MARCH 2024

Kyoto Group
Company Presentation

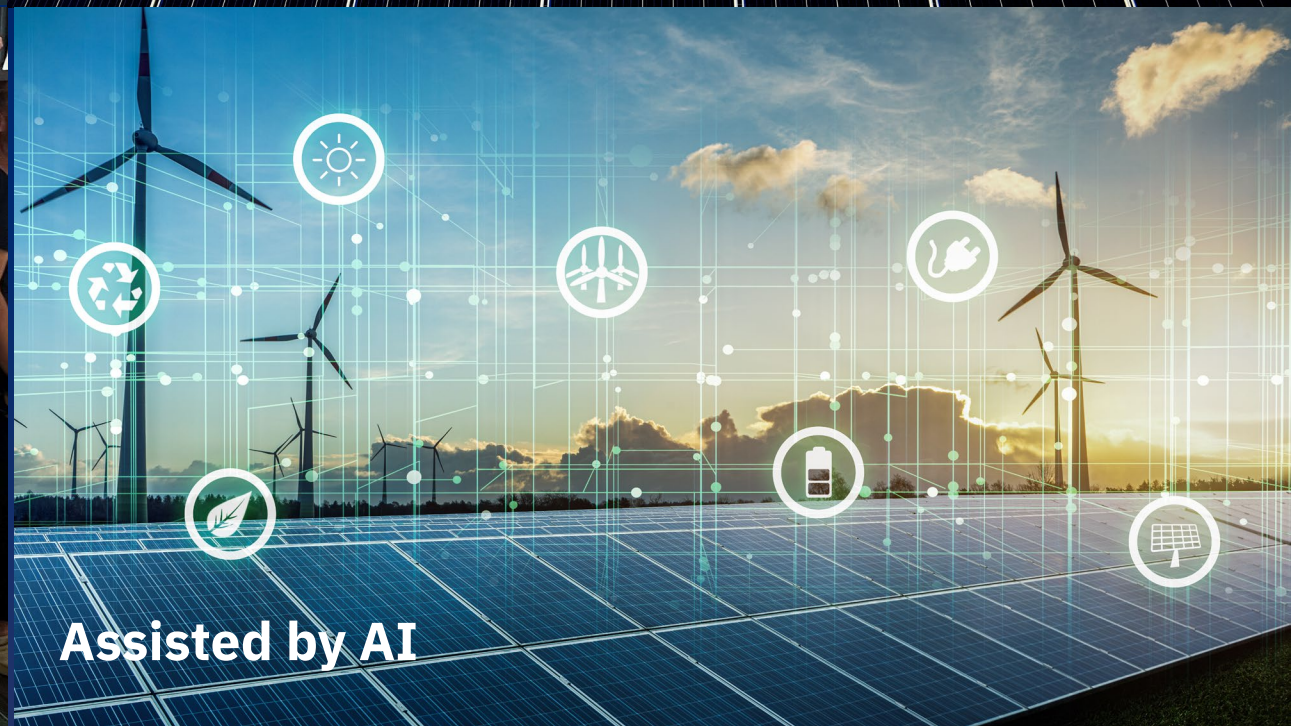
Mission

Empower industry with clean process heat

Vision

A world powered by Nature

Enabled by people



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Agenda

MARCH 2024

1. What problem do we solve for the society?
2. How do we solve it?
3. How does our solution compare to other technologies?
4. What does it mean for our clients?
5. What does it mean for us?


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Global average temperature Nov 17th 2023

> 2°C

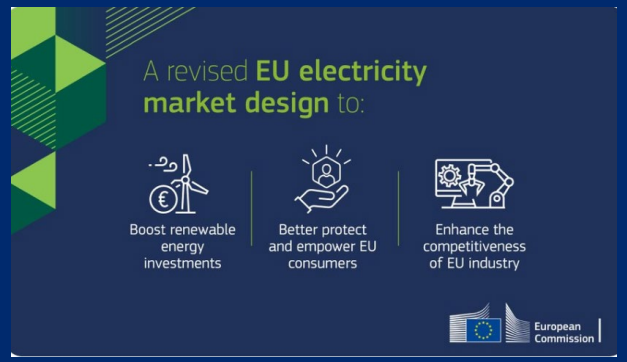
“Humanity has opened the gates of hell”

António Guterres,
UN Secretary General

Radical action ongoing to change CO_2 trajectory

Clean-tech investments need to triple. Now.
And will be fueled by critical legislation.

Designing a new electricity market



Renewable PPAs + storage, peak-shaving products, national objectives and support schemes for energy storage & demand response to balance the grid

Era of “electricity only” is over

Accelerating clean technologies

Energy storage included among selected strategic clean technologies given priority status and access to fast-track permissions, funding etc., to accelerate EU decarbonization

Incentivizing energy storage

EU Member States obliged to set targets for energy storage & demand response and revise every second year

New Electricity Market Design agreed

Provisional Agreement on new Electricity Market Design December 14th 2023

Adoption in Official Journal expected during 2H 2024

NO LOOPHOLE FOR FOSSIL FLEXIBILITY!

Member states shall define national targets for non-fossil flexibility, including energy storage & demand respons

also including capacity mechanisms, peak shaving products, support for green PPAs etc

EU may establish a Union strategy on non-fossil flexibility, depending on the consolidation of the Members states targets

Europe tightening climate policies even further

Provisional Agreement Feb 6th 2024 on a
90% reduction of GHG by 2040

EU to strengthen European Industry

Provisional Agreement on Strategic Technologies Europe Platform (STEP) Regulation Feb 7th 2024

A sovereignty seal will be awarded to projects that contribute to the STEP objectives. It will serve as a quality label, helping projects attract public and private investments and promoting better access to EU funding

The European Commission proposes STEP Regulation	The European Parliament adopts its position	The council adopts its position	Trilogues	European Council	Provisional agreement
20 June 2023	17 October 2023	10 January 2024	15 & 31 January 5 February 2024	1 February 2024	7 February 2024

The STEP objectives are to:
Support development and manufacturing of critical emerging technologies relevant to green and digital transitions i.e. deep and digital technologies, clean technologies and biotechnologies - the list of clean technologies includes 'electricity and heat storage'

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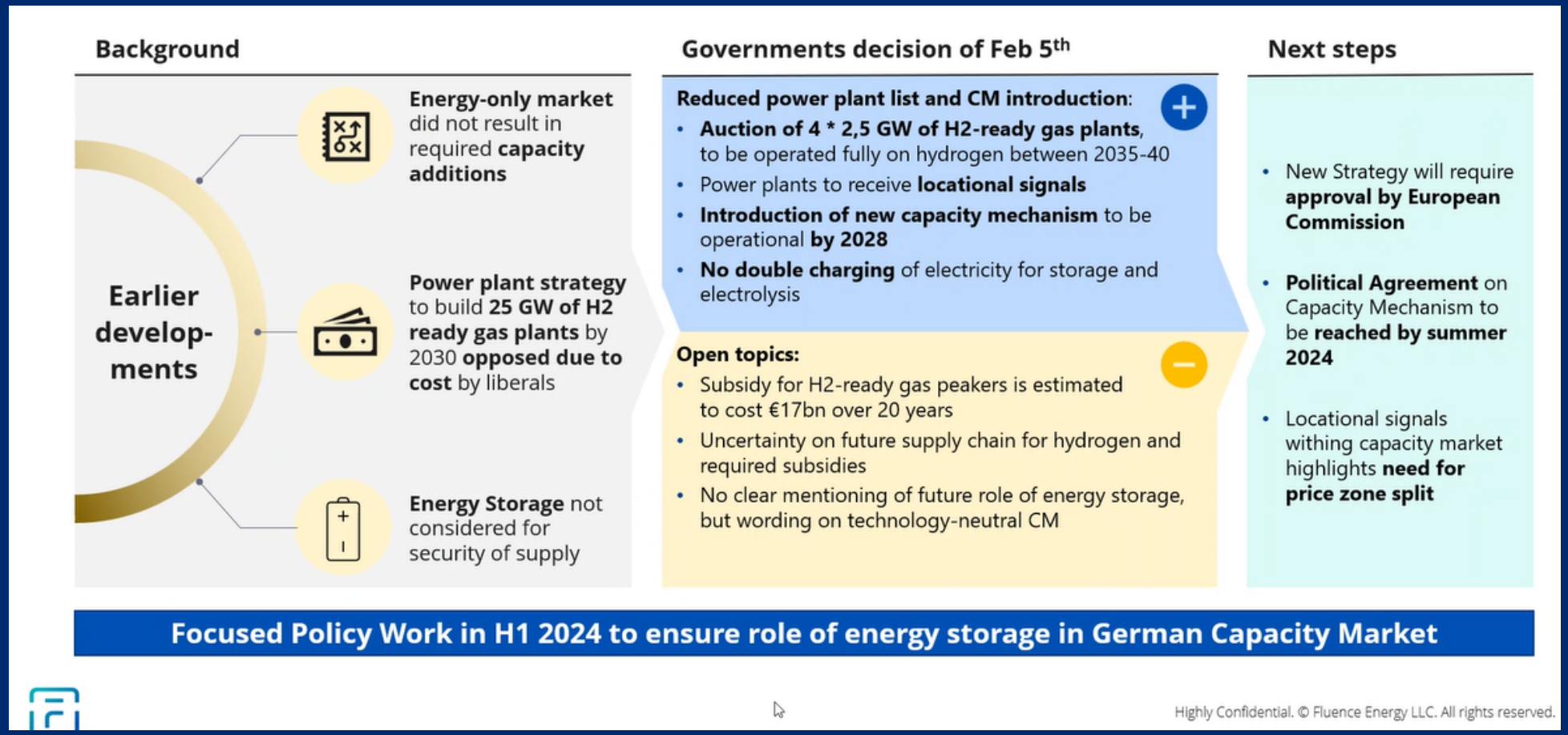
Introduction of Capacity Mechanism in Germany

Example from EU Member State; fundamental shift in energy policy, Feb 5th 2024



EU to strengthen European Industry

Addressing the competitiveness in the single market (Europe)

EU Elections Activities – Commission Work on Competitiveness

Mario Draghi's IDEAS think tank within the EC is working on report on "The future of European competitiveness, looking at the challenges faced by industry and companies in the Single Market."

