



Make new from old – Innovative wastewater heat recovery for the swimming pool on Sachsendamm

Berlin, Germany

IN A NUTSHELL

In the framework of the climate protection agreement with the Berlin Senate, the municipal water company, Berliner Wasserbetriebe (BWB – Berlin water company), was searching for innovative renewable energy sources. Through the installation of a heat pump, they now recover heat from the city’s wastewater systems and use it for a local swimming pool.

Background

As Germany’s capital city, with a population of approximately 3.5 million inhabitants, Berlin has set itself ambitious climate goals. The city’s Energy Turnaround Act targets a CO₂ emission reduction of 85% by 2050 compared to 1990 level (climate neutrality). The present project was realised in the course of the climate protection agreement and is based on a study conducted by the innovation platform NetzwerKE (networkE) to evaluate the heat demand of the swimming facility on Sachsendamm.

This public swimming pool on Sachsendamm is operated by Berliner Bäder-Betriebe (BBB - Berlin public baths operator). It retrieves heat, which would otherwise get lost, from wastewater systems. The decision to heat the swimming pool in this way followed an inspection of BWB’s own canal system and potential heat users nearby. The swimming pool’s heat demand remains consistent throughout the year. From an energy point of view, heat demand and heat supply are therefore well matched.

How it works in detail

Since the early summer of 2012, the sport and teaching swimming pool on Berlin’s Sachsendamm road has retrieved wastewater heat from the nearby sewage system. Similar to geothermal power usage, the heat is recovered through a heat pump. Instead of using the ground as a source of heat, the warm wastewater (coming from showers, baths and washing-up) of the sewer provides sufficient temperatures of 10 to 20°C throughout the year. In modern, well-insulated buildings, wastewater pipes are one of the remaining heat leaks. Approximately 15% of the supplied heat (e.g. via heating systems) goes to waste in the wastewater system.



The swimming pool on Sachsendamm (source: BWB)

BERLIN



Population:
3,561,948

Area
891.7 km²

Signatory
to the Covenant
of Mayors since:
2010

CO₂ emission
reduction target:
-60% by 2030
compared to 1990

Therefore, an innovative sewer heat exchanger was installed by the BWB directly into the sewer pipes (over a distance of 70 meters) to extract heat from wastewater. By using an efficient wastewater heat pump, the basic heat requirements of a section of the swimming pool facilities will be covered. This includes mostly sections with low supply temperatures, such as underfloor heating and the heating of the swimming pool's water. The already existing gas boiler of the swimming pool covers remaining heat demand peaks (bivalent configuration).

The BWB provides heat to the swimming pool operator at cost-price for a period of 10 years.

The high potential of wastewater recovery

The project is accompanied by a BWB-financed study to evaluate the operating data of the innovative installation to unlock the potential of wastewater utilisation. In theory, wastewater coming from 300 apartments could cover the warm water demand of 35 apartments. In Germany, every fifth to tenth building could be supplied by this type of regenerative energy. To ensure efficiency, only sufficiently large sewers and pressure pipes with a good water flow in close proximity to heat users should be considered for such a model.

Through a comparison of alternatives, primary energy savings of more than 539 MWh/y and a reduction in CO₂ emissions of 89 t/y (annual CO₂ per capita emissions of 15 Berliners) are predicted. The operating results of the innovative technology to recover wastewater heat are planned to be used in additional locations in Berlin.

Financing the project

The project's total expenditure amounts to €635,700 (without maintenance). €381,420 was funded by Berlin's UEP fund (Umweltentlastungsprogramm - environmental relief programme), of which €317,850 came from the European Regional Development Fund (ERDF).



539 MWh/year of energy savings

89 t/year of CO₂ reduction



FINANCING THE PROJECT

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- + **Total amount:**
€635,700

USEFUL LINKS

- ▶ Covenant of Mayors profile of Berlin: <http://bit.ly/2E1xaeH>
- ▶ 10 Years Berlin Environmental Relief Programme: <http://bit.ly/2noDjyt>
- ▶ Berlin Climate protection information office: <http://bit.ly/2rSeklj>



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