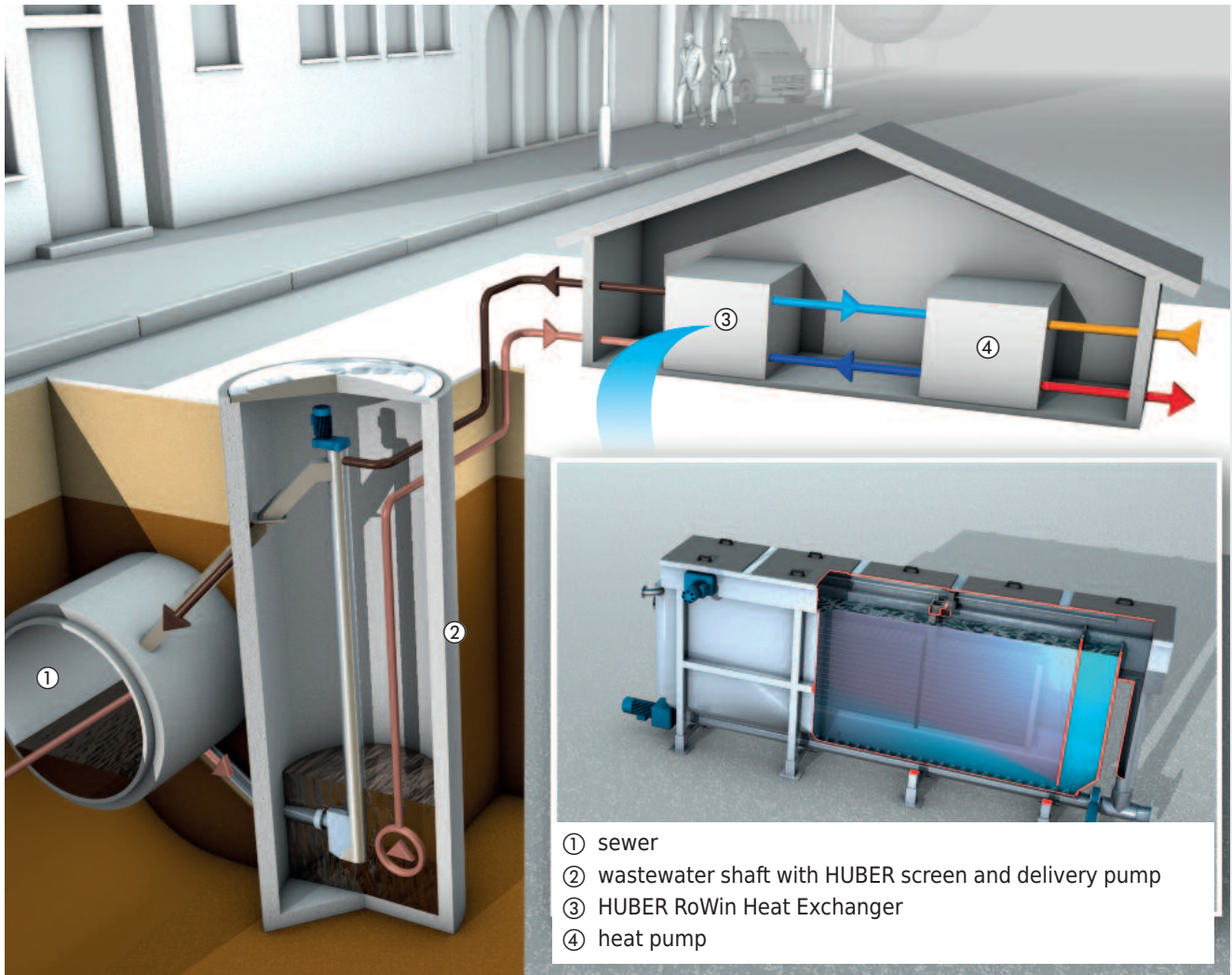


# Heating and cooling with wastewater



Recovery of thermal energy from municipal and industrial  
wastewater



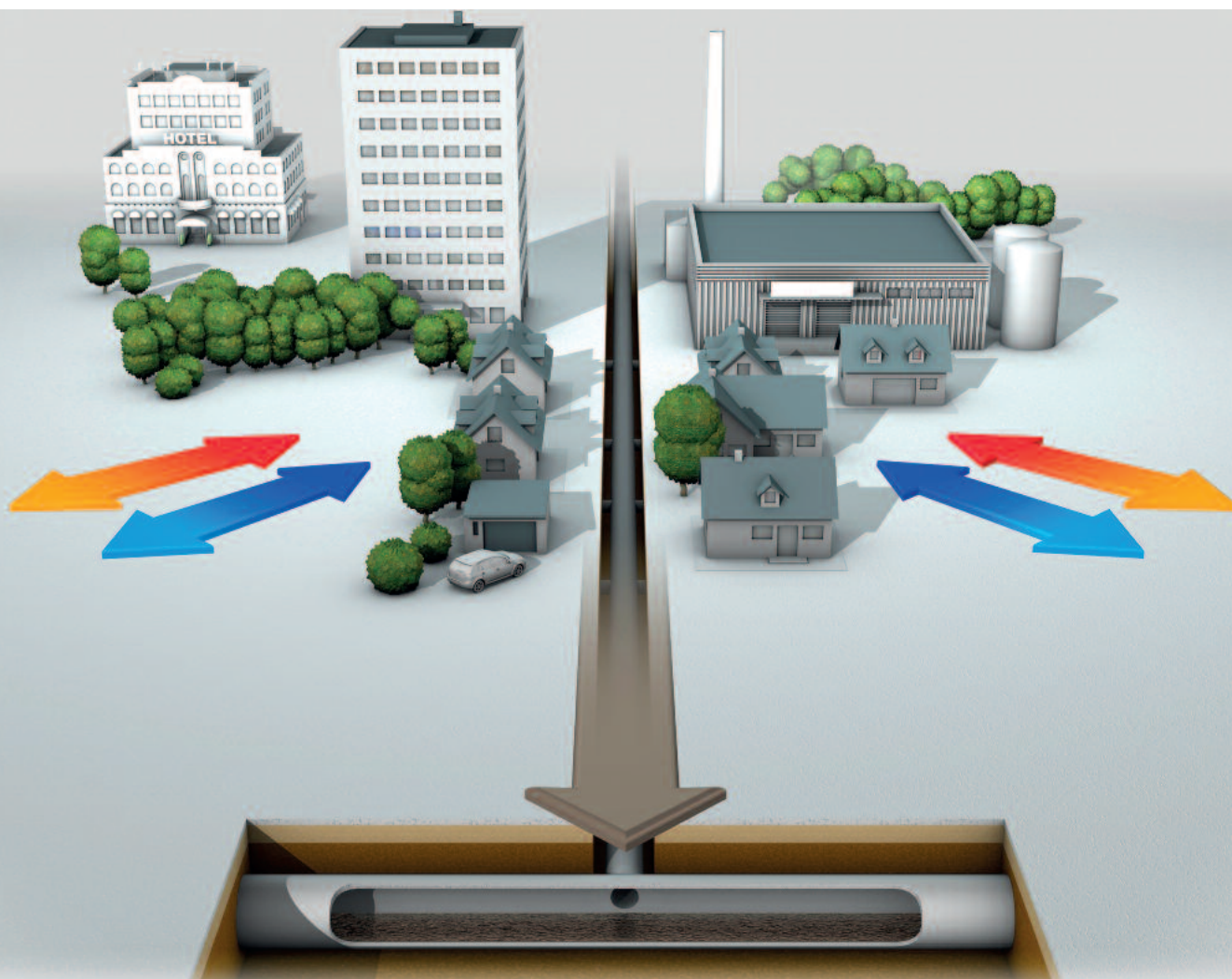
*HUBER ThermWin® system for the recovery of energy from wastewater*

### **HUBER ThermWin® system**

The HUBER ThermWin® system is used to recover the energy from wastewater. Via an intake structure a portion of the sewage flows from the sewer into a screen that retains coarse solids. The pre-screened wastewater is lifted and flows by gravity through the above ground installed heat exchanger. This creates continuously stable hydraulic conditions and ensures a controlled heat transfer. In the HUBER RoWin Heat Exchanger the heat energy is transferred to a clean carrier medium (normally water) which transports the energy to the heat pump. The cooled wastewater flows back to the sewer taking along the screenings.

### **HUBER RoWin Heat Exchanger**

The innovative HUBER RoWin Heat Exchanger has been developed especially for wastewater applications. Mechanical preventive cleaning of the heat transfer surfaces is applied to eliminate biofouling and its negative effects and ensure the maximum heat transfer capacity is permanently maintained. Sediments and solids settling on the tank floor are removed by a screw conveyor to prevent blocking. Up to 80% of the heat required can be recycled from wastewater.



