

# Turboden Heat Generation Solutions

2026 Industrial Process EmERging Technologies (IPER) Workshop

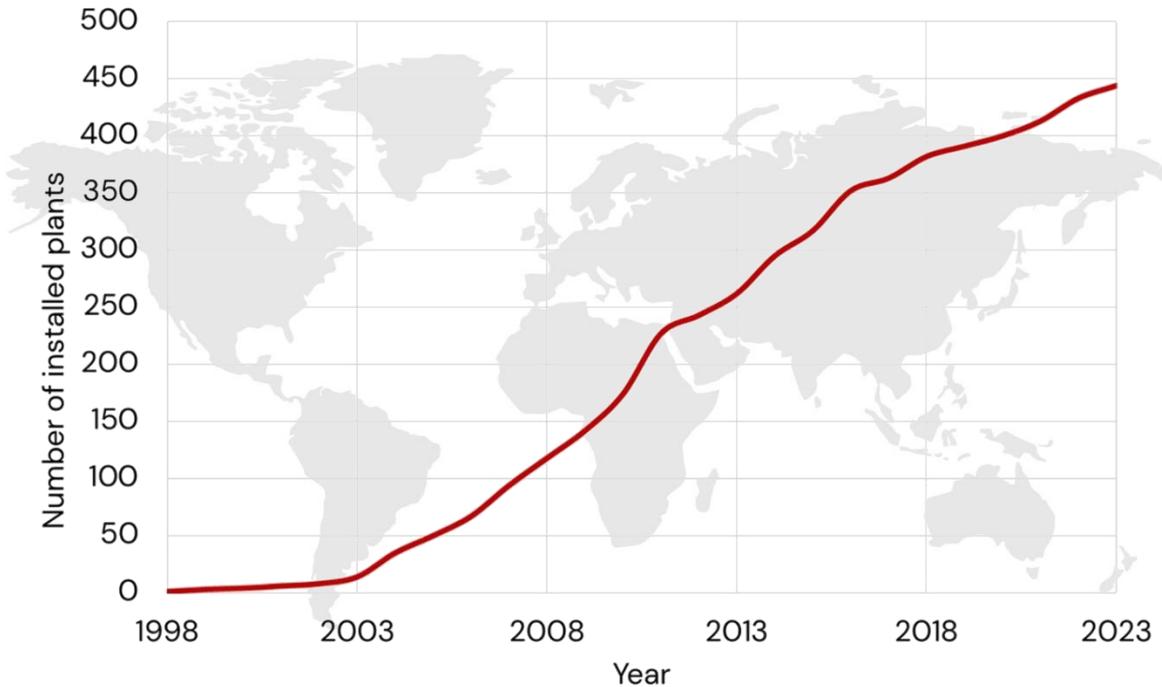
**David Pasquale, Ph.D.**

*Turbomachinery R&D and Design Innovation Project Manager*

IPER 2026

**Turboden S.p.A.**

A Group Company of  **MITSUBISHI HEAVY INDUSTRIES**



## GLOBAL AND PROVEN EXPERIENCE

Worldwide presence in  
**50+ countries**

Delivered  
**460+ plants**

**HIGH TEMPERATURE  
POWER GENERATION\*  
& CHP**

442 units, 814 MWe

**GEOHERMAL POWER  
GENERATION**

20 units, 247 MWe

**HEAT  
ELECTRIFICATION**

2 HP units, 18 MWth  
1 MVR unit, 22 t/h

Last update: June 2025  
\* ORC and gas expanders included.



