

*Conference-related project article:*

## Hamburg Water Cycle

### Energy and Heat from wastewater in a closed-loop process

The HAMBURG WATER CYCLE [1] has come up with an new approach for treating wastewater-streams by introducing the separation of blackwater (toilet), greywater (kitchen, bathrom, washing machine) and the collection rainwater for further use in the new build district Jenfelder Au. By this approach also energy and heat can be gained from biogas provided by the blackwater-stream for further use in the district. The innovative approach has been funded by the EU-Life Programme and German Ministries of Science and Economics.



The blackwater is collected in vacuum toilets that are a common practice in the shipping industry, reducing the use of freshwater from 5 to 9 liters to 1 liter of water. The blackwater and co-substrates are turned to biogas through anaerobic fermentation, providing energy and heat for the district. By this approach also pathogens and micro-pollutants like drug residues can be eliminated with less energy, also important nutrients like phosphorus and nitrogen can be recycled, as EU-project "Run4Life" [2] demonstrates. After the anaerobic treatment the material-residues can be further utilized to improve soil quality in agriculture, also contributing to the EU Circular Economy within the Green Deal. The project "AWAS" [3] at the University of Weimar is working on a project to also apply this approach to existing buildings and districts.

The greywater of the households is treated in a separated process and safely returned into the local waters. As this water stream is containing only little organic matter, minimal bacterial concentrations and relatively small amounts of drug residues it is much easier to clean than blackwater and a much simpler and less energy-intensive approach is used. Alternatively it is also possible to reuse the greywater for households such as watering greens or toilet flushing.

The districts rainwater is used for local purposes, e.g. for watering lawns but is also managed in a decentralized approach by using retention ponds. By that the water can either evaporate or join waters nearby. This adds to the micro-climate in the district, supporting the process of recharging groundwater and also serves as a protection against high water levels and flooding.

Links:

[1] Website (english): <https://www.hamburgwatercycle.de/>

[2] Run4Life (english): <https://run4life-project.eu/>

[3] University of Weimar AWAS (english): <https://www.uni-weimar.de/en/...>

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