*Municipal, domestic wastewater is available as an energy source in every settlement area.*

### **Heating and cooling energy from wastewater**

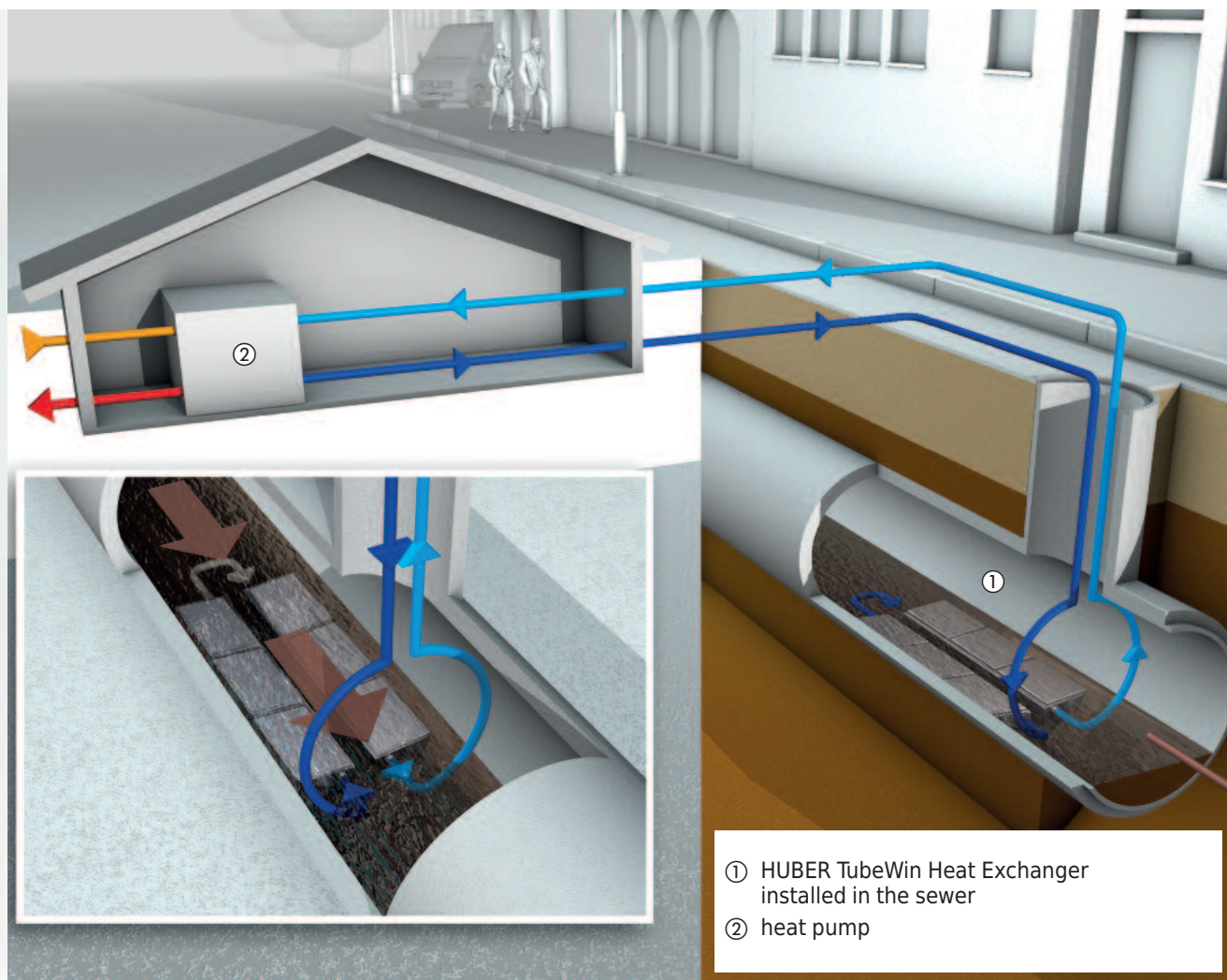
Right below the ground, in sewers, is a hidden and seldom used source of energy: domestic, municipal wastewater with a temperature of 12 °C to 20°C. Even during winter the wastewater temperature hardly ever drops below 10 °C. This makes wastewater an excellent energy source for the operation of a heat pump.

A heat exchanger is required to extract the heat energy contained within the wastewater. The heat exchanger transfers the thermal energy from the wastewater to a heat pump. Either the HUBER ThermWin® system or the HUBER TubeWin Heat Exchanger can be used to extract the energy. High coefficients of performance can be achieved with commercial heat pumps due to the high temperature level of the wastewater combined with a low-temperature heating (a floor heating for example).

