

WSE TURBO CASE STUDY 2026 MATERIAL



EFFICIENT ELECTRICIFICATION OF THE DISTILLER'S PRODUCTION

TRANSFORMING DISTILLERY ENERGY USE WITH
WSE HEAT PUMP TECHNOLOGY



Material Usage for 2026 – Sales Materials Only

All information belongs to WSE Turbo without third-party validation. The information is provided as an indicative sample and may be different in final installations depending on application specific parameters.

ABOUT WSE TURBO



Since 2019, WSE Turbo has been built on a foundation of deep engineering expertise, advanced process understanding, and decades of hands-on experience in energy systems and turbo machinery. Our headquarters are located in Lyngby, Denmark, while our production facility is based in Malmö, Sweden.

WSE TURBO's solutions are rooted in advanced thermal process optimization and waste heat recovery, enabling industries to reduce emissions while improving operational performance.

The team has decades of experience in process optimization for industrial and power plant systems, focusing on maximizing energy efficiency and integrating complex processes. We have a strong background in microturbines and combined heat and power (CHP) systems, from R&D to commercialization.

The team has a proven track record in production engineering, from prototype development to full-scale manufacturing across automotive, aerospace, and energy sectors. The services provided rely on a deep understanding of mechanical integrity, performance optimization, and reliability in demanding industrial environments. The team also has the entrepreneurial and strategic capability to translate complex engineering solutions into scalable, market-driven energy systems.

By combining these multidisciplinary expertises, WSE Turbo delivers integrated energy solutions that go beyond conventional approaches. The team unites precision turbo machinery with intelligent system design. At WSE Turbo, we are more than a heatpump provider.

We are strategic engineering partners.

We do not just decarbonize industrial heat.
We apply decades of collective knowledge to redefine industrial energy systems for a cleaner, more efficient future.



Picture: of the team in our facility in Malmö

AN ENERGY DILEMMA: ALCOHOL PRODUCTION IN FOOD & BEVERAGE MANUFACTURING

In distilleries worldwide, whether it being bioethanol or beverage production, distillation and dehydration are among the most energy-intensive steps. Both processes rely on a continuous supply of high-temperature steam, which is typically produced using fossil-fueled boilers. This results in high energy costs and significant CO₂ emissions.

At the same time, large amounts of heat are lost through condensers, vent streams, and cooling systems. Although this heat still contains energy, its temperature is usually too low to be reused directly in the process.

WSE Turbo addresses this by capturing that low-grade waste heat and upgrading it to a higher temperature using a steam heat pump. The system compresses the thermal energy to produce high-temperature steam that can be fed back into the distillation process.

By replacing part of the boiler load, this approach reduces overall energy consumption while maintaining stable process conditions. It also lowers emissions and reduces dependence on fuel, helping distilleries manage both costs and regulatory compliance.

In practice, this means existing processes can become more efficient and less carbon-intensive without major changes to core plant operations.



A HEAT PUMP BREAKTHROUGH



The Challenge

- High steam demand: Distillations operations require consistent steam at $\sim 100^{\circ}\text{C}$
- Energy waste: Valuable thermal energy from vapor streams is lost through venting and condensation.
- Sustainability goals: Need a cost-effective way to decarbonize without disrupting production.

