ATHENS European Week, Autumn 2013
November 19, 2013
„EUROPEAN WATER AND SANITATION SERVICES
vs.
SUSTAINABLE DEVELOPMENT“

Ruhrverband –
Current Issues of Economy and Sanitation

Dr. Arno Bäumer
Ruhrverband, Germany
Structure of the Presentation

• Climate and hydrology in Germany
• Water quantity and Water quality management of Ruhrverband
• Legal form, structure and management system
• Current discussions on economy and micropollutants
Urban Wastewater Treatment – Sensitive and Less Sensitive Areas in the European Union

German minimum requirements for the effluent of wastewater treatment plants over 100,000 p. e.
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Europe and Germany

Ruhrverband
Area of the Ruhr River Association

Length 216 km
Catchment area 4485 km²
Average flow 80.5 m³/s
Non-influenced natural minimum flow 4 m³/s
Abstraction for water supply 500 million m³/year, from which loss of 200 million to neighbour basins (≈ 7 m³/s) for 4 million people and the industry.
Integrated water resources management in the Ruhr river basin

Water Quantity Management
- 8 reservoirs
- Catchment areas of reservoirs
- Waterworks at the Ruhr River

Water Quality Management
- 68 wastewater treatment plants with
- 556 stormwater treatment plants
- 5 impounding lakes

for 4 million people and the industry

for 2.1 million people and the industry
Investments in the Sector „Water Quality Management“ 1986 – 2010
(absolute figures without index)
Improvement of Ruhr Water Quality at Essen (1976 - 2010)

<table>
<thead>
<tr>
<th></th>
<th>1976</th>
<th>2010</th>
<th>rate of reduction [%]</th>
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<tr>
<td>DOC</td>
<td>4.8</td>
<td>2.6</td>
<td>-46%</td>
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<td>21</td>
<td>9.4</td>
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<tr>
<td>BSB</td>
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<td>1.9</td>
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<tr>
<td>NH₄-N</td>
<td>1.0</td>
<td>0.07</td>
<td>-93%</td>
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<tr>
<td>P₆es</td>
<td>1.0</td>
<td>0.08</td>
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<tr>
<td>Ni</td>
<td>59</td>
<td>3.3</td>
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<tr>
<td>Pb</td>
<td>8</td>
<td>1.8</td>
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<tr>
<td>Zn</td>
<td>121</td>
<td>30</td>
<td>-75%</td>
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</table>
Development of the saprobic quality of the Ruhr River 1972 throughout 2005
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Water Management Associations in Northrhine-Westphalia
The structure: Bringing together the interests of all members

- The Ruhrverband is a self administrated public utility (in form of a cooperative)
- The Ruhrverband has close to 600 members (all with compulsory membership)
  - Cities and municipalities in the Ruhr catchment area
  - Waterworks
  - Industrial dischargers
- There is a need for a democratical mutual consent about major programmes

![Diagram showing the distribution of delegates from different categories.](image)
Assembly of Delegates
Assembly of Delegates, Voting Procedure
Figures of Ruhrverband

• employees: 1000
• total assets: 1.3 billion €
• yearly turnover: 300 million €
• charges = costs => non profit!

Members of Ruhrverband:

• 60 municipalities
• 389 industrial production companies
• 139 water withdrawing companies
Advantages of integrated river basin management and water governance

• As rivers do not know any political borders, it is most effective, economical, and therefore reasonable to perform water resources management within natural river basins.

• All water-related measures can be performed by supra-municipal master plans instead of local decisions.

• Planning of facilities can be centralized to minimize costs.

• Operation of plants can be regionalized according to the topographical situation and the given traffic connections in the basin.

• The self-government of a river association ensures the participation of all compulsory members in the decision-making process.

• Many synergy effects can be unlocked and utilized in the planning, construction and operation of water facilities.
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Trace Substances in Water of the River Ruhr currently in focus
(Research Project of IWW Mülheim together with the University of Aachen by order of the NRW-Ministry)

| Perfluorinated surfactants (PFC or PS): | PFOA, PFOS |
| Chelating agents:                  | EDTA, DTPA, NTA |
| Flame retardants:                  | TCPP, TCEP |
| Pharmaceuticals:                   | carbamazepine, diclofenac |
| Radio contrast agents:             | amidotrizoic acid, iopamidol |
Konkrete Maßnahmen – Bau einer großtechnischen Anlage zur Elimination von Spurenstoffen

Standort der Anlage: KA Schwerte
- 50.000 EW
- überwiegend kommunales Abwasser

Baufeld
from left to right: container for distribution of electricity and for ozone production, storage tanks for pure oxygen and for powdered activated carbon, reaction tanks for ozone and activated carbon
Removal [%]
of several parameters and micropollutants depending on dosage of powdered activated carbon (PAC)
In Germany...

- Metric benchmarking – focus on entire utilities:
  Fast growing attendance with many hundreds of participating utilities;
  very aggregated information => hard to analyse in detail

- Process benchmarking – focus on detailed processes:
  Approaches for different fields of activity e.g. wwtp, laboratory, human resources
  much more detailed => detailed share of experience
Notes on the interpretation of results...

High performance indicators do not directly indicate potential savings. Decisive factors for differing costs are:

- different local conditions and prices,
- characteristics in process engineering,
- way and costs of sludge and residue disposal

=> There is no general „Best Practice“. Everyone has to identify his own way of improving.
Summary: Possible strategic targets for a wastewater utility

- Obey the laws for wastewater disposal
- Increase the profit of the utility
- Minimize health hazards for the population
- Minimize the impacts of the discharged wastewater on the aquatic life
- Keep the fees for the customers as low as possible
- Create bright prospects for the utility
Summary: Possible strategic targets for a wastewater utility

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The targets marked with an 'X' are not feasible.

Ruhrverband
WISSEN, WERTE, WÄSSER

A3/1b/85
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Current Issues of Economy and Sanitation

Dr. Arno Bäumer
Ruhrverband, Germany
Groundwater Recharge in the Ruhr Valley (Scheme)
Wasserwirtschaft an der Ruhr (2010)

- sekündlicher Abfluss ($m^3/s$): 81,6 $m^3/s$
- aufsummiertter Jahresabfluss (Mrd. $m^3$):
  - 2,574 Mio. $m^3/a$
  - 594 Mio. $m^3/a$
  - 217 Mio. $m^3/a$
  - 654 Mio. $m^3/a$
  - 472 Mio. $m^3/a$

- mittl. unbeeinflusster Abfluss der Ruhr: 18,8 $m^3/s$
- mittl. Zufluss der Talsperren im Ruhreinzugsgebiet: 6,9 $m^3/s$
- Entnahme: 594 Mio. $m^3/a$
- Stauraum der Talsperren im Ruhreinzugsgebiet: 472 Mio. $m^3/a$
- Entziehung: 217 Mio. $m^3/a$
- unbeeinflusster Minimalabfluss: 6,9 $m^3/s$