Triveni TURBINES

STEAM GENERATING HEAT PUMPS

Turning Industrial Waste Heat into Steam

ELECTRIFIED | EFFICIENT | SUSTAINABLE



DECADES OF STEAM EXPERTISE MEETS NEXT-GEN INNOVATION TO CREATE CLEANER INDUSTRIAL HEATING SOLUTIONS

Steam Generating Heat Pumps

Every progress in industrial energy begins with a simple idea-doing more with what already exists.

At Triveni Turbine Limited, innovation means powering untapped potential into purposeful performance. Our latest innovation, the Steam Generating Heat Pump, combines decades of steam engineering expertise with advanced thermodynamics to move beyond combustion and toward intelligent energy transformation.

The Mechanism Electrification Solution

Upgrades waste heat into reliable and sustainable steam. At its core lies a precisely engineered closed-loop cycle: the refrigerant is compressed to elevate temperature and pressure, transferring heat in the condenser to generate steam 130 °C -180 °C (with option to use MVR- Steam compressor), while a sub-cooler and internal heat exchangers recover additional energy to maximize efficiency.

Through an electronic expansion valve, the refrigerant returns to low pressure before entering the evaporator, where it absorbs heat from approximately source water, turning into vapor while cooling the source fluid. The cycle then repeats, delivering consistent and efficient steam.

The true innovation is not about consuming more energy, it is about making every unit of energy work for a smarter and cleaner future.



Steam Generating Heat Pump Skid

*The above image is for representation purpose only.



INTELLIGENT STEAMING MEASURABLE IMPACT.

The real power of innovation lies not just in generating STEAM, but in reimagining how energy is utilised. Built with decades of steam engineering expertise and natural refrigerant technology, Triveni Turbines heat pumps powers high-temperature performance with a lower environmental footprint.

Engineered for Efficiency

- **High COP:** optimised to convert more input energy into usable steam output.
- **Higher Heat Transfer Efficiency:** Advanced system design enhances steam generation while maintaining operational stability.
- **Excellent Waste Heat Recovery:** Efficiently utilises low-grade waste heat ranging from 50°C and above

Driven by Sustainability

- **Fully Electrified System:** Eliminates reliance on combustion-based heating for cleaner industrial operations.
- **Zero Emission Operation at Point of Use:** Supports decarbonisation strategies.

Tailor-made for Industrial Performance

- **High-Temperature Steam Generation:** With option to cascade using MVR - Steam compressor.
- **Scalable:** Designed to adapt to evolving process demands.
- **Tailor-made Configurations:** Systems engineered as per specific customer requirements.
- **Option ATEX-Certified Electrical Components:** Ensures safety and compliance for hazardous-area installations.

Optimised for Cost-saving

- **Significant Operational Cost Savings:** Reduced energy consumption compared to fossil-fuel.
- **Lower Lifecycle Costs:** Improved efficiency and reduced maintenance needs.
- **Wide Industry Applicability:** Suitable for multiple industrial processes.

INDUSTRY & APPLICATION

- Textile Dyeing and Finishing Industry
- Pharma Industry
- Public Institutions
- Paper, Pulp & Wood Processing Industry
- Rubber and Plastic Industry
- Dairy and Food Industry
- Distillery, Brewery & Malt Plants Industry
- And Many More....

INDUSTRIAL WASTE HEAT SOURCES

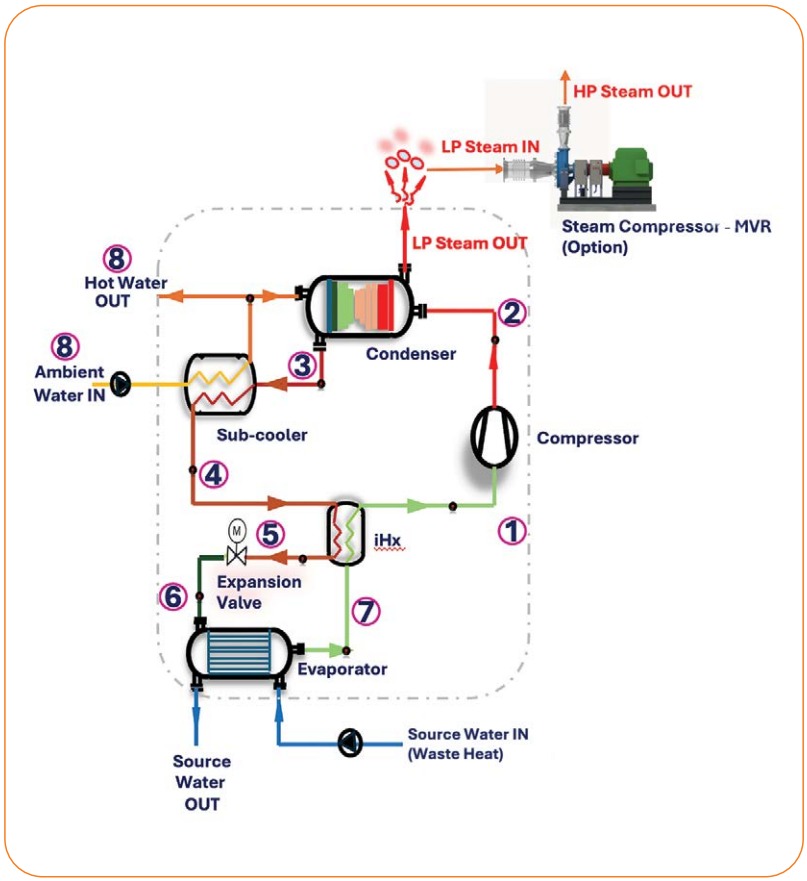
- Waste Water from Effluent Treatment Plants (ETPs)
- Compressor Waste Heat
- Equipment / Turbo-Machinery Oil Coolers
- Cooling Towers / Chillers
- Process Condensate
- Waste Fuel Gas (low-grade)
- Hot Air (exiting from dryers)



WHEN SMARTER HEAT MEETS REAL INDUSTRY

Across industries, heat pumps are no longer just a utility, they are the strategic drivers of efficiency and sustainability, and Triveni Turbines' Steam Generating Heat Pumps enable diverse industries to move towards green energy innovation.

Steam Generating Heat Pump Process Flow



1. Compressor elevates the pressure
2. In Condenser heat is rejected to produce steam
3. Additional heat is utilised in the sub-cooler
4. iHx improves COP
5. Expansion valve decreases the pressure
6. Heat is absorbed in the evaporator
7. Vapour gains heat in iHx
8. Process Hot Water generation Ambient upto 90 °C

WHY CHOOSE
TRIVENI TURBINE LIMITED

With over six decades of steam engineering expertise and global installations up to 100 MWe, Triveni Turbine Limited brings proven reliability into the next generation of clean energy solutions. Our robust, tailor-made heat pumps, ranging from 100 kW to MW Scale are designed to deliver high performance, flexibility, and long-term value. Because when experience meets innovation, industries move forward with confidence.




Triveni
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Triveni TURBINES

IMAGINE. INNOVATE. INSPIRE.

Powering Your Potential

Triveni Turbines Corporate Film

Website

Sompura FPV

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