

UPHEAT

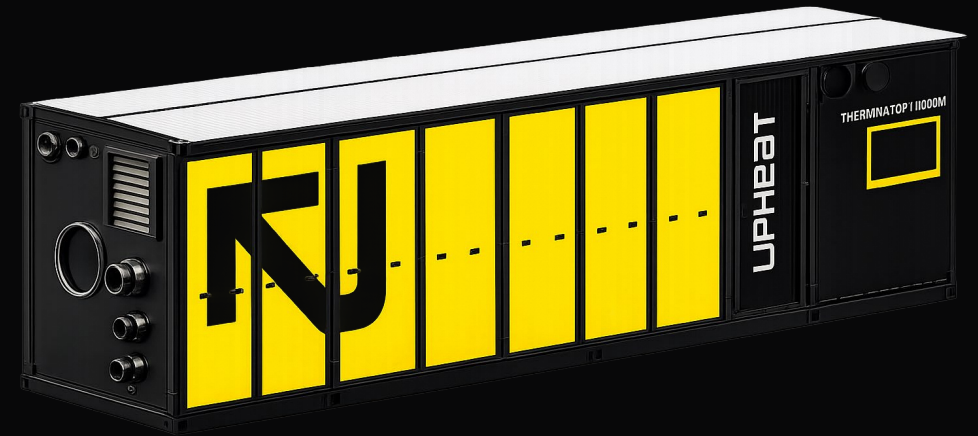
PROCESS STEAM FROM WASTE HEAT IN ONE GO

Upheat's SGHP's for
decarbonizing industry

Olli Kuusmanen, Co-founder and Chairman



THERMINATOR T1000M oil-free high-temperature heat pump



100–200 °C

process-ready
steam

1–3 years

payback time

up to 75 %

less purchased
energy

HIGH-SPEED TURBOS NOW COMING TO INDUSTRIAL HEAT PUMPS...

