

SEMICENTRALIZED SYSTEMS

Raising Water & Energy Efficiency

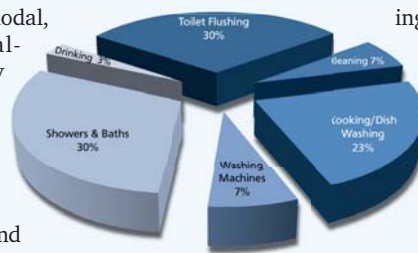
Potentials for Water Reuse within the SEMIZENTRAL Approach

Wastewater contains water - a valuable resource - in concentrations of more than 99.5 %. Thus, water reuse is an essential component of integrated water resource management, not only in arid and in water deficient areas, but increasingly also in densely populated urban areas, where water demand and supply diverge widely. Intra-urban reuse of water for utilizations which do not require drinking water quality offers a high potential to save valuable water resources and reduce

wastewater discharge. But water reuse requires the transition from conventional centralized to nodal, semicentralized supply and treatment systems, with short distances from the firsthand user to the treatment units and back to the secondhand reuse. Intra-urban water reuse facilitates

the reduction of drinking water consumption to the quantity needed for cooking, drinking, and personal hygiene, as the reused greywater - after adequate treatment - covers the demand of water needed for toilet flushing. By reusing adequately treated water, the demand of potable water could already be reduced

by 30 %. Intra-urban water reuse not only preserves valuable resources, but often it is more energy-efficient and more cost-effective. Research shows that the recommendable size of integrated semicentralized systems for new development areas ranges between 20,000 and 100,000 inhabitants. Generally there cannot be a universal solution for everywhere. The individual circumstances and interests need to be considered in order to find an adapted and locally-fitted solution.



Case Study Qingdao, China

In the Qingdao Case there are three core aims: (1) reducing water demand by intra-urban water reuse, (2) ensuring reliable treatment for sewage sludge, and (3) offering energy self-sufficient treatment for all material flows. Saving 30 % of potable water by using treated greywater for toilet flushing is only the first step - even higher reduction rates can be achieved by treating the whole amount of the arising greywater and enabling industrial use or for public purposes. The integration of sewage sludge and waste treatment leads to an increase of the overall system efficiency and a decrease of

the amount of residues to be disposed. At the same time, the sludge is stabilized and a solution for the currently tense and severely deficient treatment situation of wastewater sludge is given. The integrated anaerob treatment of sewage sludge and biowaste gains sufficient biogas for generating electricity for the overall treatment facilities within a semicentralized supply and treatment centre and even to produce a surplus of electric energy.



The energy is gained from organic material, the wastewater treatment sludge as well as biowaste and residuals. Using the biogas out of this sludge and waste, not only the energy bill is reduced to a minimum, but also the CO₂ balance of the whole system is significantly improved.

Implementation at WHE Qingdao 2014

Qingdao, a vigour city with the population about 7.6 million, is a typical emerging metropolis at the coast of Shandong province in China. The "World Horticulture Exposition", which is celebrated as the "Olympics" in the international horticultural community, will be held in Qingdao in 2014. The half-a-year (May to October 2014) exhibition period will attract at least 12 million visitors. SEMIZENTRAL, as a pioneer

of resource-efficient infrastructures in cities, will be implemented firstly in the new development area of WHE in Qingdao to serve about 12,000 residents. The SEMIZENTRAL approach will display a flexible, resource-saving and energy self-sufficient supply and treatment solution for the future. It will be together with the spectacular WHE to promote Qingdao's development and improve the Qingdaoers' quality of life.

