakeholder perception & engagement | Monitoring technical, economic and environmental performance



Fast track market uptake

- Proof and operation of UTES and DSM technologies

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 – 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

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The current role of energy storage in the EU

12 October 2021 | Jacopo Tosoni

EASE Members

EASE
European Association for Storage of Energy

Introduction

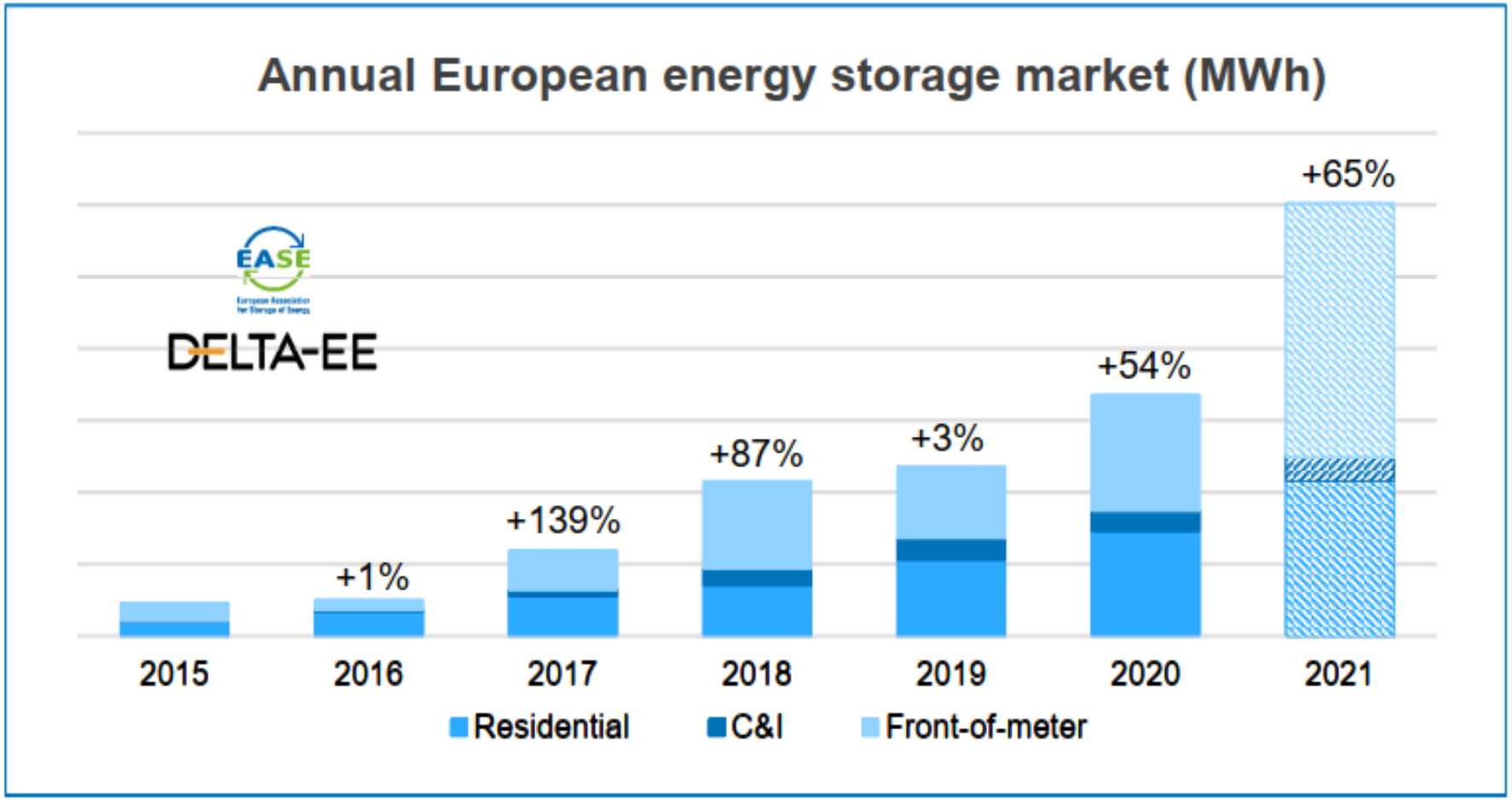
Going straight to the point

There is an increasing demand for energy storage in Europe

8.3 GWh
2021

0.6 GWh
2015

Cumulative installed base



And this despite the COVID-19 Pandemic, which has dramatically slowed down projects

But why is there an increasing demand for energy storage in Europe?

There are three key drivers

There is an increasing demand for energy storage

EASE
European Association for Storage of Energy

Driver 1: Need to increase energy efficiency, optimisation and to reduce CO_2 emissions

European Commission
Climate Action

There is a need for decarbonise not only the energy sector, but also other sectors by a.o. improving links between different energy carriers, decreasing import dependency on fossil fuels (these weeks' gas spikes!)