Publication date:

- Summer 2024

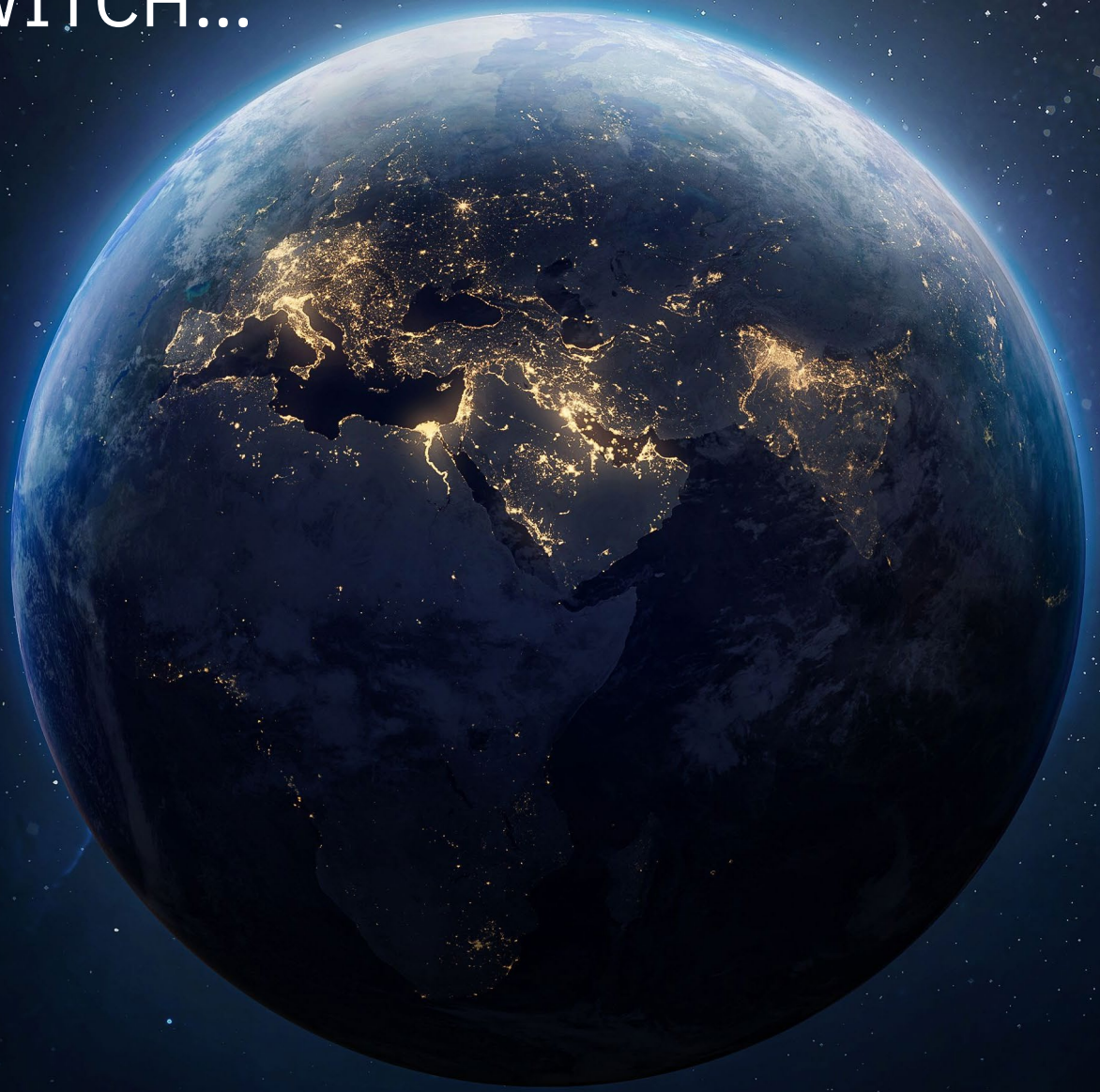
Key takeaways from Washington DC Jan 2024

Crafting The Transatlantic Green Marketplace

Recommendations delivered to the EU/US agenda

1. Prioritize electrification and TES
2. Recognize TES value for energy system flexibility
3. Focus support schemes on opex
4. Enhance long-term grid planning
5. Invest ahead of need
6. Urgently raise awareness

THE BIG FUEL SWITCH...



Electricity

1. Vehicles
2. Residential heating
3. Low/mid temp industrial heat

Hydrogen/Ammonia

4. High temp industrial heat
5. Heavy long distance transportation

... HAS STARTED

74%

OF NEW CAPACITY INSTALLED
IS SOLAR & WIND (2023)

Decarbonization IMPOSSIBLE without energy storage

70% of new power capacity 2020-2030 is solar & wind
70% of total electricity from solar & wind by 2050

The challenge:
Unmatched supply and demand

Source: International Energy Agency

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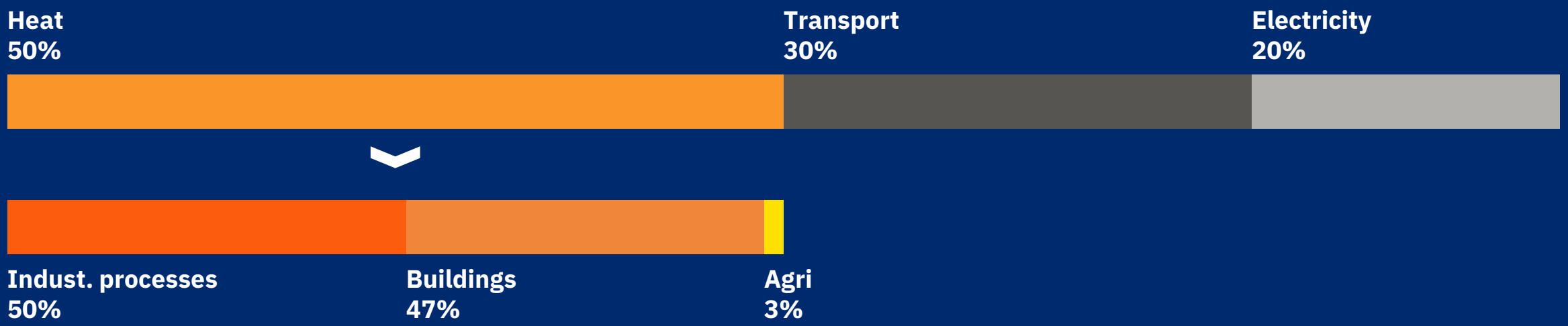
Heat is half!

Global energy demand



https://iea.org/reports/renewables-2020/renewable-heat

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Heat generation is dirty

89 %

non-renewable heat production

40 %

global CO_2 emissions

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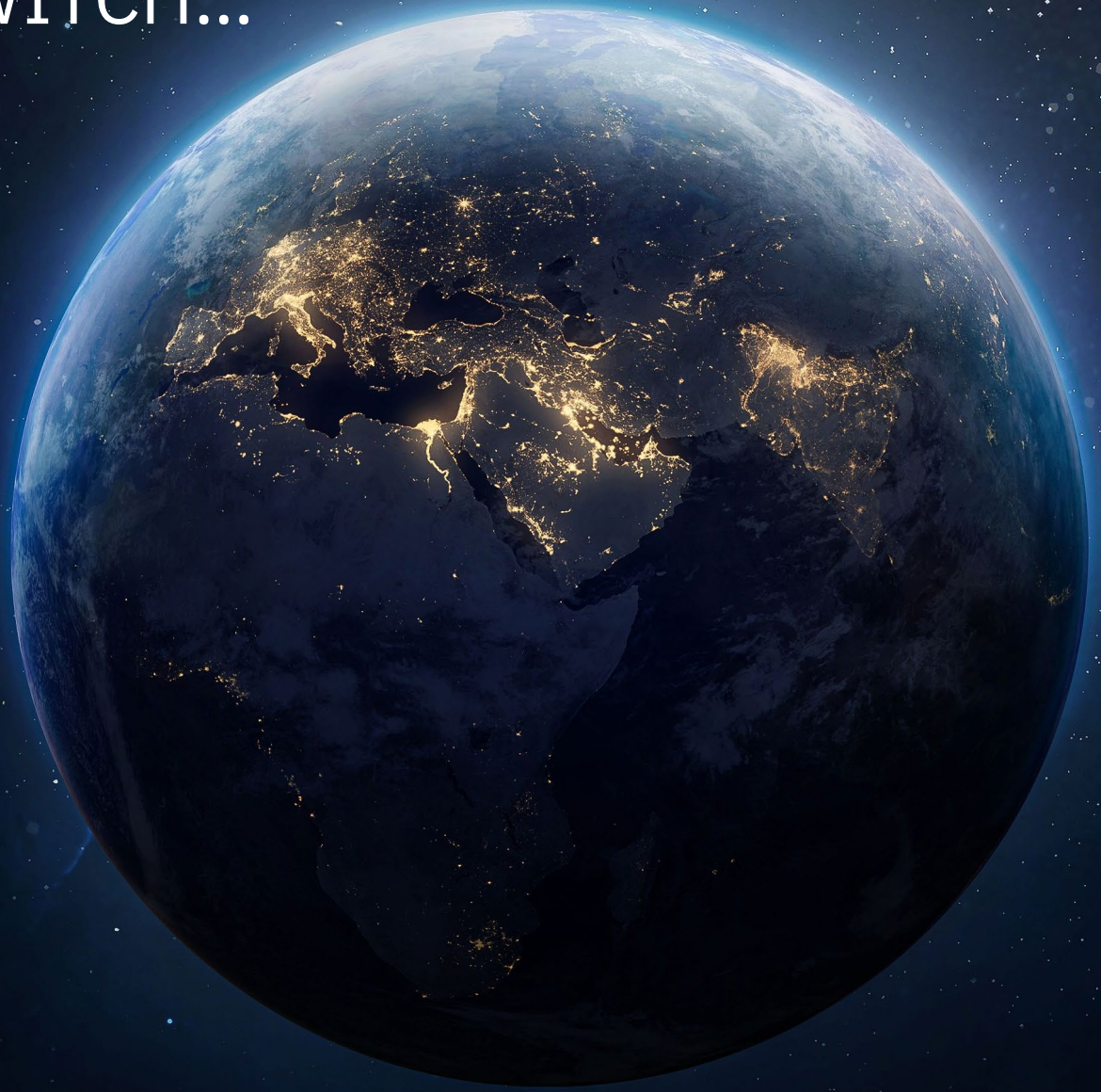
THE BIG FUEL SWITCH...



