

A silhouette of a wind farm with numerous turbines on a hill against a vibrant sunset sky with orange, pink, and purple clouds.

# WELCOME

**Kyoto Group Capital Markets Day  
2022 27<sup>th</sup> October**

**Market breakthrough with proven technology**

**KYOTO**

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# Klimahuset

Klimahuset is a part of the Natural History museum, University of Oslo. Opened up in June 2020 - 30,000 visitors in the pandemic year 2021

- Up-to-date research in the field of climate and climate change
  - Interactive exhibitions with a mix of digital and analogue installations
  - Is a model building in climate and environment
  - Offers tuition for school classes and kindergarten children
- Events and activities with varied forms of expression



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# Agenda

02:00 – 02:05	Welcome	CFO Håvard Haukdal
02:05 – 02:15	Kyoto's why	CEO Camilla Nilsson
02:15 – 02:35	Heatcube 2.0 Generation Launch	CTO Bjarke Buchbjerg
02:35 – 02:50	Why molten salt as the energy storage medium?	Magnus Rambraut, Commercial Director, YARA
02:50 – 03:05	BREAK	

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# Agenda

03:05 – 03:20	On the 'doorstep' to market breakthrough	CEO Camilla Nilsson
03:20 – 03:40	Clear commercial priorities	CCO Tim de Haas
03:40 – 03:50	The Kyoto platform for execution	CEO Camilla Nilsson
03:50 – 04:05	BREAK	

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# Agenda

04:05 – 04:25	Decarbonizing the power markets	Sigbjørn Seland, Chief Analyst at StormGeo Nena
04:25 – 04:40	Summary & financial update	CFO Håvard Haukdal
04:40 – 05:00	Q&A and panel discussion	CFO Håvard Haukdal
05:00 – 06:00	Networking session with food & drinks	

Introduction

# KYOTO's why

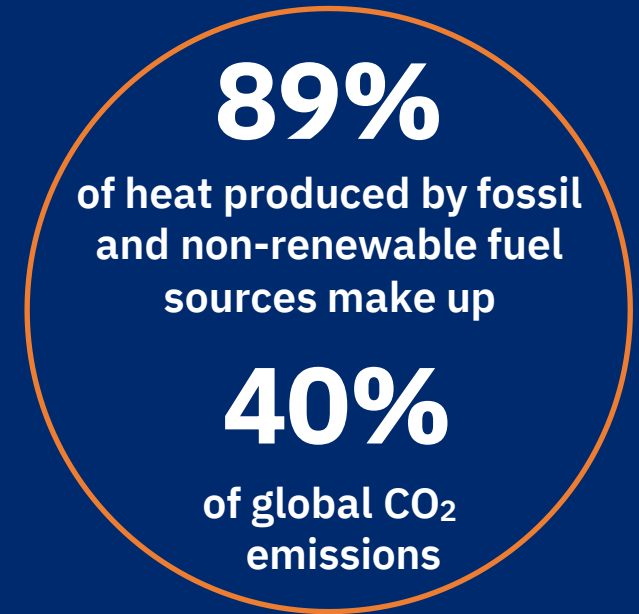
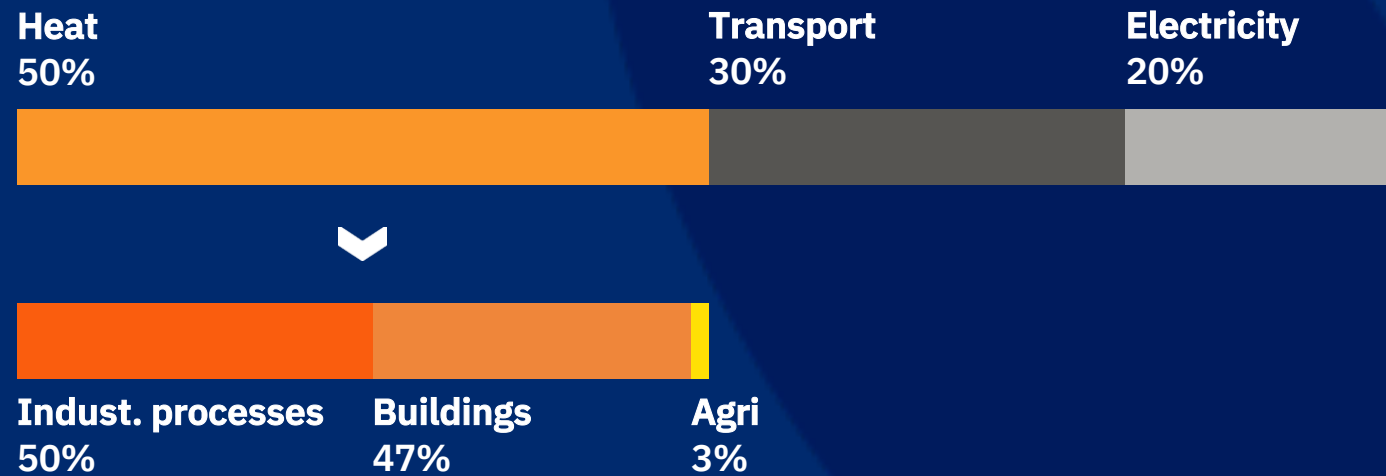
CEO Camilla Nilsson

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# Heat accounts for half of global energy consumption

## Global energy demand



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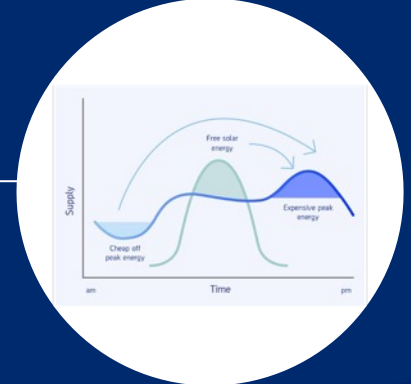
# Decarbonization impossible without energy storage



The world is not on track to limit the rise in global temperature to 1.5° celcius...



Urgent need for energy transition and electrification through renewables



The challenge: Unmatched supply and demand

# Geopolitical situation in Europe

Fuelling the need for reduced industrial gas consumption and demand for Kyoto's solutions



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# The origin of the proven Kyoto Heatcube™ technology

## Gemasolar Thermosolar Plant

*One of the oldest solar power plants in the world*

- Nominal Capacity: 19MW CT
- Storage capacity: 15h of molten salt storage
- The efficiency of the cycle: 40%
- Location: Spain, Sevilla
- Start of operation: 2011

## Achievements

- Total operation is 6,450 hours at full capacity per year
- Prevention of about 30,000 tons of CO<sub>2</sub> emissions per year.

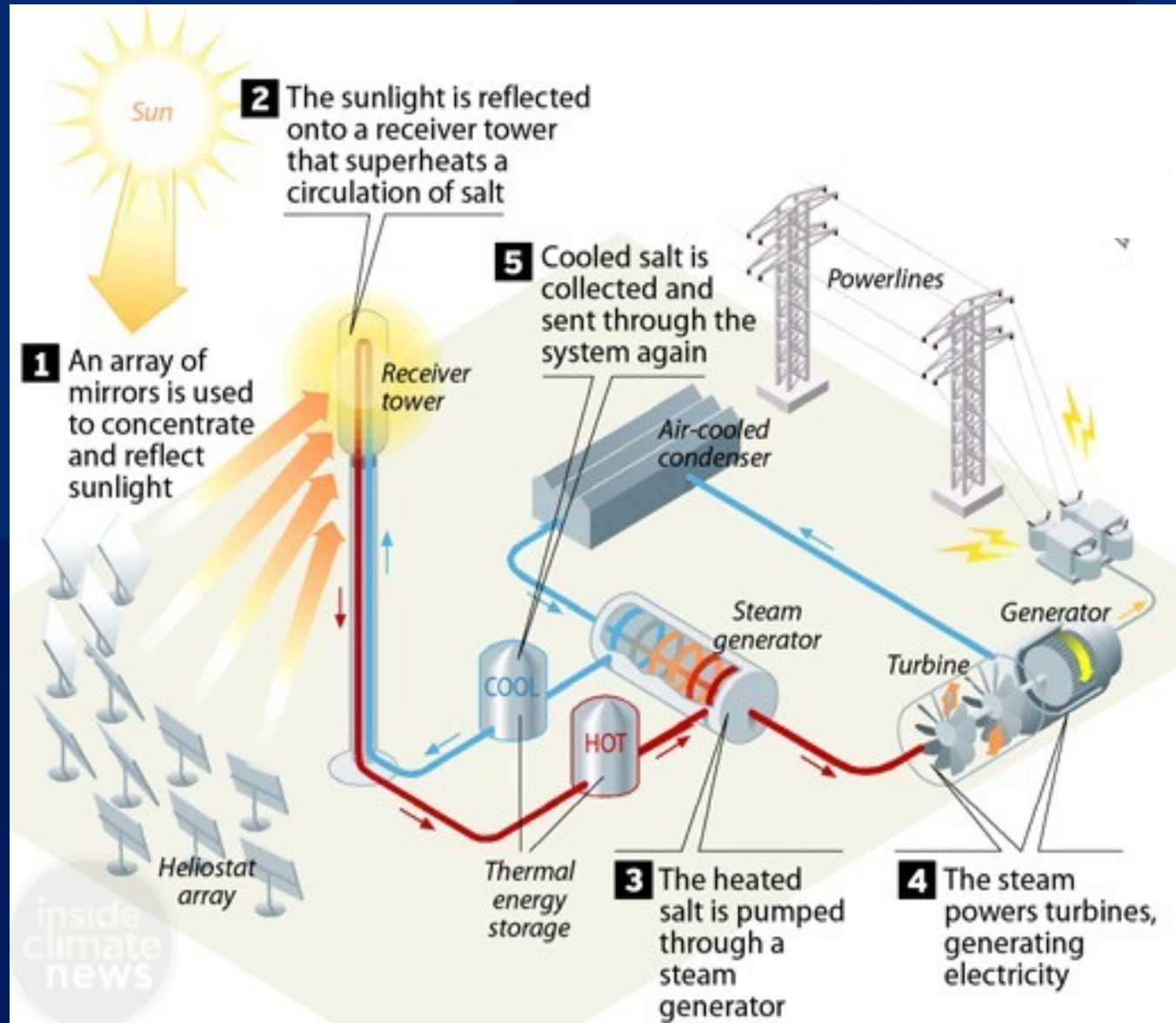




# The origin of the proven Kyoto Heatcube™ technology

## Solar thermal power stations in the world

- Operational: 57
- With a storage capacity: 28
- Announced & under construction for future use: 21



# Heatcube 1.0





HEATCUBE 2.0

# Generation Launch

THE KYOTO ENERGY REVOLUTION

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[Click here to watch the video](#)

**KYOTO**

[360 view of Heatcube 2.0 click here](#)

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[Click here to watch the animation video](#)

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# Heatcube 2.0

## Key Metrics

- Charging capacity: 10, 20 or 30MW
- Storage capacity: 16 – 96 MWh
- Storage time: long duration (> 8 hours)
- Discharge capacity: up to 5 MW
- Discharge in form of steam
- Temperature range of steam: 170-400°C
- Lifetime 25 years
- RTE of more than 90%\*
- Less than 1 minute from standby to charge, discharge or simultaneous charge and discharge

Footprint: ~ 170 sq.m - 310 sq.m

Height: ~ 15m

Weight: ~ 400 MT – 1,500 MT

*\* Based on size, total heat produced and the ambient conditions of the specific area.*



Next on our agenda

# Magnus Rambraut

From YARA

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Knowledge grows

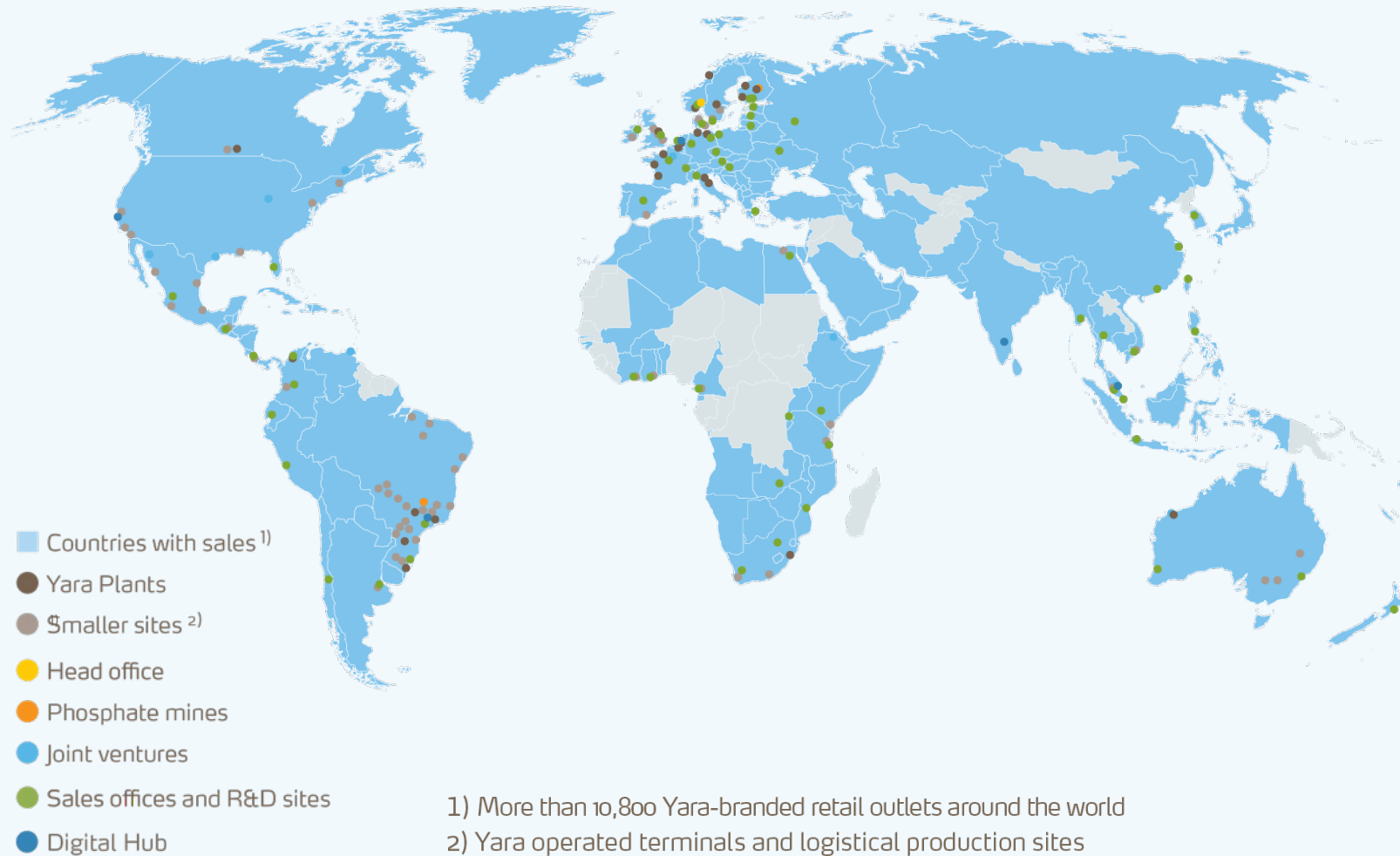
# Why Molten Salt as an Energy Storage Medium?

