german cooperation
DEUTSCHE ZUSAMMENARBEIT

INFINITE OPPORTUNITIES | GERMANY + INDIA

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

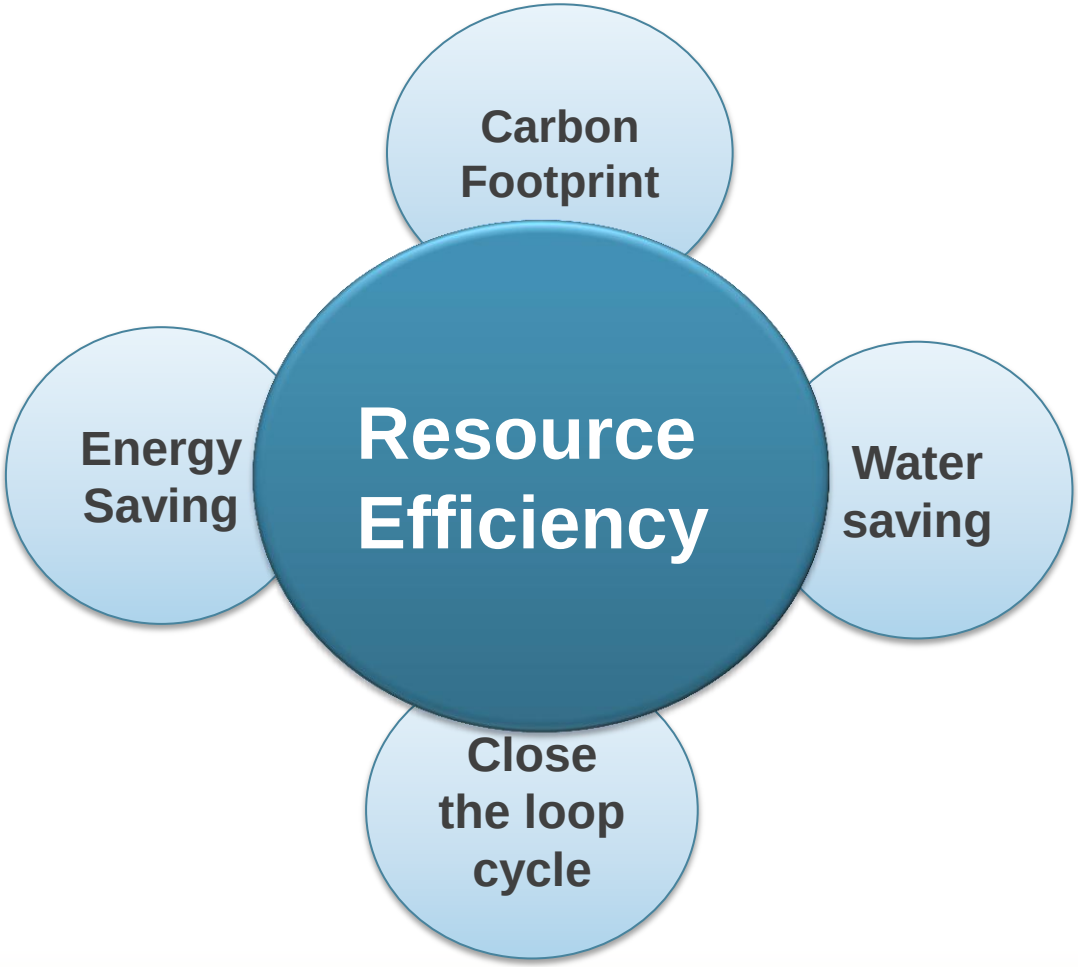
"Promoting Water use and resource efficiency in the urban water sector: Showcasing Hamburg city in North Germany"

Regional Workshop on "Energy and Resource Efficiency in Urban Water Management"

Centre for Science and Environment (CSE)

India Habitat Centre 20th of Dec. 2013

Components of Resource Efficiency



German Scenario

Goals

Germany's target was to reduce its greenhouse gas (GHG) emissions by **21% below the 1990 level**, in the 2008-2012 period to meet its Kyoto Protocol obligation

Though Germany's economy grew significantly between 1990 and 2012 as of 2012, we have achieved **25.5% below the 1990 level.**

GHG reduction did not cause any economic slow-down.

However, Germany's own objective seeks to reduce GHG emissions by 40% by 2020!