Electricity

1. Vehicles
2. Residential heating
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Hydrogen/Ammonia

4. High temp industrial heat
5. Heavy long distance transportation






Industries with significant low/medium heat demand

- Paper, pulp and print
- Chemical and petrochemical
- Non-metallic minerals
- Non-ferrous metals
- Food
- Iron and steel

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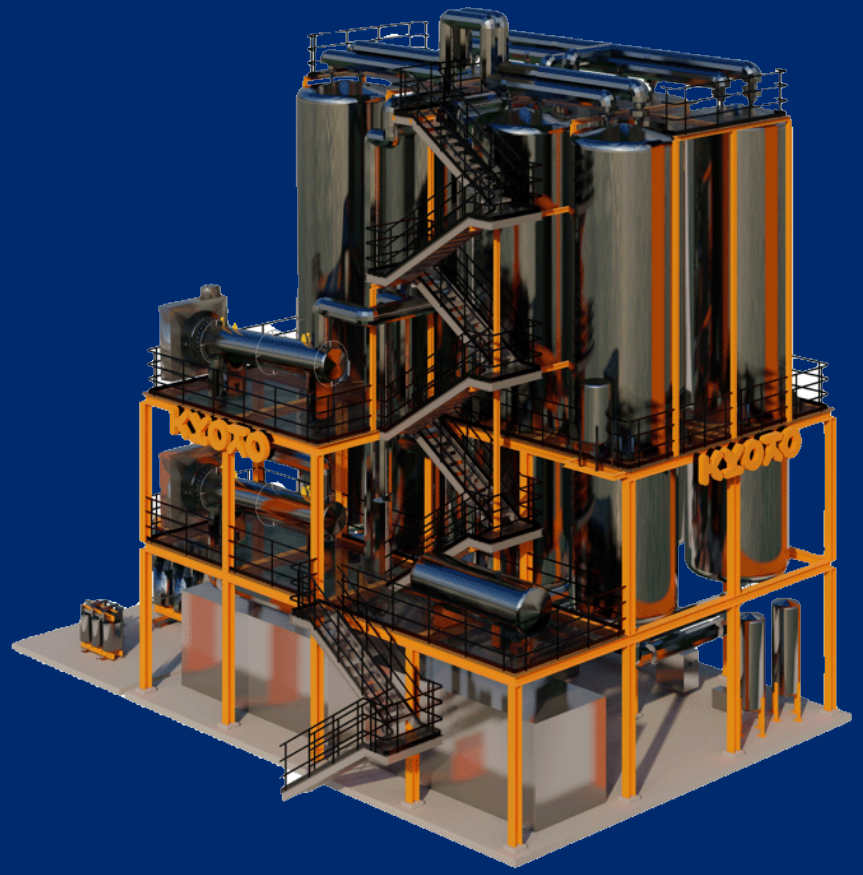
PERFECT STORM - PERFECT SOLUTION

Heatcube electrifies process heat for the industry by also storing / balancing / load shifting

- Cost competitive
- Stable high-quality steam, at precise temperature
- Maximum flexibility – charge & discharge simultaneously (decoupled)
- Approved by energy authorities as flexible asset for grid
- Standardized modules, sizable to customer demands
- Strong European supply chain, positioned to scale

Heatcube.



Charging capacity:	0.5 to 30MW
Storage capacity:	16-120 MWh
Storage capacity per tank:	8 MWh
Discharge capacity:	1.5 to 20 MW
Discharge in form of:	Steam, hot air or thermal oils
Temperature range of steam:	133.5°C to 400°C
Pressure range of steam:	3-40 bar(a)
Temperature of salt:	190 - 415°C
Charge response time:	<90sec
Round-trip efficiency:	>93%

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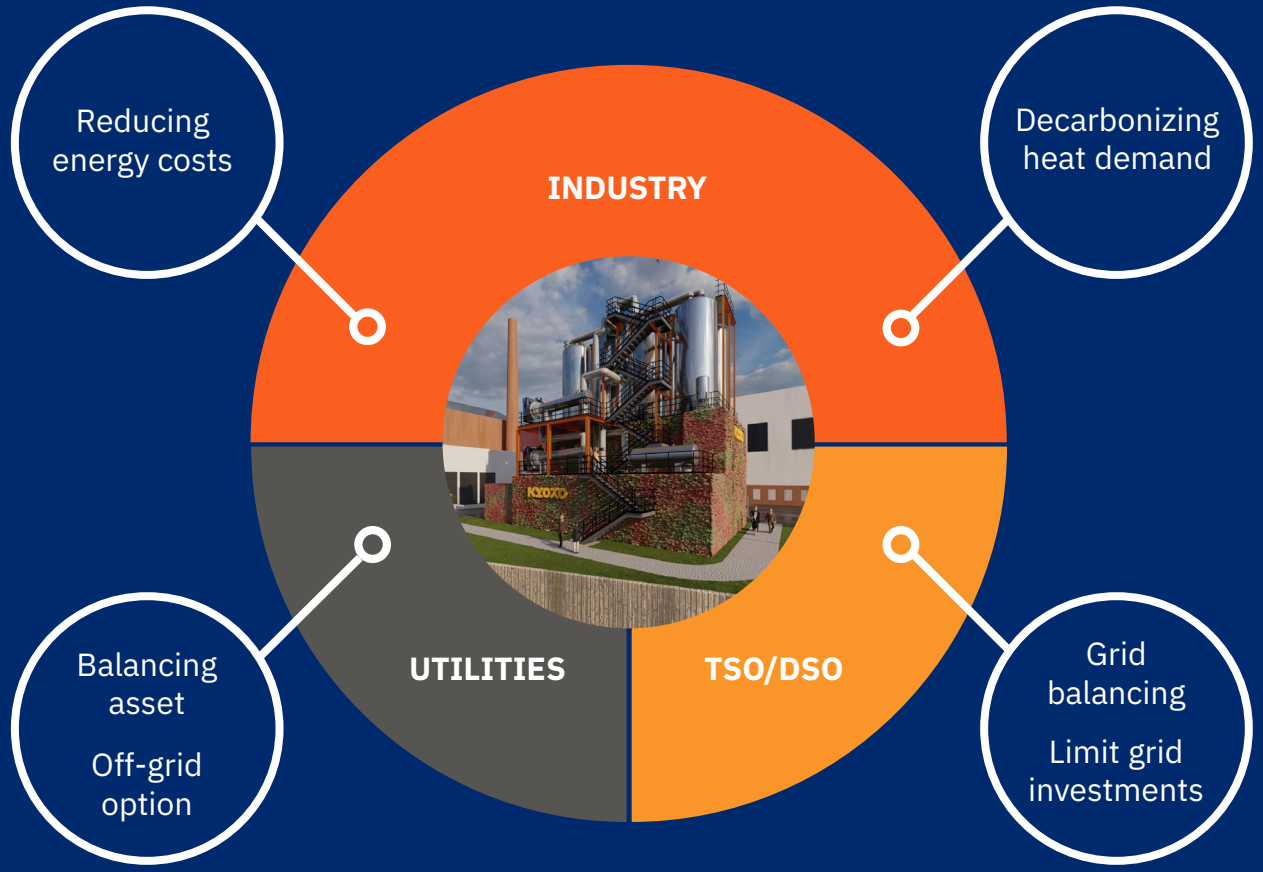
Heatcube provides benefits to Industry, Utilities and DSOs

Value creation by Heatcube



The Heatcube allows industry to:

- Avoid increasing CO2 costs
- Utilize the increasing power price volatility
- Utilize the increasing value of flexible assets

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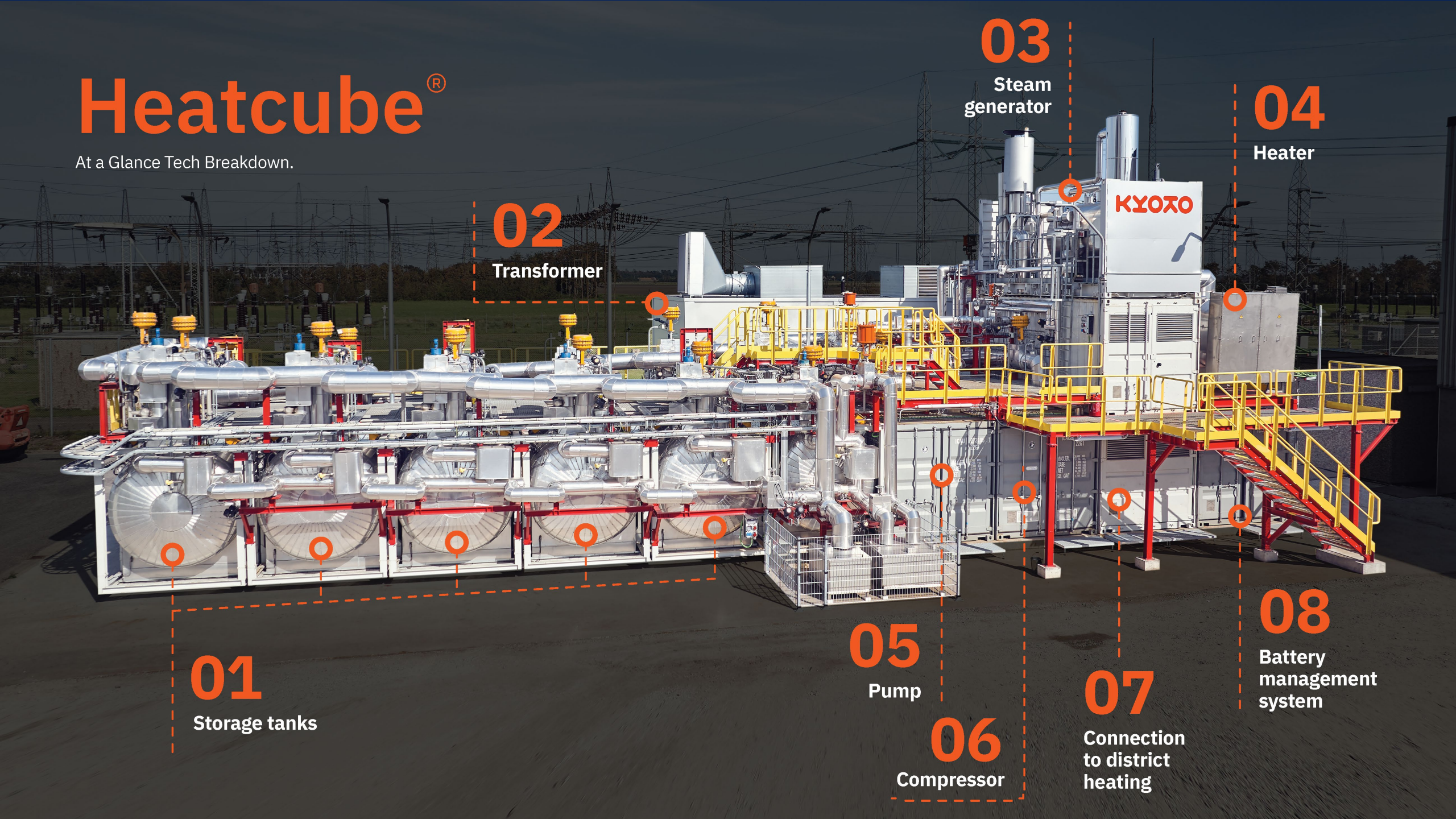
First commercial installation

