



# Heat Pumps to Decarbonize Industrial Heat

Heat pumps to decarbonize heat up to 200°C in the MW range

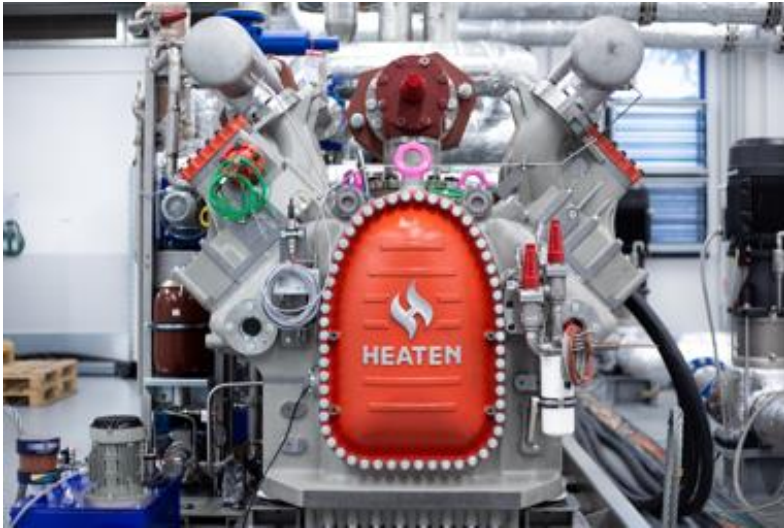
28<sup>th</sup> November, IHP Prague



Public



# Introduction Heaten



- High Temperature Heat Pump
- Up to 200°C
- Up to 8 MW<sub>th</sub> per heat pump
- Up to 50 MW<sub>th</sub>
- Decarbonizing industrial process heat