Kyoto Capital Markets Day 2022





# Global mission, global presence



**17,000**

Employees worldwide

**11.6**

Billion USD  
revenue

**28**

Production  
plants

**160**

Countries  
with sales

**10,800**

Yara-branded retail outlets globally





## Our Mission

Responsibly feed the world and protect the planet.



## Our Vision

A collaborative society;  
a world without hunger;  
a planet respected.

# A global challenge

*1.5° Celsius.*

A large, dark metal electricity pylon stands prominently in the foreground, its lattice structure silhouetted against a vibrant sunset sky. The sun is low on the horizon, casting a warm, orange glow across the clouds. Several high-voltage power lines stretch from the pylon towards the horizon. In the background, another smaller pylon is visible, and the landscape appears to be a flat, open area.

Power Sector (1/3 of global emissions)

Heat sector (50% of the global energy consumption)

*Are vital to be decarbonized if we should stay below the target*





# A move to renewable energy is inevitable

1. *Reduced costs / CapEx*
2. *Government support for renewable power buildout*
3. *Carbon pricing*

*....will ensure that renewables will eventually dominate power generation.*

*Over the coming 30 years, USD 12 trillion will be invested in both building a larger grid and adapting it to the variability of solar and wind through technical solutions such as connectivity, storage, and demand response.*





# Storage is key to adoption of Renewable Energy

*As the proportion of renewables grows, we are presented with 3 challenges;*

- 1) Balancing energy supply and demand (including heat)*
- 2) A change in transmission flow patterns*
- 3) A decrease in system stability*

*Energy Storage, including Thermal Energy Storage, systems can help address these issues by increasing the flexibility of the power systems*



# Molten Salts is a widely accepted and proven technology

*The most widespread Thermal Energy Storage technology are **molten salts** coupled with Concentrated Solar Power (CSP) plants,*

Molten Salts can effectively be used in novel Thermal Energy Storage Solutions to store electricity and/or heat independently of CSP

Yara has successfully completed a large scale pilot of the molten salt for thermal energy storage and heat transfer medium – more than 5.000 hours of operation







# Sustainability at core of Yara Molten Salt

- *Natural raw materials (Calcium, potassium and sodium nitrate)*
- *Nontoxic and nonhazardous*
- *Widely accessible raw materials*
- *Low priced and sustainably produced compared to amongst others raw materials for alternative Energy Storage Solutions*
- *Low Carbon Footprint*







A landscape photograph featuring a series of wind turbines silhouetted against a vibrant sunset sky. The sky is filled with soft, wispy clouds in shades of orange, pink, and purple. The turbines are of varying heights and are scattered across a dark, silhouetted horizon line. The overall mood is serene and hopeful, suggesting a transition to renewable energy.

# BREAK

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# On the 'doorstep' to market breakthrough

CEO Camilla Nilsson

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# Nordyllandsværket project progress

Towards commissioning Jan 2023

- Permits received, foundation cast, tanks installed
- Melting of salt ongoing
- Additional equipment expected to arrive Nov 2022
- “Best of breed” Gen 1.0 solution under installation. Key learning essentials to develop Gen 2.0
- Expected commissioning scheduled to start in January 2023



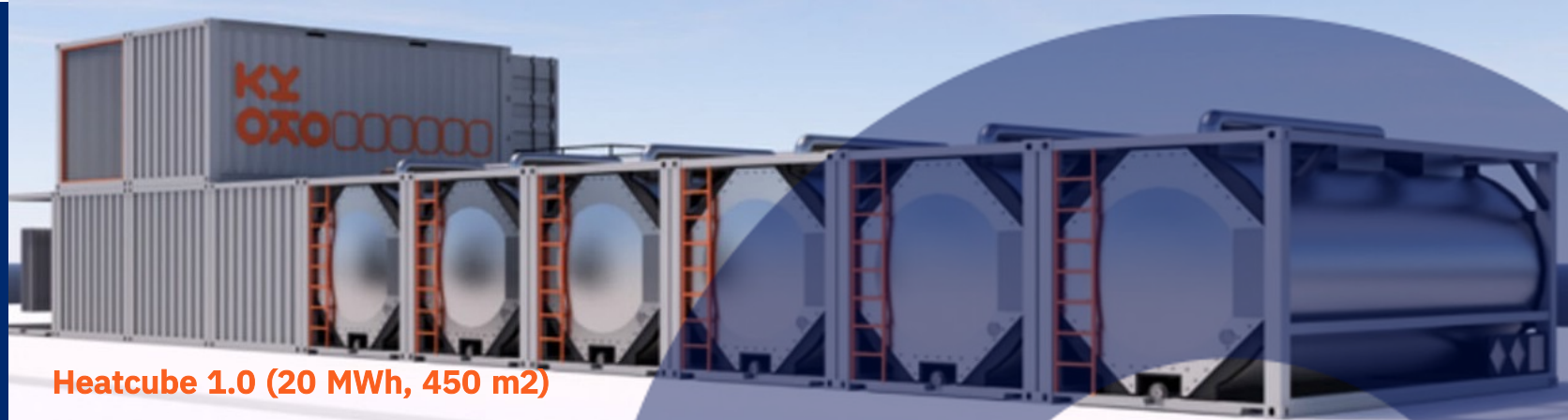
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# Heatcube 2.0 for serial production

Improving energy density from 47 kWh/m<sup>2</sup> to 233 kWh/m<sup>2</sup>

- Major energy density improvement
- Significant material cost reduction
- Same amount of valves for 3,7X more energy stored
- Control system optimization
- Hydraulic design improvements
- Construction optimization, cost and time



Heatcube 1.0 (20 MWh, 450 m<sup>2</sup>)



Heatcube 2.0 (56 MWh, 240 m<sup>2</sup>)

**KYOTO**



# Heatcube 2.0

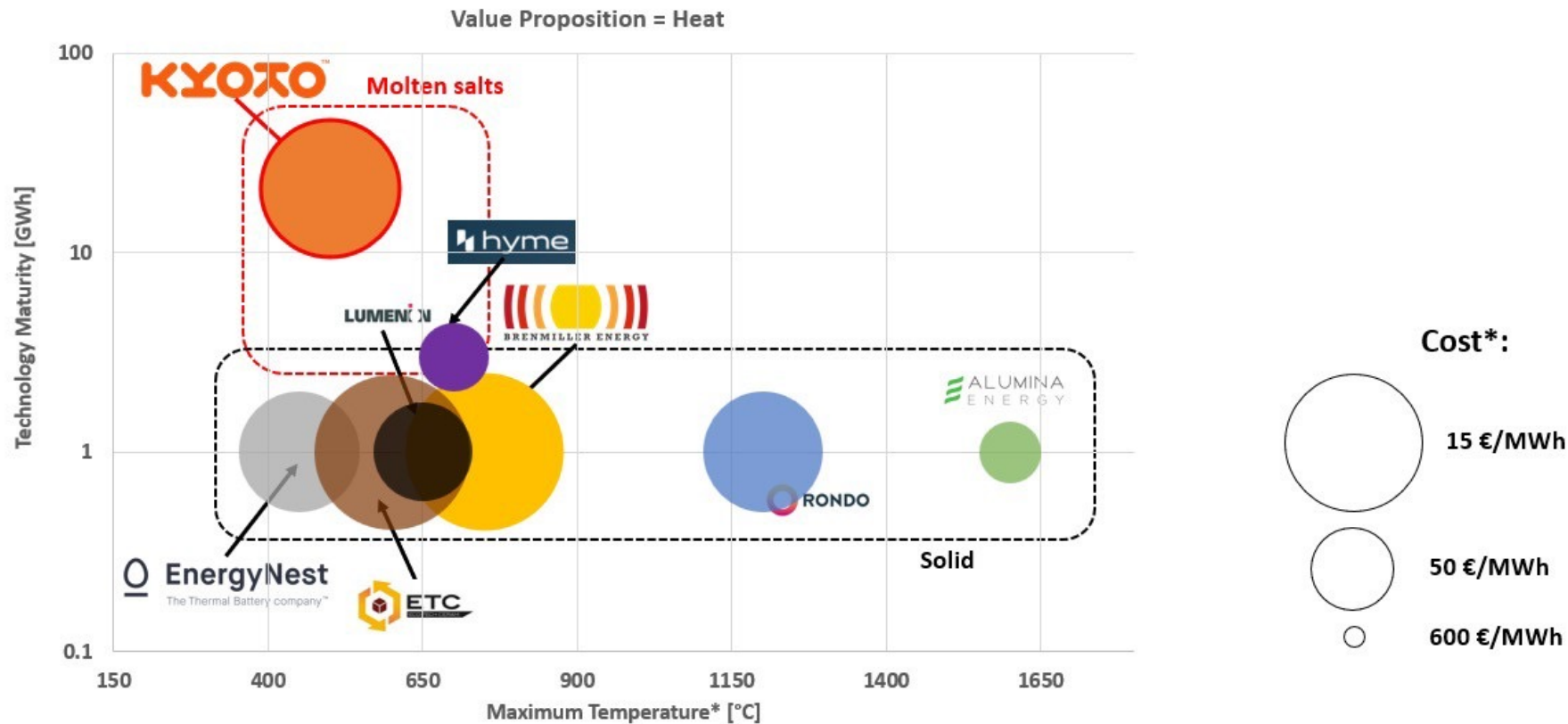
## Key competitive advantages

- Energy density
- Charge/discharge simultaneously
- Dispatchable, < 1min response
- Stable delivery of steam (temp)
- Cost



# Competitive landscape

First mover advantage with proven technology,  
only molten salt company with heat as value proposition



\*Based on officially available data

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# Clear commercial priorities concluded

CCO Tim de Haas

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# Key markets identified and prioritized

Based on demand and market conditions (energy & regulatory)



**98 TWh** estimated yearly industrial heat demand

- Significant and increasing price volatility
- Speedy expansion of renewables
- Attractive electricity prices
- Supportive regulatory framework



**100 TWh** estimated yearly industrial heat demand

- Strong strategic partnerships established
- Access to relevant world-class expertise
- Significant & increasing price volatility
- Speedy expansion of renewables
- Attractive electricity prices
- Supportive regulatory framework



**8.9 TWh** estimated yearly waste heat available

- Strong strategic partnerships established



**11 TWh** estimated yearly industrial heat demand

- First installation under construction
- Strong strategic partnerships established
- Access to attractive electricity prices



**227 TWh** estimated yearly industrial heat demand

- Supportive regulatory framework

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# Six industries with significant heat demand prioritized

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

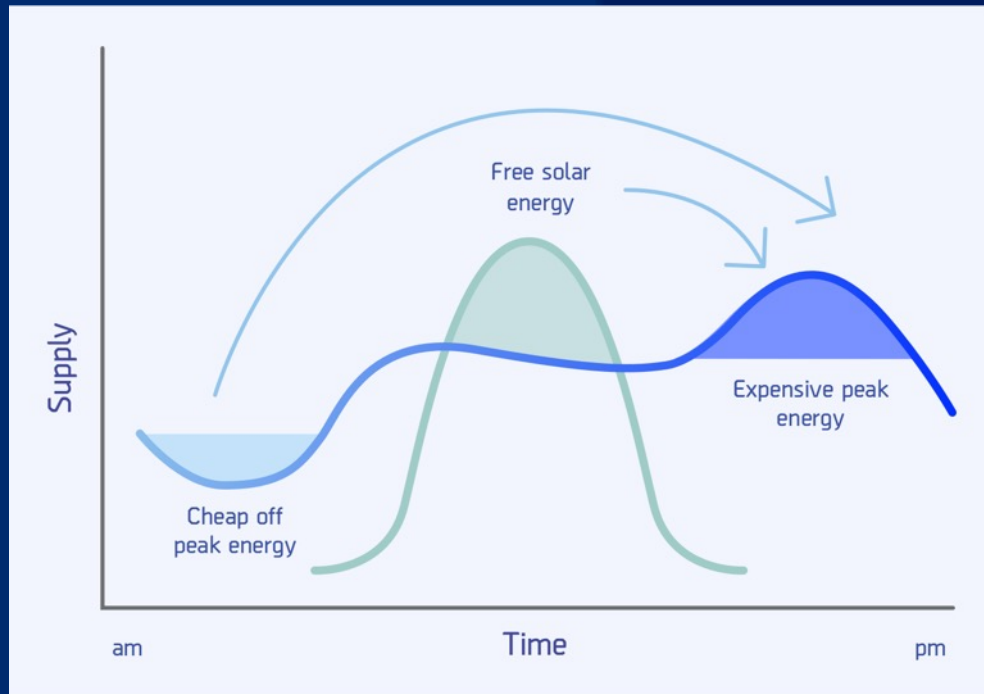
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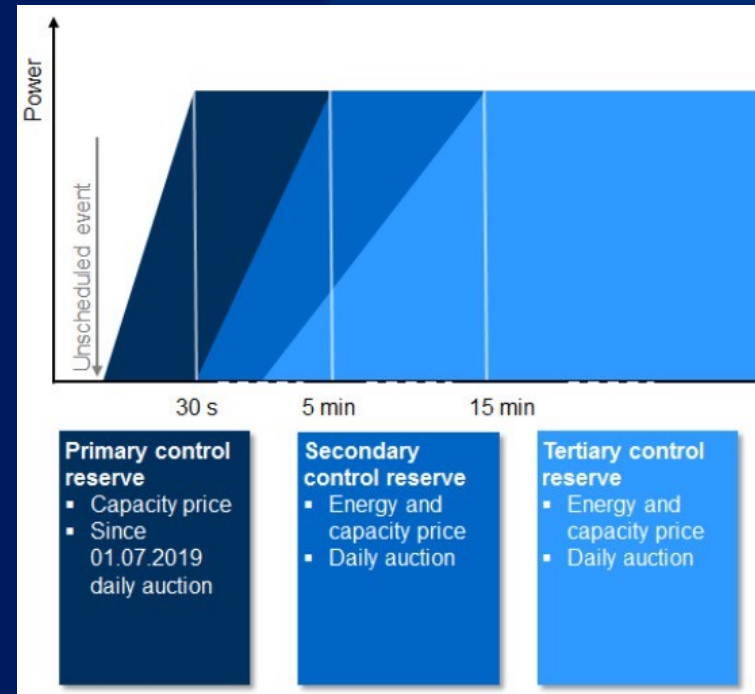
# Kyoto's Heatcube™

enables industrial partners to benefit from off-peak electricity prices and from participating in the reserve market

