The German Experiences with a self-organised Water Sector

- Key Factors for an Alternative to Regulation

Wolf Merkel, Nicole Mueller

IWW Water Centre, Mülheim an der Ruhr, Germany

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Agenda

The German Water Sector…

1) General Characteristics
2) Legal Framework
3) Dimension and Structure
4) Competition
5) The Role of Benchmarking
6) Economic Challenges
7) Lessons learnt

Resources and Climate

- **Germany is fortunate to have plenty of water resources** (many natural lakes, rivers and well-fed groundwater systems, artificial lakes and reservoirs)
- **Only 2.7 % of the available water resources are used for public water supply → indicates extensive water reserves**
- **Beside of precipitation during all seasons, the German climate is characterized by moderate temperatures and frequent weather change**
- **The German Weather Service generally predicts sufficient future rainfall, whilst temperature forecasts based on different climate scenarios consistently indicate increasing temperatures**
- **The impacts of climate change are quite moderate, but Germany will have to face warmer, drier summers and milder, wetter winters**

Sources: Statistisches Bundesamt (2011): 20-25; Umweltbundesamt (2010): 14-18), Deutscher Wetterdienst (2014a) and (2014b), DVGW (2009)

Demographical Change

- **The impacts of demographical change represent a major challenge**
- **Whilst the population was around 82 million in 2008, future forecasts show an estimated decrease of around 4.6 million people until 2030**
- **Especially for sectors with rigid assets and capacities like the water industry, strongly declining consumer numbers are alarming**
- **Aging population becomes more and more challenging for the wastewater treatment because of drug residues in the wastewater**

Sources: Statistische Ämter des Bundes und der Länder (2011): 21 , BDEW et al. (2011): 41

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Relevant Legislation - Overview

Primary Source of Law for Water Supply & Wastewater Removal

Water Resources Act (Wasserhaushaltsgesetz - WHG)

Hygienic Requirements

Drinking Water Regulations (Trinkwasserverordnung)

Wastewater Regulations (Abwasserverordnung)

Structural Requirements

§ 28 of the Basic Law (Grundgesetz)

State Water Laws (Landeswassergesetze)

Water Resources Act - Wastewater

Water Resources Act (Wasserhaushaltsgesetz)

- Requirements concerning the management of all water resources: surface water, ground water and marine water as well as flood protection, water body development, water supervision and fines
- **Sewage** shall be removed reasonable, so that public welfare is not compromised
- Liable entities are allowed to transfer the wastewater obligations to third parties
- Anyone who operates a sewage system is required to maintain its state, its ability to function and its conservation
- Service provider has to monitor its operation and the type and quantity of sewage content himself
- Obligation to record and store relevant information and upon request to provide them to the competent authority

Source: WHG (2009): § 54 – 61

Water Resources Act – Drinking Water

Water Resources Act (Wasserhaushaltsgesetz)

- Since 2009, **water supply** is *officially* a service of general interest (Daseinsvorsorge), which emphasizes its great importance and essentiality
- Water suppliers are forced by the requirements of the WHG to manage the resource water carefully and to inform the end-consumer on water saving opportunities.
- Water demand shall be covered primarily by local, close water resources, if the effort is reasonable and acceptable
- Thereby no region shall be affected disproportionately to serve an area-wide water conservation

Source: WHG (2009): § 50, Lotze/Reinhardt (2009): 3277

§ 28 of the Basic Law

§ 28 of the Basic Law (Grundgesetz)

- Municipalities have the right to regulate all affairs of the local community on their own responsibility, however, they have to take account of the current legislation

- **The right of self-governing the water services as part of the municipal public duty does not mean that it has to be fulfilled directly by the municipalities.**
- **Unless state law provisions do not prevent this possibility, the municipalities are allowed to transfer tasks to third, private entities or make use of cross-municipality solutions**

Source:GG (1949): §28, Ewers et al. (2001): 17)

Status of Self–Organisation

1 General Characteristics

2 Legal Framework

3 Dimension & Structure

4 Competition

5 Role of Benchmarking

6 Economic Challenges

7 Lessons learnt

“The legal framework defines basic requirements for the quality, safety, sustainability, and economic efficiency of water services, but it is the water sector itself which fills the legal framework with life through the definition of technical rules and standards”

(Petry/Castell-Exner (2012))

A general economic regulatory authority does not exist in the German water industry, nonetheless, *ex post* water price regulation is applied in case of the suspicion that the monopoly has been exploited

Leading Associations

- **Federal Association of Energy and Water** (Bundesverband der Energie- und Wasserwirtschaft)

bdew
Energie. Wasser. Leben.