- **Location** Norbis Park in Denmark
- **Customer** Aalborg Forsyning
- **Industry** District heating
- **Purpose** Decarbonization, replacing coal
- **Start of operation** August 2023
- **Charge capacity** 5 MW
- **Storage capacity** 18 MWh
- **Discharge capacity** 4MW
- **Steam pressure and temp** 16 bar(a), 201,38º C
- **Electricity source** Onsite windmills and/or grid
- **Annual production** ≈ 275 houses powered annually
- **Annual CO2 reduction** ≈ 2000* tonnes

** Based on standard efficiency and CO2e factors for coal fired CHP*

Heatcube®

At a Glance Tech Breakdown.



01 Storage tanks

02 Transformer

03 Steam generator

04 Heater

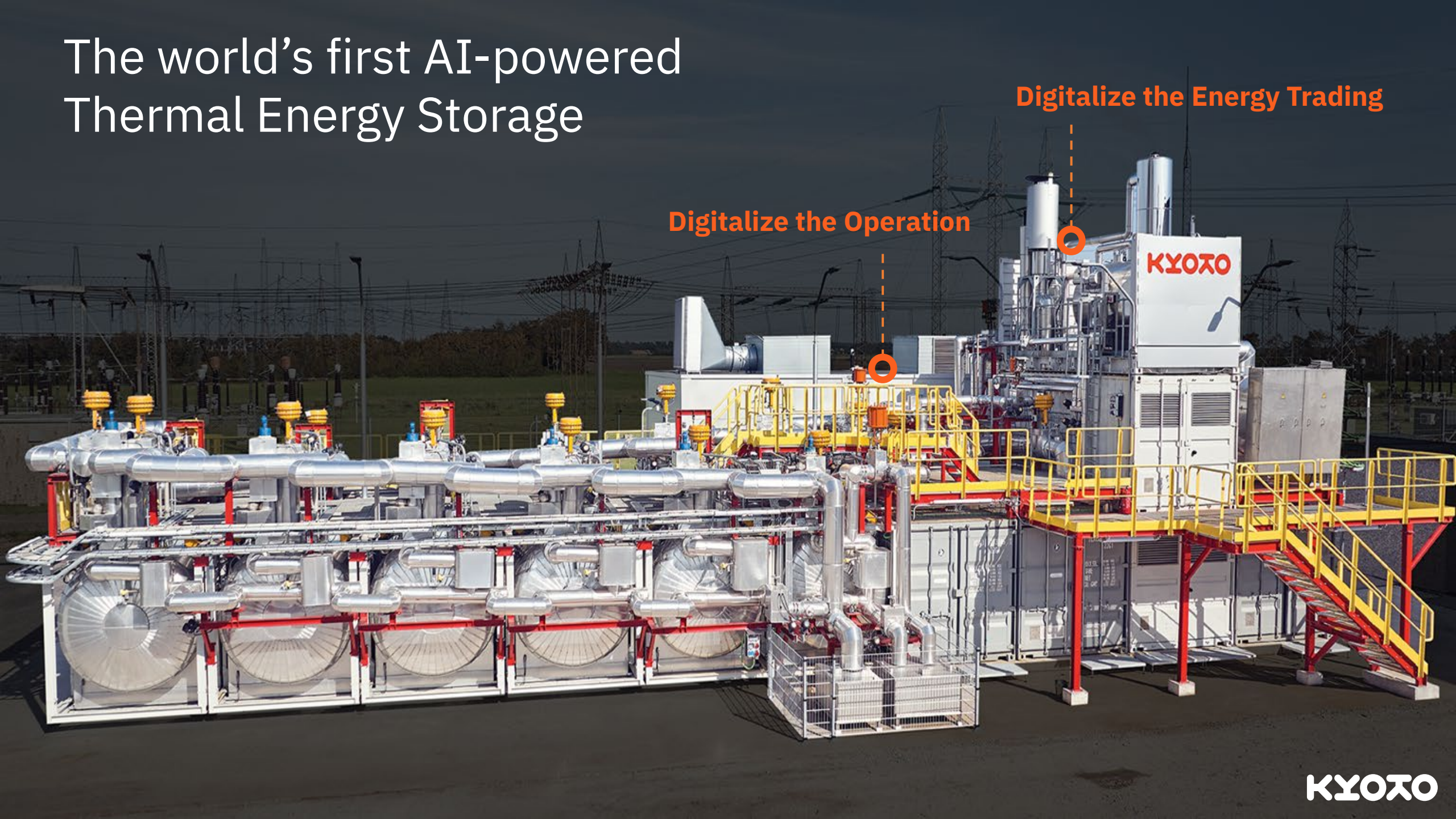
05 Pump

06 Compressor

07 Connection to district heating

08 Battery management system

The world’s first AI-powered Thermal Energy Storage



HEATCUBE AT NORBIS PARK
DIGITAL TWIN

WATCH HERE

AI-powered brain of Heatcube

Enabled by digital twin

Digitalize the operation

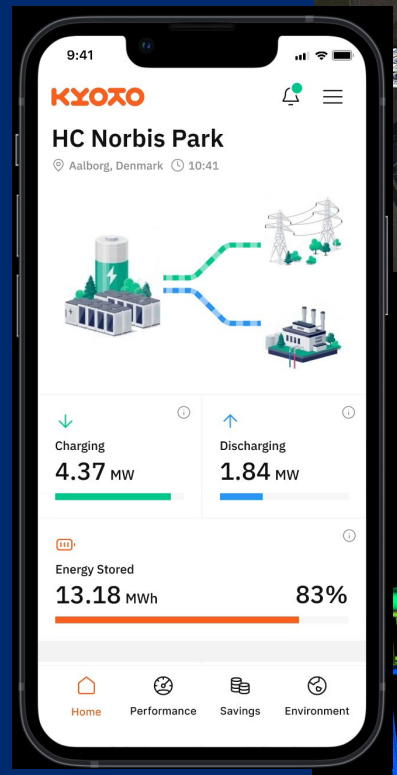
- Remote Monitoring
- Performance Analysis
- Predictive Maintenance