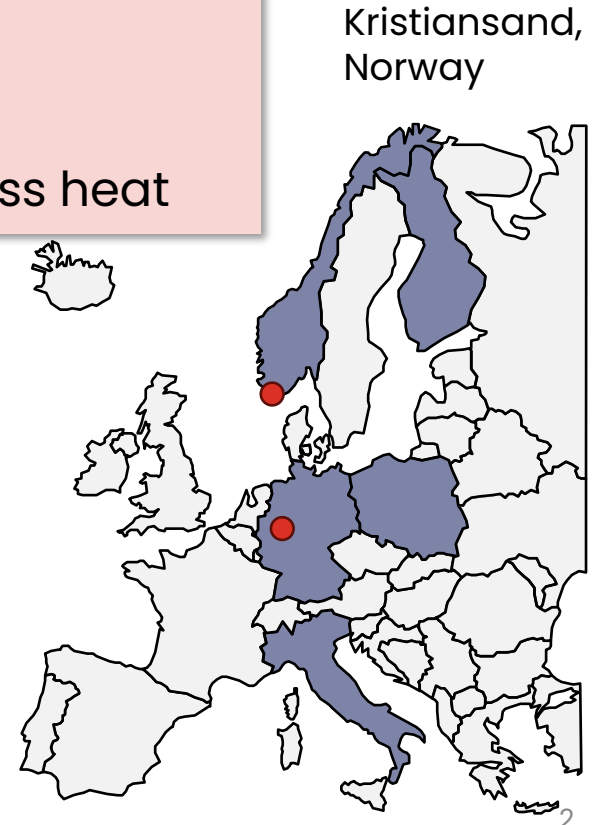
Backed by a strong investor



Supported by a strong partner



Remscheid,  
Germany



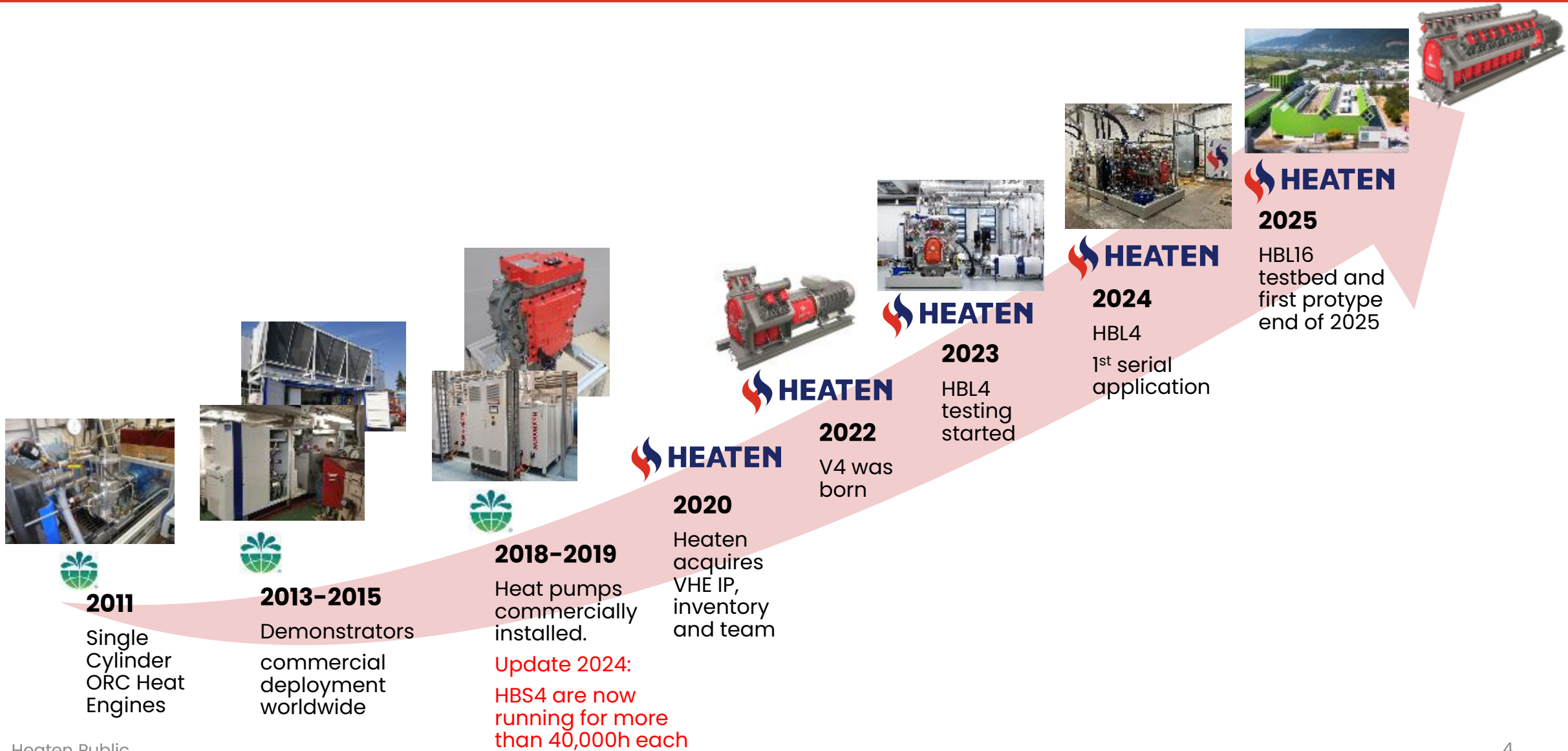
# Stronger together - Heaten



Has delivered more than 57,000 engines globally

- Through a team of more than 4,000 experts
- And a service network in more than 100 countries

# 13 Years of Development – Now we scale up



# Market segments & applications



## Main market sectors



**Food, Beverage & Ingredients**



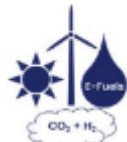
**District Heating**



**Chemical Industry and Refineries**



**Pulp and paper**



**New industries like CCS, CCU, and DAC**

## Applications

Target temperature 90–200°C

Target power range 1–50 MW<sub>th</sub>

Heat source: 10–150°C  
water or steam

Heat sink: 90–200°C  
water or steam

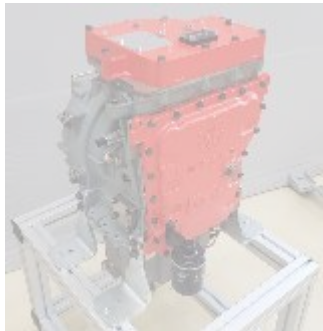
# Largest piston-based compressor on the market