Largest plant  
in operation  
30 MWe



Largest plant  
under construction  
120 MWe



Overall capacity  
installed  
+1,000 MWe

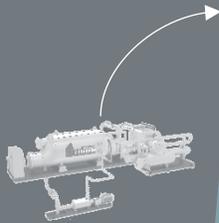
# MHI AT A GLANCE



FOUNDATION	EMPLOYEES	GROUP COMPANIES	SALES
<p><b>1884</b> over 130 years of history</p> 	<p><b>77,768</b> (Consolidated)</p> 	<p><b>259</b> (Consolidated)</p> 	<p><b>¥5TN</b> (\$33.6BN*) (FY2024, consolidated)</p> 

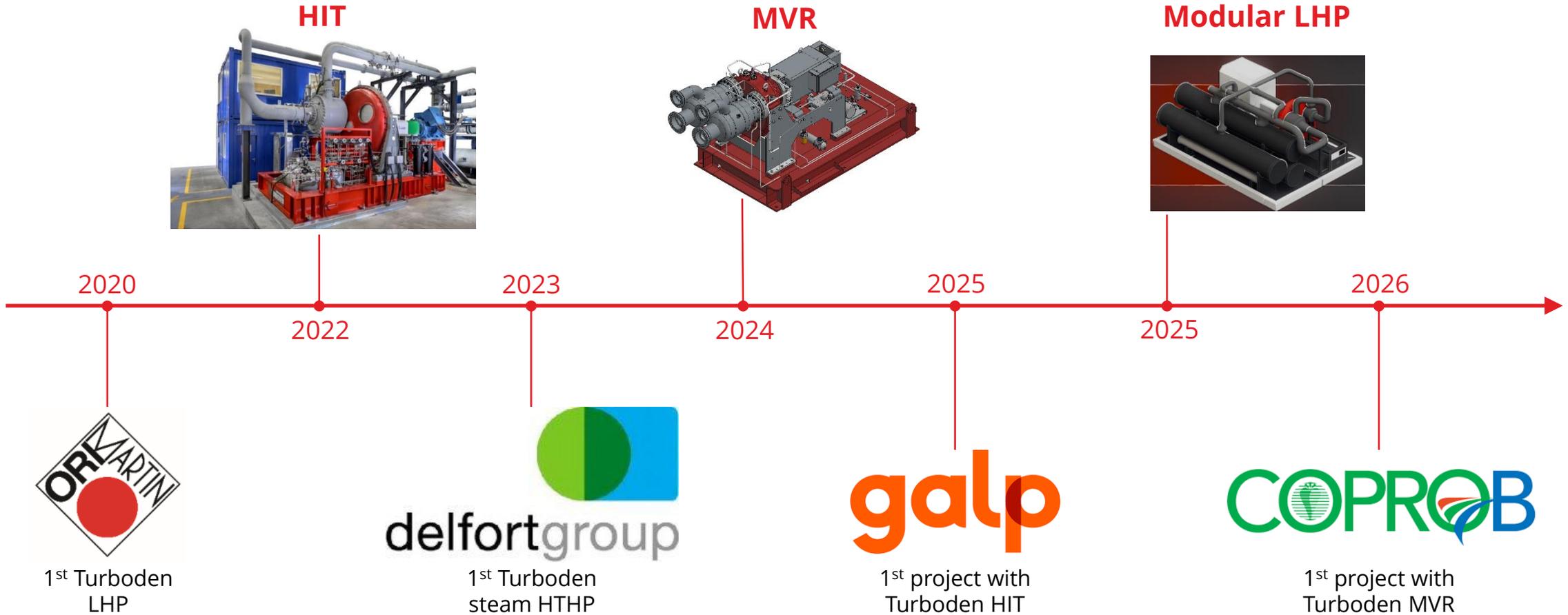
\*On the FY2022 average JPY/USD exchange rate.

## DIVERSE PRODUCTS



<p>GX (GREEN TRANSFORMATION) SOLUTIONS</p> 	<p>PLANTS &amp; INFRASTRUCTURE SYSTEMS</p> 	<p>LOGISTICS, THERMAL &amp; DRIVE SYSTEMS</p> 	<p>NUCLEAR ENERGY SYSTEMS</p> 	<p>MACHINERY SYSTEMS</p> 	<p>INTEGRATED DEFENSE &amp; SPACE SYSTEMS</p> 	<p>COMMERCIAL AVIATION SYSTEMS</p> 	<p>ENERGY SYSTEMS</p> 
--	---	---	---	--	---	--	---