And indeed, Fernandez Costa will show how the European Commission plans to tackle decarbonisation…

There is an increasing demand for energy storage in Europe

European Association for Storage of Energy

Driver 2: Increase in variable renewable energy

Need to bridge fluctuations at different time-scales in supply and demand

ES technologies, such as TES, can ensure energy shifting not only intraday, but looking at a seasonal/strategic perspective

Mr Koornneef will look into this topic later

There is an increasing demand for energy storage

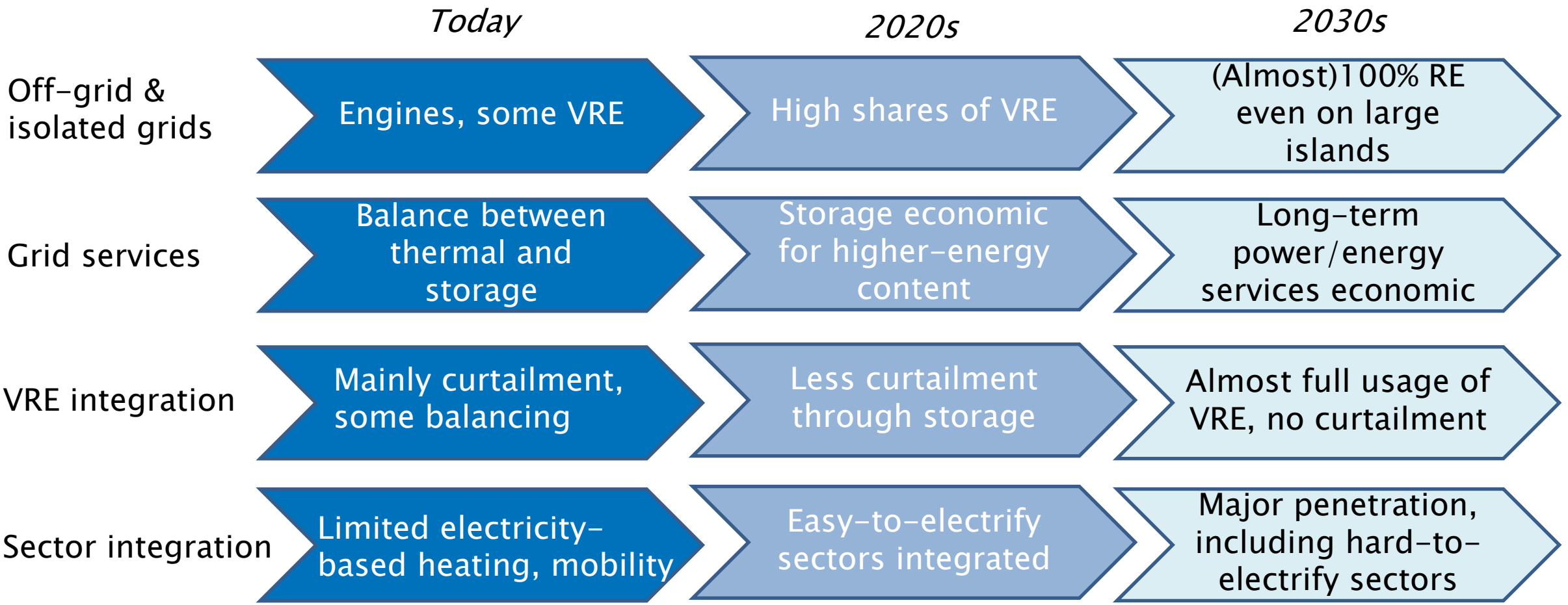
European Association for Storage of Energy

Driver 3: Increase in renewable energy curtailment

Key for improving the return on renewable energy generation investments

What will the drivers lead to?

In 2030, the landscape will be completely different



So, it's everything all set to decarbonise the system?

Is Energy Storage' potential fully untapped?

The simple answer: no

Need to work on…

1. Legislative framework
2. Lack of proper remuneration

1. Legislative framework

The EU is going in the right direction…

- …But some EU countries still don't have a definition of energy storage, or don't allow them to provide flexibility service, or the rights/obligations of operators are not defined

- For energy Storage, still double grid fees and consumption taxes on energy stored to be fed back to the system

- The lack of Energy Storage targets is delaying its uptake and the creation of new market products that can decarbonise and stabilise the grid

The Brightside: many EU-level changes incoming?

2. Lack of proper remuneration

a. Not all ES services are remunerated – some countries allow to monetise better than others
   a. In particular, services related to long-term / seasonal / strategic storage are nor remunerated at all
   b. *Thermal Energy Storage can do it*

Other key problems, such as short term contract and capacity markets de-rating are also present

Generation/Bulk Services	Ancillary Services	Transmission Infrastructure Services	Distribution Infrastructure Services	Customer Energy Management Services
Arbitrage	Primary frequency control	Transmission investment deferral	Capacity support	End-user peak shaving
Electric supply capacity	Secondary frequency control	Angular stability	Contingency grid support	Time-of-use energy cost management
Support to conventional generation	Tertiary frequency control	Transmission support	Distribution investment deferral	Particular requirements in power quality
Ancillary services RES support	Frequency stability of the system		Distribution power quality	Maximising self-production & self-consumption of electricity
Capacity firming	Black start		Dynamic, local voltage control	Demand charge management
Curtailment minimisation	Voltage support		Intentional islanding	Continuity of energy supply
Limitation of disturbances	New ancillary services		Limitation of disturbances	Limitation of upstream disturbances
			Reactive power compensation	Reactive power compensation
				EV integration

What does this mean?

1. Energy storage still faces barriers in Europe

2. If such barriers are tackled, ES uptake will be even more dramatic

3. Long-duration ES technologies, such as TES, are key to ensure stability and system decarbonisation in Europe

Thank you for your attention

Talk to us

We're ready to answer your questions.

Email
info@ease-storage.eu

Website
www.ease-storage.eu

Phone number
+32 2 743 29 82

Follow us
@EASE_ES

Come visit us
Avenue Adolphe Lacomblé 59/8
BE - 1030 Brussels