## Load Shifting



## Reserve Market



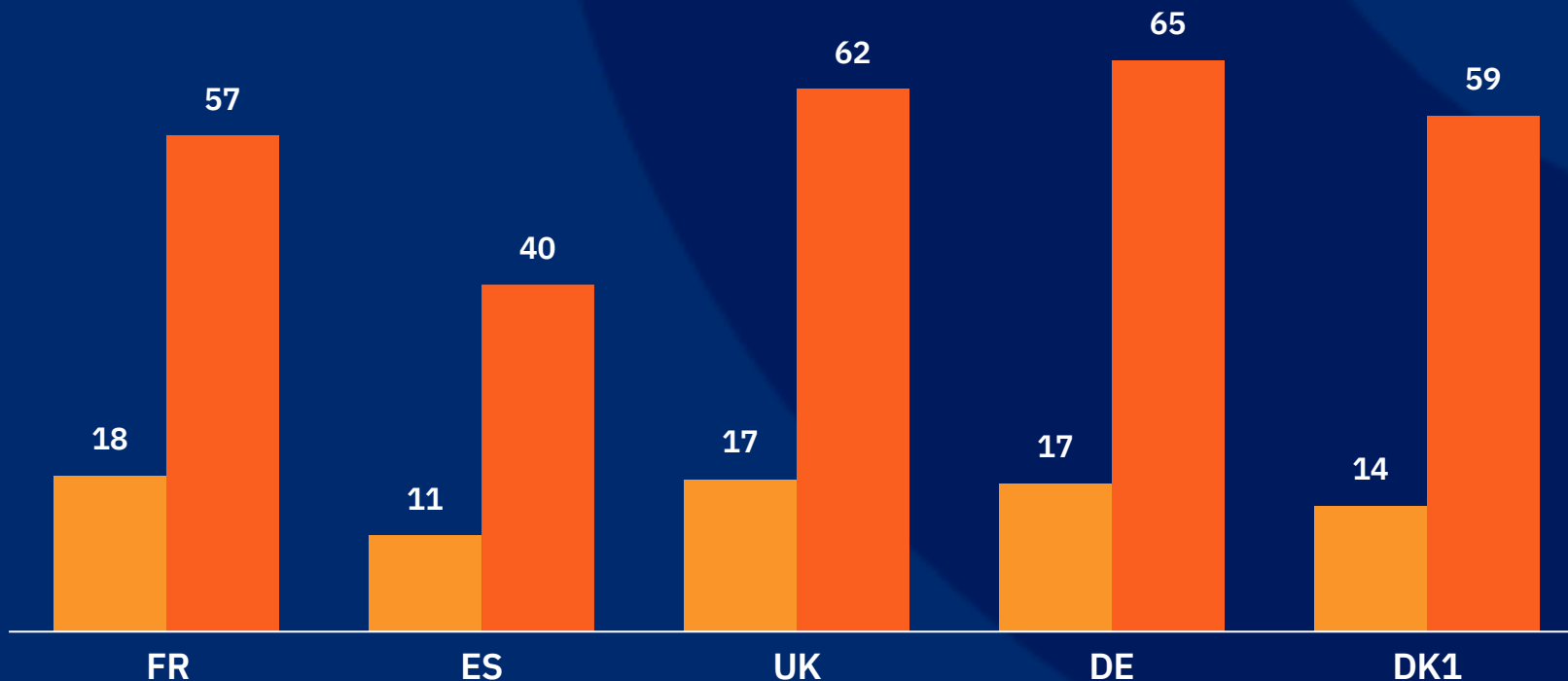
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# Intra-day price volatility is 3-4x higher compared to 2018

Price volatility expressed as 5 cheapest hours vs 6am-10pm

Change in price volatility (€/MWh)

2018 H1 2022

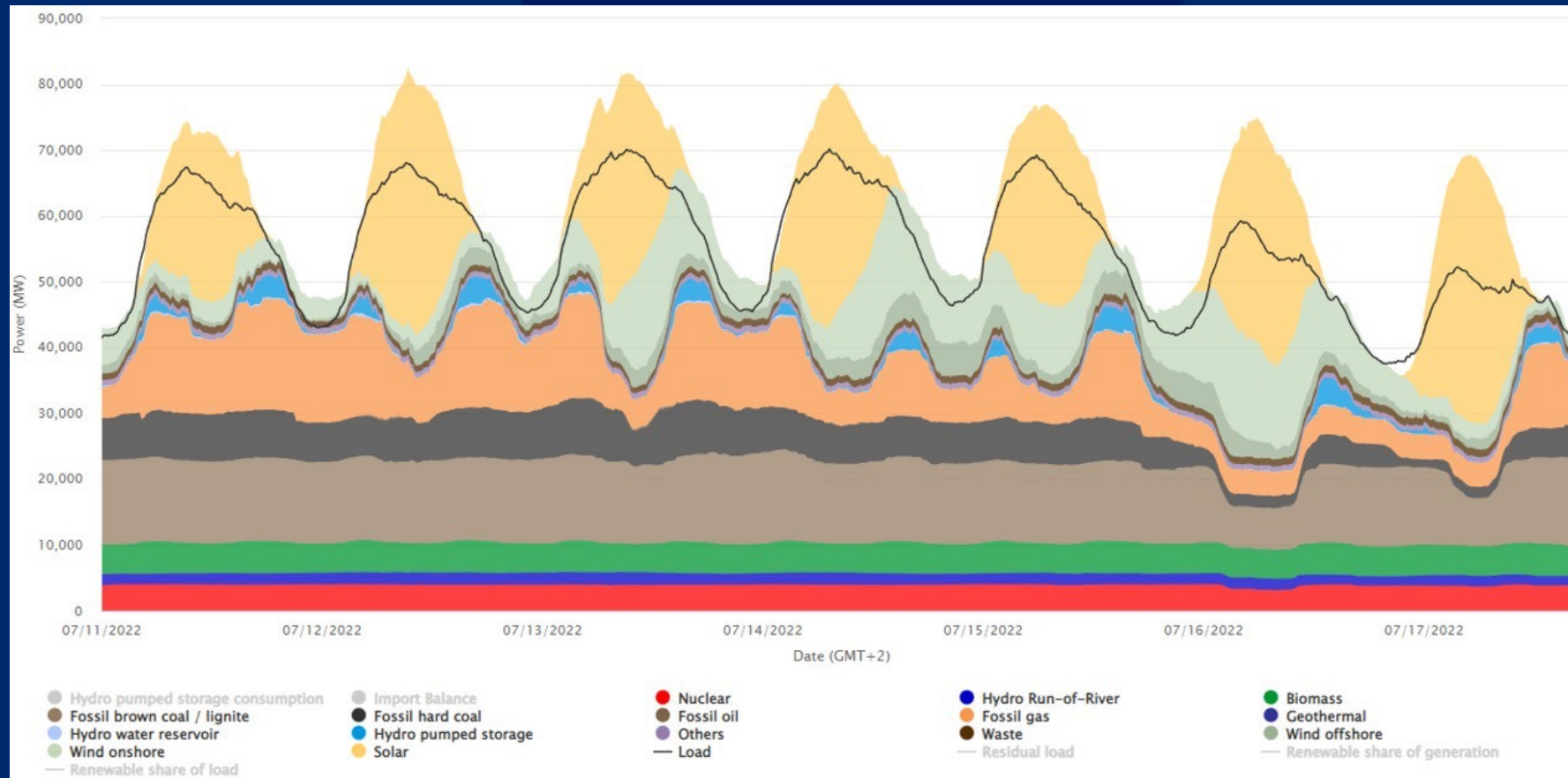


- Share of renewable energy in the energy mix continuously increases
- The flexibility on supply side results in higher intra-day price volatilities
- Increased number of hours with negative prices are expected

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# Power balance in Germany week 28 2022

## Net Production

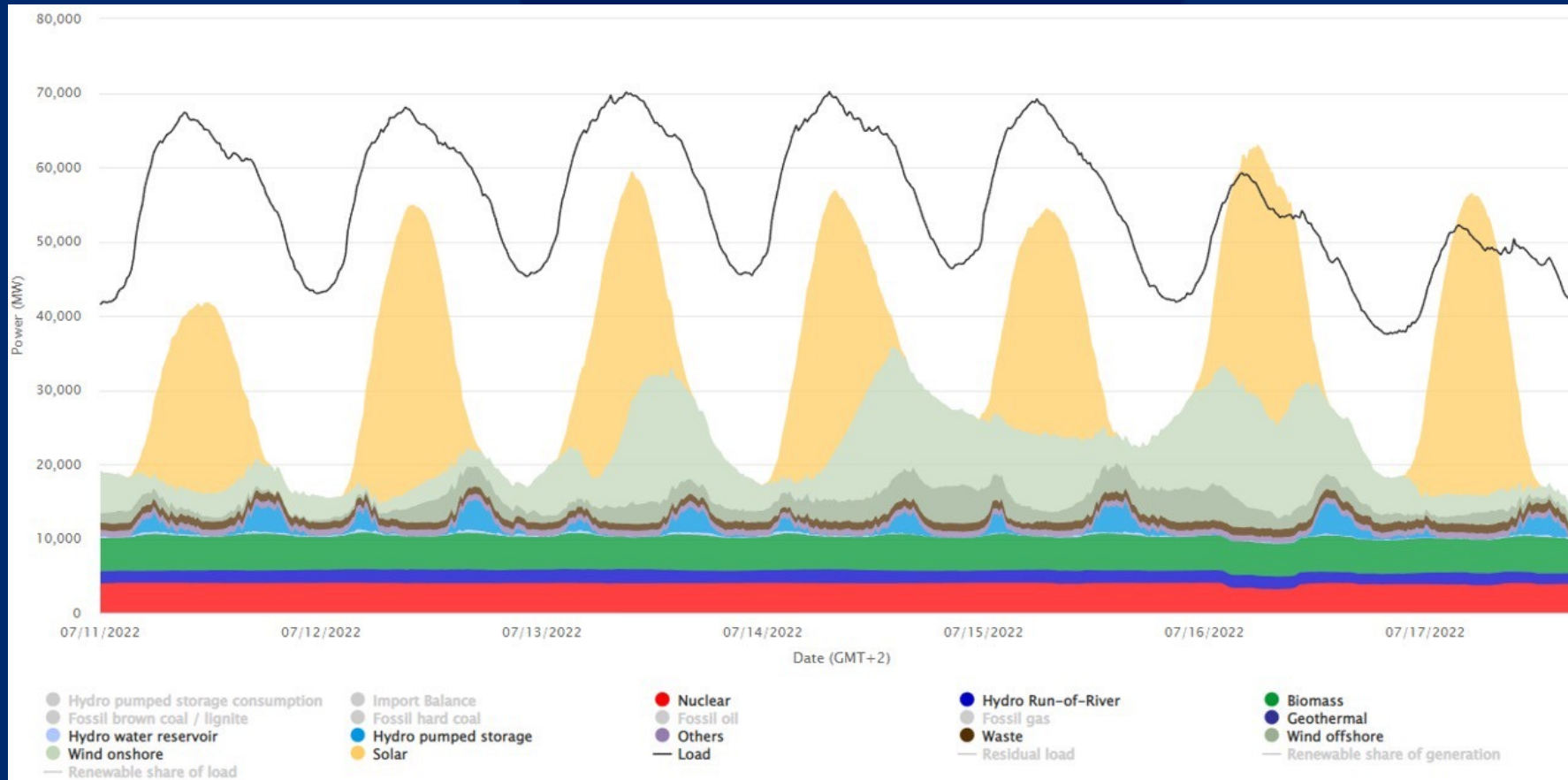


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# Power balance in Germany week 28 2022

## Removing the flexible fossil-based production



# Kyoto offers the Heatcube™ with two commercial models

The market break-through is expected roughly with a 50/50 volume split on the two commercial models

## Heat as a Product (HaaP)

### Traditional Product Sale

- EPC or direct sales
- Support and service agreements with customers
- One-time payments

## Heat as a Service (HaaS)

### Heat Sales to Customers

- Heat purchase agreements (HPA)
- Operated by Kyoto and/or partner
- Recurring stable, long-term revenues

# MoU with Hydro REIN to develop combined renewable energy & thermal energy storage solutions for industrial players

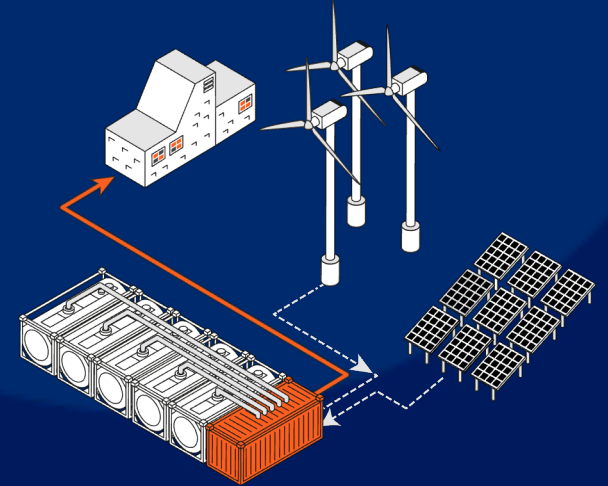


Agreed on a joint go-to-market approach to industrial clients:

- Hydro REIN offers guaranteed renewable energy
- Kyoto Group's Heatcube offers renewable heat
- Kyoto Group will co-design the solution and participate in serving the clients

Target of 3 to 5 pilot and commercial projects over the next two years with identified clients

- Guaranteed renewable energy and heat on demand
- For industrial clients to decarbonize and optimize both their energy consumption and heat demand

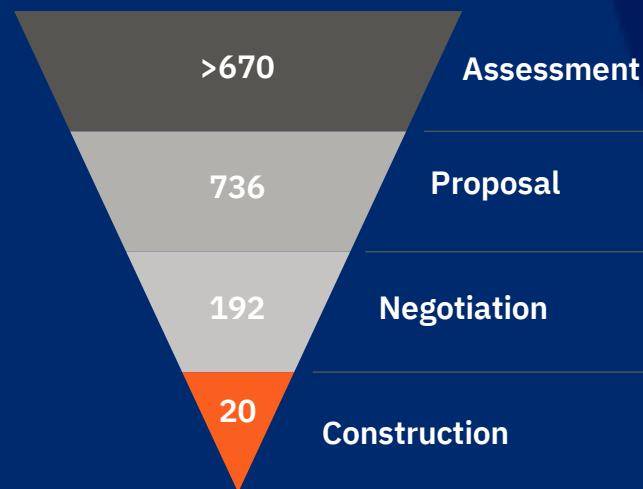


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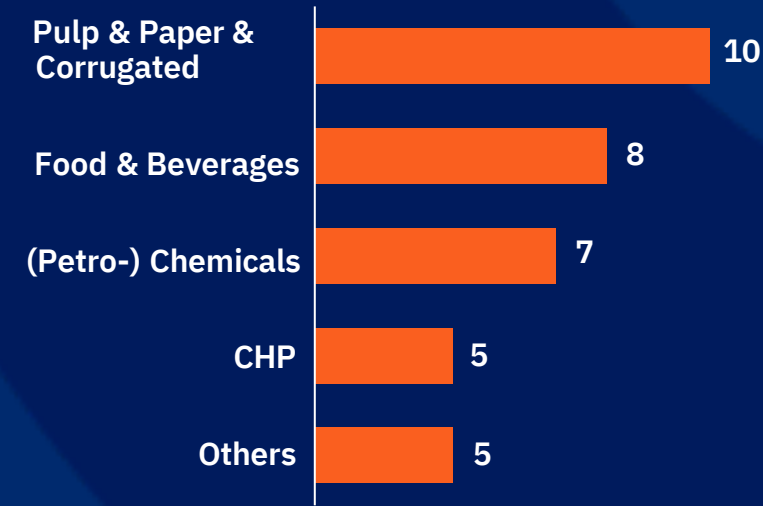
# Potential pipeline covering multiple industries in the targeted markets

## Storage pipeline (MWh)

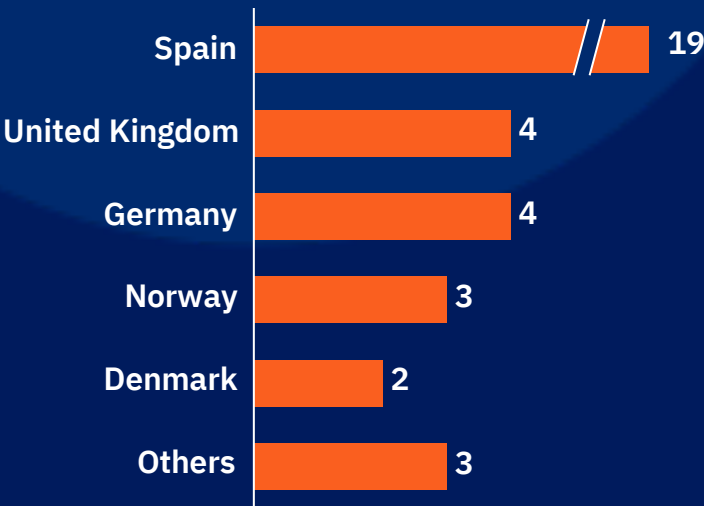
Total volume: >1 800 MWh



## Industry Split (no of projects)



## Geographical Split



Assessment: Identified opportunities, dialogue initiated, not all potential storage sizes quantified | Proposal: NDA signed, commercial offer sent to and under evaluation by customer | Negotiation: LoI signed, commercial contract in negotiation | Construction: Currently in installation

# Letter of Intent (LoI) in Corrugated Cardboard Industry

## Implementing a reference project for >600 plants

### Background on Glomma Papp

- Designing, developing, and manufacturing packaging and display solutions for business markets since 1931
- Glomma Papp AS's vision is to inspire and improve

### Status

- Thermal storage of 40 MWh
- Annual capacity of up to 12 GWh thermal energy
- Reduction of up to 2.700 tons of CO2 annually

### Goal

- Commissioning planned for during the summer of 2023



*"This is further proof of our commitments to sustainability and to reducing CO2 emissions from our processes and actively being a part of the green transition for the corrugated industry. Kyoto's Heatcube™ offers an interesting potential for us [...]"*

John Stevenson,  
Technical  
Manager Glomma  
Papp AS



## Over 600 corrugated cardboard plants in Europe largely using fossil fuel today

- Standardized processes and equipment in most plants
- Industry is required to decarbonize their processes and meet new environmental standards



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# Letter of Intent (LoI) in Food & Beverage Industry

## Spearheading into food industry with Spanish producer

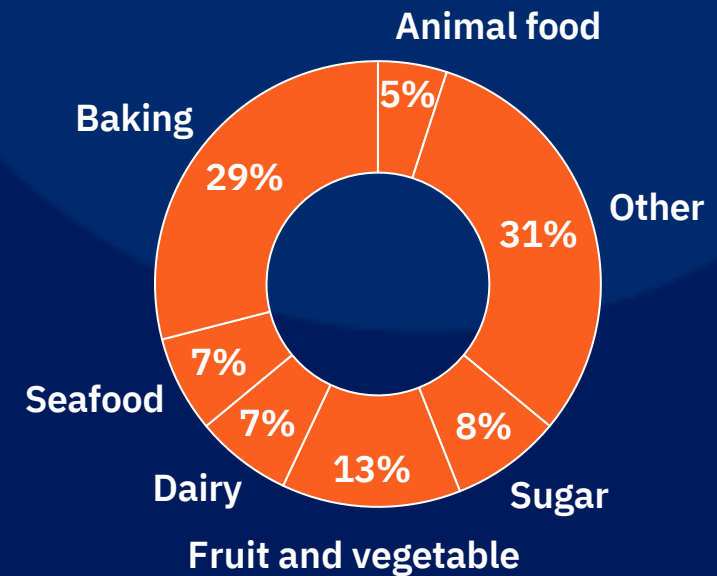
Over 50 olive oil and tomato plants just in Spain

### Background

- Among market leaders within its segment in food sector in Spain
- Renewable solution for heat generation for food production process and wastewater treatment
- Replacing natural gas boiler giving a competitive advantage for the client's operation

### Status

- Thermal storage of 64 MWh
- Annual capacity of up to 20 GWh thermal energy
- Reduction of more than 3.000 tons of CO2 annually
- Utilizing solar energy, the Heatcube will ensure emission-free heat production both day and night



### Goal

- Commissioning during the second half of 2023

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# Letter of Intent (LoI) in Cogeneration Plants

## Spearheading into cogeneration industry in Spain

### Background

- Client with several cogeneration facilities in Spain
- Provides a competitive advantage for the client's operation and reduction of CO2 emissions

### Status

- Thermal storage of 88 MWh
- Annual capacity of more than 40 GWh thermal energy
- Reduction of more than 9.000 tons of CO2 annually

### Goal

- Commissioning during the second half of 2023



## Several plants in the same group in Spain

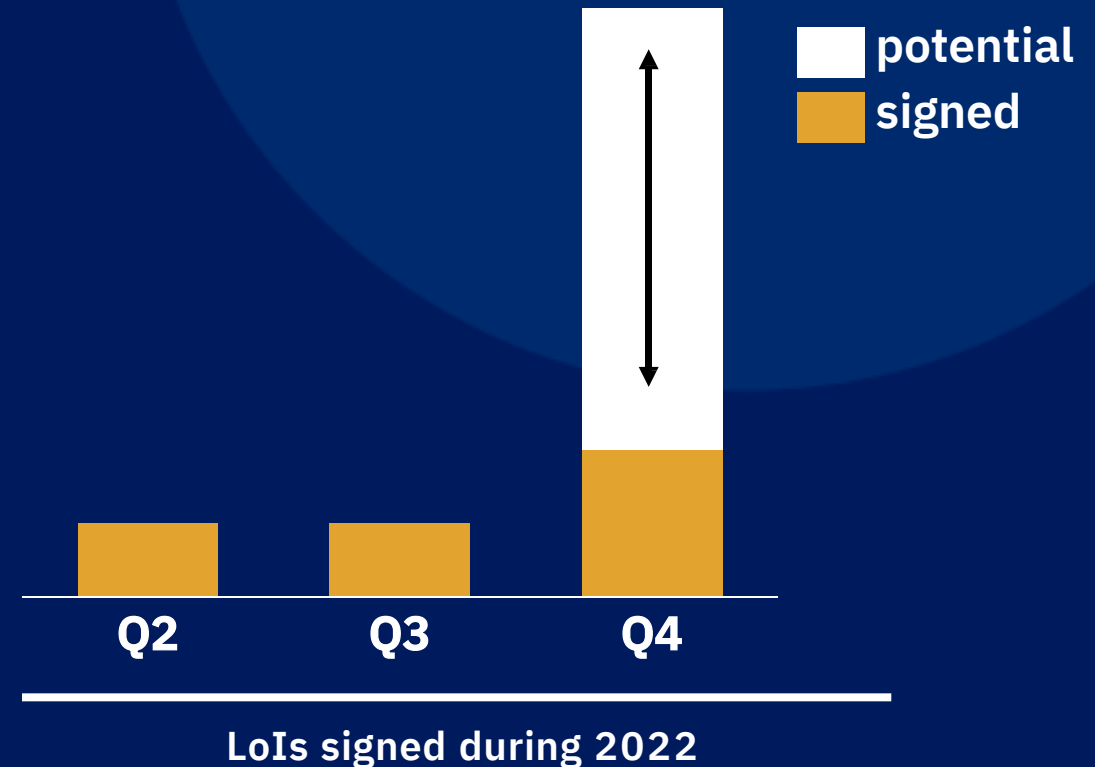


# We are on track on signing between 5 to 10 LoIs within 2022

Aiming for converting first loIs into signed contracts within a few months

## Outlook for 2022.

- Negotiating and signing 5-10 LoIs
- Entering into final negotiations of supply agreements
- Aiming for converting first LoIs into signed contracts within a few months





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# The Kyoto platform for execution

CEO Camilla Nilsson

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# From start-up to scale-up

## At market break-through with proven technology



# MT & BoD with extensive industry and scale-up experience



**Camilla Nilsson**  
Chief Executive Officer



**Håvard Haukdal**  
Chief Financial Officer



**Bjarke Buchbjerg**  
Chief Technology Officer



**Tim de Haas**  
Chief Commercial Officer



**Peter Iversen**  
Chief Manufacturing Officer



**Susanne Vinje**  
Chief Supply Chain Officer



**Agnieszka Sleds**  
Chief Project Officer



**Henrik Holck-Clausen**  
Chief People & Culture Officer



**Eivind Reiten**  
Chairman



**Thorleif Enger**  
Board member



**Arne Erik Kristiansen**  
Board member



**Pål Selboe Valseth**  
Board member



**Ivar Andreas Valstad**  
Board member

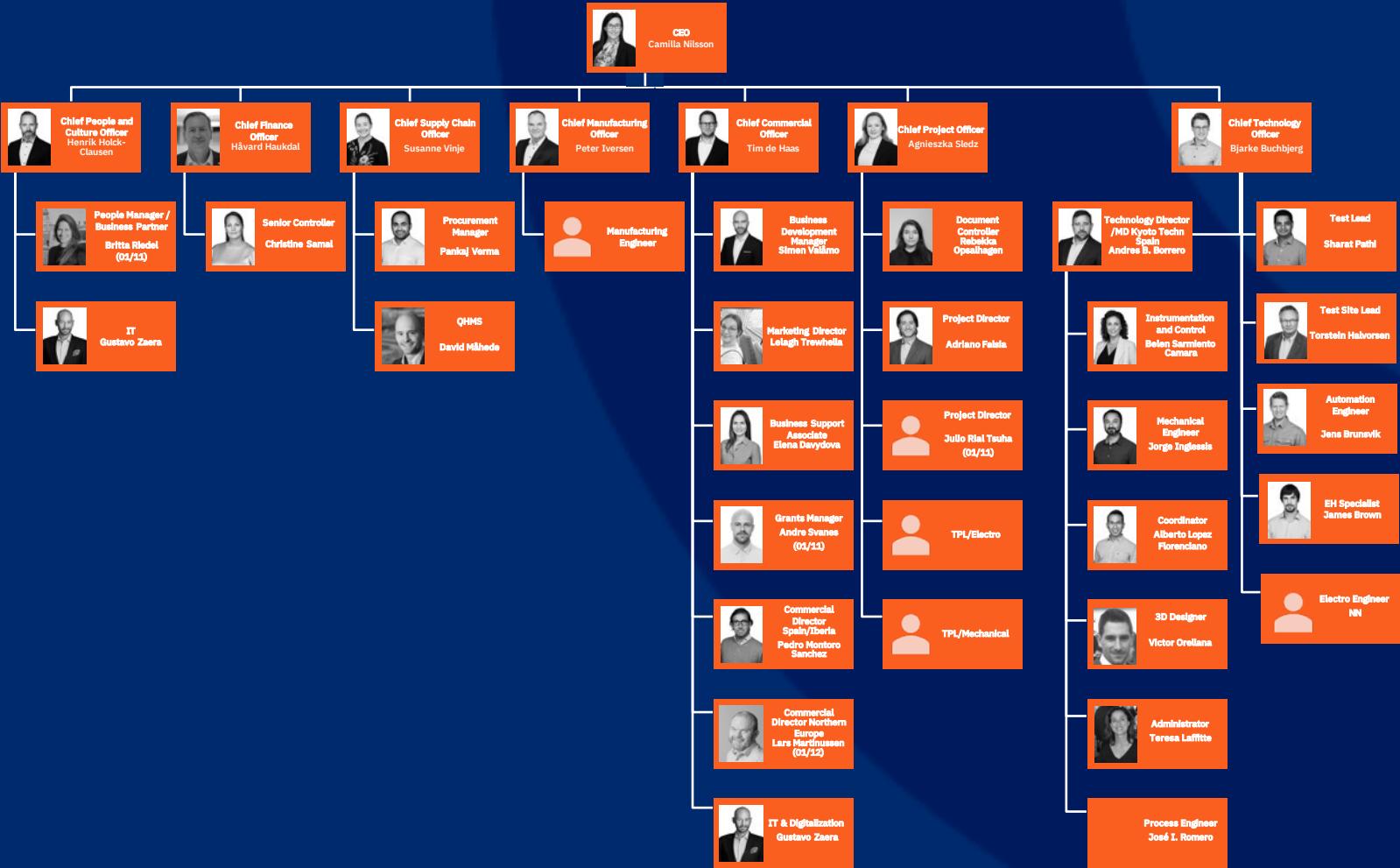


**Hans Olav Kvalvaag**  
Board member

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# Strong Kyoto organization for scaling established



