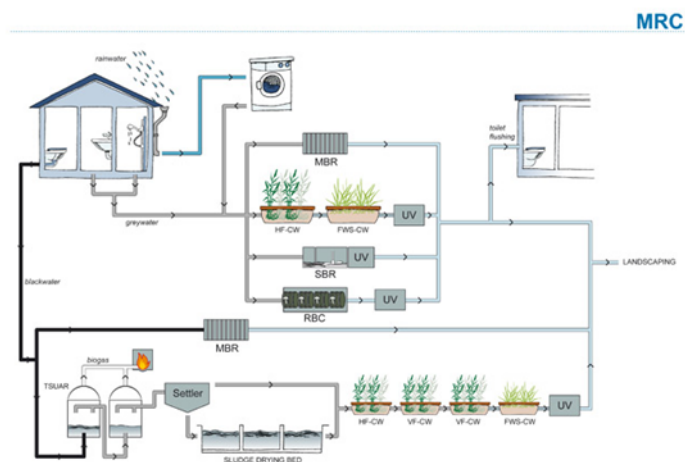


Project name Grey water management for Istanbul



Keywords grey water, collection, treatment, reuse, characterization, water scarcity, climate change

Start of project 2012

End of project In operation since the beginning of 2005 (all units operated during 2005-2008 after that period some units have been run)

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Short project description / project function Grey water (GW) technology options have been tested at case study area along with their functional purposes located at TUBITAK MRC premises. In this manner, optimization of operation with respect to efficiency, running conditions and alleviation, energy/economics, assessment of the suitability of the approach for the special features of Istanbul are aimed.

Assessment of the advantages/disadvantages of GW systems in connection with rain water harvesting systems in practise would constitute a base for system scale-up for large size implementation examples. The results obtained lead to system modifications and operation parameters optimization under local conditions for specific needs of Istanbul.

Water GW consists of discharges from showers, washing basins, washing machines and kitchen of two lodging buildings located in TUBITAK MRC premises. GW treatment system elements are membrane bio-reactor, a series of constructed wetlands (horizontal flow and free-water surface type), sequential -batch reactor and rotating biological contactor combined with two- layer- filtration (anthracite-sand) and disinfection by UV and chlorination. GW influent and effluent samples, taken from inlet raw GW, after treatment processes, obtained throughout the experimental study,

	analyzed and evaluated for environmentally meaningful key parameters. The performance assessments of the designed systems are accomplished by long term comparison of the results with respect to reuse criteria. The treated GW was used for toilet flushing, irrigation and cleaning purposes.
Energy	Assessment and comparison of the GW treatment technology options were made on long term operation basis. The results also compared with the literature data. Furthermore CO2 emission calculation and assessment as a life cycle assessment concept was accomplished for especially the rotating biological contactor system.
Biomass	The excess sludge of the biological treatment units are diverted to a reed bed designed for sludge. In addition to that, a small scale compost reactor was operated for the organic wastes. In the case study area, black water was also segregated and treated separately by membrane bio-reactor, two stage up-flow anaerobic sludge blanket reactor, series of constructed wet-lands (horizontal flow, vertical flow and free surface type). The excess sludge of the anaerobic reactors was also discharged to reed bed.
Project benefits	The concept may constitute a partial solution for urban areas for the water scarcity due to climate change impacts. It may also be implemented for summer resort areas where, population fluctuation is high especially for summer season. The results can be used as a basis for larger implementation urban areas. The case study area was also utilized for specific training and dissemination of knowledge purposes at national and international levels for relevant institutions including universities, municipalities, governmental organizations, high schools, etc.
Project level	Pilot project
Financial scale	Total construction costs = 16380 € Yearly management =381 €
Environmental conditions	Climate zone: The region has a transitional climate between Black Sea and Mediterranean Climate characteristics. In summer the weather is hot and humid and during winter it is cold, wet and sometimes snowy. Istanbul is located at 41.0136 North latitude
Altitude	113 meters above sea level
Description of special local conditions	The district of Gebze is located in the western most portion of Kocaeli Province, situated 30 miles east of Istanbul on the northern shore of the Sea of Marmara
Context Zero Emission Buildings	GW segregation, treatment and reuse are integral part of ZEB concept. It should also be combined with energy production from grey water applications. References: Constructed and operated throughout the project Zer0-M (www.zer0-m.org) and upgraded and operated during the

project PREPARED (www.prepared-fp7.eu)