Heaten has developed a range of compressors that addresses industrial customer needs

- V-compressor design is the basis for the multi-cylinder piston technology
- More than 4 liter per cylinder and high speed of 1,500 rpm results in the biggest piston-based compressor family on the market

2019



HBS4 – 4 x up to 50 kW<sub>th</sub>  
4 x 46 m<sup>3</sup>/h

(Single compressors  
arranged in parallel)

Today



HBL4 – up to 2 MW<sub>th</sub>  
1,476 m<sup>3</sup>/h  
(V-compressor)

2025

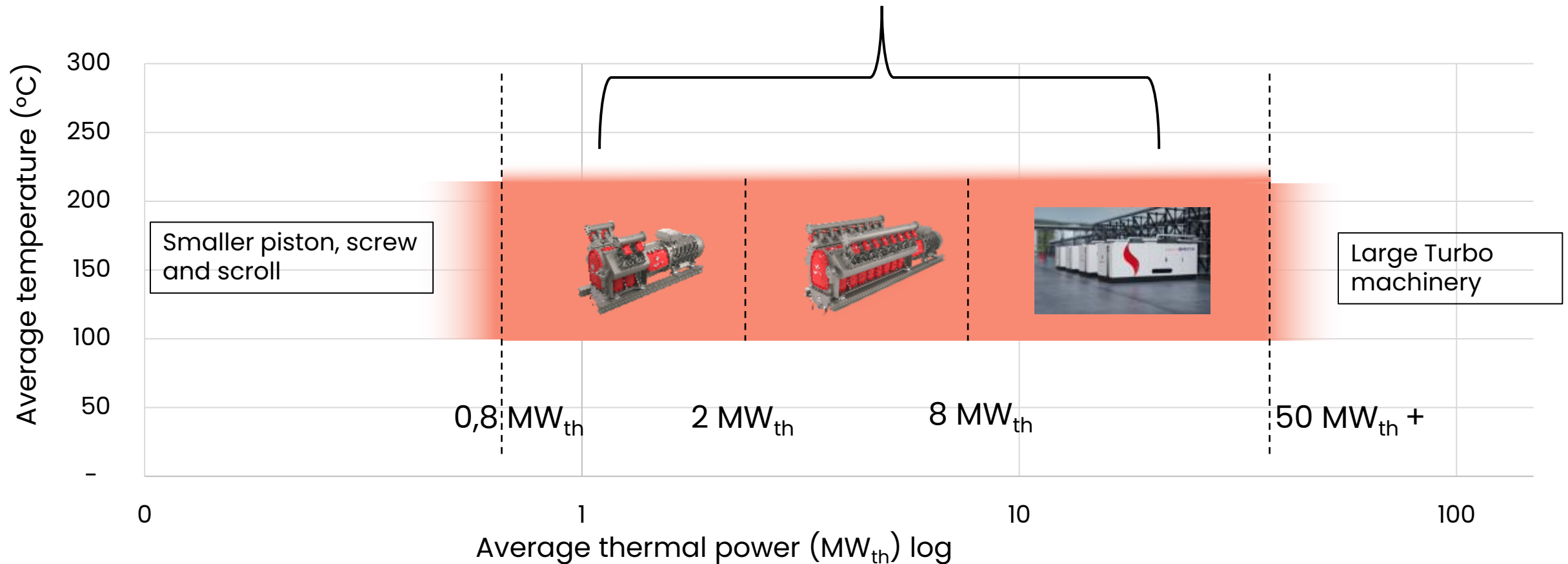


HBL16 – up to 8 MW<sub>th</sub>  
5,904 m<sup>3</sup>/h  
(V-compressor)

# Flexible operation across temperature and power loads



Typical heat demand in the industry:  
1.5–30 MW<sub>th</sub> saturated steam between 120–180°C