33 employees spread over 3 countries divided on 12 nationalities with an average of 13 years of experience and 30% females and world leading molten salt engineering expertise



# World class energy storage and molten salt expertise



- Acquisition of Mercury Energy
- Expansion of Kyoto's geographic footprint
- Mercury Energy brings significant IPR for molten salt
- Owner of Mercury Energy, Andres Barros Borrero, joined Kyoto as part of the acquisition



- Collaboration agreement with KTH
- Financed by Kyoto, led by Silvia Trevisan, supervised by Bjarke Buchbjerg and Rafael Guédez
- Focusing on research and material development

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# Extensive molten salt engineering experience in-house

Significant experience in molten salt, thermal energy & large-scale projects

## Sevilla, Spain

**Engineering Coordinator**  
Alberto López Florenciano  
M.Sc. Mechanical Engineer

>10 yrs in EPC projects in CSP power plants with thermal energy storage and in chemical factories, including site engineering management



**Simulation Engineer**  
Jorge Inglessis  
M.Sc. Mechanical Engineer

10 yrs in FEA and CFD modelling of CSP plant components and processes, including molten salt tanks



**3D Designer**  
Victor Orellana Cocinero  
M.Sc.

11 yrs of 3D Modelling Design in EPC projects with thermal energy storage in molten salts



**Instrumentation & Control**  
Belén Camara  
M.Sc. I&C Engineer

10 yrs in EPC projects, CSP plants with thermal energy storage in molten salt and steam



**Senior Process Engineer**  
José Ignacio Romero  
M.Sc.

10 yrs in EPC projects and R+D with thermal energy storage



**Administration & Control**  
Teresa Laffitte Solis  
MBA



## Oslo, Norway



**Test Leader**  
Sharat Pathi  
PhD Chemical Engineer

14 years of experience in Process design, optimization, process simulation, heat & material balance etc.



**EH Specialist**  
James Brown  
Post Doc

15 yrs of experience in R&D, engineering management & large electromechanical product development (electrical heaters)



**Test Site Lead**  
Torstein Halvorsen  
B.Sc.

30+ years of experience in production & production engineering in the opti metrics industry



**Automation Engineer**  
Jens Brunsvik  
M.Sc.

10 yrs of experience in software engineering and design



## Contracted Partners

**Royal Institute of Technology**  
Rafael Guede, PhD  
Silvia Trevisan, PhD



**RPOW Consulting \***  
Trusted engineering partner



**AACSP Consulting \***  
Trusted engineering partner



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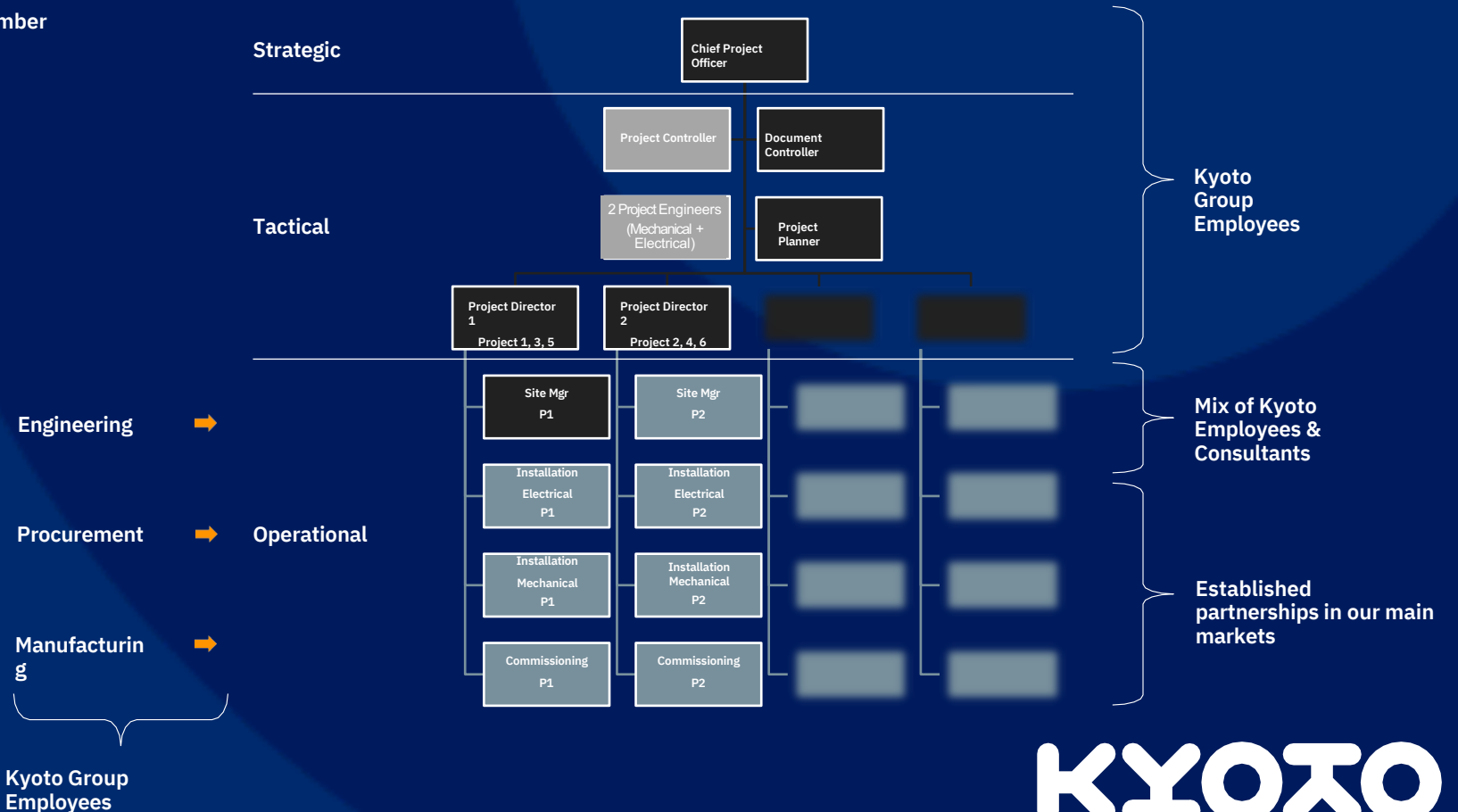
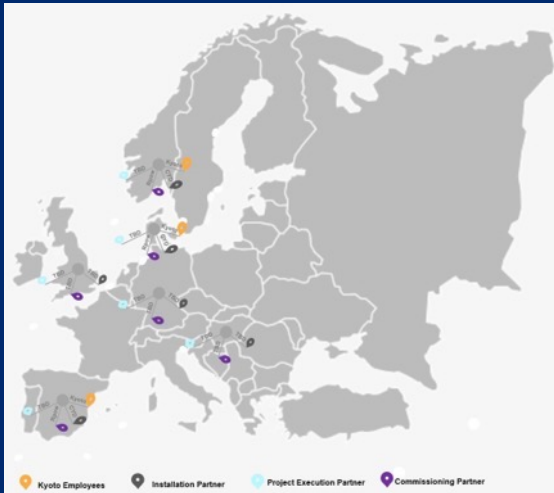
\* Detailed competency description to be viewed in appendix



# Scalable project organization

## How to secure multi project execution without building fixed cost

- A scalable organization that can grow/shrink fast based on number of projects/contracts
- Strategic & Tactical Resources are kept internal
- Operational resources – Majority Kept external to;
  - Avoid building fixed cost
  - Avoid resources not being used
  - Meet various markets and geographies
- Engineering, Procurement and Manufacturing are remaining as separate departments from the project organization



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# Solid collaboration platform in the Heatcube value chain

Strategic partners with extensive thermal energy & molten salt experience



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A landscape photograph featuring a series of wind turbines silhouetted against a vibrant sunset sky. The sky is filled with soft, wispy clouds in shades of orange, pink, and purple. The turbines are of varying heights and are scattered across a dark, silhouetted horizon line. The overall mood is serene and hopeful, suggesting a transition to renewable energy.

# BREAK

**KYOTO**



Next on our agenda

# Sigbjørn Seland

From StormGeo Nena

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CAPITAL MARKETS DAY

# Decarbonizing the power markets

Sigbjørn Seland from StormGeo Nena



**StormGeo** Nena

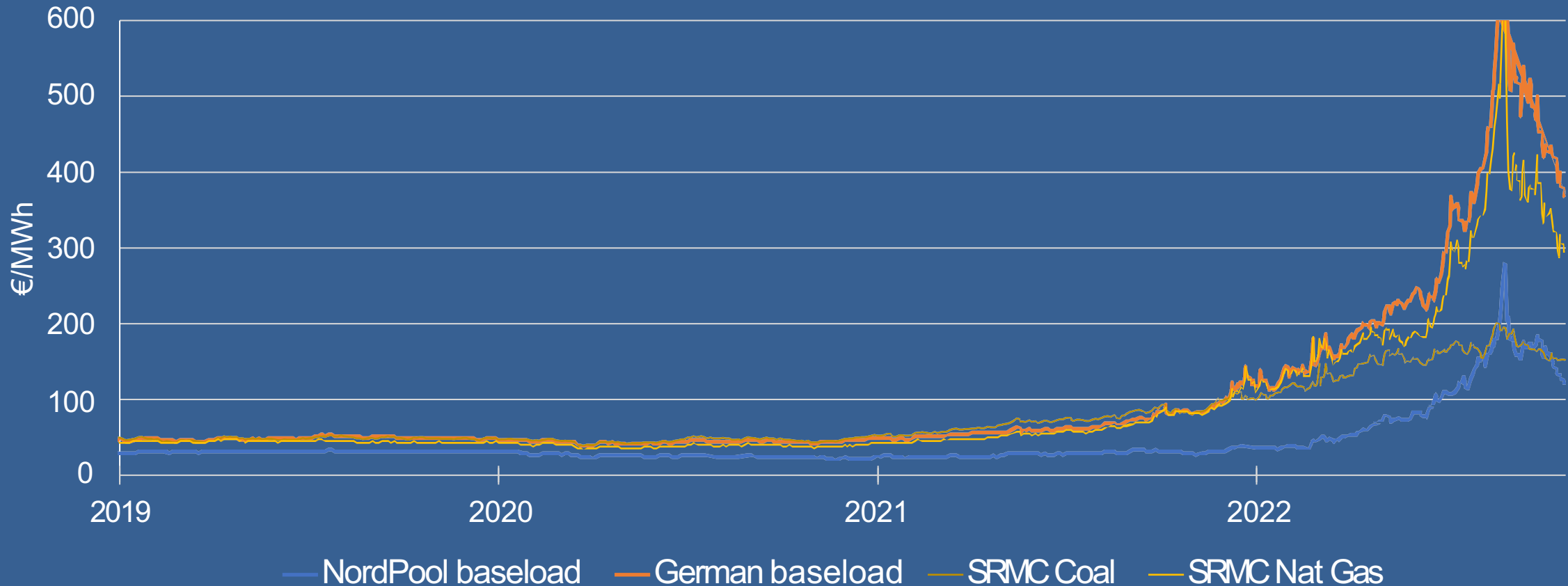
## Current state of the power markets

- **European power markets still dominated by coal and nat gas fuelled power plants. Base load power prices typically set by the short run marginal production cost (SRMC) of a hard coal power plant or by a CCGT (Combined Cycle Gas Turbine)**
- **Nordic power largely decoupled from SRMC coal and SRMC nat gas as hydro and wind power, with SRMC at zero, dominates**
- **Short-term volatility impacted by the spiking fuel prices – hourly prices determined by either renewables or thermal power plants**



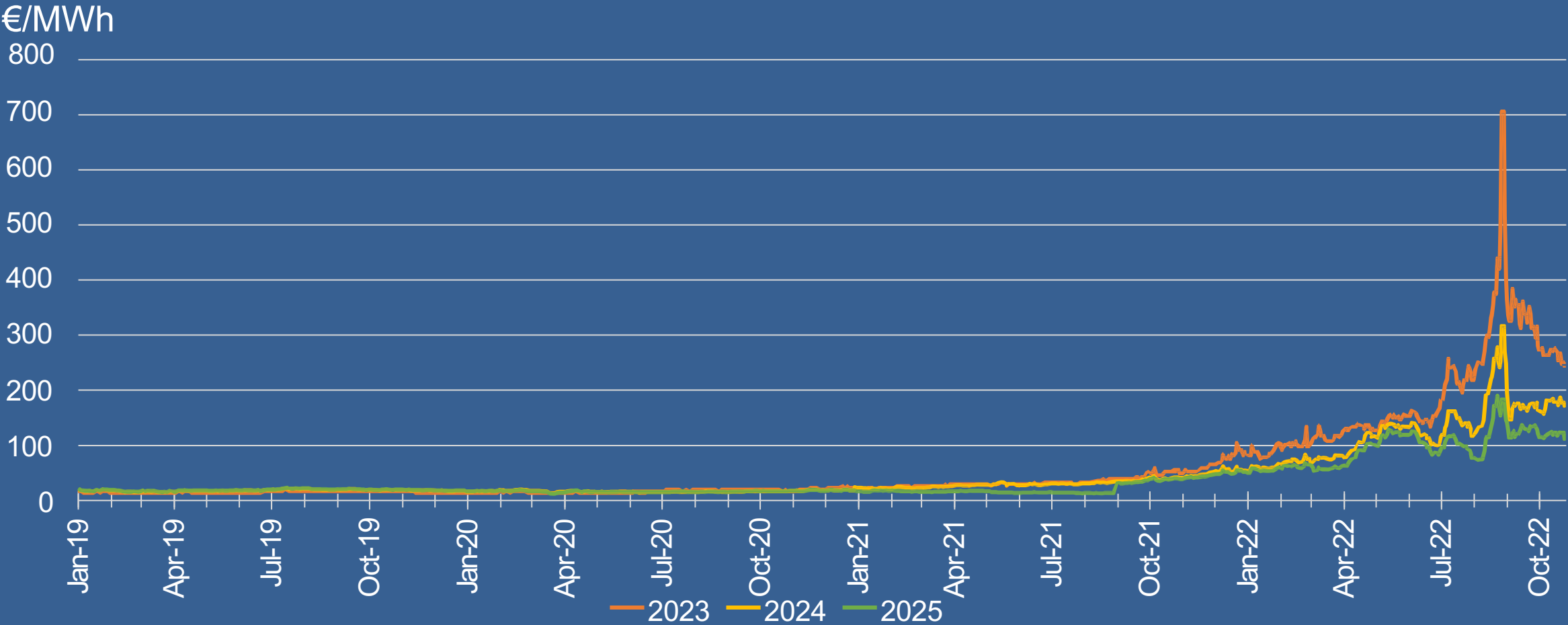
# German and Nordic baseload 2023 futures price vs SRMC coal and SRMC nat gas

- German baseload strongly linked to SRMC nat gas.
- Nordic baseload largely disconnected to SRMC coal/nat gas, hence to German/Conti power. Connection stronger when Nordic hydrological balance is weak.



