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PRESS RELEASE

Turboden Successfully Starts Up the World's Largest Steam-Producing Heat Pump, Setting a New Benchmark for Industrial Decarbonization

Brescia February 17, Italy – Turboden S.p.A., a group company of Mitsubishi Heavy Industries, announces the successful start-up of the world's largest steam-producing heat pump, a groundbreaking solution designed and manufactured to decarbonize industrial steam generation. The system is now fully operational at ***delfort***, a leading manufacturer of specialty papers, and is overperforming with a Coefficient of Performance (COP) 10% above the guaranteed value, confirming the technical excellence and reliability of Turboden's technology.

This milestone marks the successful completion of one of the most innovative projects ever undertaken by Turboden and represents a major step forward in the decarbonization of energy-intensive industrial processes.

"For the industrial and energy sectors, this project stands as clear evidence that large-scale heat pump technologies are a viable and already available decarbonization solution, delivering outstanding performance as a high-efficiency alternative to traditional fossil-based systems," ***Paolo Bertuzzi, Managing Director and CEO Turboden S.p.A.***

A technological breakthrough in CO_2-free steam generation

The project consists of a Large Heat Pump (LHP) coupled with a Mechanical Vapor Recompression (MVR) capable of generating 12 MWth of superheated steam at 3.4 bar(a), lifting the temperature up to 150–180°C. The system recovers low-grade waste heat from the industrial process and upgrades it using CO_2-free electricity.

At the core of the solution is the integration of the LHP with a MVR, enabling the production of high-temperature steam with zero CO_2 emissions. This plant is the largest steam-producing heat pump ever built and demonstrates the concrete potential of CO_2-free heat technologies to replace fossil-fuel-based boilers in demanding industrial applications requiring steam beyond 150 °C.

Meeting the customer's decarbonization challenge

The customer, **delfort**, is a global innovation leader in the development, manufacturing, and distribution of specialty papers, with a strong commitment to sustainability and the decarbonization of its production processes.

delfort required a solution capable of supplying its production with fully decarbonized steam, while guaranteeing the same quality, reliability, and continuity traditionally provided by fossil-fuel boilers. Turboden addressed this need by developing a customized steam electrification solution that produces steam from CO_2-free electricity while valorizing low-temperature waste heat from the paper manufacturing process itself.

The result is a robust, efficient, and future-proof system that avoids approximately **19,000 tons of CO_2 emissions per year** (calculated, Scope 1).

"This project marks a significant milestone in delfort's decarbonization journey. The successful implementation of this efficient and sustainable heat-pump process into our heat generation system clearly proves the potential of this technology. We are

Turboden S.p.A. Via Cernaia, 10 - 25124 Brescia, Italy
T +390303552001 - info@turboden.it - www.turboden.com - turboden@legalmail.it
Società soggetta alla direzione e coordinamento di Mitsubishi Heavy Industries Ltd.
C.F. / P.IVA (VAT) 02582620981 - capitale sociale € 1.800.000 i.v.
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proud to be a front runner in our industry. This investment reinforces our ability to deliver high-quality, sustainably produced paper solutions to our customers" says ***Hannes Kinast, COO of delfort****.*

Tailor-made engineering for complex constraints

One of the key challenges of the project was to install the heat pump inside an existing room with limited footprint available. Turboden designed the plant to ensure optimal accessibility, maintainability, and performance.

This was achieved through a close and collaborative engineering effort between Turboden and delfort, resulting in a tailor-made plant set-up fully integrated in the paper mill. In addition, Turboden managed the seamless interaction between the heat pump and the MVR across all operating phases, applying advanced process know-how and sophisticated system integration capabilities

A clear statement of Turboden's commitment in steam electrification technologies

"This achievement reflects Turboden's commitment to delivering concrete results through technically robust and forward-looking solutions. The successful start-up of the world's largest steam-producing heat pump marks an important step in the electrification of industrial heat at scale. It further consolidates Turboden's expertise in high-temperature large heat pumps and reinforces our role as a long-term technology partner, supporting customers in the transition towards efficient and sustainable electrified heat solutions," ***Nicola Rossetti, General Manager Heat Electrification BU at Turboden S.p.A.***

The successful implementation of the project represents a further milestone for the development of steam electrification solutions and projects, confirming Turboden central role within Mitsubishi Heavy Industries Green Transformation initiatives.

For more information,
Alessandra Costa
Senior Marketing & Communication Manager
alessandra.costa@turboden.it

About Turboden

Founded in 1980, Turboden S.p.A. is an Italian company and part of the Mitsubishi Heavy Industries Group, providing global technological solutions for power generation and the electrification of heat for industries and utilities. Turboden is a recognized leader in the design, manufacture, and maintenance of proprietary turbomachinery, including Organic Rankine Cycle (ORC) systems for distributed power generation, large heat pumps, and Mechanical Vapor Recompression (MVR) systems.
Today, Turboden is a reliable technology partner enabling higher energy efficiency and supporting the decarbonization of district heating networks and energy-intensive industrial processes worldwide. www.turboden.it

About delfortgroup

delfortgroup AG, headquartered in Traun, Upper Austria, is a global innovation leader in the development, production, and distribution of specialty and functional papers for the tobacco, pharmaceutical, food, and label industries. delfort, together with select partners, possesses extensive process expertise throughout the supply chain. The company employs more than 3,300 people worldwide, from Europe and the USA to China. www.delfortgroup.com