……..it is a long way to go!

Hamburg City

Area 755 km2
Population (2012) 1.8 Mio
Density 2,400/km2

HAMBURG WASSER

Public owned water utility

Employees	1050
Household connection	217,000
Water treated	150 MLD

HAMBURG WASSER's objectives on combating Climate Change

HAMBURG WASSER is energy-self-sufficient by 2018

- Since 2011 HAMBURG WASSER's carbon-neutral production of electricity and heat on own grounds fully levels the consumption of its sewage treatment plant

- In 2018 HAMBURG WASSER's carbon-neutral production of electricity and heat on own grounds will level the consumption of the whole group of companies

- **CO_2-emissions by 2018: < 1,000 t/a**
  vs. 100,000 t/a in 1990 (52,000 t/a in 2009)

WWTP: Retrofitting aeration tanks

- Retrofitting from surface aeration to compressed air aeration
- 16 aeration tanks, 5 turbo-compressors
- About 29 000 disk aerators
- Investment: 20.9 Mio. €
- Energy savings ca. 50%

Energy per year: 18.2 Mio. kWh

Savings CO_2 e per year: 12,800 metric tons*

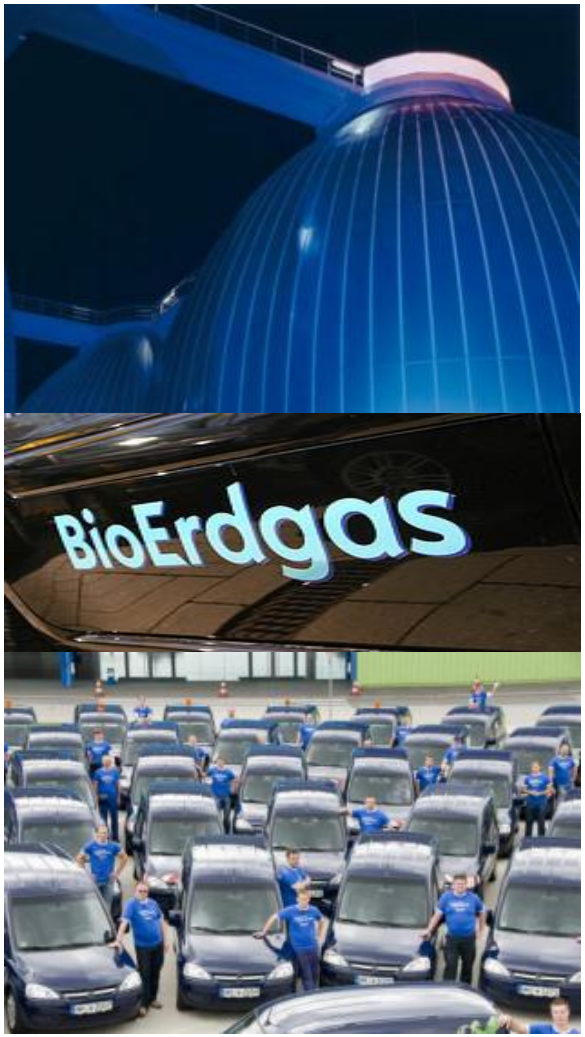
**USEPA calculator*

WWTP: BioMethane from digester gas

- Feed into the gas grid of the local gas supplier (EON Hanse AG)
- Utilization in own bi-fuel cars, CHPs, space heating, …
- Investment: 2.7 Mio. €

Energy per year: 16 Mio. kWh

Savings CO_2 e per year: 11,300 metric tons*



Energy from Wastewater - pilot project

Energy per year: 2 Mio. kWh

Savings CO_2 e per year: 1,400 metric tons*

Wind Turbines at WWTP Dradenau and Köhlbrandhöft

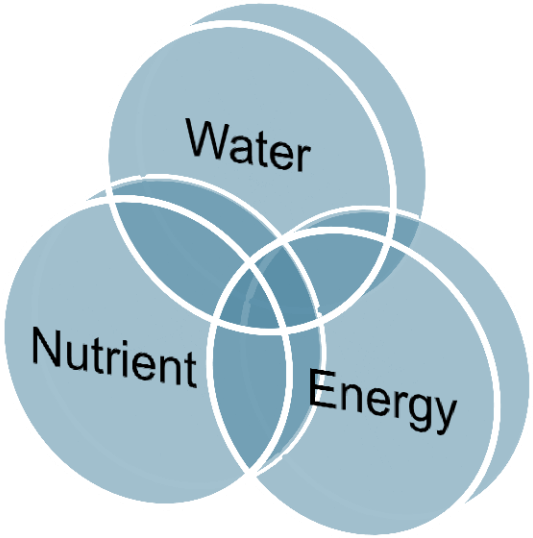
- 2 Wind turbine generators,
  Rated power 2.5 MW each
- Investment costs 8.9 Mio. €
- Commissioning 2011