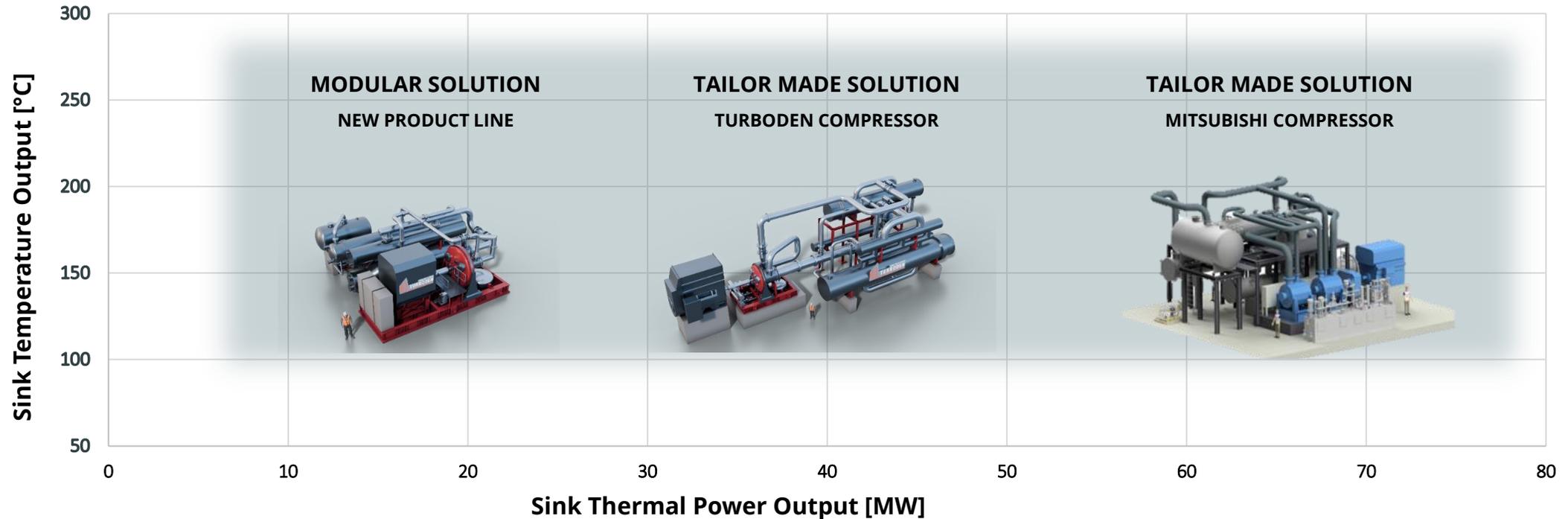
# LARGE HEAT PUMPS MILESTONES



Turboden S.p.A.

A Group Company of **MITSUBISHI HEAVY INDUSTRIES**

# TURBODEN PRODUCT PORTFOLIO



## HEAT PUMPS

**Custom made units** designed for complex projects from 10 to 80 MW

**Modular units** scalable design from 5 to 15 MW and pre-assembled skids

Temperatures up to 130°C for district heating, up to 300°C for steam industrial applications

