Herzlich Willkommen
Welcome !

hanseWasser - waste water treatment

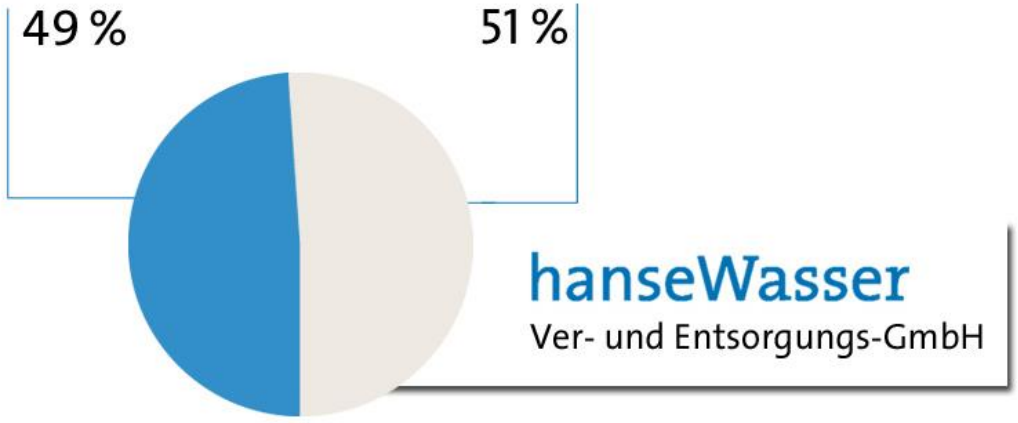
14.09.2020, possible future project ideas - current challenges

Peter Fahsing, hanseWasser WWT- Bremen

Company Structure

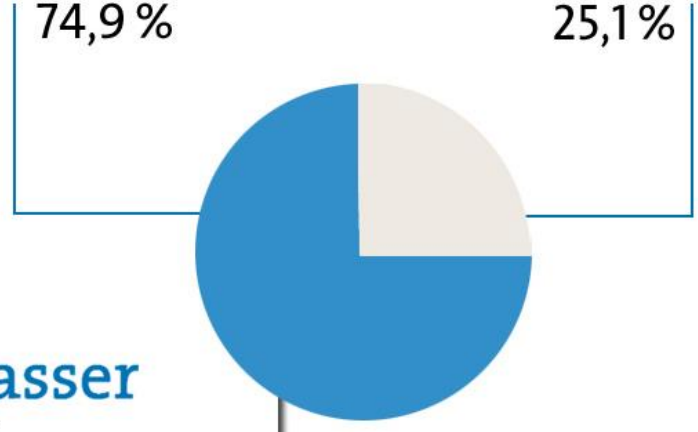
GELSENWASSER
GAS. STROM. NATÜRLICH WASSER.

swb



hanseWasser
Ver- und Entsorgungs-GmbH

Freie
Hansestadt
Bremen



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Bremen GmbH

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Facts and Figures

- **turnover** 101.2 m Euro
- **employee** 389
- 24,8 m Euro **investment** per year in waste water facilities
- **Carbon neutral** company from 2015
- Integrated **quality and entvironmental management**
- **EMAS-certificate** since 2012
- 2.82 Euro/m³ **wastewater fee**
- 2.42 Euro/m³ **sewage fee**
- 0.63 Euro/m² **rainwater fee**

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H(ealth) S(afety) E(nvironment) at hanseWasser

- **occupational health and safety** and **climate and enviromental protection** are important.
- **regular instruction in employee protection** and personal protective equipment.
- **H(ealth) S(afety) E(nvironmental)-Managementsystem** exeeds the guidelines.
- With **training and communication we develop the employees regarding employee protection**.
- Goal: **high level of safety , zero accidents!**

Energy goals

Sustainability

- Economic activity focussed on environmental protection and sustainability.

Responsibility

- Commitment to saving resources and climate protection

Climate neutral

- The activities of hanseWasser are carbon neutral from 2015.