1990s

HST Oy

Wastewater aeration blowers



Juha Saari

High-speed technology

2000s

**Sundyne · CompAir ·
Gardner Denver - TRANE**

Industrial air compressors
(United Technologies); Chillers



Juha Saari

High-speed technology

2010s – 2020s

Tamturbo Plc

Oil-free industrial air compressors



Juha Lammi

CTO Tamturbo 2013–2023



Timo Pulkki

CEO Tamturbo 2014–2021



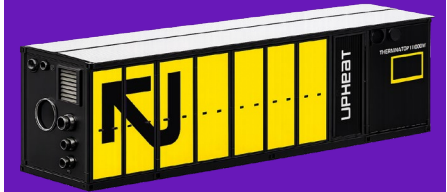
Olli Kuismanen

CCO Tamturbo 2017–2021

Today

Upheat

Steam-generating heat pumps



THE CHALLENGE

FINDING A TECHNICALLY AND ECONOMICALLY VIABLE (ROI 1–3 YEARS) HEAT CIRCULATION SOLUTION ABOVE 100 °C

Current industrial heat pump solutions

1

Max. 120 °C

Limited to max. 120 °C due to oil lubrication

2

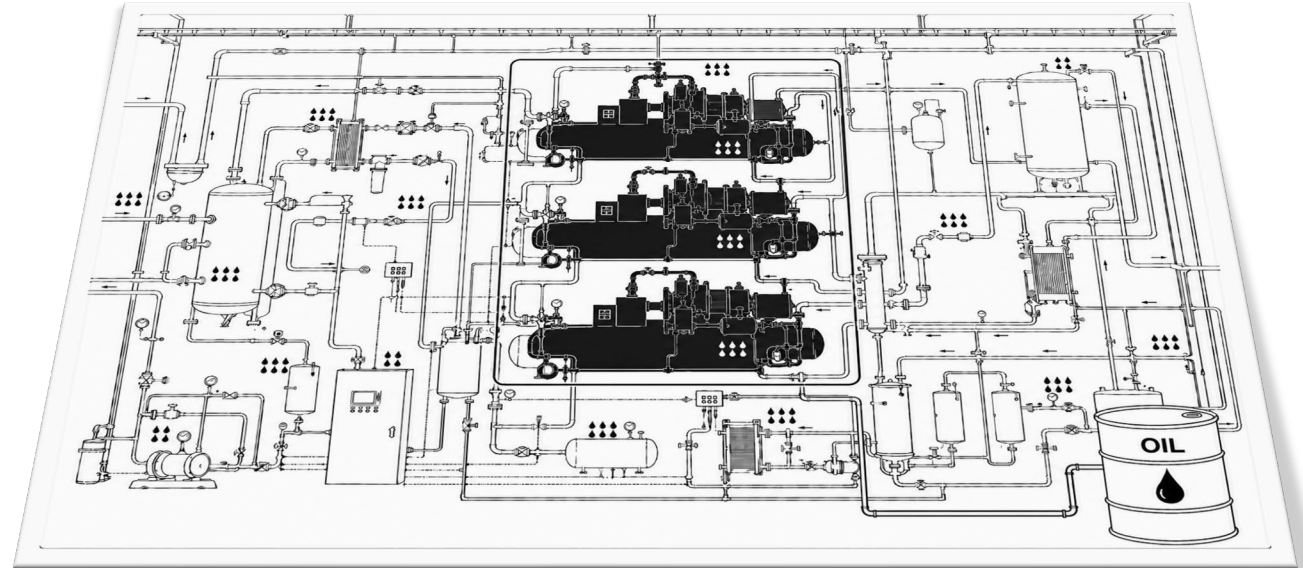
Complex integration

Custom projects are complex and expensive to integrate

3

High maintenance

Maintenance costs are high



The result: Factories waste vast amounts of energy and fail to decarbonize – not because of will, but because profitable solutions don't exist.

CIRCULARITY OF INDUSTRIAL HEAT IS THE KEY TO DECARBONIZATION

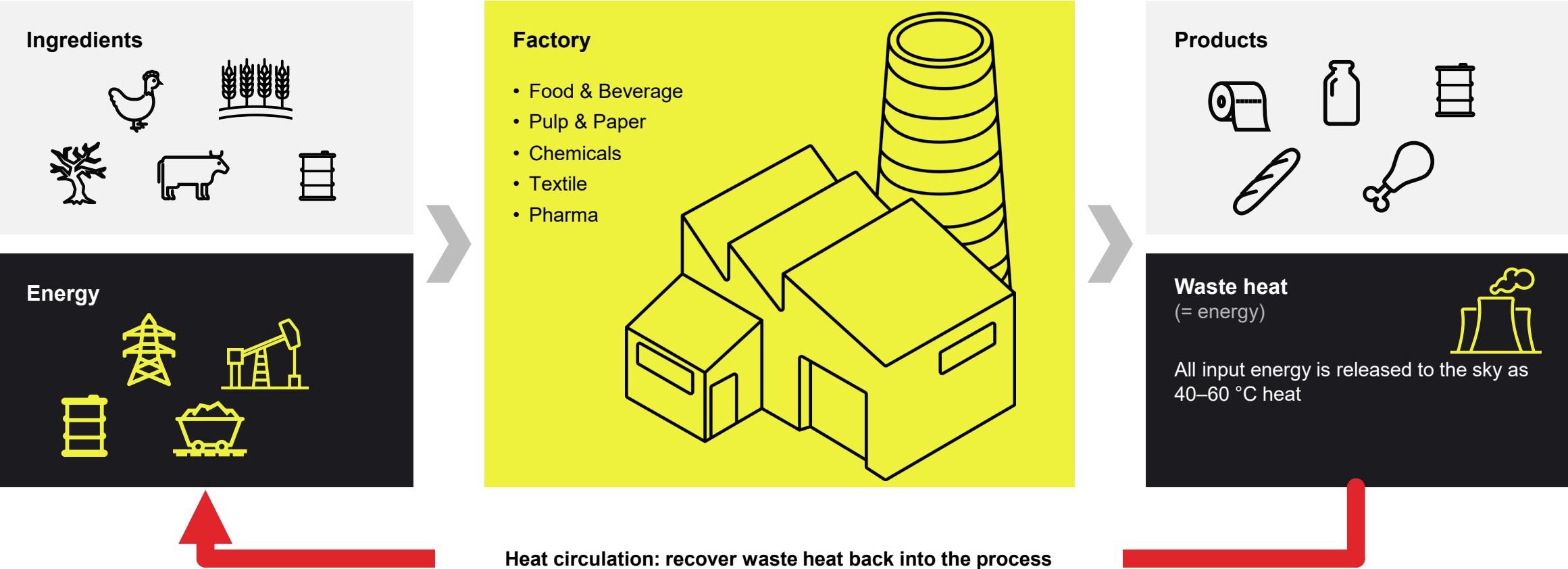
50 %

of global energy use for heating is consumed by industrial heat generation
(30 % of global total energy use)