## STEAM COMPRESSOR

**Large Scale Customized MVR** (3-60 ton/h)

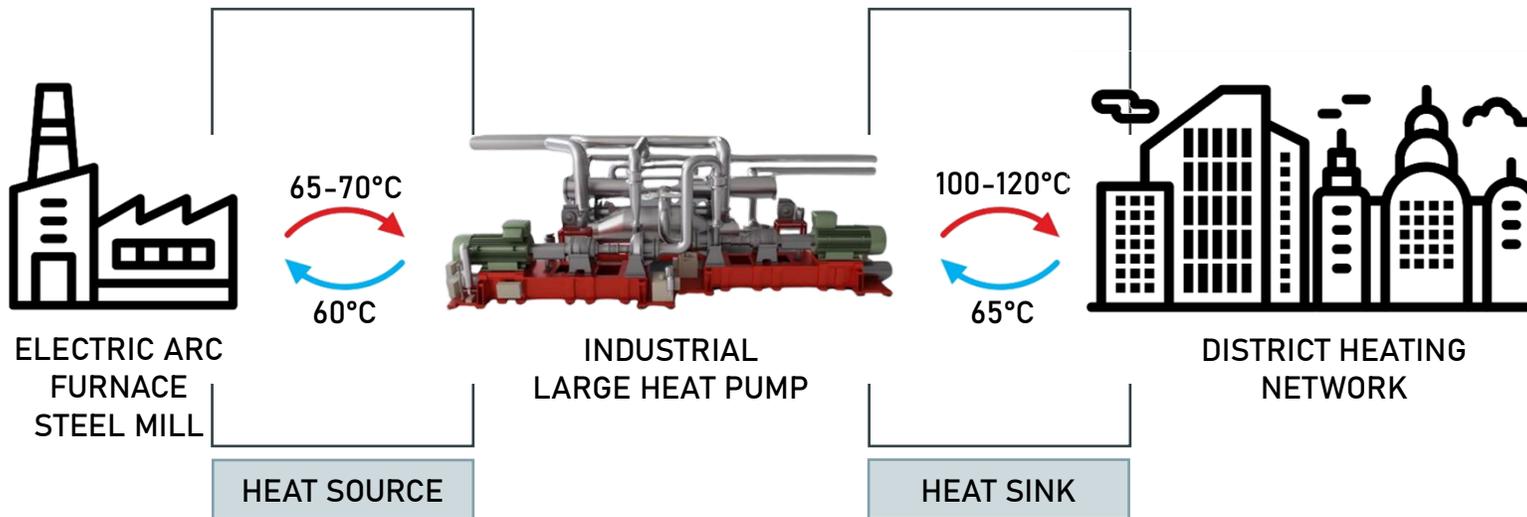
**Mini-scale MVR** (1-3 ton/h)

Steam Temperatures up to 300°C, pressure up to 30 barg

# CASE HISTORY: ORI MARTIN STEELWORKS INDUSTRY



# CASE HISTORY: ORI MARTIN STEELWORKS INDUSTRY



Instead of wasting the heat generated during the steelmaking process and dissipated through cooling towers, the customer chose to recover the heat with an LHP, upgrading it and feeding the local district heating network, achieving a more efficient and sustainable energy use.