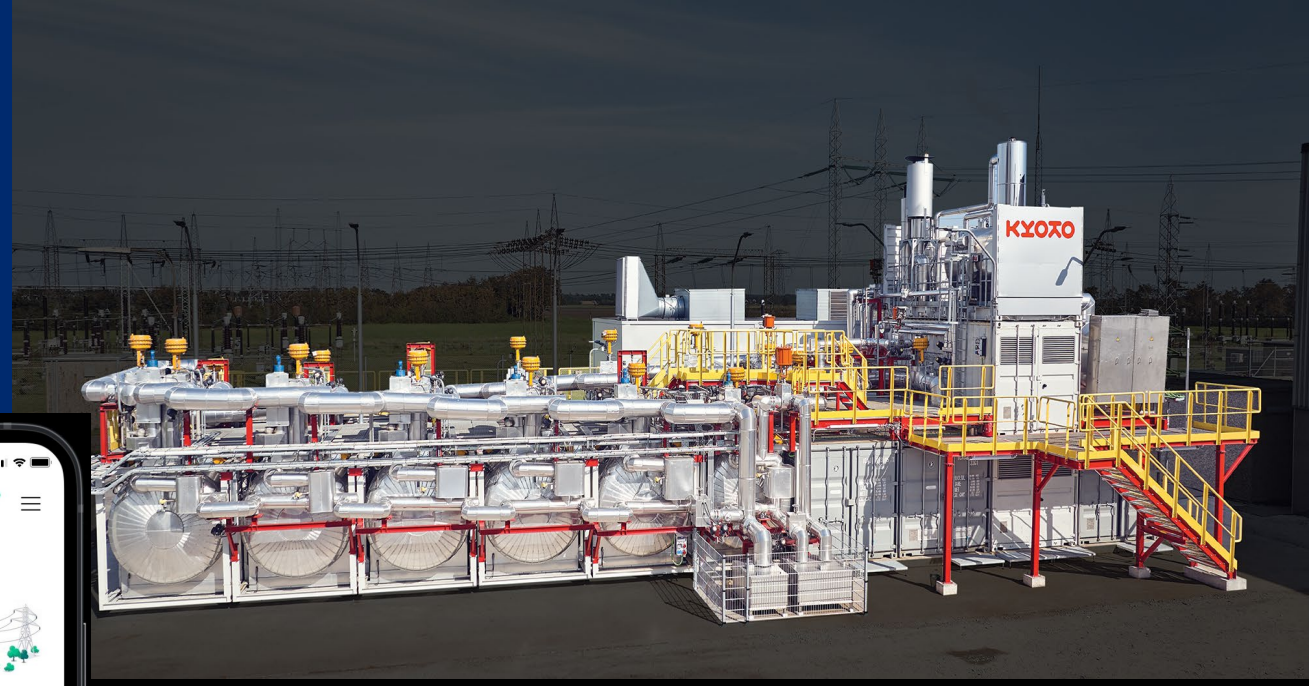
Increase the performance

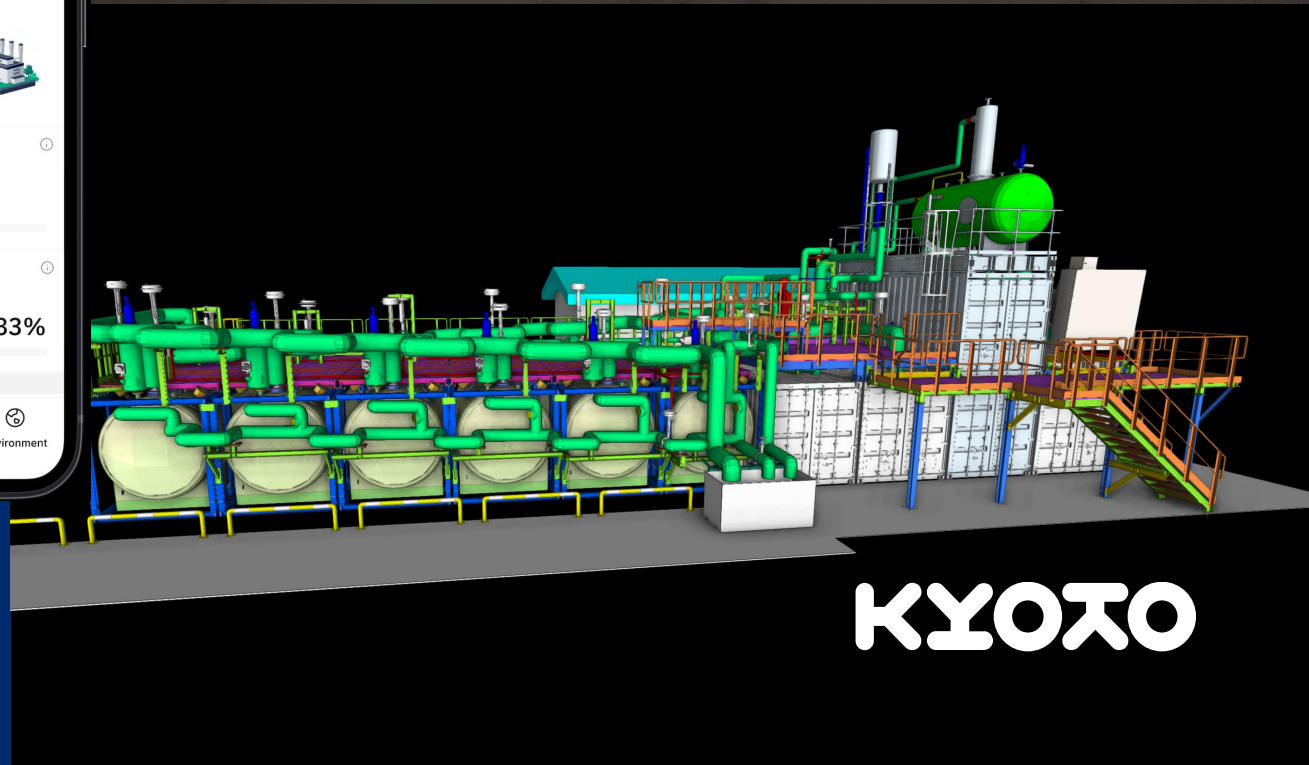
- Guaranteed >93% RTE
- Minimized down-time

Reduce the operational costs

- Minimize operational maintenance
- Avoid corrective maintenance







Approved by

ENERGINET

Kyoto Group – IP strategy

Done in collaboration with AWA

The Purpose of Patents

- **Prevent** other actors to make use of Kyoto Group Technology
- **Delay** competitors by forcing them to spend time and resources on developing other or different technologies

Strategy to reach the Purpose

- Patent **Key Technology** that is related to the **Modulization**, **Robustness** and **Reliability**, which leads to lower **Product**-, **Installation**- and **Operational** cost

Actions done to reach the Purpose

- 3 patents in filed concerning the **Storage System** and the **Circulation** of molten salts
- 1 patent in preparation for filing concerning the **Melting** of ternary salts

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POSITIONED TO SCALE

2023 DELIVERABLES

Heatcube #1 NJV operational

Iberdrola joint Go 2 market activities & second largest owner

Spirax-Sarco tech development & largest owner

Quadrupling discharge capacity in partnership with Steinmüller

Nordic Green Bank funding

Heatcube #2 KALL contract signed

The Alliance: Enabling large scale commercial roll-out

Kyoto's technology and commercial model validated through thorough technical & commercial DD

- Together with our partners from **Iberdrola, Spirax-Sarco** and **Steinmüller Engineering** we are pushing for performance and excellence

One-stop-shop for industrial clients; Alliance controlling entire value-chain to decarbonize an industrial plant

- Access to **Iberdrola's** more than 2 000 industrial clients in Spain alone and competitive renewable electricity

Supply chain capable of large-scale roll-out

- **Vulcanic** with large production facility in Torrelavega, Spain
- **Steinmüller Engineering** designing the steam generator made for serial-production, to be outsourced to manufactures

spirax sarco

Vulcanic

KYOTO™

Iberdrola

steinmüller engineering

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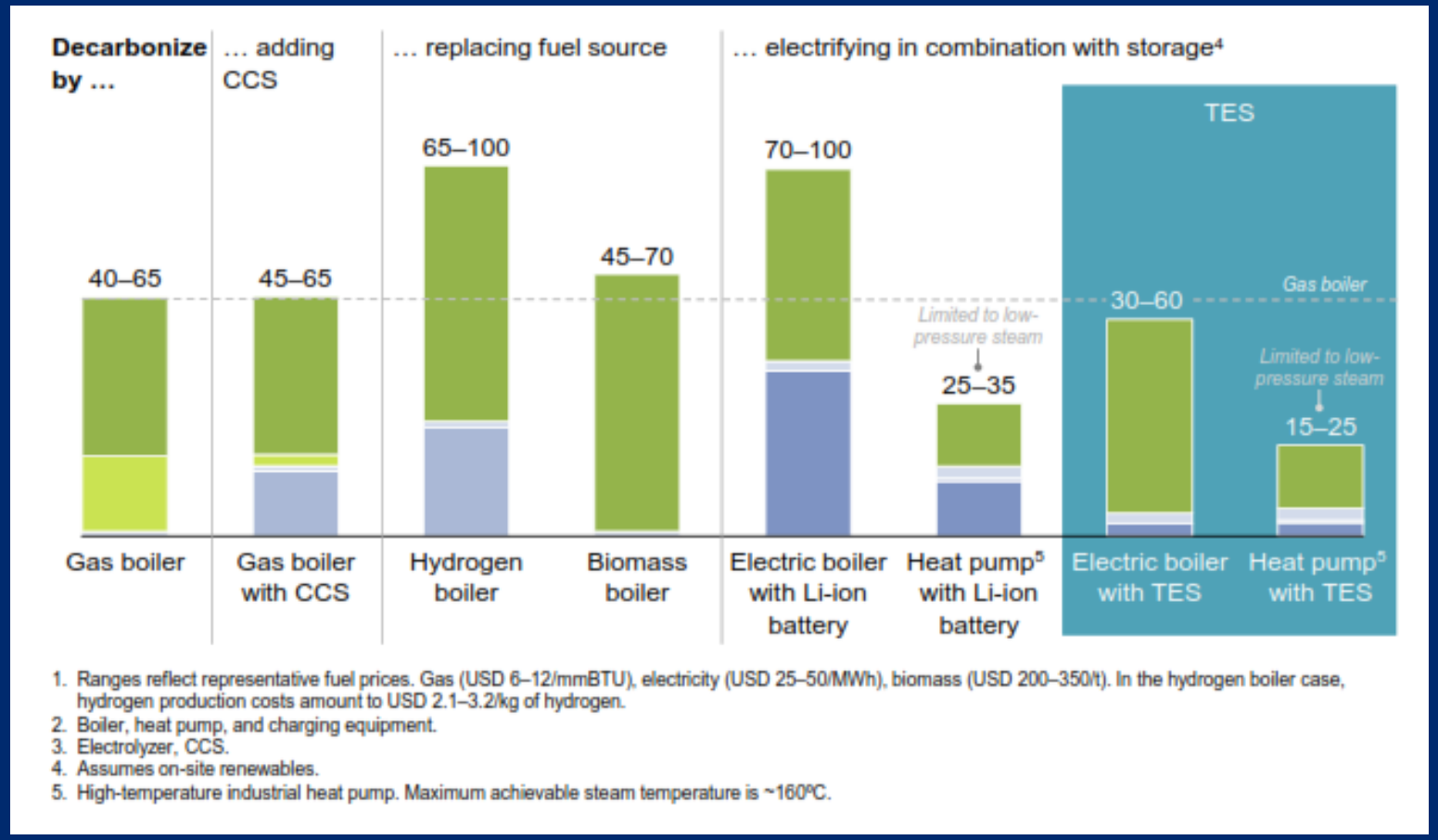
We are offering the most cost competitive available technology to make the decarbonization happening now

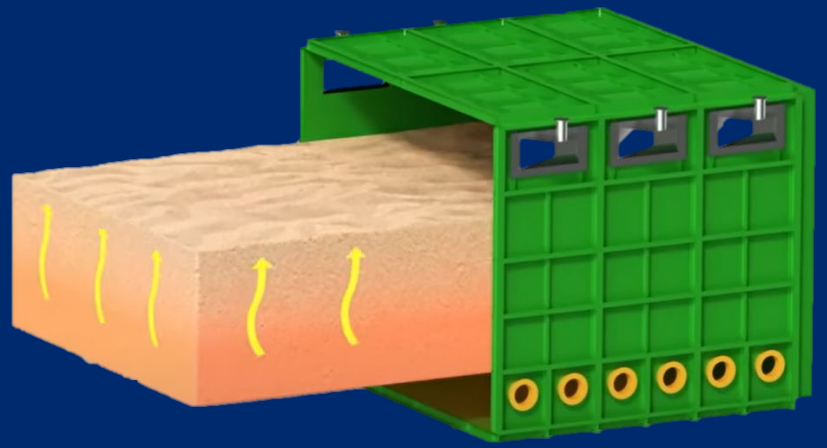


1. Ranges reflect representative fuel prices. Gas (USD 6–12/mmBTU), electricity (USD 25–50/MWh), biomass (USD 200–350/t). In the hydrogen boiler case, hydrogen production costs amount to USD 2.1–3.2/kg of hydrogen.
2. Boiler, heat pump, and charging equipment.
3. Electrolyzer, CCS.
4. Assumes on-site renewables.
5. High-temperature industrial heat pump. Maximum achievable steam temperature is ~160ºC.