Energy per year: 14 Mio. kWh

Savings CO_2 e per year: 9,900 metric tons*

Paradigm change in water supply and waste water disposal is imminent

- Closed loop approaches (Ecosan) for water-energy- and material flow efficiency
- New technologies and systems applicable
- **New business models for “classic” water utilities**



Waste water is a resource!

Green Energy from Black Water – HAMBURG WATER Cycle in Jenfelder Au

- 75 acres, 770 accommodation units
- Land allocation:
  - Housing (60%)
  - Trade and commerce (20%)
  - Green spaces (20%)

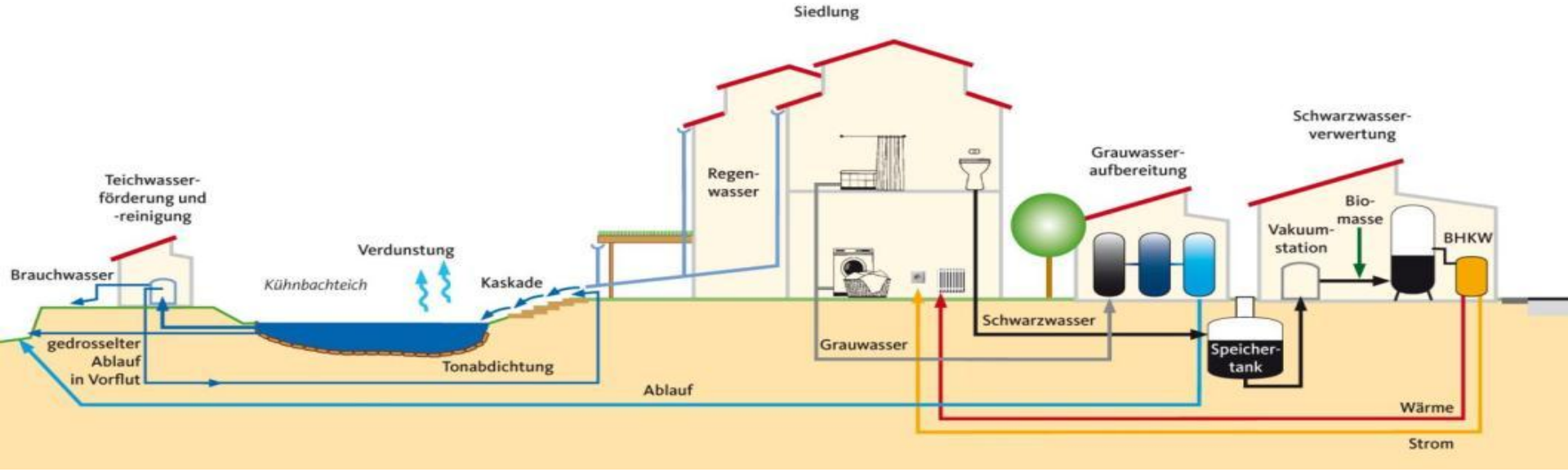
to be realized 2012-2016

- Low energy or passive house standard (50 – 15 kWh/m²)
- Sanitation-, energy- and zero CO_2 concept: HAMBURG WATER Cycle

Green Energy from Black Water – HAMBURG WATER Cycle in Jenfelder Au

HAMBURG WATER Cycle® – Characteristics of water concept

- Grey water collection and treatment (trickling filter/ membrane technology)
- Transportation of black water by means of vacuum technology (-80% water)
- Black water with toxics and resources remains concentrated.
- Black water separation enables anaerobic treatment together with other biomass and therefore production of energy on site (zero CO_2).



Why is this of interest for Indian Water Utilities?

As a federal enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

Published by
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

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Layout
GIZ/Hamburg Wasser

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