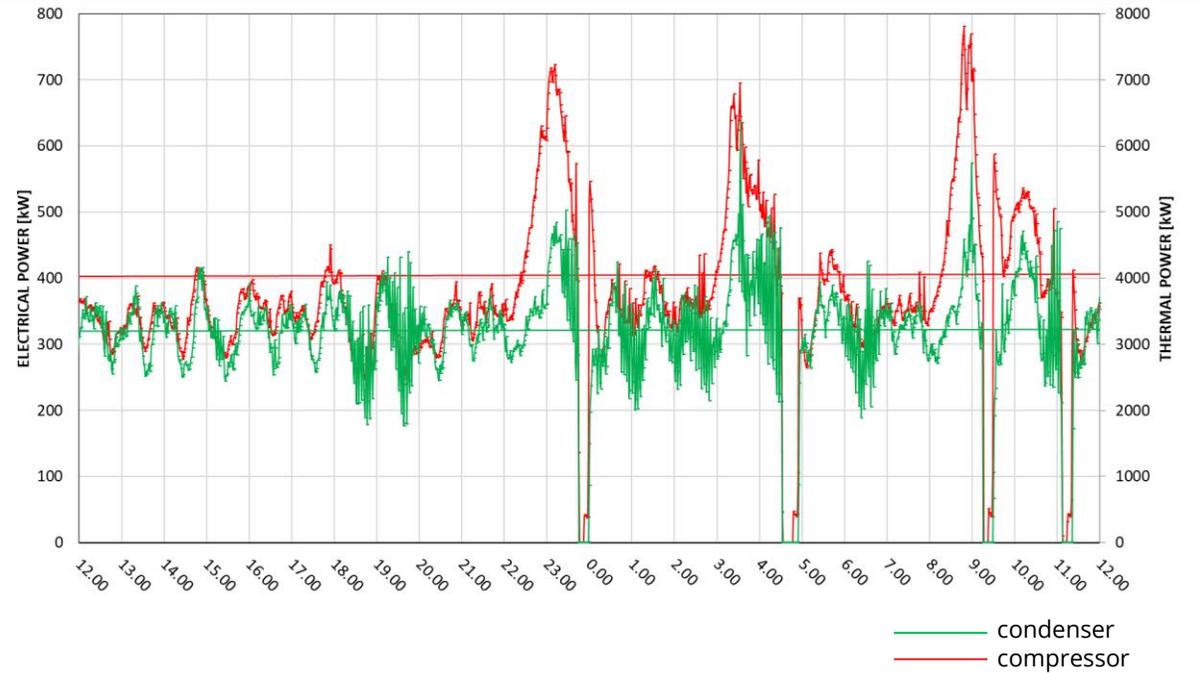
## PROJECT FEATURES

- Country: Italy, in operation since early 2023
- Size: 5 MWth
- Exploitation of steel mill waste heat to serve local district heating network
- Output: pressurized water at 120°C delivered to the district heating network

## TECHNICAL FEATURES

- Centrifugal innovative compressor designed by Turboden
- LHP working fluid: synthetic refrigerant

# CASE HISTORY: ORI MARTIN STEELWORKS INDUSTRY - IN OPERATION



— condenser  
— compressor

Turboden S.p.A. - All rights reserved

# CASE HISTORY: DELFORT GROUP AG PAPER MILL



delfortgroup



Turboden S.p.A.