Role model

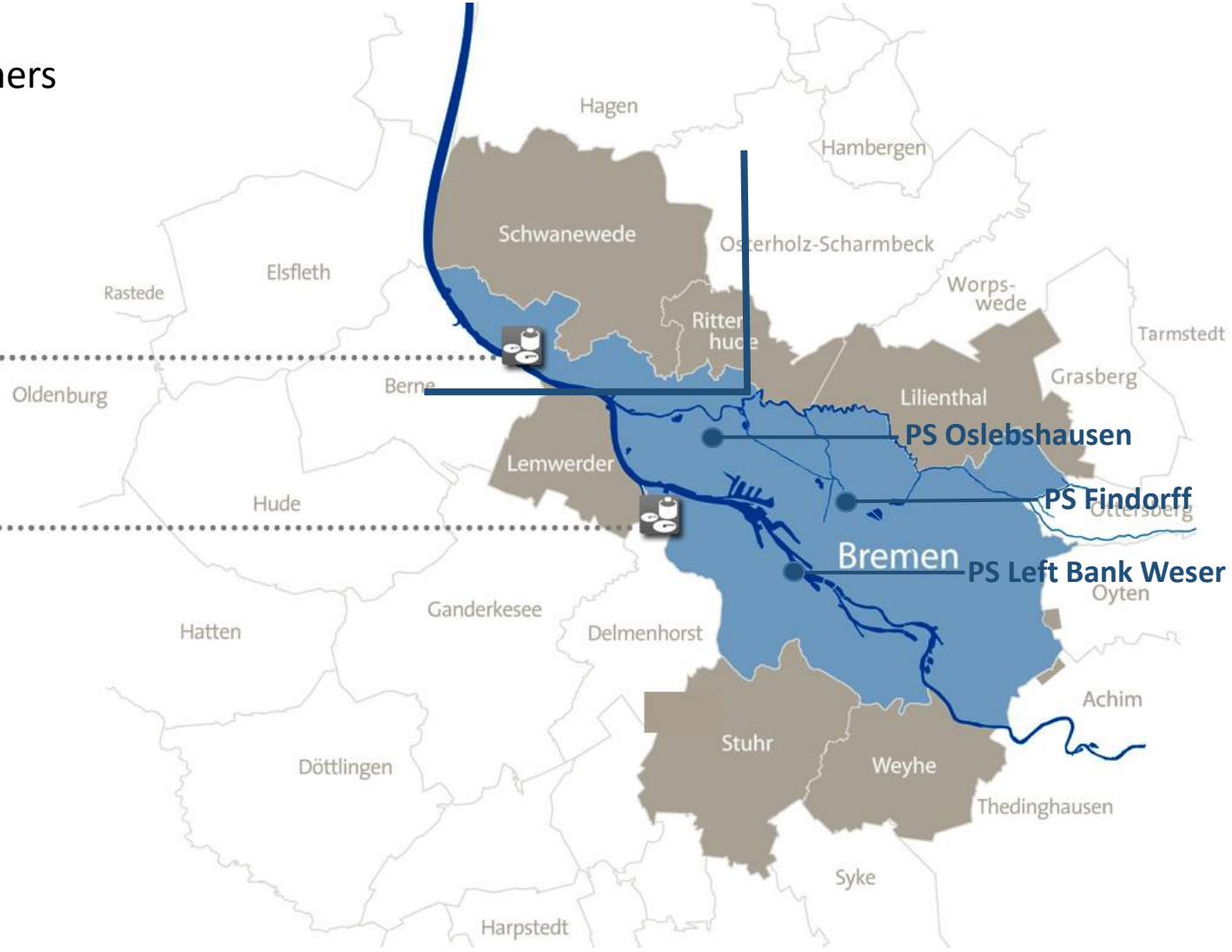
- The behavoir of hanseWasser activities is an example to society.

