



Surface Water Regenerative Heat Solutions

- ▶ Heat generation from rivers, lakes and seas ensures a CO₂-friendly, resilient heat supply
- ▶ High-quality screens enable reliable water abstraction in harmony with nature
- ▶ Sophisticated machine design and extensive project expertise promote cost-optimised, timely project implementation

Decarbonising the heat market is crucial for climate protection

The decarbonisation of the heat supply is a central project in order to achieve German and European climate protection targets. Taking Germany as an example, heat is responsible for more than 50 percent of the total final energy consumption. Almost 40 percent of all energy-related CO₂ emissions in Germany are currently generated in the heat market to provide space heating, hot water and process heat.

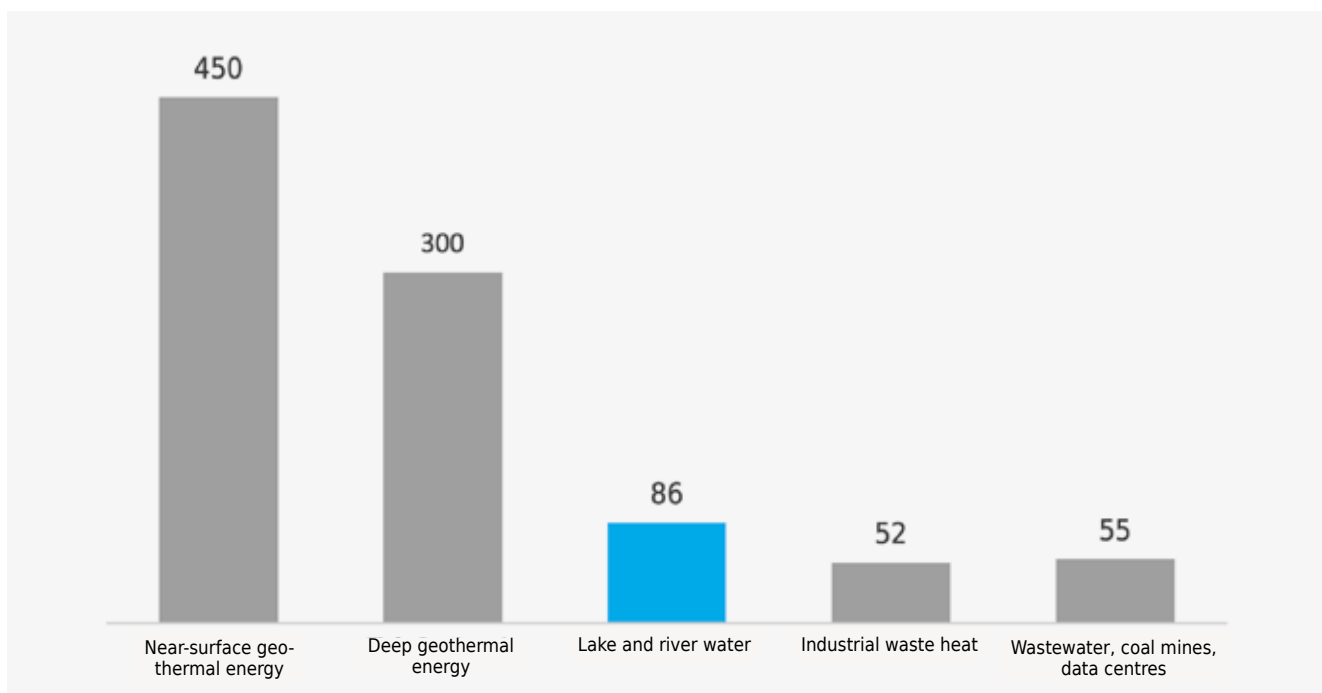
In order to switch from the current fossil-dominated heat supply of buildings and industry towards a climate-neutral heat supply by 2045, the implementation of the “heat transition” is one of the greatest challenges for the coming years.

Surface water from rivers, lakes and seas can contribute to a successful heat transition

In addition to the great potential of ambient air and geothermal energy, as well as the use of waste heat from wastewater, the extraction of heat from surface waters such as rivers, lakes and seas opens up attractive opportunities for a sustainable, CO₂-friendly, resilient heat supply.

Surface water stores enormous amounts of heat energy, which can be tapped easily using large-scale heat pumps. Temperature changes in surface waters are also slow and less pronounced compared to the daytime and seasonal fluctuations in air temperatures.

Potential studies for different regions have shown that river and sea heat can make a significant contribution to meeting the heating demand. It is estimated that around 90 TWh could be generated from river and sea water in Germany alone. There is also great potential in Switzerland, the UK and Scandinavia, with Denmark, Sweden and Switzerland in particular having successfully used this form of heat generation for many years.



Potential for covering heat requirements up to 200 °C via regenerative heat using a heat pump in Germany (excluding ambient air) in TWh, source: Agora Energiewende (2023).

Correct water abstraction determines the success of heat recovery

The surface water must be treated mechanically in the first step, regardless of the size and type of heat pump. Dirt loads such as leaves, branches, algae or other impurities must be removed to enable efficient heat recovery. HUBER supplies the appropriate screening machines, designed for a long service life and automated, smooth operation. The screening machines are manufactured in stainless steel V2A and V4A, in duplex or super duplex, depending on the project-specific requirements. The combination of stainless steel 4A and cathodic corrosion protection for seawater applications is also possible.

Our portfolio of coarse screens for regenerative heat from surface waters includes:

- ▶ HUBER Multi-Rake Bar Screen RakeMax®
- ▶ HUBER Pumping Stations Screen ROTAMAT® RoK4
- ▶ HUBER Grab Screen TrashLift



HUBER Multi-Rake Bar Screen RakeMax®.