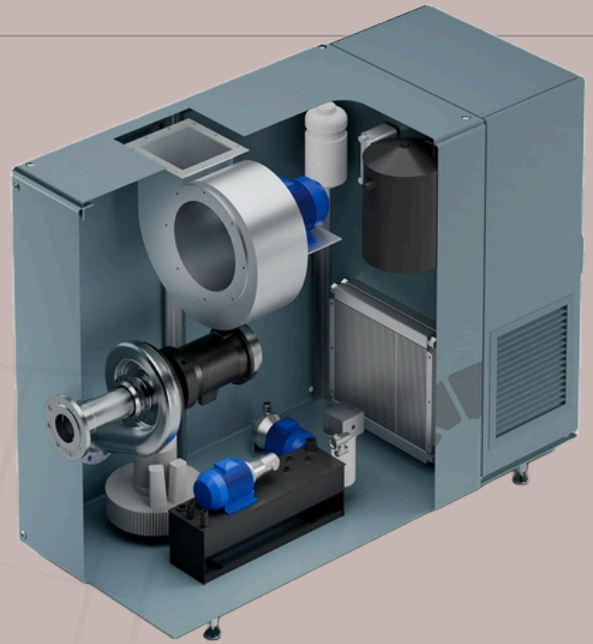
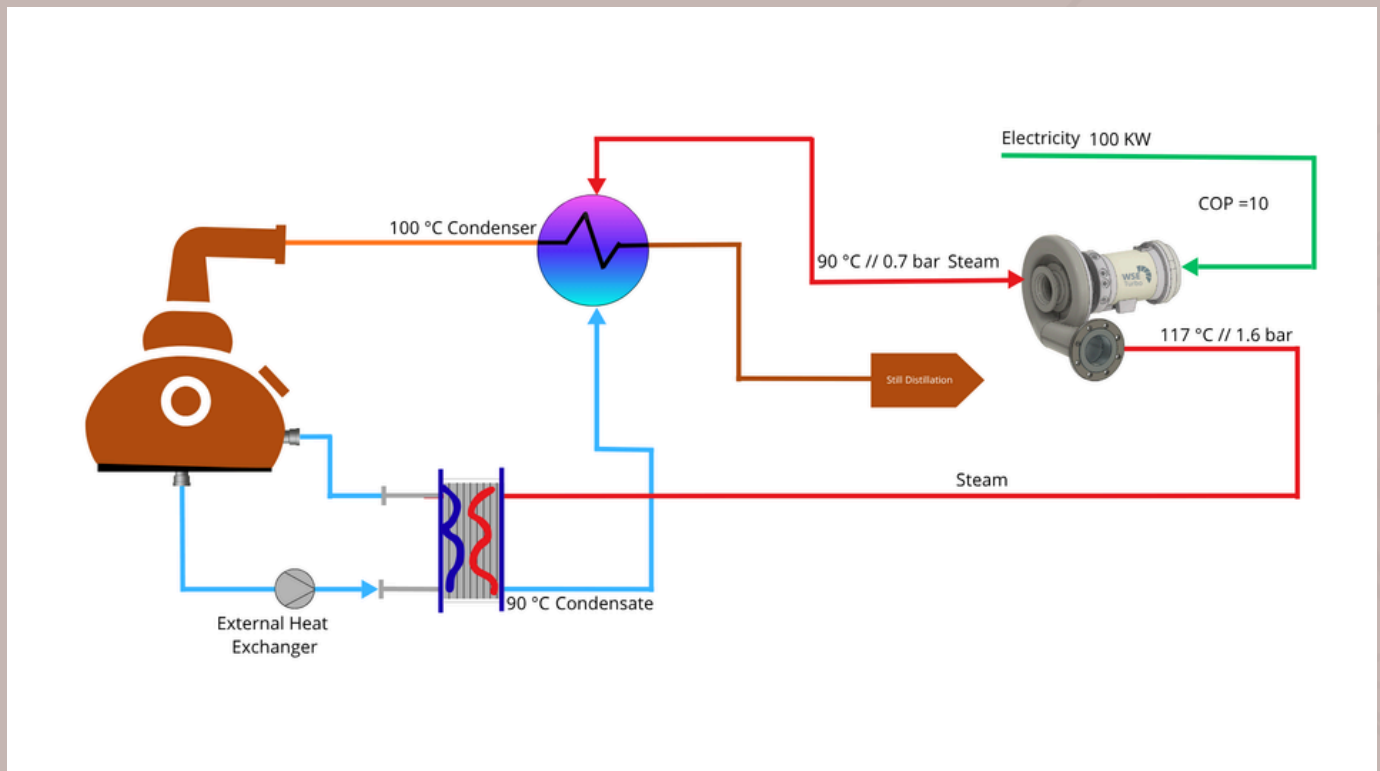


Figure 1 Heat Pump simulation

Technology: The WSE Turbo System

Component	Specification
Heat Source	Waste vapor from brewing process
Core Technology	Mechanical Vapor Recompression (MVR)
Compressor Type	1 Stage Compressors (Turbo chargers)
Steam Output Temp.	$\sim 90^{\circ}\text{C}$ (saturated)
Electric Input	Powered by grid or renewable electricity



Figur 2: Simulation with Heat Pump integration on column C1.