Sewerage in the region Bremen

750.000 inhabitants
1000 Commercial Customers

Sewage treatment plant
Kläranlage Farge

Sewage treatment plant
Kläranlage Seehausen



50 m³ Mio
Abwasser/Jahr
Wastewater per Year

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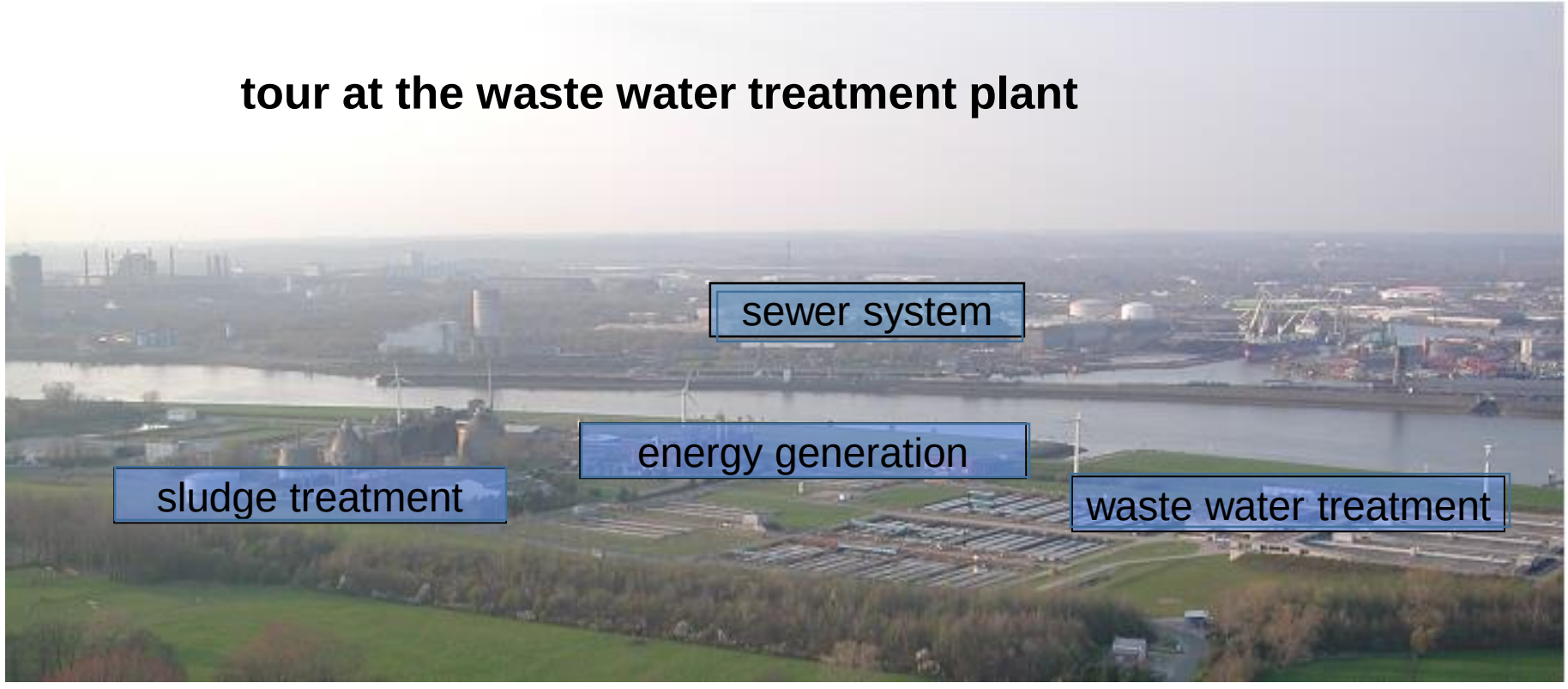
Waste Water Treatment plant Seehausen



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Sewer System

Combined- and separate system

- 2.300 km sewer system
- 669 km combinded wasterwater
- 791 km wasterwater sewer
- 713 km rainwater sewer
- 300 pumping stations