80 %

of that energy is generated by burning fossil fuels

→ Heat accounts for the majority of industrial CO₂ emissions

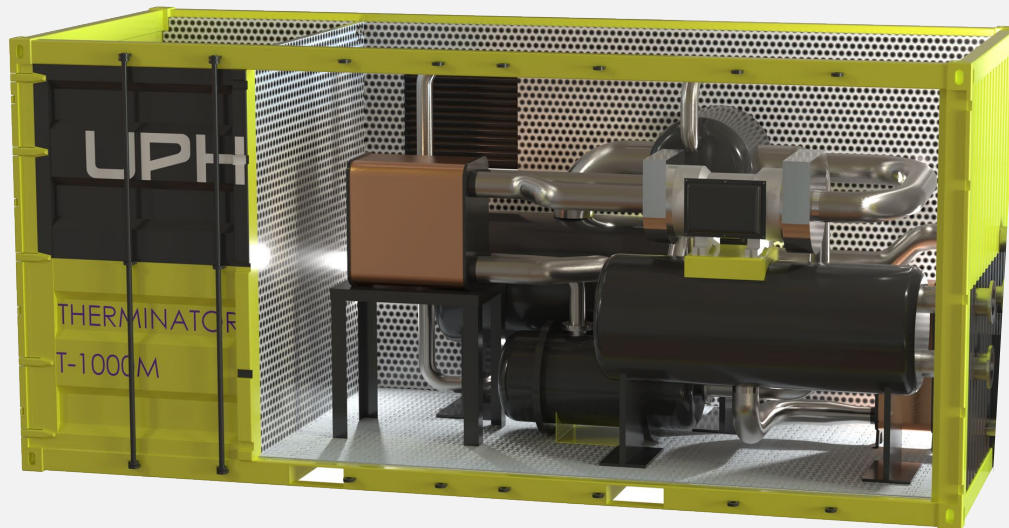


THE SOLUTION

HEAT DECARBONIZATION THAT FINALLY MAKES ECONOMIC SENSE

THERMINATOR

Oil-free high-temperature heat pump – product portfolio of 4 models



SOURCE TEMPERATURE

40 (30) – 60°C

SINK TEMPERATURE

100 – 200°C

TEMPERATURE LIFT

68 – 105 °C

Wide capacity and heat power control range

THERMAL POWER RANGE OF T-1000M

700 – 1600 kWth

COMPRESSOR

400 kW oil-free high-speed turbo with magnetic bearing

40–60 °C waste heat



THERMINATOR heat pump



100–200 °C process steam

HIGH-SPEED TURBO WITH MAGNETIC LEVITATION CHANGING THE GAME

The only active component in a heat pump is the compressor

The high-speed motor rotor with turbo compressor impellers levitates on the magnetic field of the magnetic bearings.