# Unique characteristics of the HeatBooster

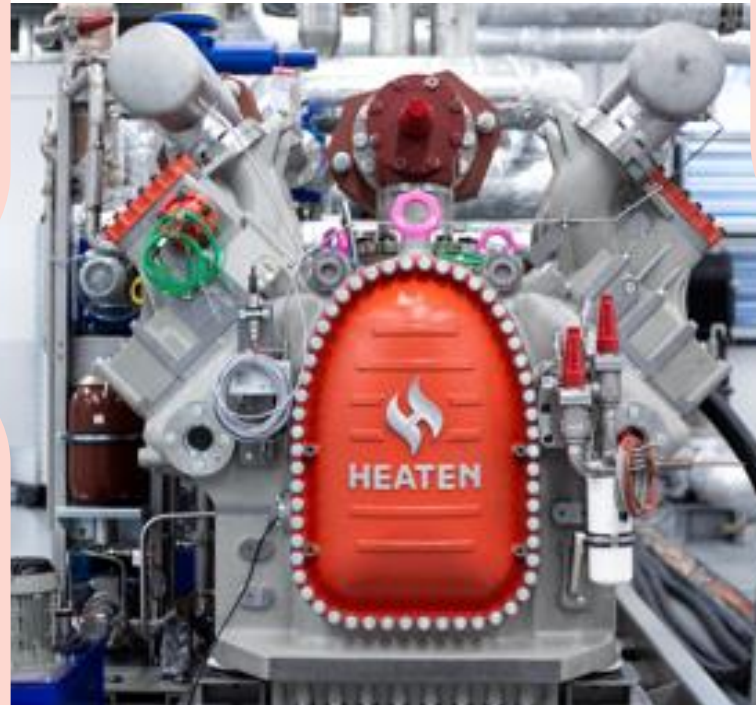


## PERFORMANCE & EFFICIENCY

- Efficiency curve is “flat” over 20 – 100% load range
- COP range of 50 to 55% of Carnot



## Unique large scale piston compressor



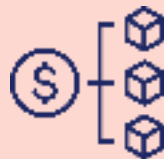
## SIZING & RANGE



- **1-8 MW<sub>th</sub>** per HeatBooster
- **3-50 MW<sub>th</sub>** per system

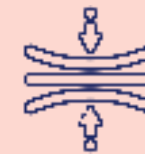
## SCALABILITY

- Scalability is proven
- A few hundreds HBL16's per year could be produced in Jenbach



## FLEXIBILITY

- Can use all HFO's and HC's.
- Variable compression ratio: One hardware for all temp. range of 90-200°C