Other screens and screening machines can be selected if required. If, for example, algae or mussels are present in surface water, the HUBER Drum Screen LIQUID or the HUBER Disc Filter RoDisc® are a suitable solution for fine

Our experts select the most suitable solution from a wide range of coarse and fine screens based on the project-specific conditions. The structural requirements of the inlet structure, water volumes to be treated and expected dirt loads are taken into account. Investment and operating costs as well as environmental aspects such as fish and noise protection are also taken into account when finding solutions.

Our portfolio of fine screens for regenerative heat from surface water:

- ▶ HUBER Multi-Rake Bar Screen RakeMax®
- ▶ HUBER Band Screen CenterMax®
- ▶ HUBER Band Screen DiscMax®
- ▶ HUBER Band Screen DualMax®



HUBER Band Screen DiscMax®.

screening in the micrometre range in order to protect heat exchangers and heat pumps from growth and thus enable optimal heat transfer.

HUBER offers solutions for water extraction in harmony with nature

When developing solution concepts, HUBER focuses on environmentally-friendly designs and sustainability. This starts with the use of resource-conserving materials and the closing of loops, as well as a climate-neutral energy supply through 100 percent hydropower in production.

For us, harmony with nature also means optimal fish protection. This starts with the correct design of the structure and screen. It also includes optional fish deterrent systems that are integrated at the entrance to the extraction structure and ensure that fish do not swim into the extraction structure.

With our HUBER Band Screen DiscMax®, specially developed, water-filled buckets transport fish out of the sewer and gently transfer them into a water-filled gutter, through which the fish are returned to their natural habitat.

With our innovative screen designs, we ensure that noise emissions are reduced as much as possible and the visual impact of water abstraction is minimised to enable optimal integration of heat recovery in urban areas.



The protection of fish plays a role in many projects.

Innovative heat exchangers complete our range for regenerative heat from surface waters

In order to make use of the heat contained in the pre-treated water, it must be extracted via heat exchangers before heat pumps bring the heating and hot water to a sufficiently high temperature level.

HUBER has developed the HUBER Heat Exchanger RoWin for this purpose. This consists of a steel tank in which horizontal tubular modules, which are also made of steel, are arranged in parallel. Alternatively, the heat exchanger can be installed directly in a concrete channel, where the immersed pipe modules are equipped for optimal flow.

The pre-screened surface water flows through the heat exchanger and, via the compactly arranged pipes, gives off its thermal energy to the cooling water. The energy for the heat pump is supplied through the heated cooling medium.

Over time, algae deposits and fine impurities can form on the heat transfer surfaces of the tube modules and lead to a decline in performance. To ensure optimal heat transfer during operation, HUBER has designed an innovative, fully automatic cleaning mechanism that preventively cleans the heat exchanger surfaces.

The HUBER Heat Exchanger RoWin is made of stainless steel to avoid potential material corrosion.



Two HUBER Heat Exchangers RoWin installed in parallel in the tank.

Project reference – Regenerative heat from the Spree for a climate-neutral Berlin

Berlin is pursuing the long-term goal of becoming a climate-neutral city by 2045. In addition to increasing energy efficiency and saving energy, the use of renewable energies is a key starting point for reducing CO₂ emissions. In light of this, the Berlin-based company BTB (Blockheizkraftwerks-Träger- und Betreibergesellschaft mbH Berlin) has decided to convert its power plant site by 2030. A modern, CO₂-neutral energy park is gradually being created. In addition to geothermal energy and heat storage, an innovative project was implemented that uses the Spree as a heat source from spring to autumn.

HUBER supplied the multi-stage automatic cleaning system for the extraction and treatment of the Spree water, in which the HUBER Multi-Rake Bar Screen RakeMax® is used as a coarse and fine screen. Fish-friendly design was taken into account in the planning and implementation of the extraction structure.

The water extracted from the Spree is mechanically cleaned in two channels by screens with gap widths of 30 millimetres and 3 millimetres. The HUBER Multi-Rake Bar Screen RakeMax® offers the advantages of a compact, easy-to-maintain and economical screen with a small footprint and reliable, high cleaning performance even with high dirt loads.

The river water cleaned with the HUBER RakeMax® is collected in a basin and pumped via submersible pumps for further treatment before it is fed to two large heat pumps with 3.5 megawatts of thermal output each. Heat is first extracted from the Spree water via shell and tube heat exchangers.

The generated heat energy is then increased to the required temperature level of the district heating network of over 90°C. This is done by evaporating and liquefying refrigerant and transferring the phase change energy to the hot water system.

At the end of the process, the river water cooled by around 4°C is returned to the Spree, which also has a positive effect on the river ecosystem as a result of improved oxygen-binding capacity.



Berlin with the Spree as its heat source.



Installation of the HUBER Multi-Rake Bar Screen RakeMax® in Berlin-Schöneeweide (source: BTB).

HUBER develops cost-effective solutions in close cooperation with customers and tailored to their individual needs

HUBER supports its customers with both planning and implementing projects for heat recovery from surface waters.

After-sales service for operation and maintenance rounds off our portfolio. Our many years of experience and a sophisticated design of the screens and screening machines enable our customers to achieve particularly low operating and maintenance costs, with reduced space requirements due to the compact design and easy, quick installation and commissioning.

Produced in Germany in first-class manufacturing quality, our machines ensure smooth, long-lasting plant operation for reliable extraction, even with large dirt loads.



Customer proximity is our highest priority – on-site consulting from HUBER experts.

HUBER SE

Industriepark Erasbach A1 | 92334 Berching
Phone: +49 8462 201-0 | water-intake@huber.de

www.huber.de

HUBER Solutions for Regenerative Heat from
Surface Waters

Subject to technical modification | 0.1 / 1 – 3.2024 – 3.2024