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*For immediate release*

## **Triveni Turbines unveils India's First CO<sub>2</sub>-Based Heat Pump**

*Built in collaboration with IISc, Bengaluru, this product marks breakthrough moment in sustainable industrial heating & cooling solutions*

**Noida, August 04, 2025:** Triveni Turbine Limited (Triveni Turbines), one of the leading manufacturers of industrial steam turbines globally, today unveiled **India's first CO<sub>2</sub>-based high-temperature heat pump, capable of delivering heat up to 122°C and achieving a Coefficient of Performance (COP) of 6.** Indigenously developed, the product marks a major step forward in offering clean and future-ready heating solutions to India's industrial sector.

Unlike conventional heat pumps that use synthetic refrigerants with high global warming potential, this **new solution uses carbon dioxide (CO<sub>2</sub> or R-744) — a natural, non-toxic, and non-flammable refrigerant with zero Ozone Depletion Potential (ODP) and a Global Warming Potential (GWP) of 1.** The launch comes at a time when countries, including India, are accelerating efforts to phase out hydrofluorocarbons (HFCs) under the Kigali Amendment to the Montreal Protocol, due to their high climate impact.

This **heat pump is up to 3x more efficient than conventional electric heating solutions** and significantly more efficient than average commercial heat pumps. Globally, a COP of 6 for high-temperature heat pumps operating above 100°C is considered best-in-class, especially under tropical climate conditions. The heat pump **has been successfully tested at Triveni Turbines' newly commissioned Heat Pump Test Centre in Bengaluru**, where it met full performance benchmarks.

Announcing the launch of the country's first CO<sub>2</sub>-based heating solution, **Mr Dhruv M. Sawhney, Chairman and Managing Director, Triveni Turbine Limited, said** "It is a moment of pride for us as we unveil pathbreaking innovation that will lead the shift from fossil-fuel based industrial heating and cooling solutions. This will provide much desired boost to the country's path to Net-Zero emissions and alleviate the dependency on imports to fuel our industries, while adopting cleaner and increased efficient technologies. Our new heat pump is 100% engineered & made in India, and helps reduce energy consumption, operational costs and environmental impact. The launch is also part of the Company's broader strategy to expand its product and solutions portfolio and deliver technologically superior, energy-efficient products."

This CO<sub>2</sub>-based solution has been developed in technical collaboration with the Indian Institute of Science (IISc), Bengaluru, combining academic research with the industrial engineering legacy of Triveni Turbines. **Dr. Pramod Kumar, Professor and Chair at the Interdisciplinary Centre for Energy Research (ICER), IISc, said,** "It has been a privilege for me and my team to be associated with this project at Triveni Turbines. We believe this is one of the first high-temperature heat pump globally, that is capable of achieving temperatures up to 122°C using CO<sub>2</sub> as a refrigerant operating in a tropical environment. The development was not easy as trans-critical CO<sub>2</sub> systems operate at substantially higher pressures compared to conventional refrigerants like R124a or R1233zd. While the team at IISc worked on tailoring the cycle for Indian climatic conditions, the team at Triveni Turbines leveraged its rich engineering legacy in steam turbine manufacturing to design, manufacture and test the heat pump."

The heat pump has been **designed for process industries** that require high-temperature heat, such as pharmaceuticals, food and beverages, chemicals, textiles, distilleries, pulp & paper, and district heating/cooling. It supports applications like steam generation, pasteurization, distillation, dehydration, dyeing, metal cleaning, and drying — making it highly relevant for sectors seeking to reduce fossil fuel use.

This next-generation product has been conceptualized, designed, and built entirely in India, reinforcing commitment by Triveni Turbines towards Make-In-India. Triveni Turbines has been the market leader in providing cost effective, energy-efficient and environmentally friendly solutions have led to the substantial investment in undertaking extensive research and development. Triveni Turbines is also working on further expanding its product portfolio for industrial heating and power, cementing its role as a long-term partner in the clean energy transition.

## About Triveni Turbine Limited

Triveni Turbine Limited (TTL) is a focused, growing and market-leading corporation having core competency in the area of industrial heat & power solutions and decentralized steam-based renewable turbines up to 100 MW size. The Company is amongst the leading manufacturers of industrial steam turbines both in India and globally. The Company delivers robust, reliable and efficient end-to-end solutions. The Company's ability to provide high-tech precision engineered-to-order solutions has made it one of the most trusted names within the sector.

Triveni Turbines manufactures steam turbines at its world-class manufacturing facilities in Bengaluru, India and assists its customers with their aftermarket requirement through its global servicing offices. With installations of 6000+ steam turbines across over 20 industries, Triveni Turbines is present in over 80 countries around the world. It was demerged from its parent Company, Triveni Engineering and Industries Limited (TEIL) in 2010. TEIL held 21.85% equity capital of TTL since the demerger until 2022. On September 21, 2022 TEIL fully divested its stake in TTL.

Triveni Turbine Limited offers steam turbine solutions for Industrial Captive and Renewable Power. The Company provides renewable power solutions specifically for Biomass, Independent Power Producers, Process Co-generation, Waste-to-Energy, Waste Heat Recovery and District Heating. Its steam turbines are used in diverse industries, ranging from Sugar, Distilleries, Steel, Cement, Textiles, Chemicals, Oil & Gas, Pulp & Paper, Petrochemicals, Fertilisers, Solvent Extraction, Metals, Palm Oil to Food Processing and more. Apart from manufacturing, the Company also provides a wide range of aftermarket services to its own fleet of turbines as well as turbines and other rotating equipment such as compressors, rotors, etc. of other makes supported by its team of highly experienced and qualified service engineers.

Triveni Turbines' market leadership has been built on a foundation of strong and continuously evolving research, development and engineering capabilities. The customer centric approach to R&D, along with a keen focus on delivered product and life-cycle cost has allowed Triveni Turbines to set benchmarks for efficiency, robustness and up-time of the turbine. A strong internal team, strengthened by collaborative associations with globally leading design and research institutions, has placed Triveni at the forefront of a technically challenging field dominated by large multi-nationals.

For further information on the Company, its products and services please visit [www.triveniturbines.com](http://www.triveniturbines.com)

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