The electric power required is therefore only about 20% to 25% of the total power so that precious primary energy can be saved. Due to its low temperature of 20° to 25° during summer wastewater is also an ideal heat sink. The use of wastewater for cooling buildings provides therefore an economic and efficient solution.

The recycling of heat energy from wastewater flows, or the use of wastewater as a heat sink for cooling plants, is an economic and ecologically worthwhile alternative to conventional heating and cooling systems. Unlike fossil fuels, wastewater is an inexhaustible energy source which is available at any time and does not cause any climate-damaging emissions.





*Schematic drawing showing how the heat exchanger elements are arranged in the sewer*

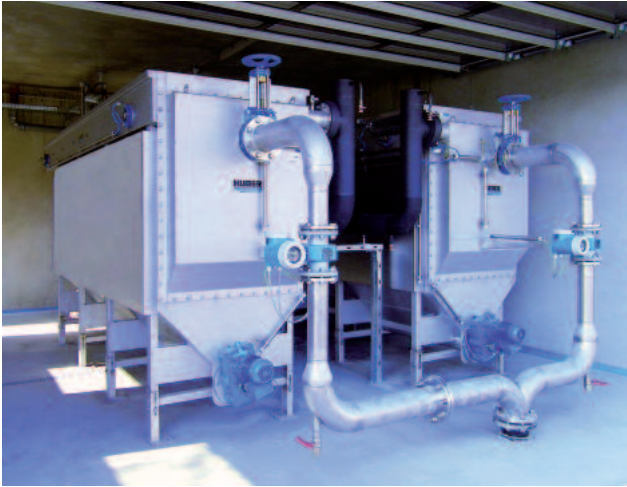
### **HUBER TubeWin Heat Exchanger**

Another possibility to extract energy from wastewater is the installation of heat exchanger elements directly on the sewer base. Such a solution is the HUBER TubeWin Heat Exchanger. Due to its flat and robust design the HUBER TubeWin Heat Exchanger can be installed in sewers as small as one metre diameter. The thermal energy contained within the wastewater flow is transferred to a cooling medium inside the modules so that the wastewater heat can be used by a heat pump. The heat exchanger elements do not need extra space as they are installed inside the sewer. Another advantage is that several HUBER TubeWin units can be installed in parallel or in series.

The system cannot only be adapted to sewer shapes but also to specific wastewater parameters. As all lines are inside the modules, sewer cross sections remain virtually unaffected.

All components are made of V4A stainless steel for a long product life. The use of a HUBER TubeWin Heat Exchanger represents a sustainable and reliable solution of heat recovery from wastewater. The system can be used all year round, for heating and cooling.

## ➤ Applications



*Municipal wastewater; 260 kW heat output used to heat apartment buildings > 7,000 m<sup>2</sup>*



*Municipal wastewater, 585 heat output, 605 kW cooling capacity, used to heat and cool an about 22.000 m<sup>2</sup> size office building*



*Industrial plant, 90 kW cooling capacity with simultaneous heat output of about 120 kW, used for process optimisation*



*Example of a containerised solution with about 60 kW heat output used to heat a sports and day-care centre for children*



*Wastewater from a swimming bath, about 450 kW heat output used to heat the swimming bath*



*120 kW cooling capacity used to cool a storage building*



## ►► Planning criteria

### 1. Wastewater supply

A continuous wastewater flow of approx. 5 l/sec is required to ensure efficient heat recovery.

### 2. Energy yield

The minimum output of useful heat for economic heat recovery from wastewater is approx. 20 kW. The wastewater temperature should not fall below 10 °C.

### 3. System requirements

The efficiency of heat pumps increases with decreasing temperatures of energy usage. Especially beneficial are new buildings with low temperature heating systems.

### 4. Locality

The connection from the heat station to the sewer system and building should be as short as possible to minimise investment and operating costs.



Heat station with HUBER RoWin Heat Exchanger

## ►► Applications

- Recovery of heat energy and/or hot water
- Combined heating and cooling
- Suitable for installation in nursing homes, hospitals, schools, sports halls, etc.
- Feeding recovered heat into local heat distribution networks
- Usage of an energy source available within city and town areas

## ►► Benefits

- Quick and easy installation
- Fast implementation and utilisation, compact heat exchanger, easy maintenance, eco-friendly
- Climate-friendly due to CO<sub>2</sub> reduction
- Independence of gas or oil
- Independence of sewer geometry
- High cost-effectiveness compared to conventional retrofitting solutions



Climatisation of an office building with the HUBER ThermWin® system

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Heat Recovery from Wastewater