# Nordic baseload futures discount to German baseload futures

Nordic discount slowly decreasing further out on the futures curve, but general picture is Nordic power is “record cheap” compared to most of Europe



Decarbonizing the power markets

# Future development in the markets

Power markets in Europe are changing rapidly

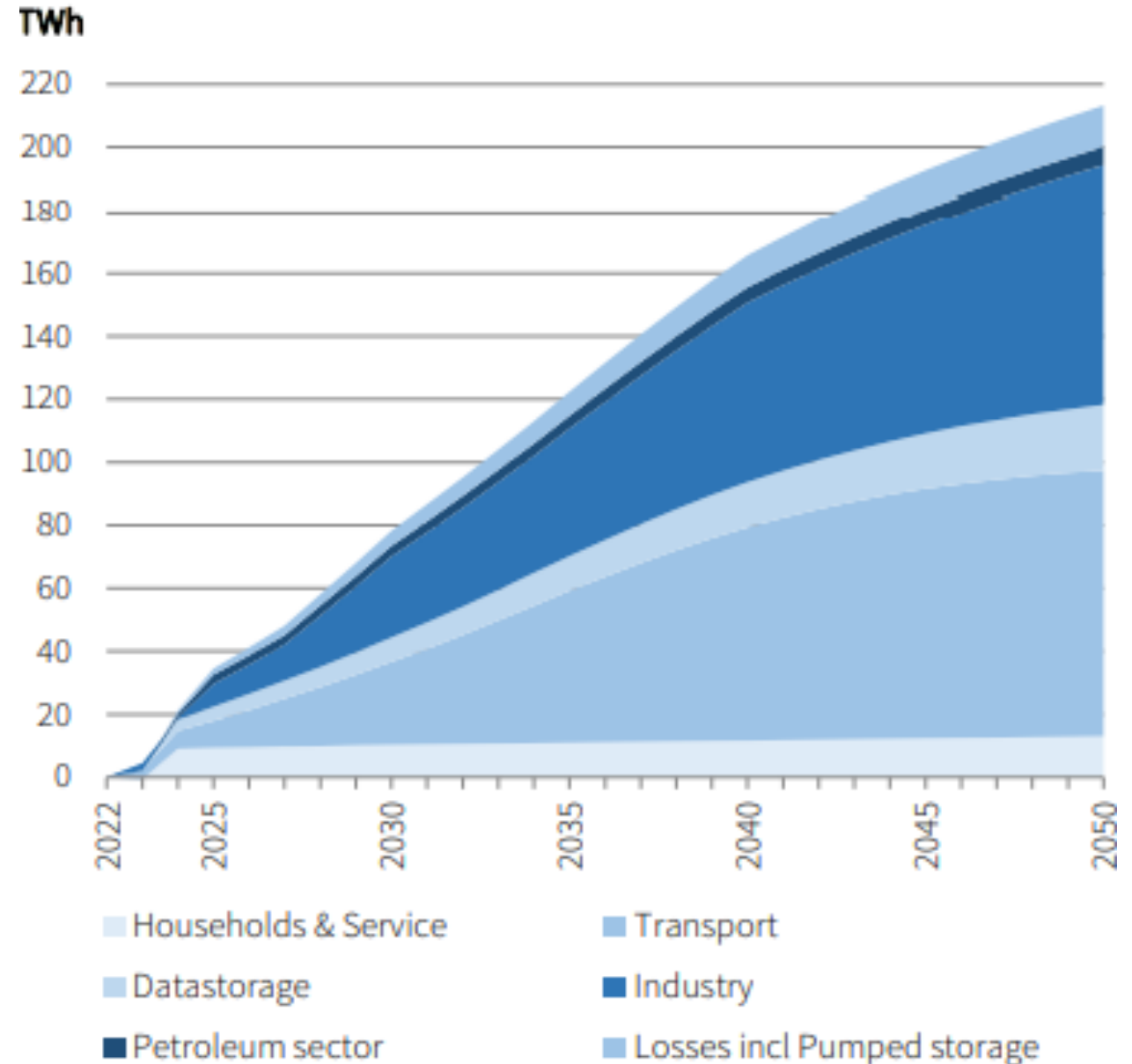
- **The backdrop is the EU's objective, expressed in the Energy Road Map 2050, that Europe should be a low-carbon economy in 2050**
- **Decarbonisation is largely achieved through electrification. It is widely accepted that electricity consumption will increase a lot.**

Future developments in the markets

## Electricity consumption growth in the Nordic region.

- The development in industrial consumption includes electricity consumed to the production of green hydrogen.
- Electricity consumption growth in other parts of Europe will likely be even stronger

## Electricity consumption growth 2022-2050

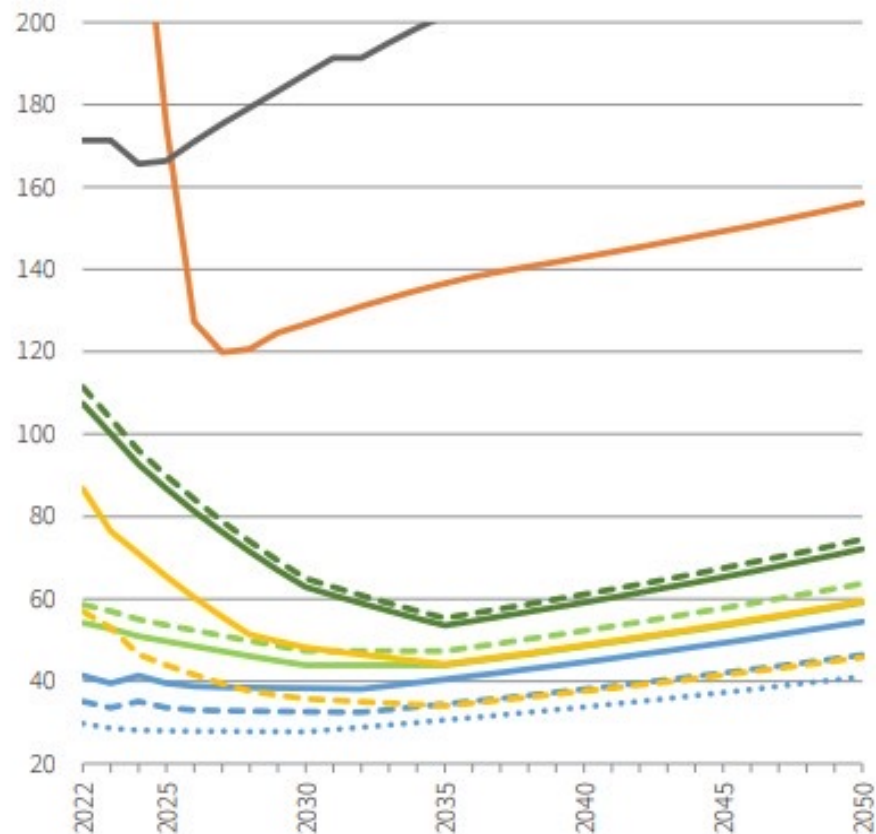




# Future development in the markets

Power markets in Europe are changing rapidly

- EUAs (CO2 allowances) is EUs main tool to achieve the goal of the Energy Road Map 2050. The price of EUAs must be high enough for sufficient investment to be made in emission-reducing measures. However, there is little evidence that decarbonization targets will ever be achieved as a direct result of the price of CO2 allowances, the price of allowances would simply be unacceptably high.
- Current situation: High prices for coal, natural gas and EUAs leads to SRMC for European base load production capacity (hard coal and CCGT power plants) being higher than long run marginal cost (LRMC) for new renewable power generation (wind and solar power)
- This results in a strong investment signal for wind power and solar power all over Europe. “All” approved wind and solar power projects should be developed as soon as possible.



## New renewable power production is extremely cheap compared to fossil fueled power production

- Investments are not limited by profitability or lack of capital, but by availability of projects
- the NIMBY (Not In My Back Yard) effect is strong, ref. the full stop to onshore wind power in Norway in 2019
- how much the NIMBY effect will limit future investments in new renewable power is one of the biggest uncertainties
- Electricity price will gradually become less influenced by SRMC coal and SRMC nat gas and more influenced by the LRMC of new renewable production



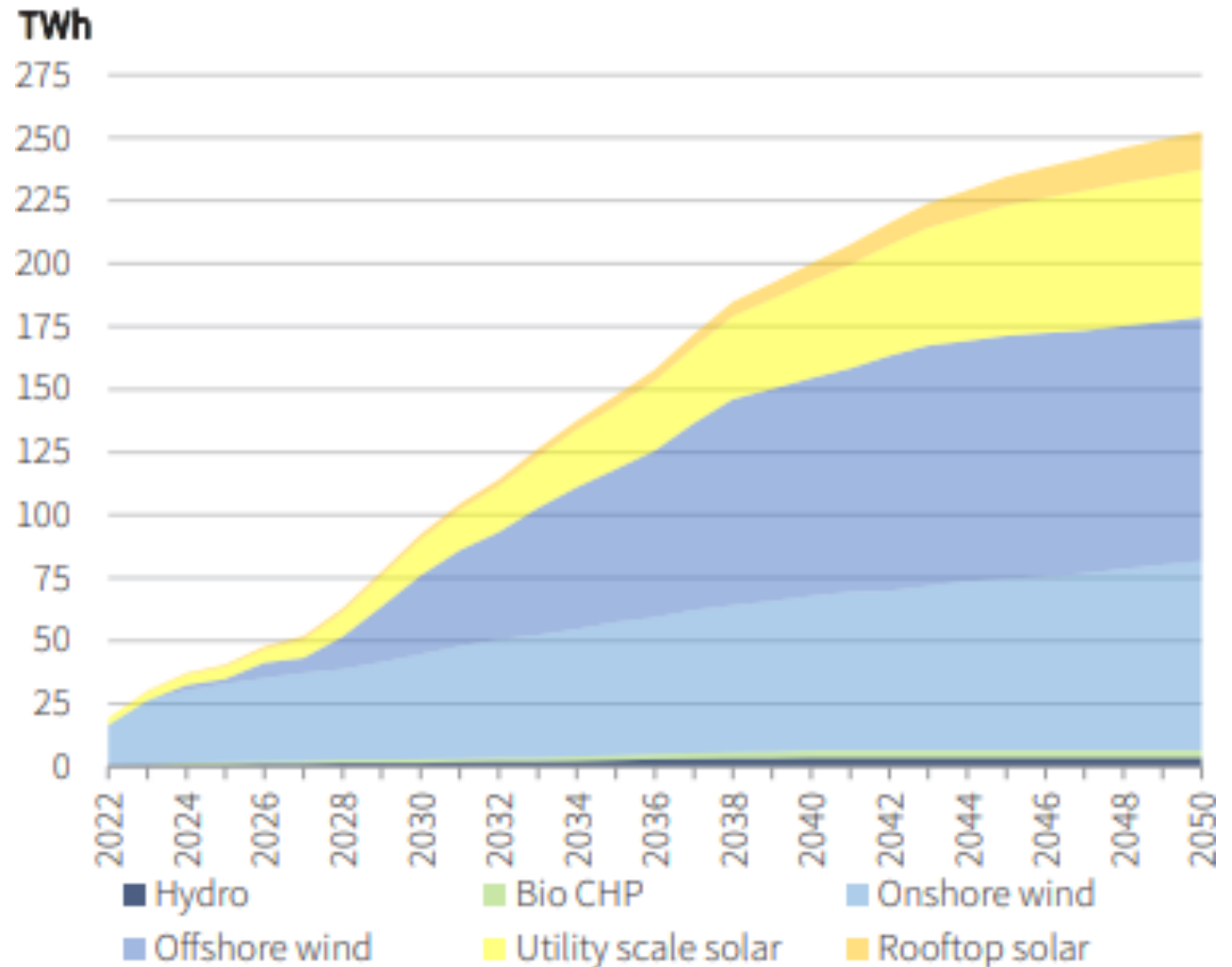
Future developments in the markets

## Renewables development in the Nordics

There has been relatively few investment decisions lately, which will dampen renewable growth in 2023 to 2025.