No oil

No mechanical contact in moving parts – no oil lubrication

Centrifugal

Most efficient compressor technology

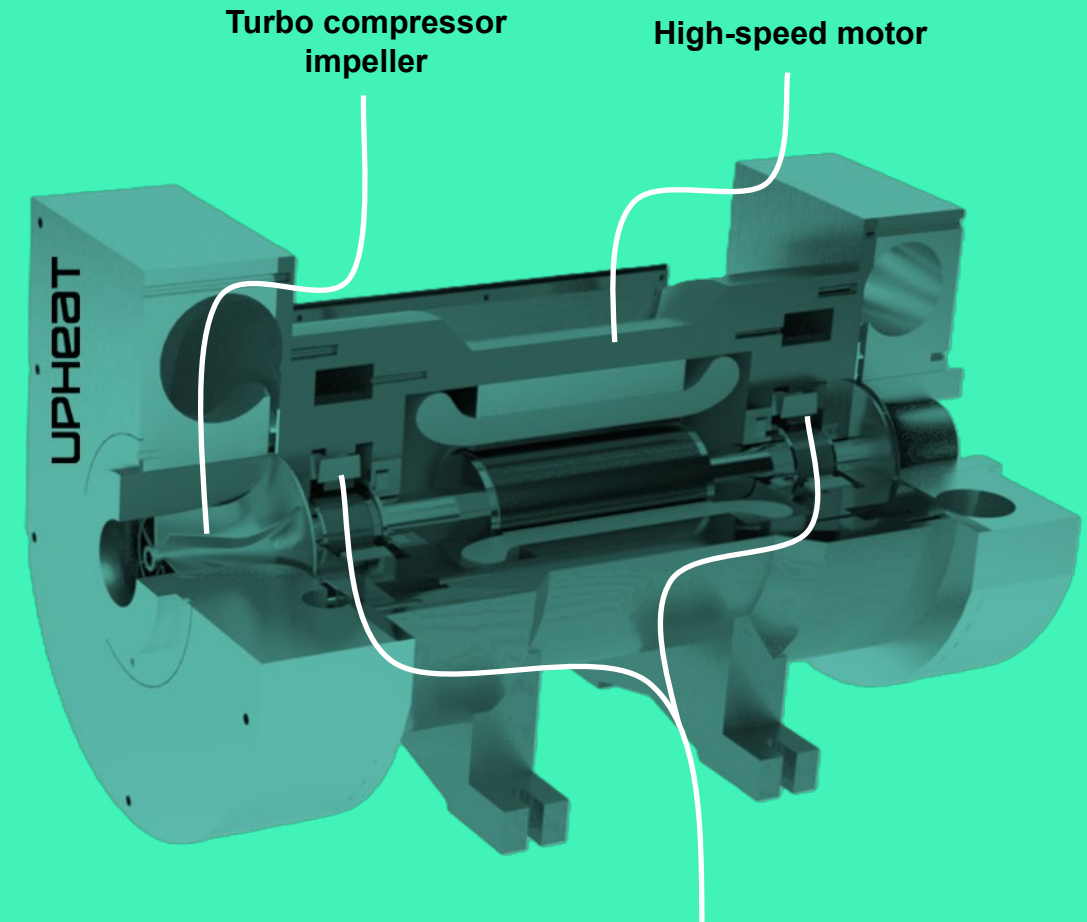
No friction, No oil

Better system efficiency

No wear

Maintenance-free

The most efficient compressor technology now coming to industrial steam generation !