Source: “Net Zero Heat: Long Duration Energy Storage to accelerate energy system decarbonization”, McKinsey & LDES, 2022

Molten salt vs solid state storage (“rocks in a box”)

Unmatched quality, flexibility & environmental aspects



- Unmatched flexibility (= demand response)
  - Charge/discharge simultaneous, at max capacity
- Stable high-quality steam at precise temperature
  - Constant heat & pressure for any load level
- Supreme environmental & safety aspects
  - No toxic elements, no flammable gasses or liquids
- No degradation over time

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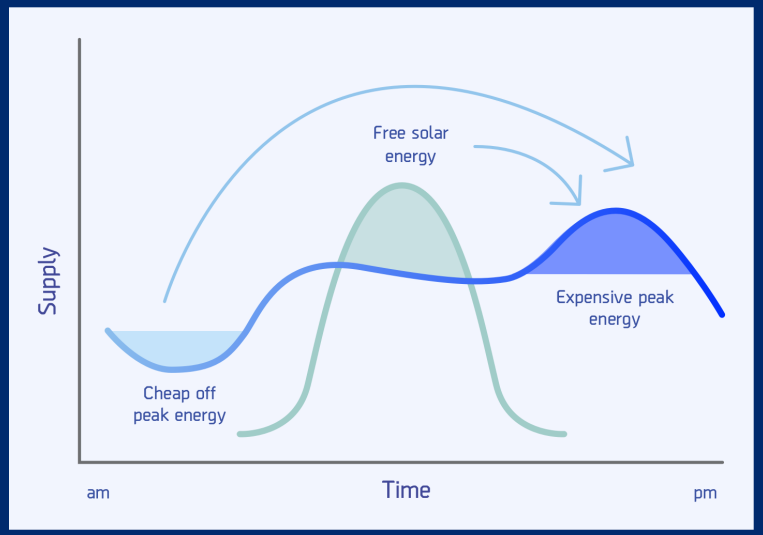
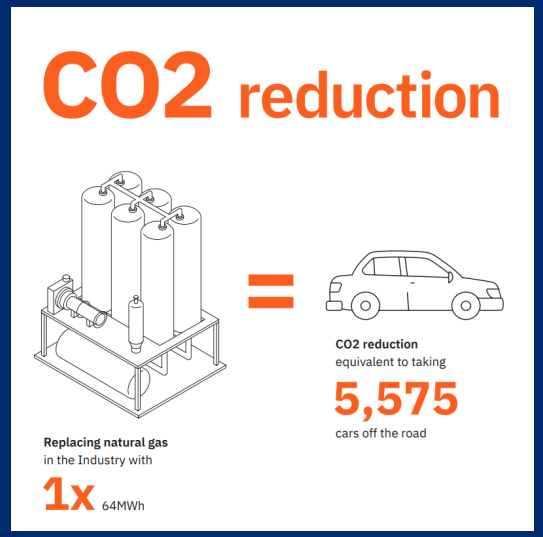
3x value propositions

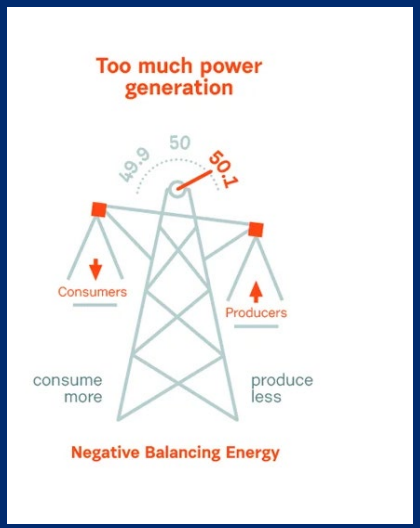
Load shifting

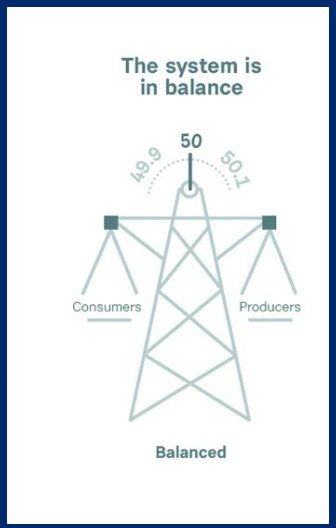


CO2 reduction and cost avoidance



Grid balancing





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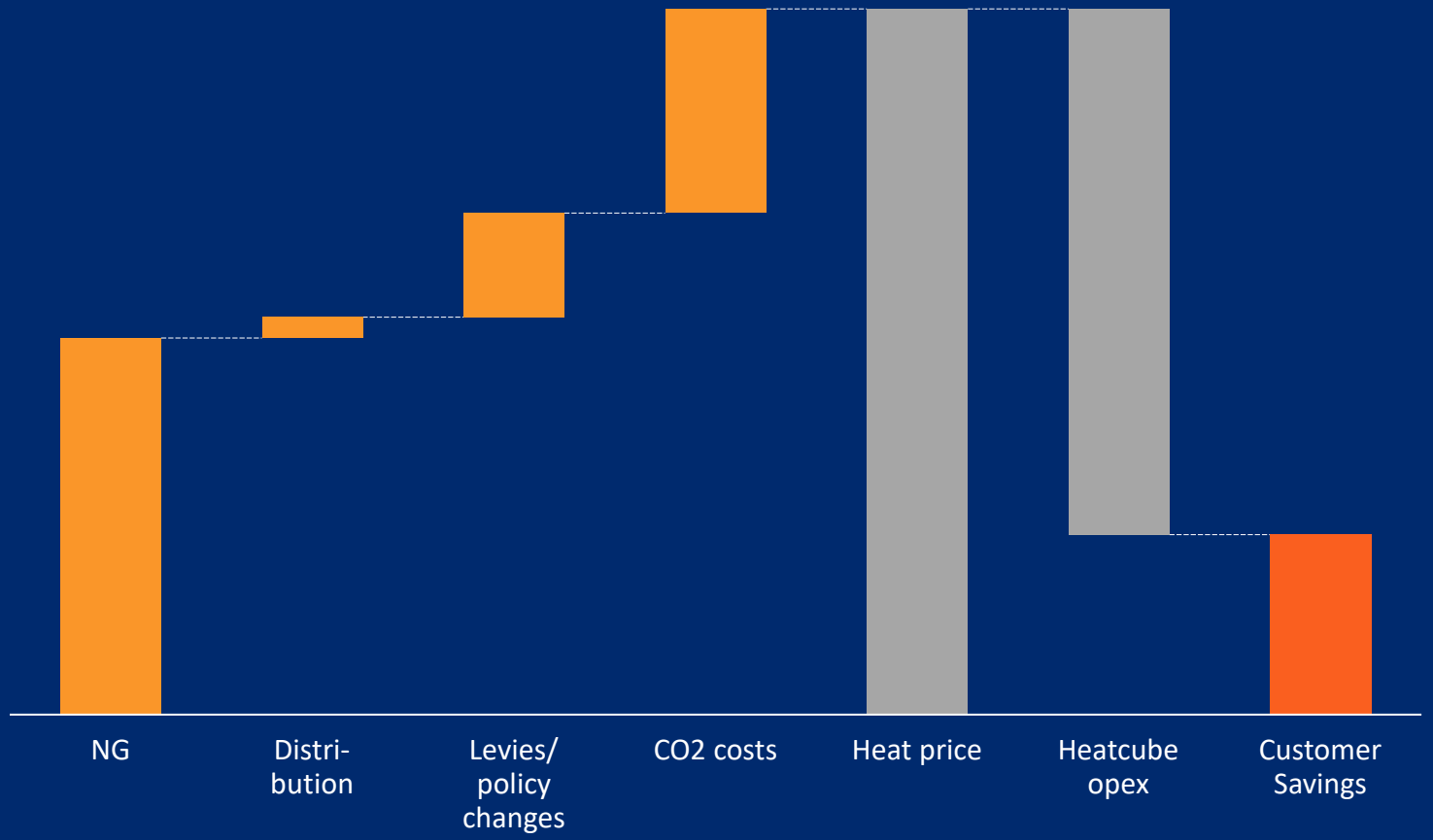
Customer perspective on Heatcube profitability

IRR 10-20%, payback 6-10 years

Customer in Spain with heat demand of 27,500 MWh/year
[€/MWh], real 2023 terms



- **Customer's reference cost** is the heat price with a Natural Gas Boiler
- **Charging Heatcube** with electricity from the grid and providing Ancillary Services
- **Customer savings** resulting in range of 10-20% IRR, nominal after tax
- **Payback time** typically of 6-10 years

Heatcube unit economics

Heatcubes' come in multiple configurations, and EBITDA contributions vary across countries and client user patterns

	 **Medium – HC 10.64.5** Demand of 20,000 MWh/year Industry: Food & Beverages	 **Large – HC 20.88.5** Demand of 35,000 MWh/year Industry: Food & Beverages
Heat price	80 EUR/MWh	80 EUR/MWh
Power, Grid tariffs* ** and flexibility reserve***	- 60 EUR/MWh	- 59 EUR/MWh
O&M*	- 2 EUR/MWh	- 1 EUR/MWh
Anticipated EBITDA contribution* **	= 18 EUR/MWh 396 000 EUR/year	= 20 EUR/MWh 700 000 EUR/year

* RTE (Round-trip Efficiency) of 90% | ** Comparable to a PPA price 40-50 EUR/MWh | *** 5-15% reduction in charging cost when participating in Frequency Reserve Markets

