

PANTOKRATOR

A better way

Unlocking the power of
Thermal Energy Storage

2025 Industry Update

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Pantokrator is a London based corporate finance advisory firm supporting high growth companies in sustainability



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Pantokrator TES content

Check out our **podcast series** with leaders in the space



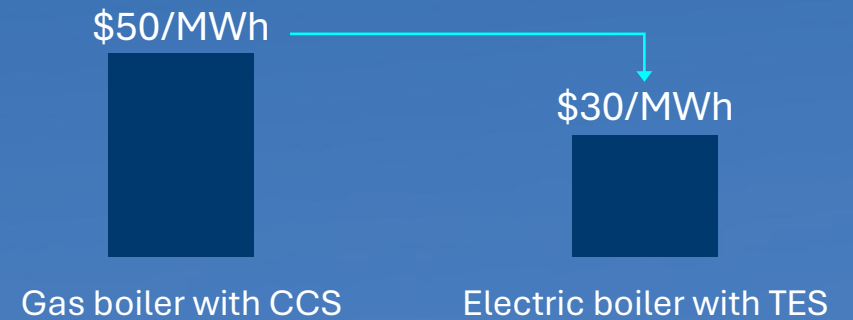
Hosted **TES webinar** with 200+ attendees and top players



\$1.5Trn

Capex for TES

TES is cost competitive today



25+

Companies



90%+

Round trip efficiency

Commercialisation: 10+ projects expected to go live in next 12 months



HaaS: potential for higher profitability

HaaS: Base case

EU Subsidies
Electricity
Heat/Steam

HaaS: Full potential

+
Additional
revenue streams

pIRR 20%+

Need expertise
to interface

Energy Trading



Energy traders

Grid Services



Energy aggregators

EU Subsidies

Electricity

Heat/Steam



Industrial clients

The current viability of the European Market

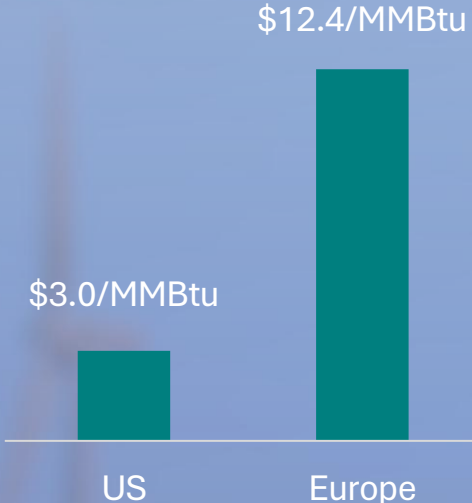
Electrification

1.3x usage by 2035



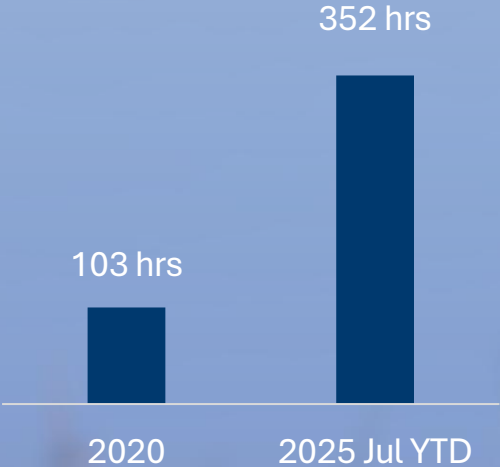
Energy security

Natural gas 4x vs US



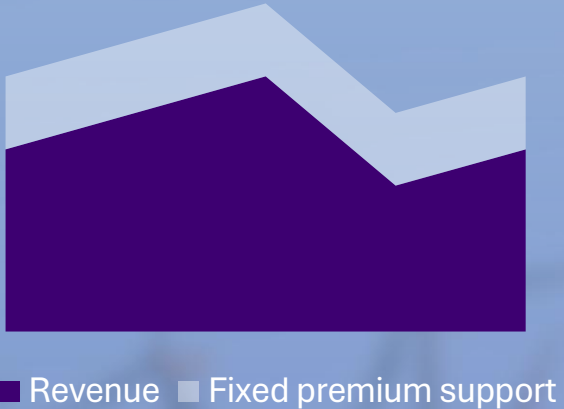
Curtailement

Negative pricing
= cheap PPAs



Heat auction subsidy

€1bn scheme,
~€20/MWh grant



Case study overview



32 MWh



20 MWh



70 MWh



7.5 MWh



100 MWh



100 MWh





x **Tempo**



32 MWh

Client

- One of Israel's largest beverage producers
- Suppliers to Heineken and Pepsi

Project

- Replacing boilers with steam through PV and grid electricity

Q4 2023

Q4 2025



15 years
PPA agreement

\$7.5m
Customer energy savings

6.2 kT
Annual abatement





x



20 MWh

Client

- Leading Finnish food manufacturer, providing prepared meals and convenience food products

Project

- Replacing 85% fossil fuel use at pizza production factory

Q3 2024

Q4 2025



7 years
Agreement

11 GWh
Steam generated p.a.

2.9 kT
Annual abatement



KRAFT
BLOCK

x Eneco

PEPSICO

70 MWh

Client

- Targeting **40% GHG** reduction by 2030

Project

- Replacing gas for 1m bags of crisps daily
- Collaboration with Eneco, largest energy supplier in Netherlands and Belgium

Q4 2022

Q4 2025

Announced

Commissioning

800°C

Storage temperature

9.0 MMm³

Customer energy savings

8.5 kT

Annual abatement



MAGALDI x
dependable energy storage



FERRERO

7.5 MWh

Client

- Supplier to **Ferrero**, global leader in confectionary and chocolate products

Project

- Replacing natural gas for vegetable oil refining
- Strategic collaboration with **Enel**

Q1 2023

Q3 2025

Announced

Operational

620°C

Storage temperature

20%

Customer gas savings

1.0 kT

Annual abatement





100 MWh

Client

- Industrial park including businesses across biogas, waste handling and plastics recycling

Project

- **Co-generation of heat and power** by leveraging 84 MW local wind and solar renewables

Q2 2024

Q3 2026



1500°C

Storage temperature

98%

P2H efficiency

80%

CO₂ savings





x



100 MWh

Project

- Providing 24/7 industrial steam, exclusively powered by on-site off-grid solar PV
- Drop-in integration with existing plant infrastructure, working alongside traditional gas boilers with no operational disruptions

Q3 2025

Q4 2025



310°C

Steam temperature

10,000

Equivalent home heating systems

>97%

Round-trip efficiency



Funding perspectives

Considerations

Mitigants

Momentum & scalability

“\$200m+ pipelines” pending success of current projects

10+ Projects coming **online in next 12 months**, without any known tech issues

Investor hesitancy

Investments lower in 2024/5 and dependent on success of initial projects

Window for VCs is limited as infrastructure funds gearing up

Returns

HaaS IRRs meet **minimums** and being secured?
Value and time of grid services and trading?

Early markets = **low elec and high gas prices**
Grid services needed for some time
Trading likely to increase

Huge market

\$1.5Trn CAPEX opportunity,
broad industrial demand

Europe attractive

Favourable **macro and policy support** unlocking robust projects

Technology

In the box: most are TRL 7+
Out of the box: Ancillary services

Commercial maturity

Projects coming online,
gaining operational experience

No winner takes all

Multiple solutions available & required: many can thrive

Heat-as-a-Service

Multiple skill sets to interface with
customers, grid and traders

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