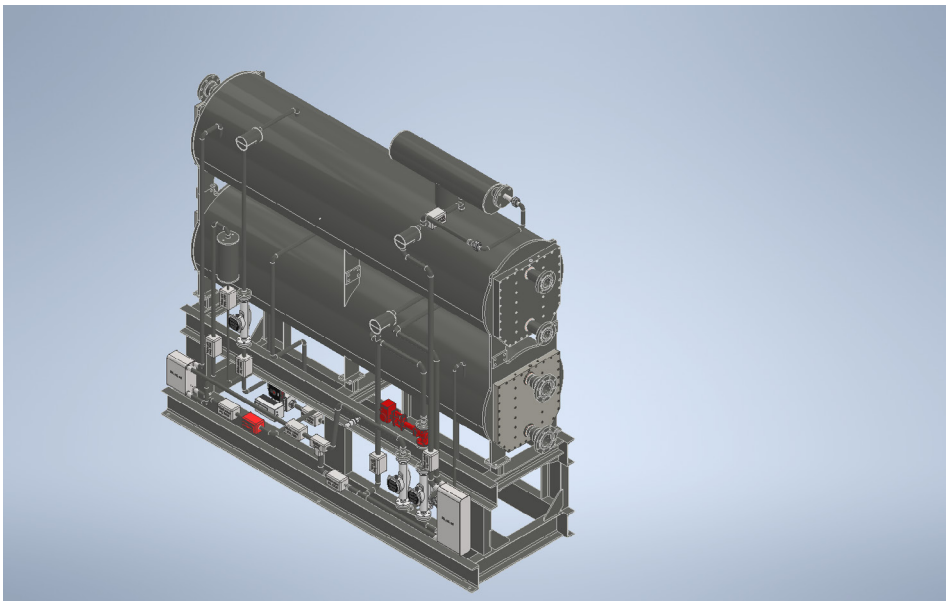
Absorption heat transformer

Push2Heat
Heat upgrading technologies



Technical details

- **Production Waste heat:** 981 kW
- **Max. operating pressure:** -1 / 5 bar
- **Max. operating pressure:** 0 / 145°C
- **Working Fluid:** H_2O/LiBr
- **Upgraded heat use:** temperature range of 110-120°C
- **Application of Upgraded Heat:** The upgraded heat is used for **preheating chemical products** up to **110°C** or for **generating steam** at **1.5 bar absolute pressure.**

Technology provided by BS Nova

Technology overview

The **Absorption Heat Transformer cycle** operates as follows:

1. The waste heat drives the cycle by enabling the **desorption** separating the refrigerant from the absorbent solution, which is normally an aqueous LiBr solution. This occurs in the **generator**.
2. The **refrigerant vapour** flows through the **condenser**, where the vapour **latent heat** is transferred to a dissipation sink at a low (ambient) temperature.
3. After being **condensed**, the refrigerant is **pumped** to a higher pressure, where the refrigerant is **evaporated** by the waste heat source.
4. Finally, the **vapour** goes from the **evaporator** to the **absorber**. The **LiBr concentrated solution** absorbs this **vapour** and due to this **exothermic process**, the **absorption heat** is released at higher temperature. Thus, the **revalorised stream** from the **Absorption Heat Transformer** may be delivered to the corresponding application.

Objective

The **goal** of the technology is to show how using **mechanical vapour compressors** and **thermally driven heat pumps** can **improve** and **reuse** large-scale **waste heat** (over 500 kW). The main **focus** is on doing this **efficiently**, **recovering** and **improving** waste heat while reaching temperatures between **90-160°C.**

Operating conditions

Component	Nominal Heat (kW)*	Inlet Temperature (°C)**	Outlet Temperature (°C)***	Volumetric Flow Rate (m3/h)****
Usable Heat Circuit (Absorber)	448	111	116	80.4
Driving Heat (Desorber)	448	85	75	39.6
Driving Heat (Evaporator)	486	85	74.6	41.2
Low Temperature Sink (Condenser)	486	15	25	41,8

*Expected heat transfer capacity; **Initial temperature of the working fluid;
***temperature of the working fluid as it exits the component; ****rate at which the working fluid flows through the component.

PUSH2HEAT in a nutshell

PUSH2HEAT is an EU-Funded project that aims at addressing the technical, economic, and regulatory barriers that prevent heat upgrading technologies to be widely deployed. It is doing so by scaling up four different heat upgrading technologies to optimise their efficiency and economic performance. In addition, it is focusing on integrating them into the relevant industrial sectors such as the paper and chemical industries.

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Glossary

- **Desorption:** The removal or release of a substance (like refrigerant) from another substance (absorbent solution), particularly occurring in the generator during the absorption refrigeration cycle.
- **Latent Heat:** The heat absorbed or released during a phase change without a temperature change. In the condenser, refrigerant vapor releases latent heat as it changes into a liquid.
- **LiBr Solution:** water-based solution containing lithium bromide (LiBr).
- **Waste Heat:** This is heat produced as a byproduct of an industrial process that would typically be discarded.

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