Magnetic bearings

30 000 - 40 000

RPM max. speed

400 kW

electrical power

1 090 × 450 mm

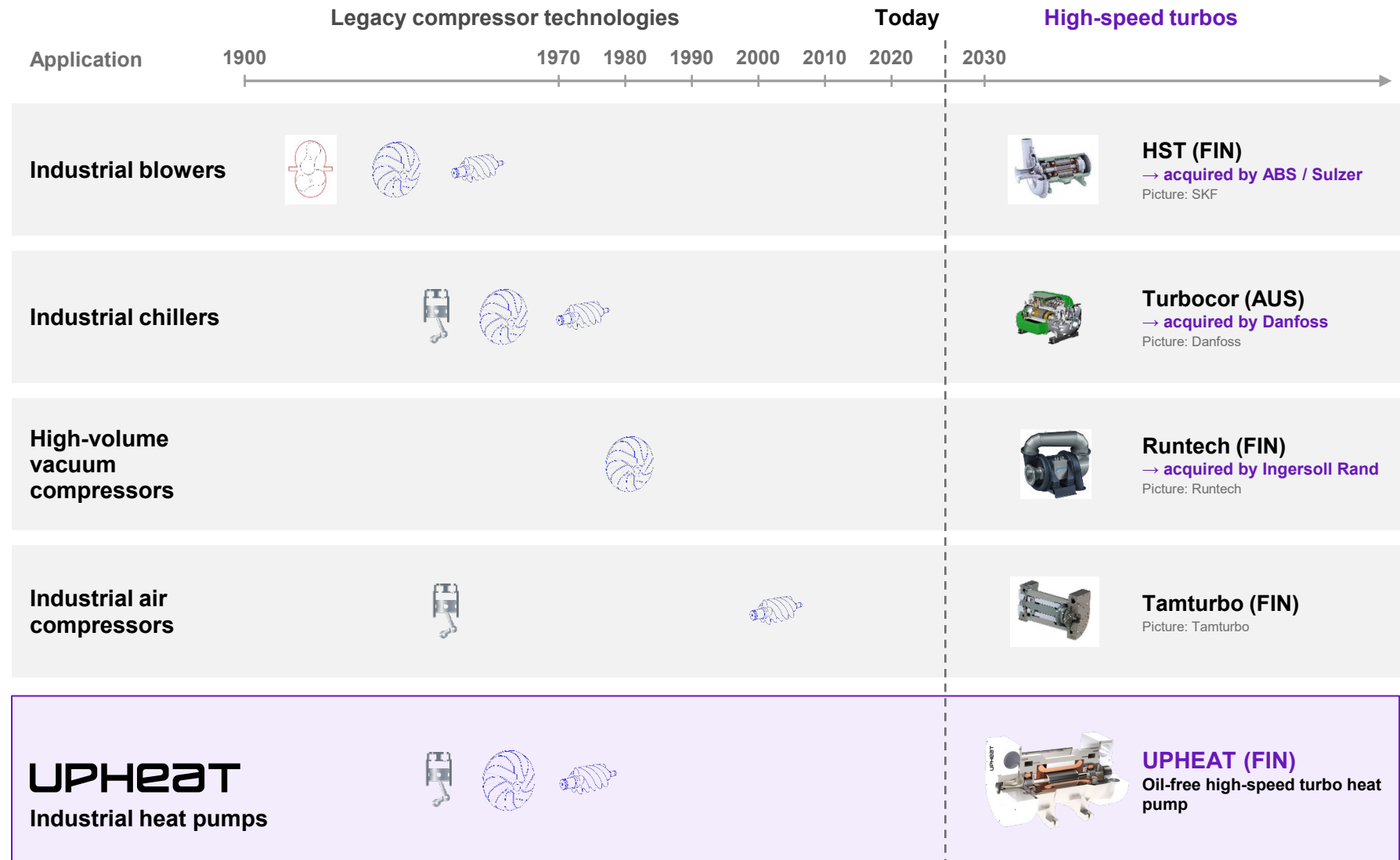
compact footprint

EVERY INDUSTRIAL COMPRESSOR WILL MIGRATE TO HIGH-SPEED TURBO

WHY HIGH-SPEED TURBO WINS

Technology has changed to high-speed turbos with magnetic bearings in most industrial compressor applications, because it is:

- ✓ 100 % oil-free
- ✓ More energy efficient
- ✓ Minimal maintenance – minimized downtime
- ✓ Lowest TCO
- ✓ Variable speed capacity control
- ✓ Superior remote monitoring
- ✓ Smaller footprint



Legacy technologies (piston, geared turbo, screw) are all oil-lubricated.

WHY UPHEAT

SUSTAINABLE, YET PROFITABLE

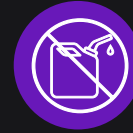


Upheat factory in Tampere, Finland



Fast ROI

An impressive **1–3 years** payback time.



Oil-free innovation

Minimizing maintenance – maximizing uptime and efficiency.



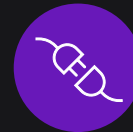
Natural refrigerants

Centrifugal compressor: an ideally efficient compression method for natural refrigerants.



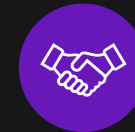
Reliability & high performance

The ultra-reliable, high-speed technology with a wide operating window is not new – just new in this category.



Factory-tested product – just plug it in

Upheat covers and factory-tests a wide range of customer needs for easy integration.