Anyhow, speed of renewable investments will pick up going forward and we forecast increased renewable growth within few years

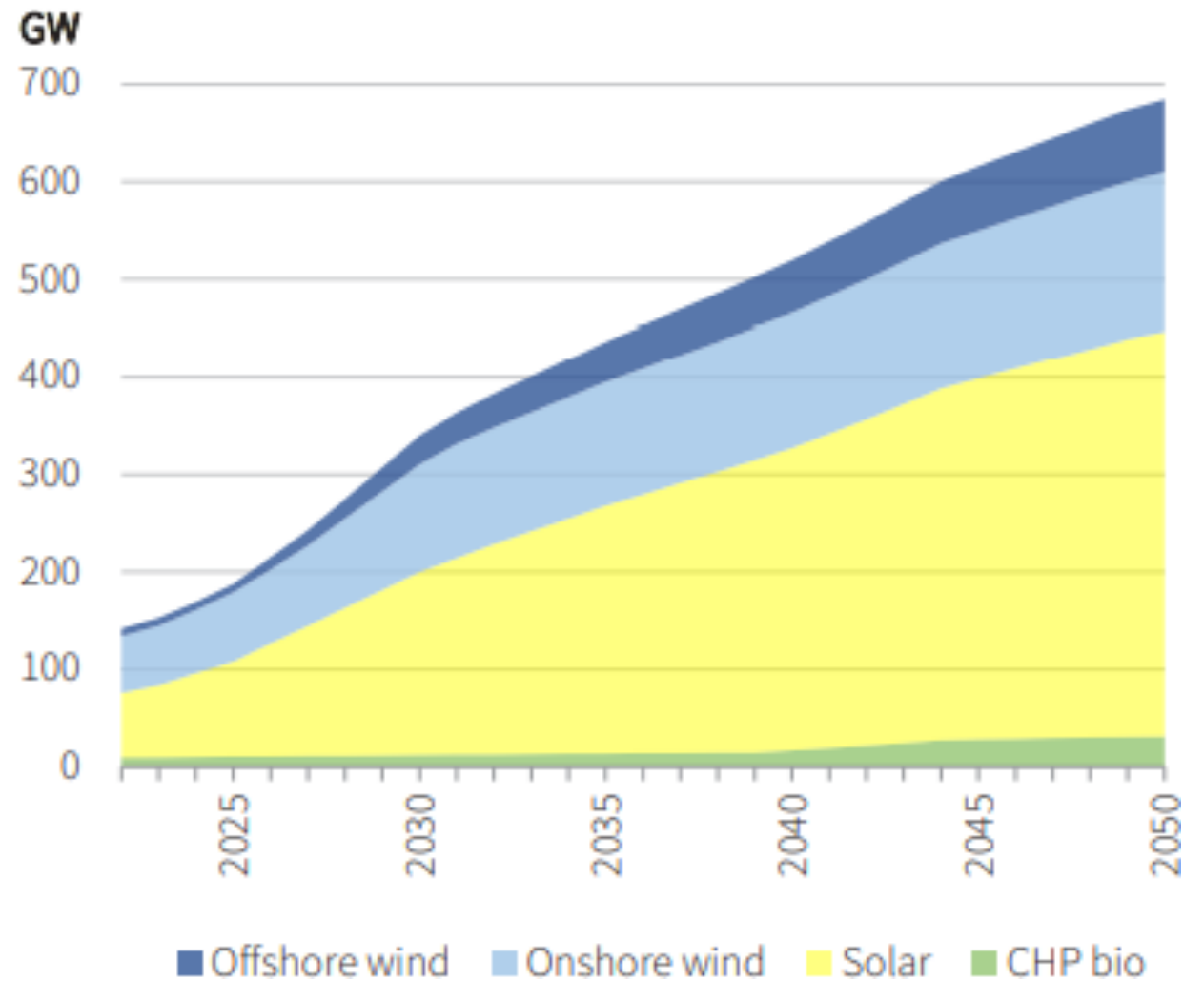
### Nordic Renewable Growth



Future developments in the markets

**Same form of development in Germany (and elsewhere in Europe)** A sustained renewable growth going forward

German renewable capacity





# Investments in Energy storage technologies

- **Sustained investments in wind and solar power are slowly but surely pushing baseload production capacity out of the market, i.e., intermittent production capacity replace baseload capacity**
- **The effect will necessarily be that power prices become more volatile. A larger proportion of the time, power prices will either be very high or very low.**
- **This opens the power markets for investments in energy storage technologies. The investment signal for energy storage occurs when power prices have become volatile enough**

## THE NORDIC POWER MARKET – P2P

We find a gradually increasing investment signal for Battery Power Plants

By early 2030, the spot price difference between charging hours and discharging hours have become large enough to spur battery investments in large scale

An investment signal for PtP peak power plant (hydrogen based) occurs shortly before 2050 in Denmark.

## CONTI EUROPE AND UK – P2P

Our findings will apply to most other countries in Europe as well.

The investment signals appear earlier in these markets, but will vary from country to country

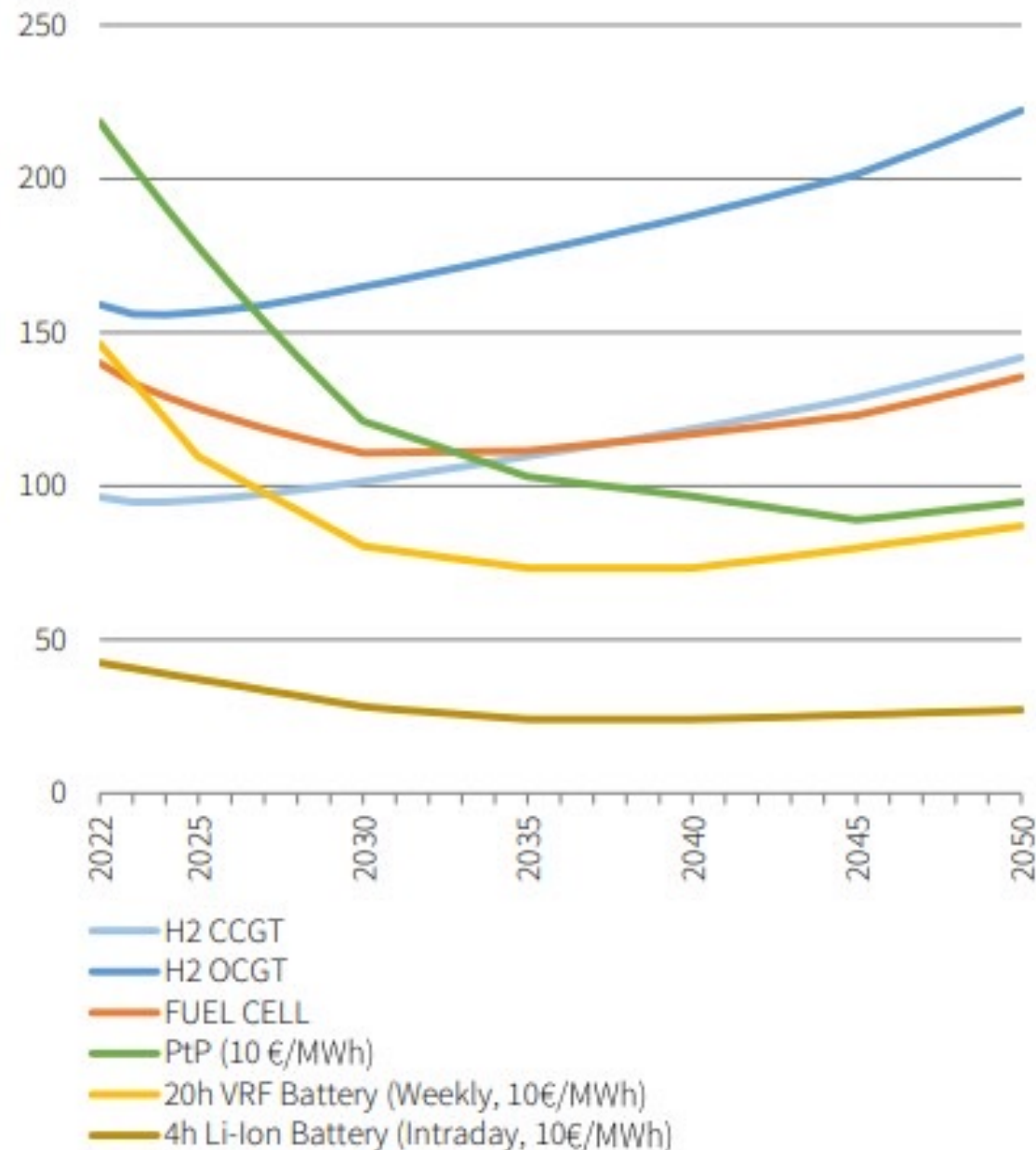
## INVESTMENTS IN OTHER ENERGY STORAGE TECHNOLOGIES

The increasing price volatility incentivize investments in all energy storage technologies that utilize low-priced hours in the power market to store energy at a low cost and produce

The more flexible (in terms of number of hours needed) the more competitive.

### LRMCs - Energy storage and H2 fired generation

€/MWh



## Key takeaways

- **Strong electricity consumption growth on the road to decarbonization**
- **Sustained investment signal for new renewable production**
- **Increasing price volatility in electricity markets slowly but surely increase profitability for investments in energy storage**
- **Electricity prices gradually less determined by SRMC of coal and nat gas production, gradually more determined by the LRMC of new renewable production (offshore wind power for the Nordic region and North-western Europe)**

CAPITAL MARKETS DAY

# Summary & financial update

CFO Håvard Haukdal

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# Kyoto Summary

At market break-through with proven technology

EUR1 000 billion market\* to  
electrify process heat



At market break-through  
with 1 800 MWh in pipeline\*\*

2/3 of industrial energy demand is for heat

90% of industrial heat generation comes  
from fossil fuels

Serviceable Addressable Market for Kyoto  
around 11 200 TWh or EUR 1 000 billion\*

Based on proven CSP Technology



Potential to become  
market leading

Storage of energy in molten salt, coupled  
with electric heater and steam generator

Relevant patents and world class  
engineering competence acquired

Delivers process heat of 170-525°C

Competitive cost position



Attractive business case

2025 CAPEX target of <40 EUR per kWh  
installed storage capacity

2025 LCOS target of <15 EUR/MWh heat  
output

Solid recurring revenues based on 50% sales  
from Heat as a Service (HaaS) and targeted  
EBITDA break-even at latest 2025

Work on long-term funding strategies to  
support growth ambitions and plans

\* Based on Aurora report 2021; \*\*Includes customers where a dialogue is initiated, as well as customers in negotiations and under contract

# Heatcube CAPEX roadmap

On track to deliver on target CAPEX roadmap, establishing a solid foundation for the Heatcube platform

## Capex composition

### Heatcube components

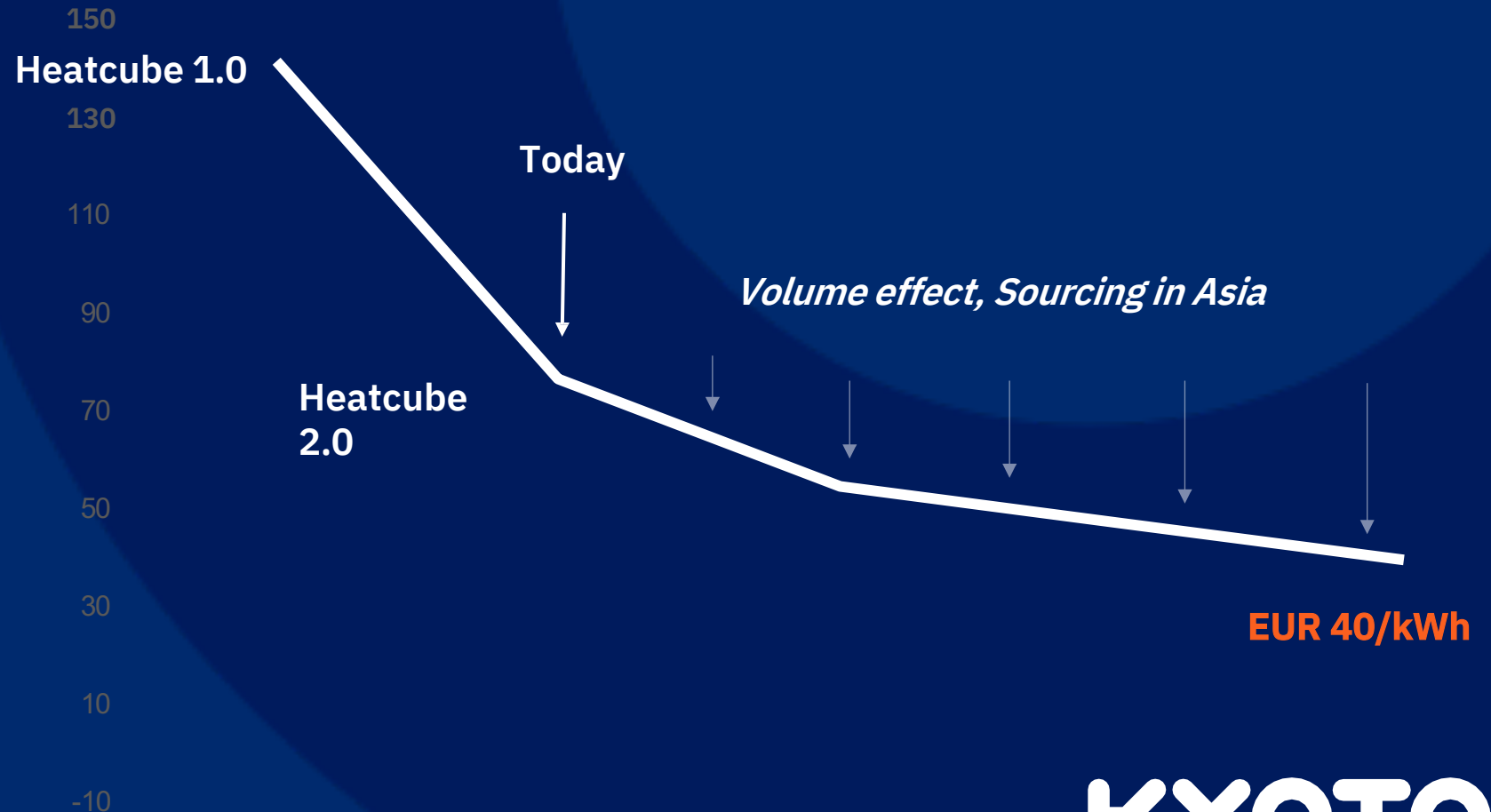
+ “Good for All” developments \*  
Battery & Energy management  
systems

