

# Excess heat from sewage in Hamburg and Singen, Germany

This case study is part of a project catalogue produced by [ReUseHeat](#) to provide inspiration on how to utilize excess heat from urban sources for heating and cooling purposes. The catalogue contains 25 existing or planned projects out of which 12 cases are Danish and 13 cases are from other European countries<sup>[2]</sup>.

## Facts about this case

**Sewage projects:** Multiple projects harnessing energy from sewage- and waste water exist in Germany

**Heating capacity:** 243 kW (Singen)

**Cooling capacity:** 200 kW (Singen)

**Heat pump COP:** 3.9 (Singen)

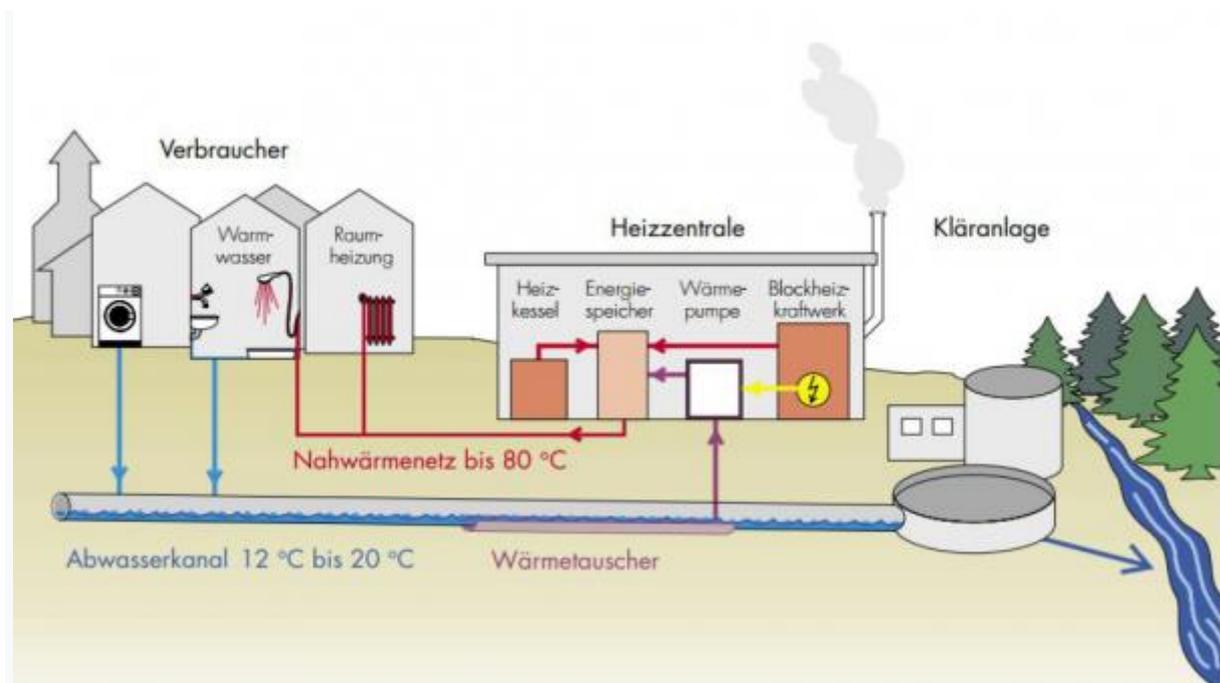
**Temperatures:** Waste water temperature is typically 15 °C

**Period:** Operation since 2004 (Singen)

**Organization:** GVV Städtische Wohnbaugesellschaft mbH

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Source: Institut Energie in Infrastrukturanlagen, Bundesverband WärmePumpe (BWP) e.V.<sup>[1]</sup>

## Description

Multiple heat recovery projects from sewage water exist in Germany. Waste water flowing in the sewage pipelines contains an often unused heating potential, which can be harnessed using low-tech piping and heat pump solutions. Heating can accordingly be supplied to small-scale internal district heating systems and heat local housings, apartments and larger buildings.

Energy from sewage pipelines is typically extracted using electrically powered heat pumps. The sewage water typically has temperatures between 12 and 20 degrees Celsius which is raised to higher temperatures up to 70 degrees Celsius. The solutions are often combined with a natural gas boiler or CHP to ensure a high security of supply and potentially produce electricity, which

can be used directly in the heat pump. Heat exchangers are either integrated in the bottom of the sewer or installed in the drain of a waste water treatment plant. The solutions are accordingly particularly favorable near large sewers or waste water treatment plants. In the following, two examples are presented.

**Pilot project at Hasteststraße, Hamburg** Waste water produced by the households at Hasteststraße in Hamburg flows into the waste water pipeline system with an unused potential of heat. The local water company, Hamburg Wasser and a construction association in Hamburg, EBV, realized a pilot project that harnesses this heating potential. Since 2009 and 2010, 215 residential units have been supplied with excess heating from the sewage system.

A 100m heat exchanger in the sewage pipeline extracts the warmth that is still in the waste water. The extracted energy is utilized using four gas absorptions heat pumps supplying approximately 2000MWh of energy annually. The total system cost was EUR 700,000, and it reduces carbon emissions by 75% compared to the pre-existing system.

**Office building, Singen** The office building in SinTec Technology Park in Singen have been supplied with waste water energy since 2004. The waste water energy is extracted with a 80m heat exchanger directly in the sewage pipelines and via an electrically powered heat pump unit, that produce heating during winter and cooling during summer. The annual waste water temperature is approximately 15 degrees Celsius and the heat pump has an annual COP of 3.9. The heat pump annually produces 240 MWh of cooling and 660MWh of heat with a cooling capacity of 200 kW and a heating capacity of 243 kW. The annual costs are lowered 5% compared to alternative gas systems and carbon emissions are reduced by approximately 28%.<sup>[2]</sup>

## References

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1. [Institut Energie in Infrastrukturanlagen, Bundesverband WärmePumpe \(BWP\) e.V](#)
2. Handbook - 25 cases of urban waste heat recovery