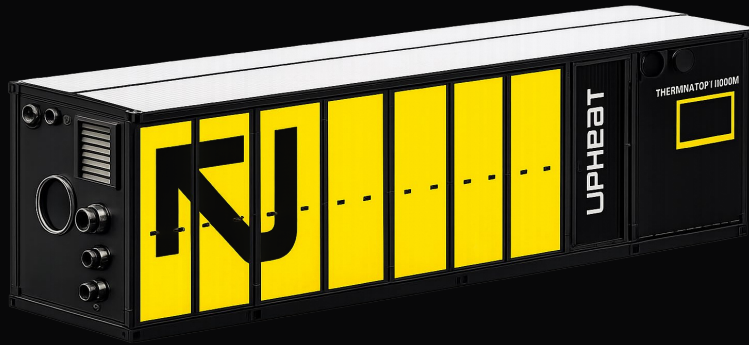


Heat-as-a-Service

Superior remote monitoring combined with minimal maintenance makes Upheat heat pumps ideal for the Heat-as-a-Service model.

GO-TO-MARKET & BUSINESS MODEL

UPHEAT OWN DIRECT SALES



Global food and beverage, pulp and paper and chemical giants want to buy from the source, so our own sales efforts are targeted to global key accounts. Projects will be implemented with local partners or specific industry OEMs.

OEM PARTNERS



Existing large OEMs in all our target markets are searching for a sustainable energy solution to bundle into their production line offering to replace natural gas in drying processes. Discussions have been active with multiple.

OTHER PARTNERS AND INTEGRATORS

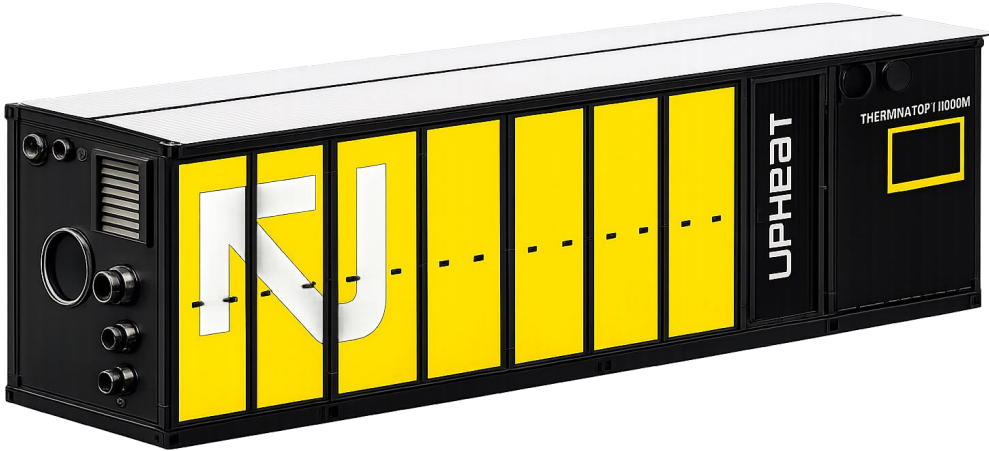


Additionally, there are local, usually on a country level, players as heat pump integrators that can serve specific geographical markets. They just need to buy the heat pump product to solve their local customers' energy challenge.

Equipment sales & STEAM-AS-A-SERVICE to address customer CAPEX limitations



PRODUCT PORTFOLIO



THERMINATOR Oil-Free High-Temperature Heat Pump Technical Specifications

	THERMINATOR T-1000M	THERMINATOR T-1000L	THERMINATOR T-2000M	THERMINATOR T-1000H
Output medium	Steam/Water	Steam/Water	Steam/Water	Steam/Water
Heating power (kW)	1000	1000	2000	1000
Nominal input temperature	40...60°C	30...50°C	40...60°C	60...80°C
Motor Power (kW)	400	400	800	400
Max temperature lift	105°C	105°C	105°C	110°C
Temperature lift range	68...105°C	68...105°C	55...105°C	84...110°C
COP at minimum temperature lift	4,0 @ 68°C lift	4,0 @ 68°C lift	4,1 @ 55°C lift	3,6 @ 84°C lift
COP at maximum temperature lift	2,8 @ 105°C lift	2,8 @ 105°C lift	2,9 @ 105°C	3,0 @ 110°C lift
Output temperature	108...165°C	98...155°C	108...165°C	144...190°C
Availability	2026	2027 (estimated)	2028 (estimated)	2028 (estimated)



Hasta la Vista, Waste Heat

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UPHEAT