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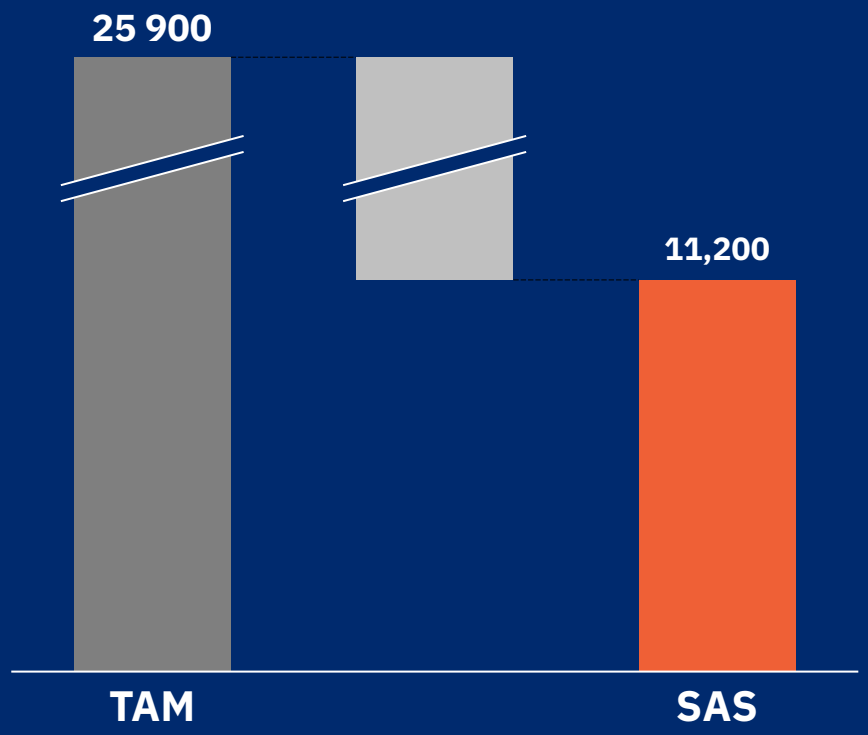
Close to EUR 1 000 billion* market potential

Global Heat demand and Serviceable market*

[TWh/year]



- Heat is half of Global energy demand
- Heatcube well suited for mid-range temperature heat demands
- Resulting Serviceable market of 11 200 TWh

*Aurora 2021=> click here
TAM (Total Addressable Heat Market) = Global heat demand – heat demand outside the industry
SAS (Serviceable Addressable Segments) = TAM – heat demand outside relevant temperature range – existing low-carbon heat + pre-heating demand

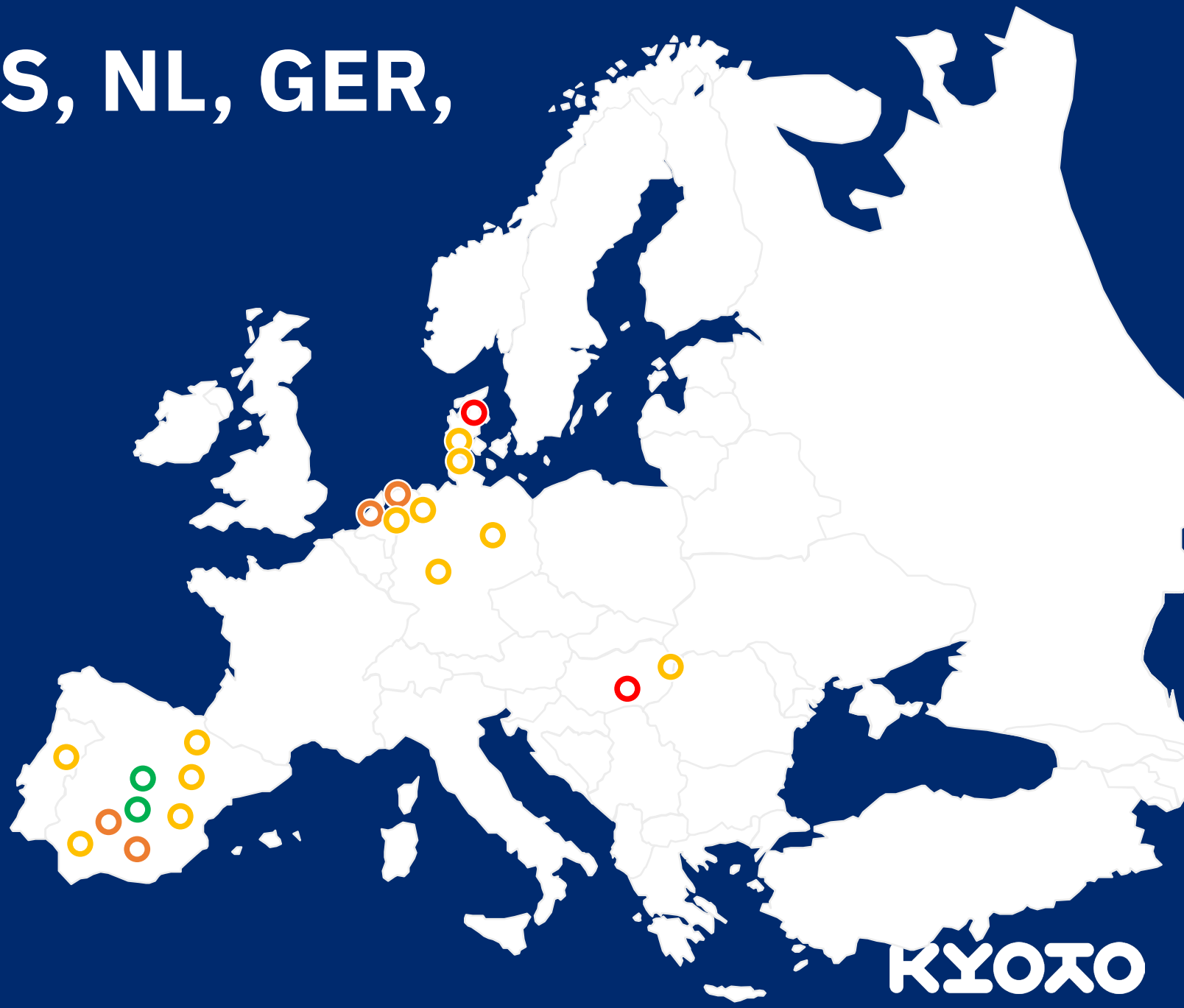
What does a global market potential of **11,200 TWh** mean?

A global market of 370,000 Heatcubes

* Serviceable addressable segment (SAS)

Key Markets: ES, NL, GER, HU

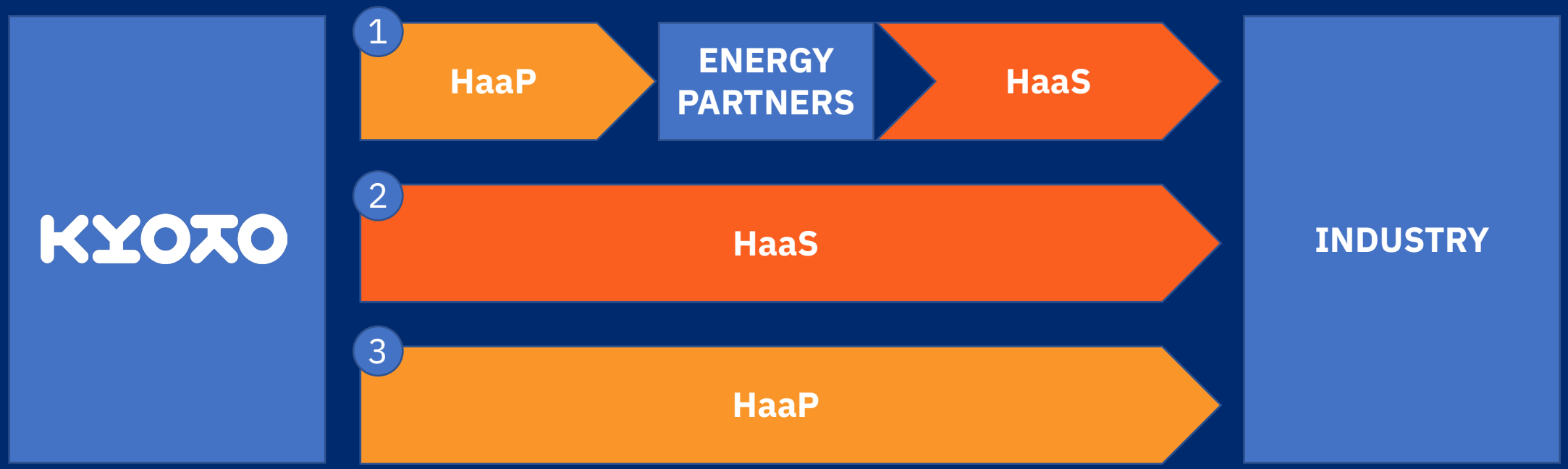
- *Heatcube projects with signed commercial contracts and/or installed*
- *Pipeline projects with funding application submitted / prepared by utility partners*
- *Pipeline projects with offers submitted / prepared by utility partners*
- *Pipeline projects with offers submitted by Kyoto*



Note: not all projects from the pipeline are represented here
Locations are indicative

Three business models for Kyoto

The established partnerships enable Kyoto offering Heatcube as a Service or as a Product to the industry