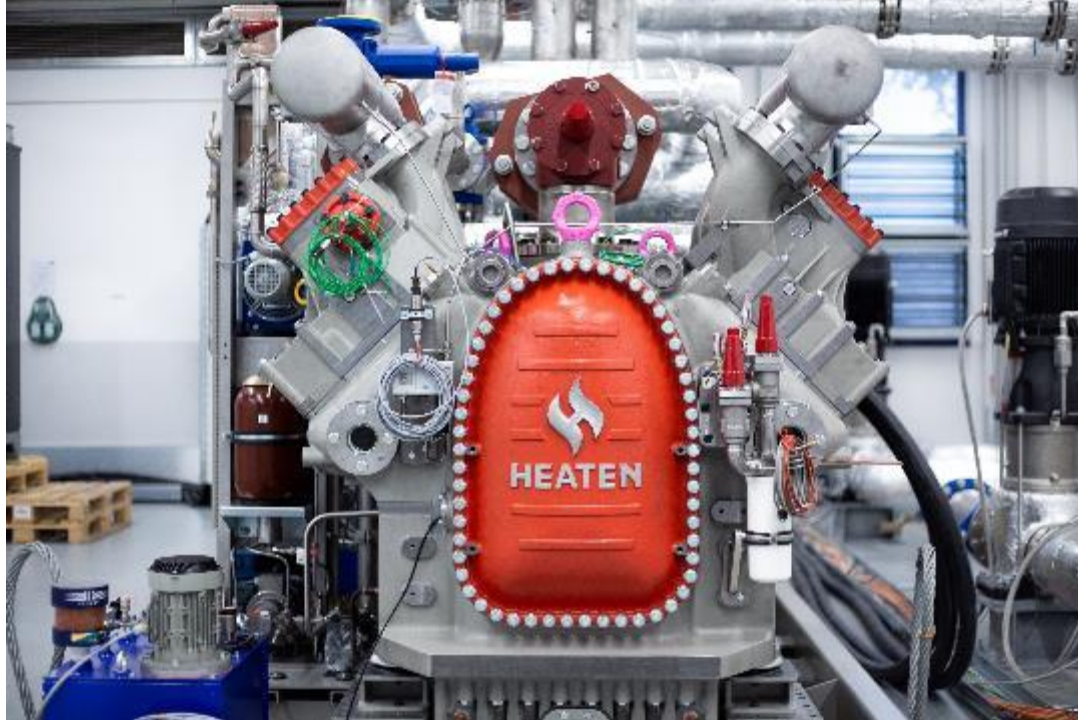


# Delivery on Strategic collaboration



- BENE0 has long-term experience in developing and producing plant-based functional ingredients from natural sources of food, feed and pharmaceutical industries.
- In November 2024 Heaten has delivered a HeatBooster to BENE0 in Belgium.
- Application: Drying application for rice ingredients, with a thermal output across a temperature range of almost 100°C, using wastewater at about 20°C as heat source.





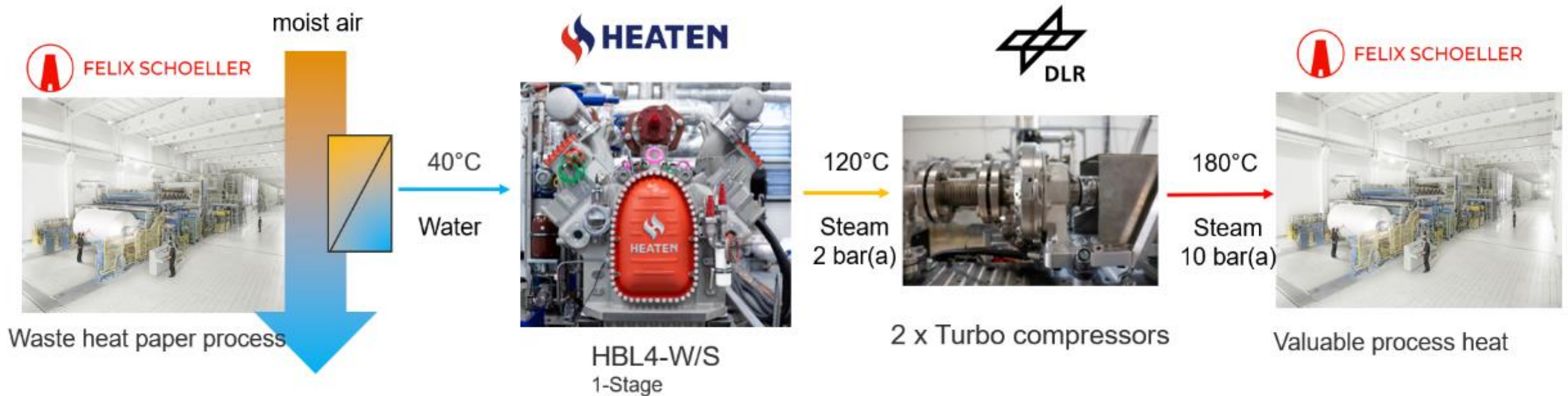
- Südzucker is one of the largest food producers in the world
- In 2025 Heaten will deliver HeatBooster machines to Südzucker
- Application: Steam supply for various application in the sugar process and hot water to a drying process



# EEETHOS – Demo III HTHP for Pulp & Paper



| Case Highlights          |                                    |
|--------------------------|------------------------------------|
| Application              | Pulp & Paper                       |
| Location                 | Felix Schoeller Osnabrück, Germany |
| Thermal power Output     | >1,000 kW <sub>th</sub> , >1,6 t/h |
| Steam output temperature | Up to 180°C                        |
| Working fluid            | Isobutane                          |