Stormwater storage capacity

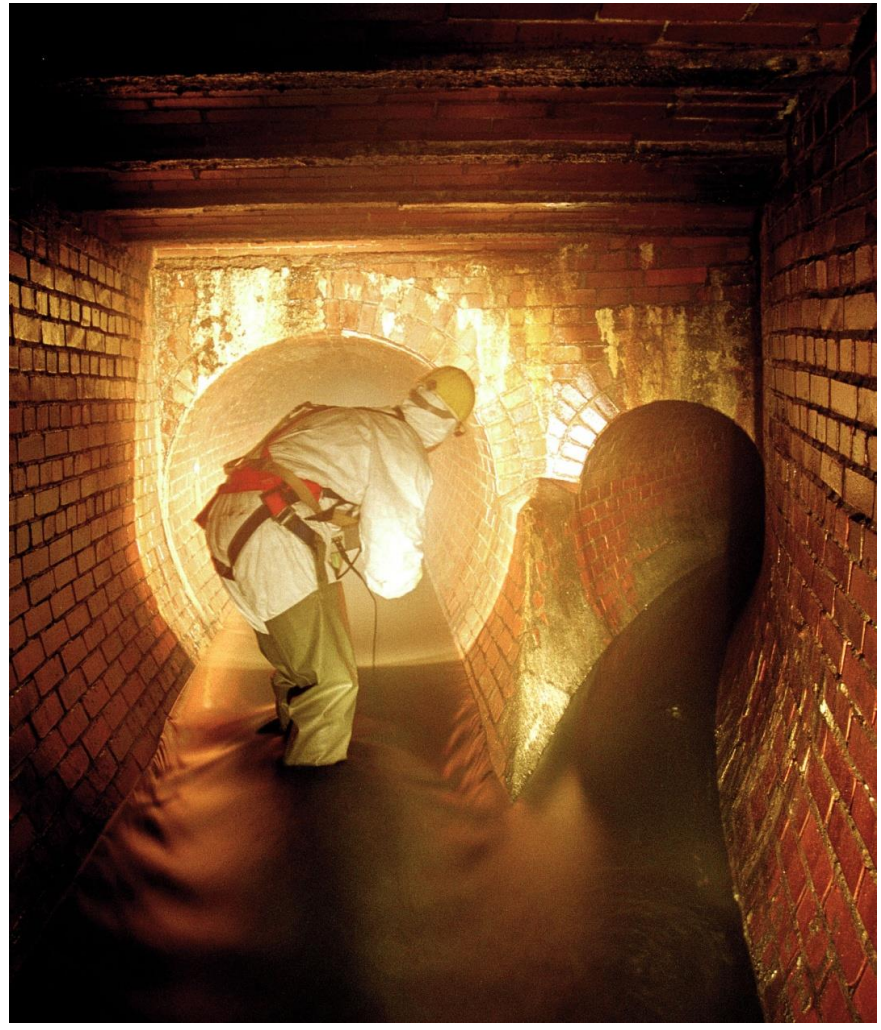
- 270.000 m³ stormwater storage in sewer systems, stormwater tanks(overflow) and resevoirs

Inspection

- 230 km sewer-TV-Inspections per year
- GIS sewer- information system

Cleaning

- 700 km of sewer cleaned per year
- Sewer and plant information system



Waste Water Treatment plant(wwtp) Bremen Seehausen

Capacity:
1.0 m PE

Load:

980,000 PE

Inlet:

2.300 km sewer system
in total max. 5,000 l/s to wwtp pumped

Quantity:

Qantity per day dry weather conditions: 130,000 m^3

Qantity per day rain weather conditions: 432,000 m^3

Process:

Activated sludge treatment with nitrogen removal.

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Inlet Pipes

- WWTP inlet quantity measured to compare with the quantity measured at the pumping stations with the objective of leak detection

Mechanical Treatment-Screen

- Primary treatment , removal of waste materials greater than 1 cm
- **Amount of waste per day: approximately 5,400 kg**

Waste from the screen

Screen system

Mechanical Treatment-Grit Chamber

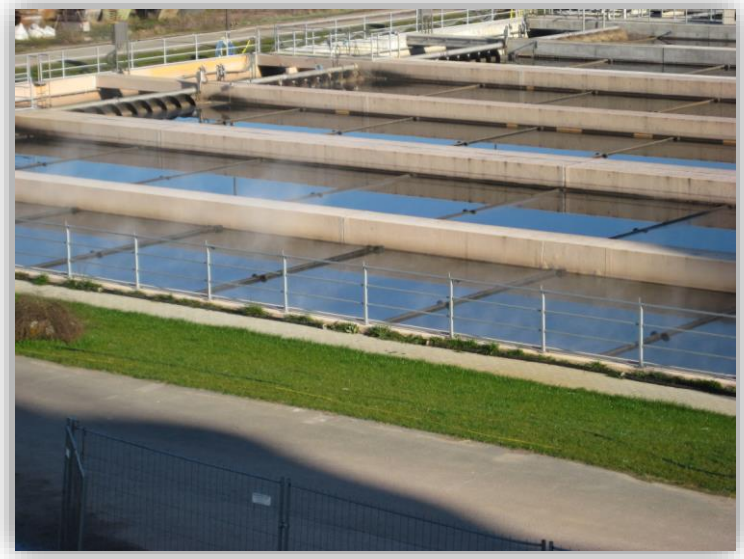
- Grit chamber. Compressed air causes the rotation of the waste water in longitudinal basins. The sand is drawn to the walls of the bassin by centrifugal forces. It drops down and is removed from the bottom of the basins by pumps
- **Amount of sand per day: approximately 1,700 kg**