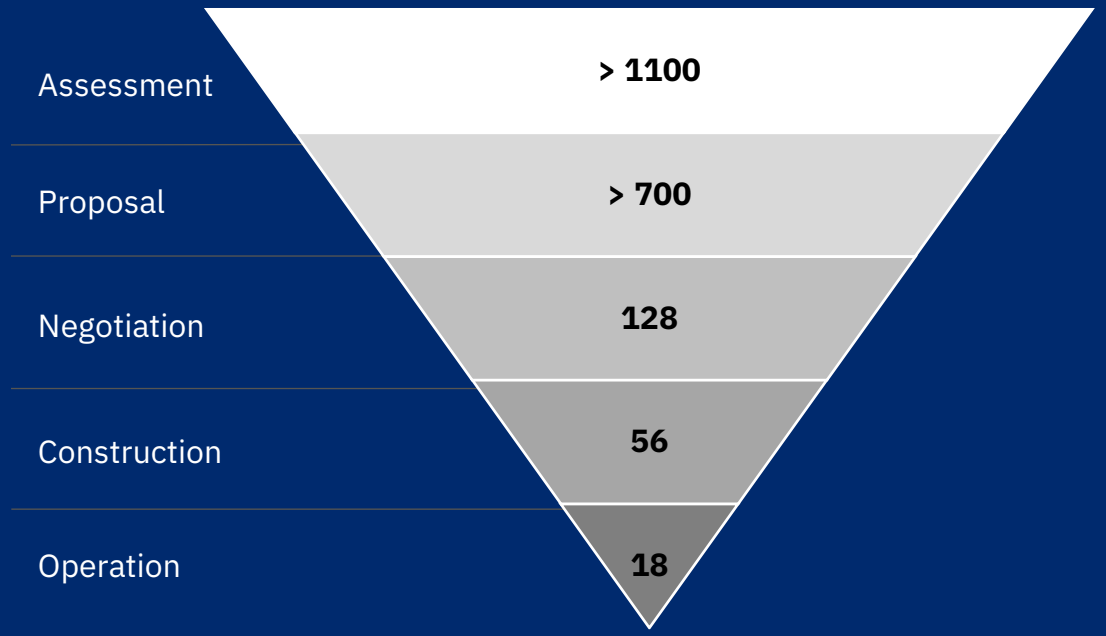


HaaP: Heat-as-a-Product
HaaS: Heat-as-a-Service

February Heatcube pipeline status

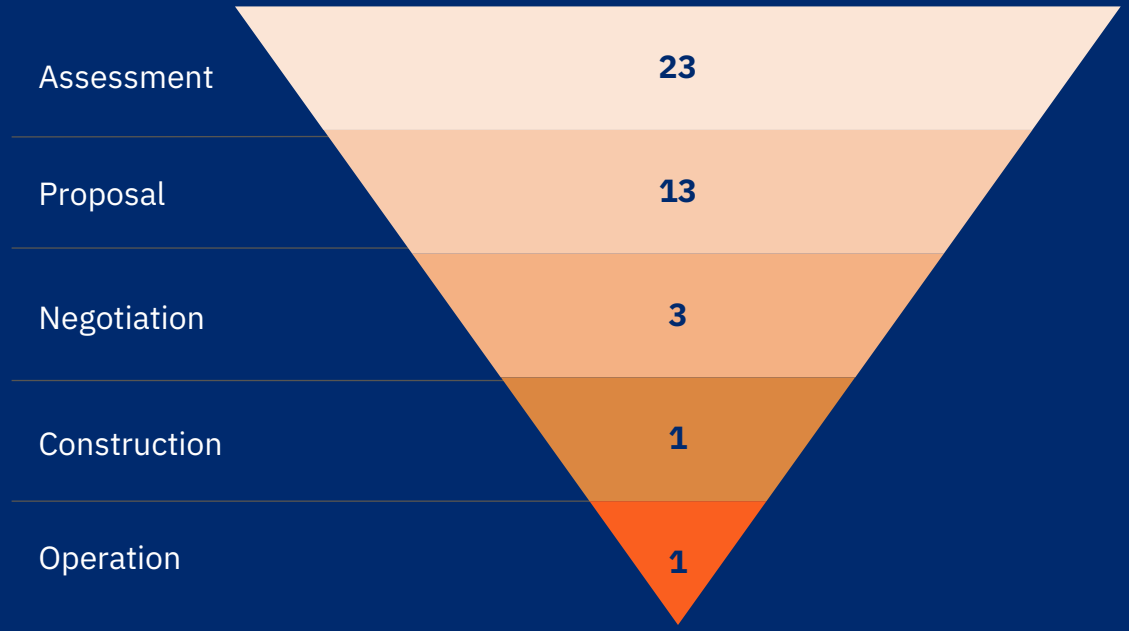
Storage pipeline (MWh)

Total volume: > 2 100 MWh (unweighted)



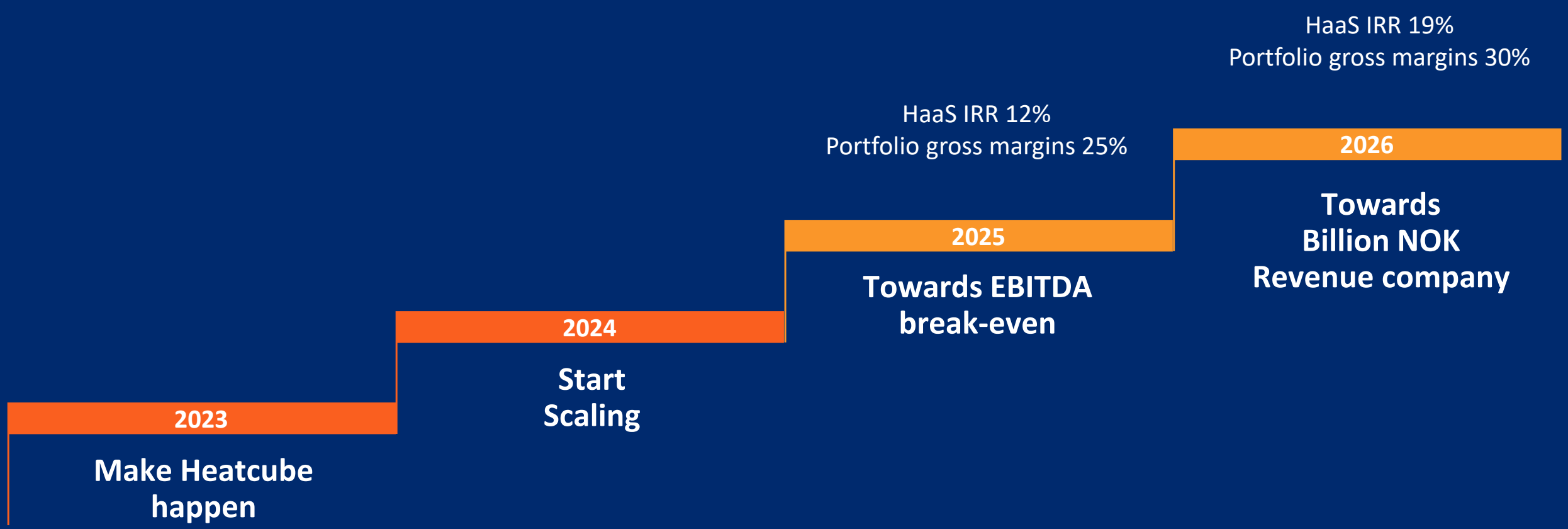
Heatcube pipeline

Total volume: 40 (unweighted)



Status: 25.02.2024

Well positioned to scale



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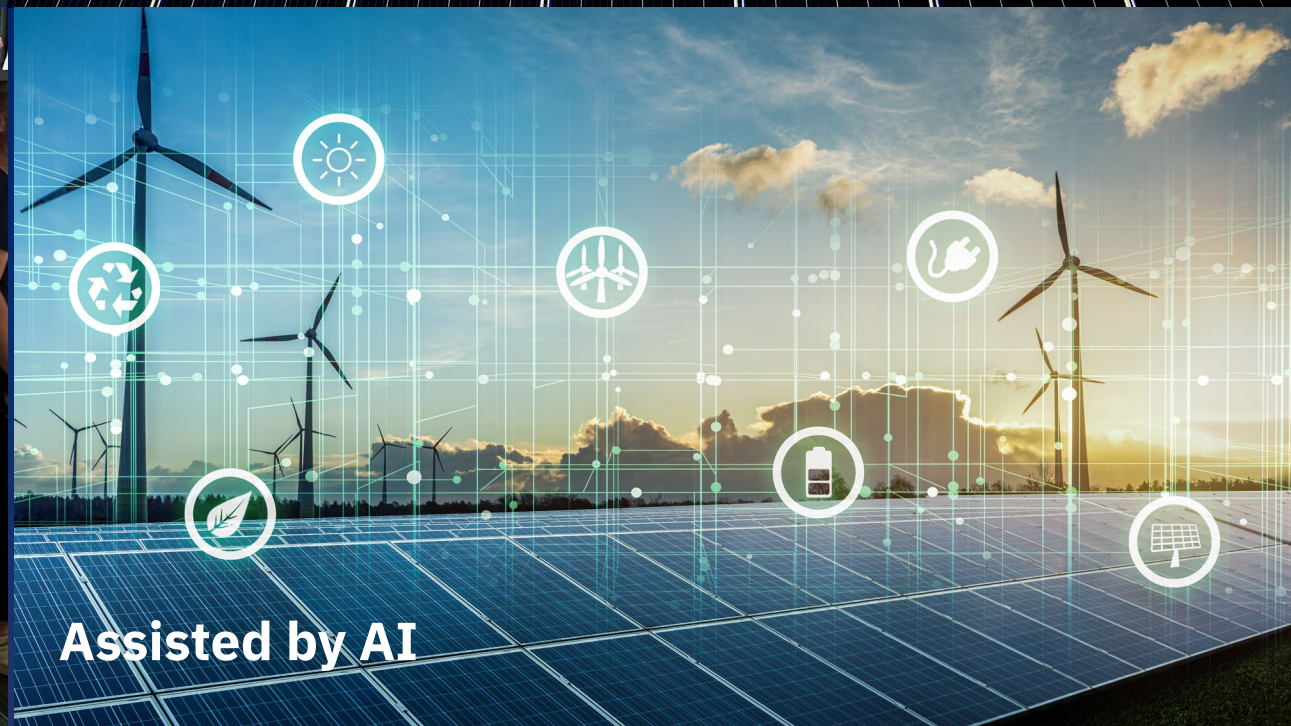
Empower industry with clean process heat

Vision

A world powered by Nature

Enabled by people



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Kyoto Group

Board of Directors

Eivind Reiten

Chairman

Thorleif Enger

Board Member

Hans Olav Kvalvåg

Board Member

Pål Selboe Valseth

Board Member

Oscar Cantalejo

Board Member

Christopher Molnar

Board Member

Kyoto Group Company Presentation March 2024

Kyoto Group

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