A Group Company of  **MITSUBISHI HEAVY INDUSTRIES**

# CASE HISTORY: DELFORT GROUP AG PAPER MILL

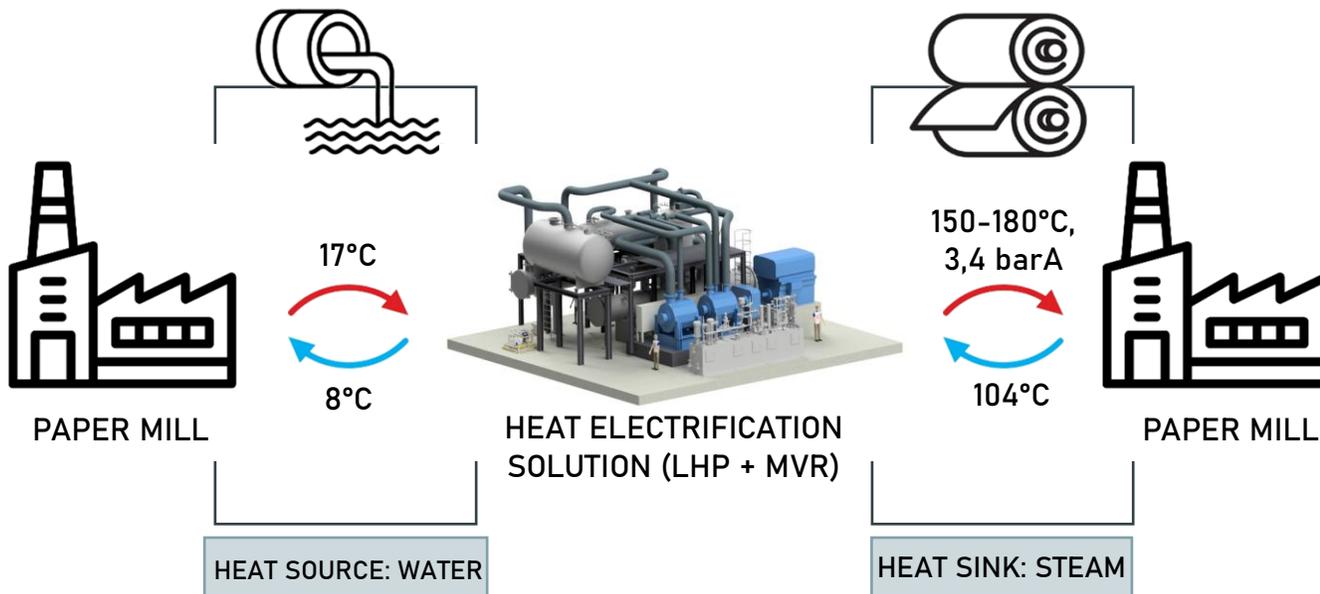


## World's Largest Steam-Producing Heat Pump is now in operation!

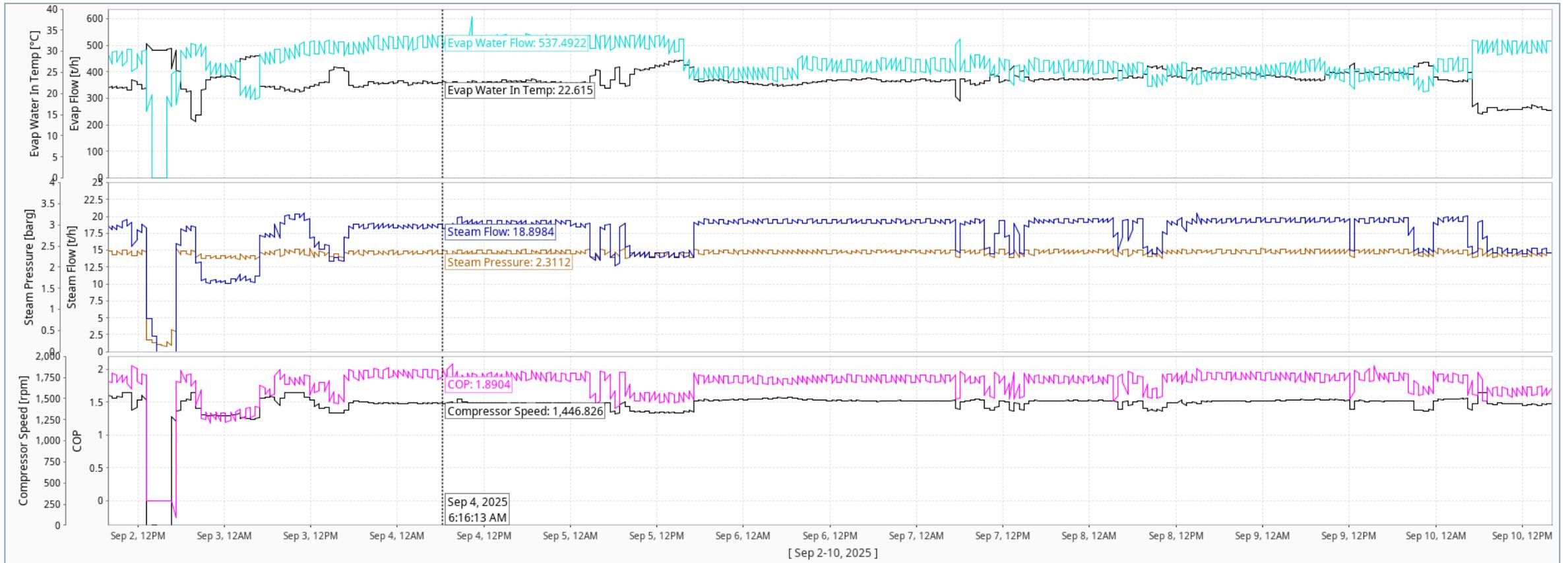
The customer valorized the low-temperature waste heat from the paper mill by installing an innovative heat-upgrade system that combines a LHP with an MVR, enabling the production of **valuable steam** for internal use.

Delfort Group required a **fully decarbonized steam** supply, that could match the performance and reliability of a traditional fossil-fuel boilers. Turboden met this need by developing a **customized heat-electrification solution** that produces steam from renewable electricity.

