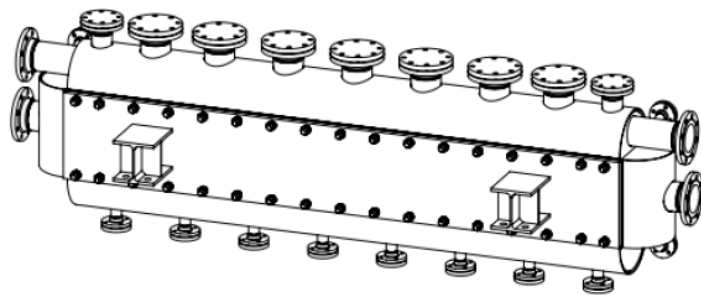


## VAU Thermotech: Co-designer of the energy turnaround

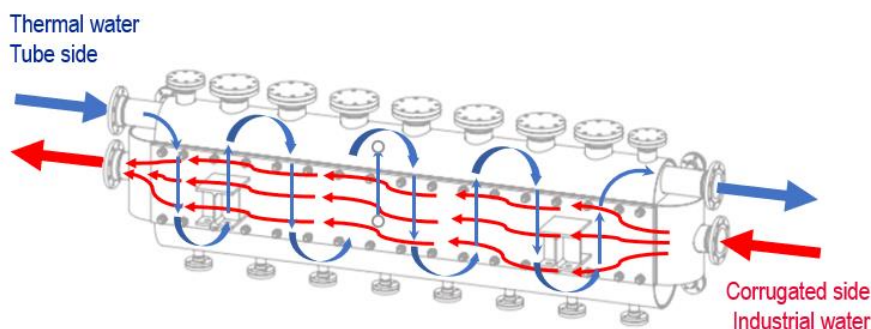
Heldrungen, July 31<sup>st</sup>, 2023 – Hot water - or more precisely thermal water - plays a very important role for the operator of a geothermal power plant in Rhineland-Palatinate. As part of the [GeoSmart Project](#) funded by the European Union, "innovations to improve the flexibility and efficiency of geothermal heat and power supply systems" are to be investigated. VAU Thermotech is supplying four fully welded hybrid tubular plate heat exchangers for this purpose, which will be tested in running operation for functionality, durability and the possibility of complete cleaning.

The task of our plate heat exchangers will be to decouple heat from the thermal water for district heating. The thermal water, at a temperature of about 164 °C, is pumped up from about 3,600 meters, flows through the respective primary side of the [hybrid tubular plate heat exchangers](#), is cooled down to about 45 °C and is pumped back into the reservoir (ground



soil). On the secondary side, 40 °C hot industrial water flows in counter-current. By leaving the four heat exchangers, the water has heated up to about 160 °C and thus supplies the heat for a district heating network. To ensure that the desired heat load and the defined temperature level is provided, we designed our four vessels with a heating surface of 114 m<sup>2</sup> each. Connected in series, they offer a total heat load of 4,167 kW.

Because of the high pressure and temperature levels, the power plant operators had to dispense with gasketed plate heat exchangers. Due to the limited footprint on the power plant site, our plate heat exchanger was preferred over a classic shell-and-tube heat exchanger. This is because our fully welded hybrid tubular plate heat exchangers offer a much larger heating surface per cubic meter of space (250 m<sup>2</sup>/m<sup>3</sup>) compared to the shell-and-tube heat exchangers. Since the thermal water has a corrosive effect due to chlorides, the plate packs of our fully welded plate heat exchangers are made of the special material 254 SMO (1.4547 stainless steel).



Moreover, the thermal water contains many salts, which makes it highly prone to plaque formation. For this reason, it is fed through the easy-to-clean tube side of the plate packs. Since the tubes are vertical, they are easily

accessible through several ports welded into the hoods located on the top of the vessel. So, the plate pack can be cleaned from above with a high-pressure water jet, for example. Dirt and water leave the vessel on the ports located at the bottom. The industrial water, on the other hand, is directed over the corrugated side of the plate pack, causing it to enter high turbulence, which significantly improves heat transfer.

After completion of the GeoSmart project, the components will be further used in the next expansion stage and supplemented by additional hybrid tubular plate heat exchangers. The plan is to transfer all geothermal heat to



the industrial water and to remove the power generation plant from the thermal water system and integrate it into the industrial water circuit.

Furthermore, the cooled thermal water - before it is pumped back into the ground - will be transferred to a lithium extraction plant. There, it will be fed through tubes filled with a sorbent. The lithium in the thermal water then binds to the sorbent and becomes enriched. It is then washed out with water and the solution is subsequently concentrated. The solution is then processed in a refinery to obtain pure lithium, which is needed to build rechargeable batteries. As a result, up to 40,000 tons of lithium per year will be produced in the future. Further details on this process can be found at [Zero Carbon Lithium™ project](#).

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### **About VAU Thermotech GmbH & Co. KG**

The independent and owner-managed VAU Thermotech GmbH & Co. KG was formed in 2008 by the takeover of VAU Werkzeug- und Gerätebau GmbH & Co. KG, which was founded in 1977. Owner and CEO is Osama Nasser. Headquarter and production are located in northern Thuringia, the branch office in Munich is an innovation hotspot for the development of new products.

The ISO 9001 certified company manufactures brazed plate heat exchangers, fully welded hybrid tubular heat exchangers and gasketed plate heat exchangers. In addition to series products such as brazed plate heat exchangers, VAU Thermotech is one of the few German heat exchanger manufacturers to master the project business with custom-made products and high-end solutions in which fully welded hybrid tubular plate heat exchangers are used for high performance. The company designs and produces its goods 100 percent in Germany and always delivers "from a single source".

The broad portfolio addresses heating, refrigeration and building technology, (petro) chemical industry as well as sugar, food and pharma-ceutical industries. The heat exchanger plates are manufactured on fully automated production lines. The required shaping tools are made by the company's own CNC-controlled machine park.

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