

# SEMIZENTRAL – Infrastructure systems for cities of the future experiencing rapid growth

Many cities in China experience rapid population development along with dynamic city growth. As a consequence of these phenomena, rising drinking water supply can not be covered anymore by local water resources. New and innovative ways of water supply are required.

#### The idea of SEMIZENTRAL

SEMIZENTRAL is an infrastructure approach for future cities. It is an alternative to extensive, centralized systems with long lead times and insufficient scalability. The innovative approach towards semicentralized supply and treatment systems has been developed to serve newly-built residential areas in fast-growing metropolitan environments. Each urban district is provided with a flexible integrative infrastructure system for water, wastewater, waste, and energy adaptable to the respective need.



Resource Recovery Center (RRC) in Qingdao.

#### The technical scheme

In Qingdao a first SEMIZENTRAL system was set up and is designed for the equivalent of a population of up to 12,000. The implementation of SEMIZENTRAL involves the separate collection of wastewater streams, greywater and blackwater. The Resource Recovery Center (RRC) is processing the streams for the district. Besides wastewater, organic waste is treated in the RRC for biogas production. The treated and disinfected greywater can be reused as service water for toilet flushing, while the treated and disinfected blackwater is reused for irrigation and street cleaning. The domestic demand for drinking water is reduced by up to 30%. Additionally, the produced biogas helps to achieve an energy selfsufficient operation of the RRC. This reduces the dependence on external primary energy, that is gained mostly from fossil resources.



Schematic scheme of the integrated water management system.



## Advantages of SEMIZENTRAL

- » Regarding water:
  - » recycling rates from 40% (greywater only) to 100% (grey- and blackwater)
  - » Savings of drinking water (domestic use): 25–30%
- » Regarding energy:
  - » Energy self-sufficient operation; even surplus of energy production possible
  - » Connection with heat/cooling concepts is possible
- » Adaptation to urban growth rates as a unit wise construction possible
- » Enclosed construction due to low-emission possible
- » Possibility for inner urban treatment plant construction given even underground with e.g. a park on top
- » Concepts supports recent Chinese legislation: recycling, raising requirements for effluent
- » Anaerobic digestion of sludge is included
- » New innovative business option for water companies

## Contact

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(bottom).







The roof top terrace of the RRC maintained with service water (top), trucks picking up irrigation water (middle), visitors touring the RRC







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