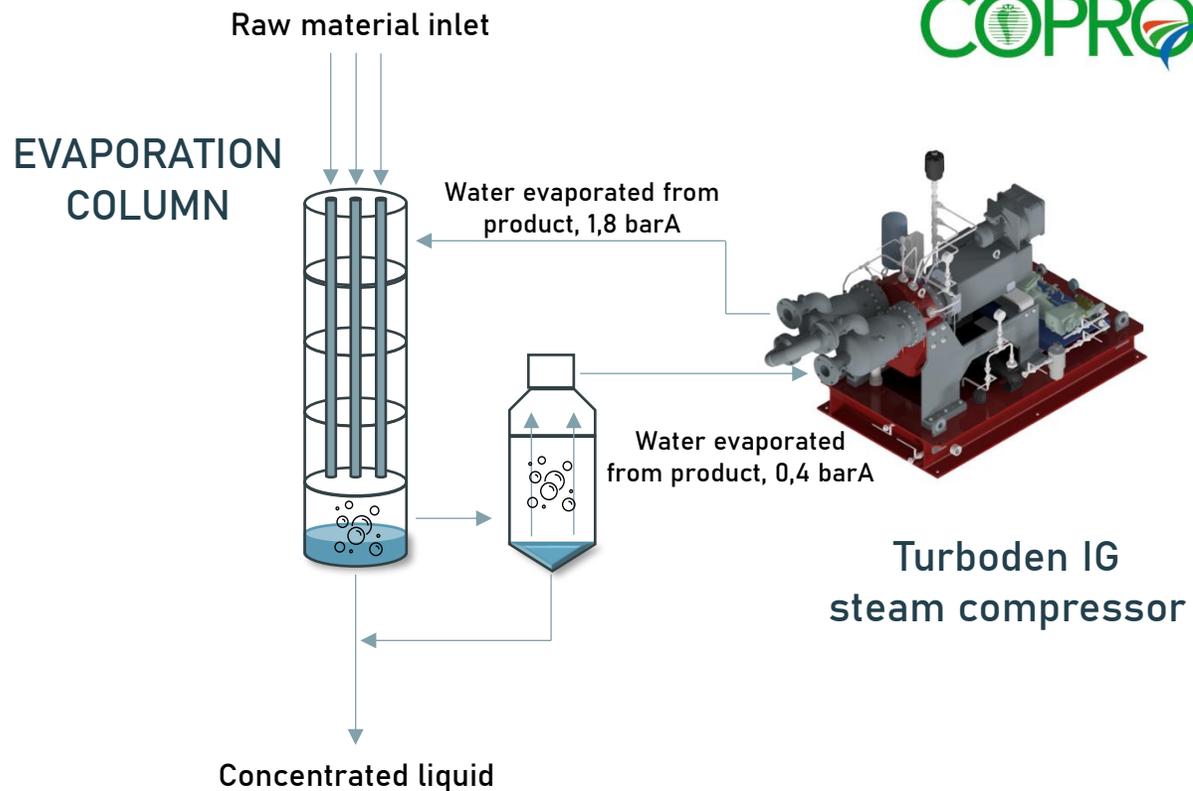
The resulting system is robust, efficient and future-proof, avoiding more than **19,000 tons of CO<sub>2</sub>** emissions per year and significantly reducing the environmental impact of the production site.



# CASE HISTORY: DELFORT GROUP AG PAPER MILL - IN OPERATION



## CASE HISTORY: COPROB SUGAR FACTORY MVR



In the process, heat is used to dry the final product. The exhausted steam vapor is compressed by a Turboden IGCC compressor to a higher temperature in a closed loop, providing the required heat to the main process. A single Turboden MVR operates within a multi-level evaporator, ensuring easy installation, high reliability and compact footprint.

### PROJECT FEATURES

- Country: Italy
- Status: Under construction
- Size: 22 ton/h of steam
- Single MVR installed in a multi-effect evaporator
- Output: saturated steam at 1,8 barA delivered to the sugar process

### TECHNICAL FEATURES

- Capability to handle process steam
  - Three-stage Integrally geared centrifugal compressor
- Turboden S.p.A.

**FIND OUT MORE**



Turboden S.p.A.

A Group Company of  **MITSUBISHI HEAVY INDUSTRIES**