Grit chamber- functional principle

Sandfanggut

Mechanical Treatment – Primary Settlement Tank

- Primary settlement tank for faeces. Removal of the sludge from bottom and the surface of the tanks by scraper breams. The sludge is pumped to the digesters. This the basis for the importent production of energy.



- **Amount of primary sludge per day: approximately 1,500 m³**

Biological Treatment –Activated Sludge Process

- The process involves air being introduced into a mixture of screened, and primary treated sewage (wastewater) combined with organisms to develop a biological floc which reduces the organic content of the sewage. Activated sludge in a light optical microscope
- In a sewage treatment plant, the activated sludge process is a biological process that can be used for one or several of the following purposes:

- oxidizing carbonaceous biological matter
- oxidizing nitrogenous matter: mainly ammonium and nitrogen in biological matter
- removing phosphates
- driving off entrained gases such as carbon dioxide, ammonia, nitrogen, etc.
- generating a biological floc that is easy to settle.
- generating a liquor that is low in dissolved or suspended material

Mechanical Treatment –Secondary Settlement Tank

- Removal of the sludge from the bottom and the surface of the tanks by scraper breams.

Sludge Treatment

- Sludge storage tank. The sludge from the primary settlement tanks is mixed with the sludge from the activated sludge treatment step. This mixture is pumped into the digesters.

sludge storage tank

mixed sludge in the storage tank

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Sludge Treatment

- In the digesters methanogenic bacteria start their work. With a temperature of 37°C in an aerobic and dark atmosphere the bacteria produce methane in a period of storage of about approximately 20 days. The treated sludge is used as fertilizer or burned in an incineration plant. The methane is used as fossil fuel to generate electricity and thermal energy to heat the digesters and the buildings at the plant.

bacteria in the digester

Sludge Treatment

- Two centrifuges reduce the moisture content in preparation for the use of the sludge as fertilizer or burning material. The water from the centrifuges is pumped to the pre clarification step and treated in the WWTP. The sludge is stored in two storage halls with air filter/cleaning systems to reduce the smell.

centrifuge with pipe system and thick material pump

sludge storage and lorry

Sludge Treatment

A manure distributor spreading the sludge before the field is tilled.

Sludge Incineration Plant.
(KENOW/TWPF)

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Energy

Demand of electrical and thermal energy of the waste water treatment plant

- electrical: 24.30 m kWh/a demand of approx. 5.400 households
- thermal: 18.27 m kWh/a demand of approx. 900 households