Process Overview

Capture: Waste steam is recovered post-boiling

Compression: WSE Turbo elevates vapor temperature

Steam Delivery steam re-enters the process and no fossil fuels required

Performance Metrics

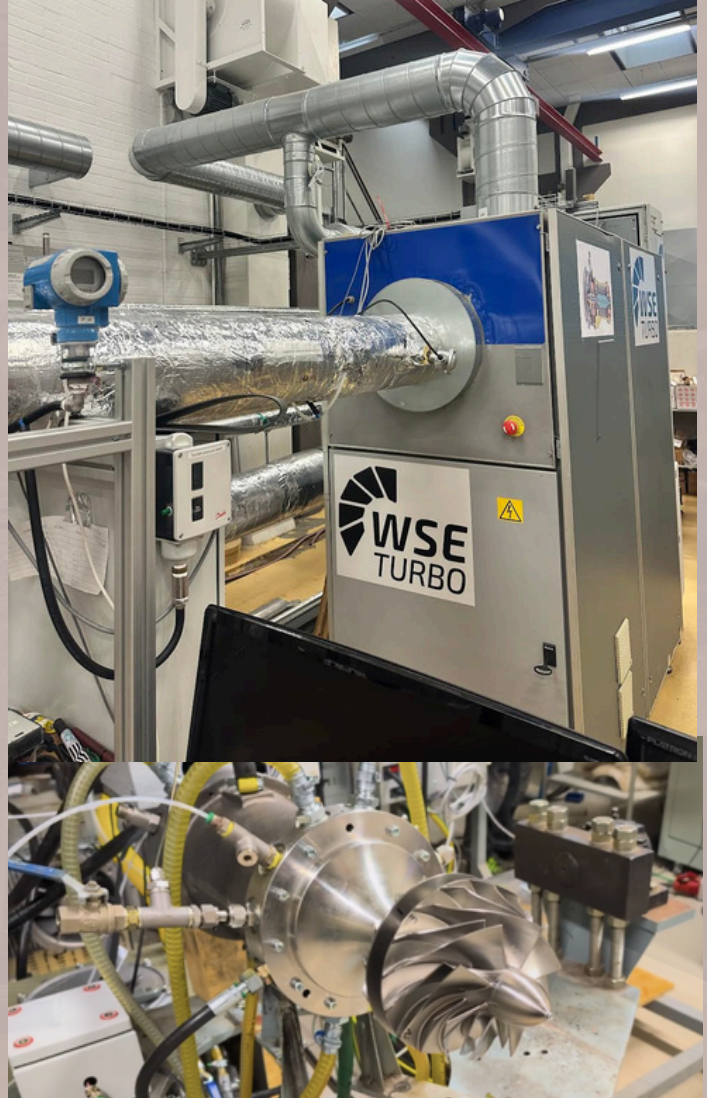
Metric	Value
Fossil fuel displacement	~90-100% of previous oil boiler load
Emissions reduction	50-100% (depending on electricity mix)
COP	10
System reliability	Proven high-reliability design with few moving parts, based on micro gas turbines with millions of operational hours

ESTABLISHING SUSTAINABLE PROCESSES

With the elimination of combustion-based heating, the WSE Turbo system plays a central role in advancing industrial decarbonization. It directly supports net zero goals by significantly lowering the carbon intensity of production one liter at a time.

From a financial perspective, the system delivers a strong return on investment with a projected ROI of just 2–5 years. Its compatibility with government decarbonization incentives further enhances the economic appeal.

Designed for flexibility, the modular WSE Turbo system can be easily replicated across multiple facilities, enabling scalable energy transformation with minimal operational disruption.



Connect with our international sales teams

CONTACT US TODAY

→ **Contactpage**

Email: hello@wseturbo.com



—visit our website for more information

<https://www.wseturbo.com/>

Visit our office and testrig
WSE Turbo Technologies
Hovedvej 102
2800 Kongens Lyngby
DENMARK