Gen2.0 engineering

+ Site assembly

+ Contingency

= CAPEX, off grid \*\*



\* Developments that will be beneficial for a group of installations, hence proportion of cost is allocated to each installation

\*\* Site preparation costs and grid connection costs vary significantly for different client sites and need to be carried by each client

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# Heatcube Levelized Cost of Storage (LCOS) roadmap

Strengthening ambition – Kyoto targets 2025 LCOS <15 EUR/MWh

LCOS (EUR / MWh) =

Sum storage costs over lifetime (EUR)

---

Sum produced heat over lifetime

(MWh)

- The Levelized Cost of Storage (LCOS) reflects the total cost of the storage technologies on a per output unit basis
- Heat storage comparisons for LCOS indicates a very competitive edge for the Heatcube technology
- Original target for 2025 was LCOS < 20 EUR / MWh
- Updated analyses indicate that we currently are slightly north of 20 EUR/MWh
- We continue to chase for improvements and strengthen our target to 2025 LCOS <15 EUR/MWh

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# 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 22,000  
MWh/year Industry: Food &  
Beverages

Heat price

80 EUR/MWh

Power, Grid tariffs\* \*\*  
and flexibility reserve\*\*\*

- 60 EUR/MWh

O&M\*

- 2 EUR/MWh

Anticipated EBITDA  
contribution\*\*\*

= 18 EUR/MWh  
396 000 EUR/year



## Large – HC 20.88.5

Demand of 35,000  
MWh/year Industry: Food  
& Beverages

80 EUR/MWh

- 59 EUR/MWh

- 1 EUR/MWh

= 20 EUR/MWh  
700 000 EUR/year

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\* 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



# Decarbonization of industrial heat demand

Annual CO2 emission reduction by 2025 equal to >71,000 cars

2025



>2,000 MWh of  
storage capacity  
installed



Reduction  
of >130,000 ton  
CO2 emissions pr  
year



Equivalent to  
emissions from  
>71,000 diesel  
cars\*\*

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Assuming Heatcube utilization of 84% annually | \* Combustion of NG: 0.2 ton CO2/MWh, 85% efficiency | \*\* Avg CO2 emissions from Diesel vehicles of 1.83 ton/year

# Key developments towards 2025 targets

## Original targets before review



# Key developments towards 2025 targets

## Revised Kyoto targets



\* LCoS = Levelized cost of Storage Capacity



# Q&A

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THAT CONCLUDES THE KYOTO GROUP CAPITAL MARKETS DAY

# For further questions

**Investor relations: Camilla and Håvard**  
**Commercial: Tim**



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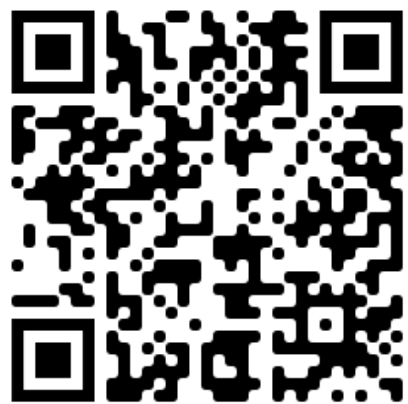


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# THANK YOU!

All registered attendees will receive a link to the on-demand version and presentation. If you have not registered sign up today

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# Appendix

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# Company highlights

## Extensive global heat potential for electrification

- 50% of the global energy is used for heat production , and decarbonization through electrification requires energy storage
- The global addressable market for Kyoto's Heatcube comprises of 11,200 TWh equal to more than 1 trillion euro\*

## Proven, modular Heatcube technology

- Kyoto's Heatcube is a modular and scalable thermal storage solution that is built on the molten salt technology used since 20+ years within the Concentrated Solar Power (CSP)
- Driven by the continuous technology development, scaling up and optimizing the supply chain, the targeted CAPEX is set to 40 €/kWh of storage for 2025 and the Levelized Cost of Storage to 15 €/MWh

## Strategy with clear commercial priorities concluded

- Based on market analysis, 5 focus markets and 6 key industries have been identified
- The value for the industry is primarily created by load shifting and participating in the reserve market and is offered either as Heat-as-a-Product (HaaP) or as Heat-as-a-Service (HaaS)

## On the door-step to market break-through

- In 2022 Kyoto gained significant traction in the market and is expected to sign 5-10 LoIs with partners in different targeted industries and geographies
- A current potential pipeline with more than 1800 MWh storage demand to ensure a continuous growth

## Strong eco-system for execution

- Kyoto Group has established a strong eco-system of partners and suppliers optimizing the pre-assembling of the modules as well as ensuring a scalable project execution organization
- Backed by a very senior industrial board of directors, the multi-national management team carries over 120 years of relevant scaling-up and industrial experience leading a highly diversified organization

## Key financials and targets

- Unit economics shows attractive cases with target EBITDA margin levels around 25%
- Within 2025 >2000 MWh of thermal storage is expected to be installed generating profitability



# Modular applications of the Heatcube

Same product, multiple configurations drive flexibility and reduce cost

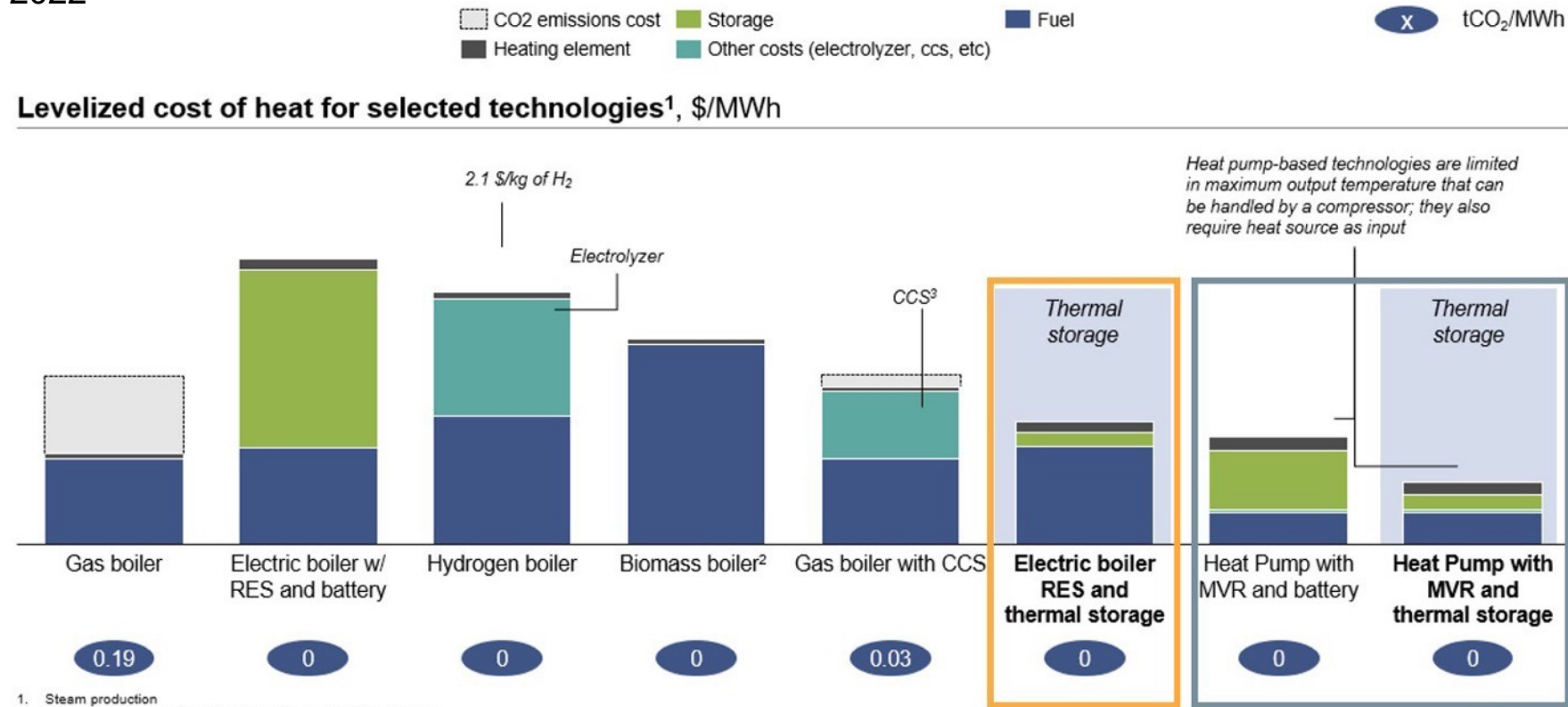


# Thermal storage is cost competitive with fossil heat when including carbon tax or at low electricity costs

Reference  
slide from  
McK/LDES

## McKinsey/LDES: Comparing the LCOH for fossil-based and renewable solutions

2022



1. Steam production
2. Biofuels cost vary regionally and can have a very broad range
3. CCS @ 108 USD / tCO<sub>2</sub>

Source: Net Zero Heat storage business case calculation, LDES Council Net Zero Heat storage industry benchmark 2022



8

### Heatcube

- Able to serve medium to high temperature industrial heat demand
- Gives access to lowest possible power prices

### Heat pump technologies

- Limited in maximum output temperature (low temperature heat)
- Heat source as input

Heatcube™ is the most mature and among the lowest cost solutions based on thermal storage

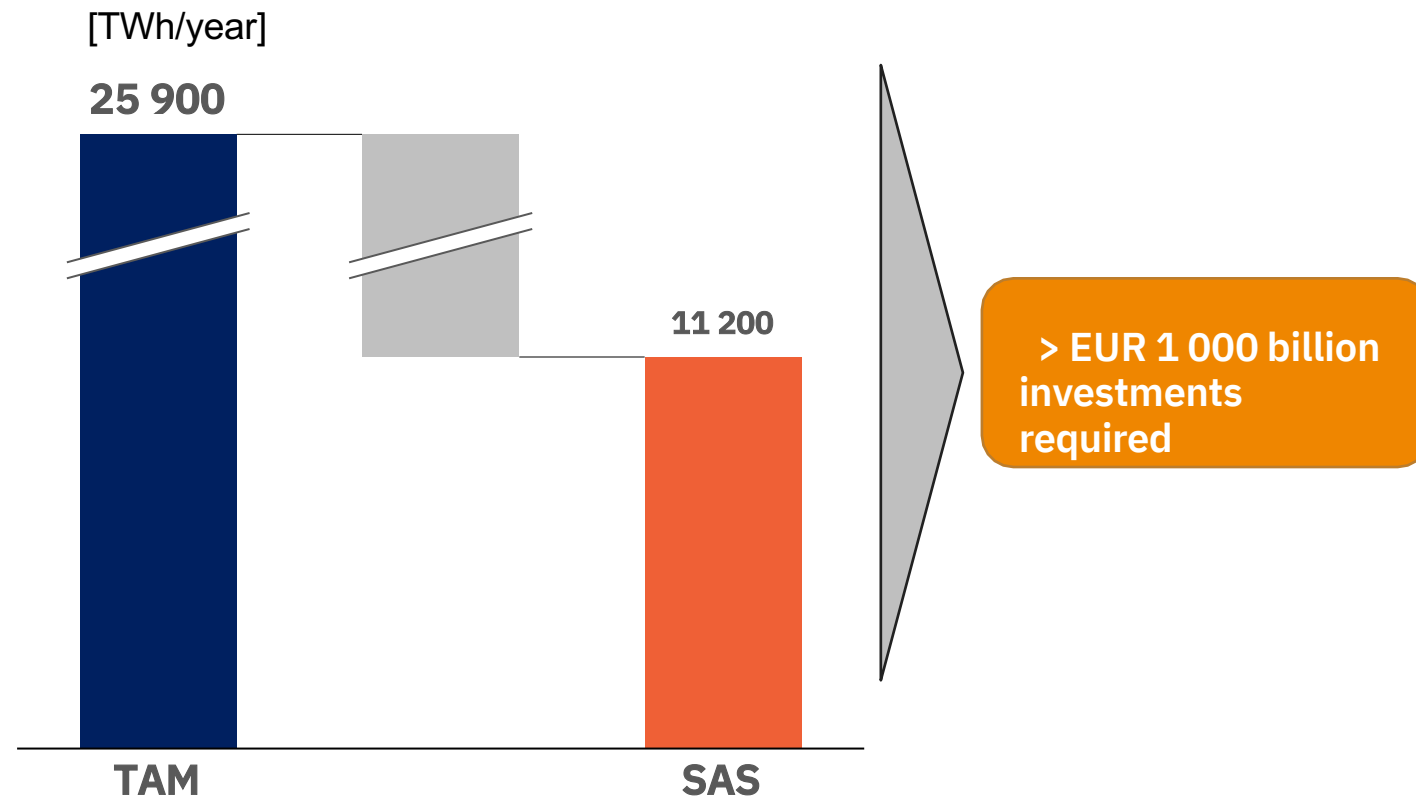
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# 11 200 TWh or more than EUR 1 000 billion\* market potential

## Temperature ranges and example for industrial processes

Very-high-temperature heat (>1,000°C)	Melting in glass furnace, reheating of slab in hot strip mill, and calcination of limestone for cement production
High-temperature heat (400–1,000°C)	Steam reforming and cracking in the petrochemical industry
Medium-temperature heat (100–400°C)	Drying, evaporation, distillation, and activation
Low-temperature heat (≤100°C)	Washing, rinsing, and food preparation

## Global Heat demand and investment requirements\*



\*Aurora 2021=> <https://f.hubspotusercontent40.net/hubfs/8855495/documents/2021-11-25%20Aurora%20-%20Kyoto%20presentation%20CMD%20Q4%202021.pdf>

TAM (Targeted 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

# Key financial highlights 1H 2022

## Key financial highlights

**EUR 1.4m**

Investment  
in Heatcube™  
technology

**EUR 6.9m**

Cash position  
30.06.22

**EUR -3.0m**

Net loss 30.06.22

**EUR -3.3m**

Cash from  
operational  
activities

## The funds has been allocated to:

- Building and installation of Heatcube™ at Nordjyllandsværket
- Organization has tripled during the first half of 2022
- Expansion of footprint, established Kyoto Technology Denmark and in the process of establishing Kyoto Technology Spain
- Acquiring of Mercury Energy in Spain
- Investment in development of next generation Heatcube™

Changed functional currency from NOK to EUR

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