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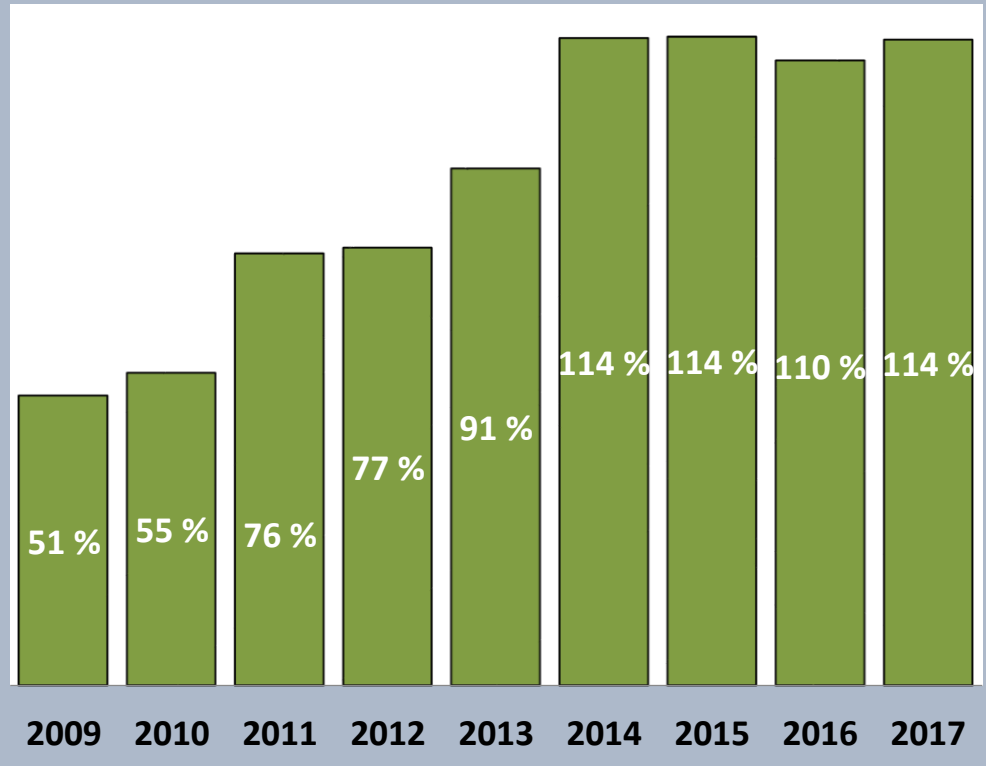
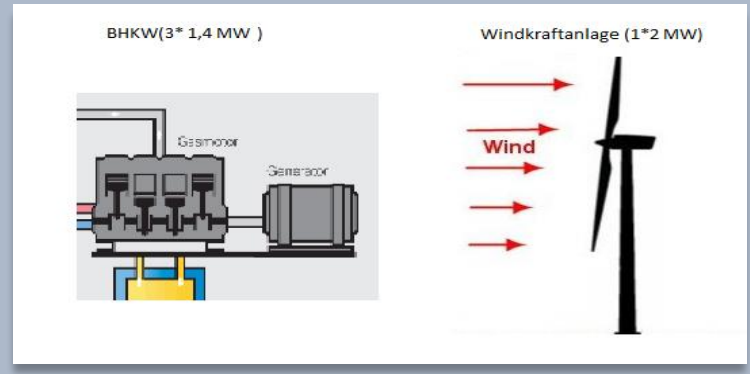
Energy

- 3 combined heat and power unit(1.4 MW el/unit) and a wind turbine(2 MW) generate more than 100 % of the energy demand at the waste water treatment plant. In addition the CHP produces the heat which is necessary to warm up the digesters and the buildings at the plant

Energy save

Energy production WWTP Seehausen





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Setup an Crisis and Emergency Management Group System

- History of the planned development of a crisis prevention structure, based in a certain way on a structure for occupational safety that was established throughout the Group in 2004
- Background for the setup of a crisis management group was an existing structure for occupational safety in a way of cross company work
- Serious accidents at energy supply companies, securing basic energy supply by utilities, pandemic incidents since 2010
- Initial/ technical background
  General averages in companies of energy supply
  Securing of energy supply
  Pandemic incidents since 2010 (Avian flu etc.)
- Start of structural development of crisis and emergency management group systems in 2012
- Initiation of a new organised crisis and emergency management group systems in 2012Establishment in the company - company rules/internal instructions manuals – information – training of the crisis management group
- Trainingsessions with different emphasis every year
- Readiness for work in 0,5-1 hour

Potable water production from cleaned waste water

- Three(four) Steps of wastewater cleaning
  - Sedimentation tank
  - Biological clarification
  - Sedimentation tank
  - Sand filter
- WWTP outlet filtration
  - Membrane filter
  - Activated carbon filter
- Staff training – sharing of knowledge
  - Know how
  - Expert and Craftsman - virtual meetings

Crisis and Emergency Management Group System

Peter Fahsing, 60
hanseWasser Bremen GmbH
Coordination of shareholding and cooperation

CV:	Consultant engineer, head of the engineering department, member of supervisory board representative
Technical focus:	remediation of explosive factory, environmental remediation, waste management, water- and wastewater engineering
Technical interest:	exchange of knowledge with municipalities and companies for public services, energy - and water supply, wastewater treatment und waste management

Organisations/Projects:

Focus exchange of experience

City of Bremen	-	Ethekwini(Durban)
German Water Partnership	-	Jordan
City of Bremen	-	Namiba, City of Windhoek

Vielen Dank. Thank you!

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