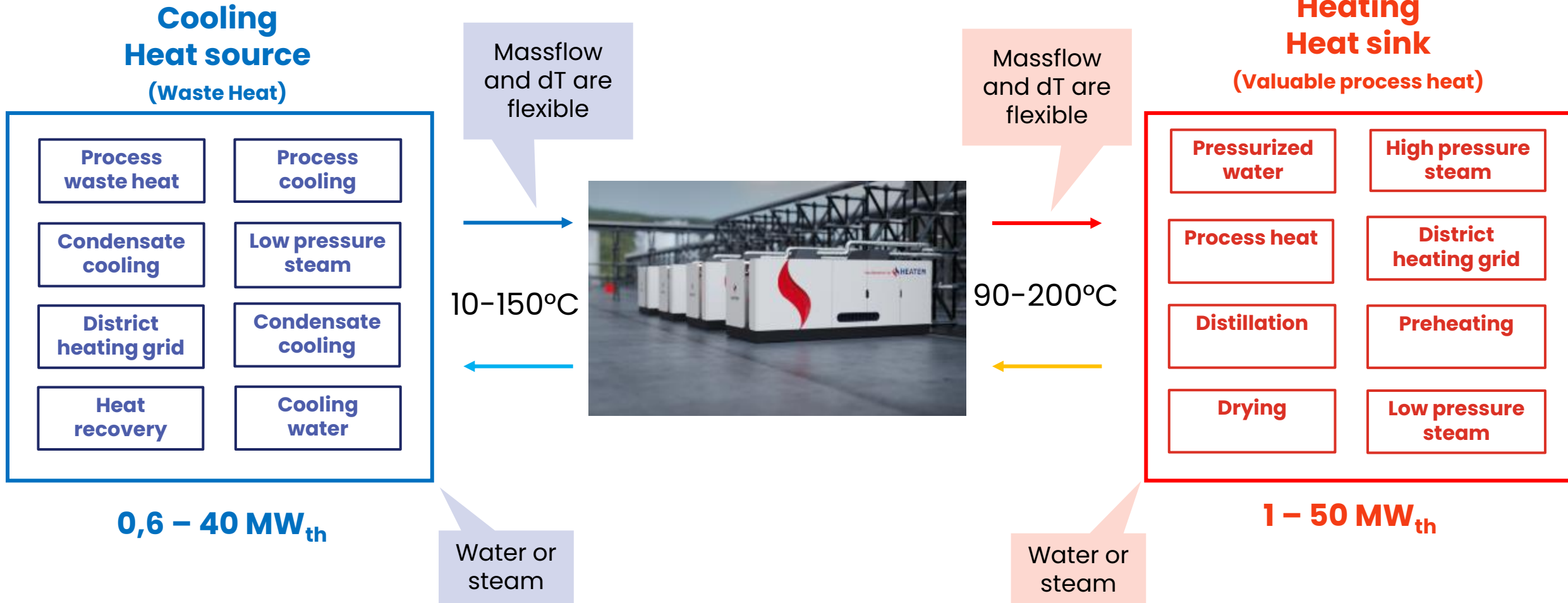


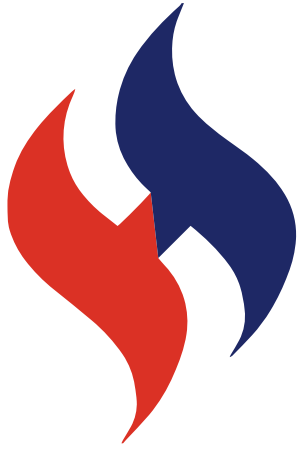
# How to fully electrify industrial process heat



- Customer integration, start small and scale up step by step
  - Lower the risk for the customer
  - Easier to integrate in the existing processes
  - Gaining operational experience
- Systems approach:
  - increase the efficiency
  - add redundancy
  - In parallel, cascade or 2-stage

# Which application do you have?





# HEATEN



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