- **German Association for Gas and Water for the Drinking Water sector** (Deutscher Verein des Gas- und Wasserfaches)

DVGW

- **German Association for Water, Wastewater and Waste** (Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall)

DWA

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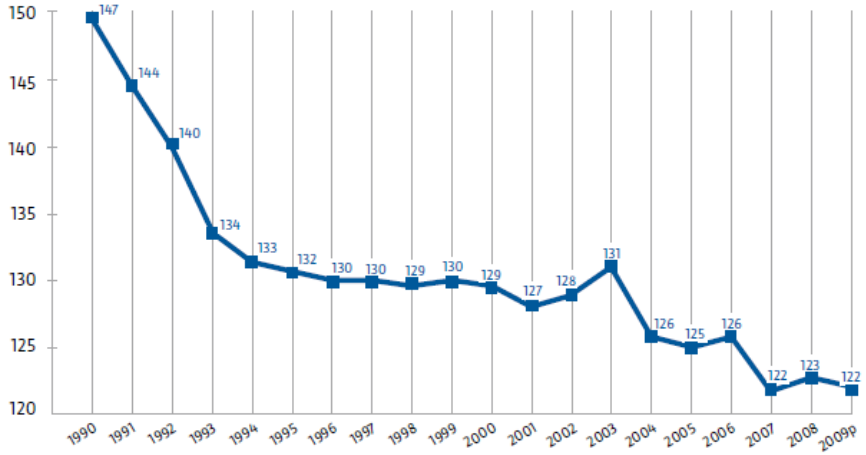
Water Production and Consumption

- **In 2011 around 4,968 million m³ water was produced** (61.1 % ground water, 30.5 % surface water and only 8.4 % spring water)
- **In comparison to 1990 the amount of the total treated water indicates a decrease of around 1,800 million m³ or 27 %**
- **Besides the challenge of a declining population, the water consumption per capita of the remaining population is also decreasing:**



Source: BDEW Water Statistics, related to households and small trades, p = provisional

Sources: BDEW (2013): 2, BDEW et al. (2011): 39

Net Works

Water Supply Sector

- High connection rate with around 99 % of the German population
- Approximately 530,000 km long net work
- Extremely high reliability of water supply
- Average water losses amount only to approximately 6,5 %
- Benchmarking projects in different German states identify varying renewal rates from 0.4 to 1.2 %

Sewage Sector

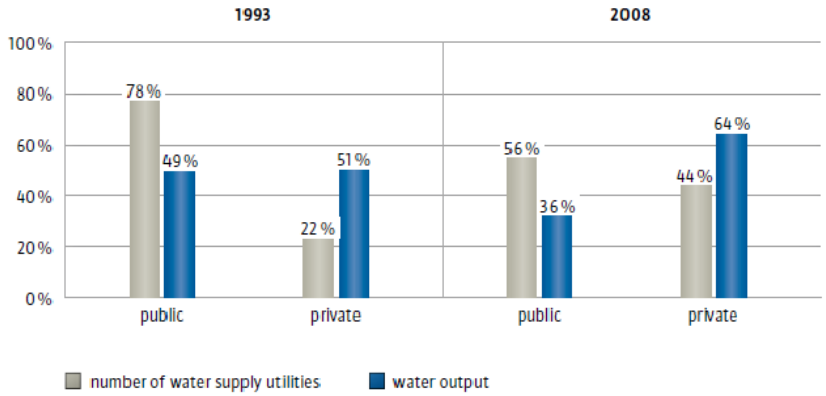
- 95 % of the population is connected to wastewater treatment plants in accordance with highest technical EU standards
- Estimated net work length: wastewater (187,264 km), storm water (114,373 km), combined water system (239,086 km)
- Considering the age structure of the German sewer net work, it is striking that approximately 70 % of the pipes are younger than 50 years. Nevertheless, parts of the main system are much older

Sources: BDEW et al. (2011): 34, 48, 52ff., 68

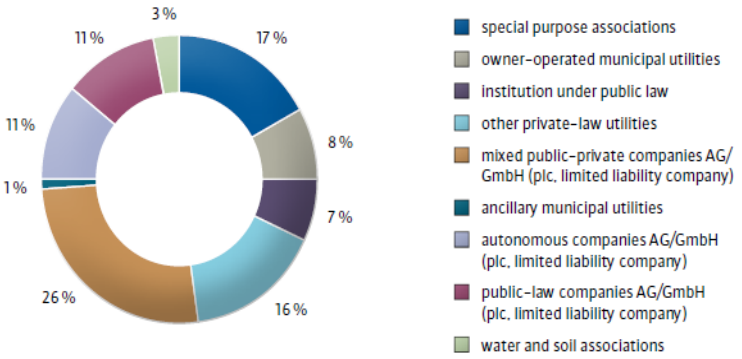
Drinking Water Utilities

The drinking water supply in Germany is organised by 6,211 companies under private or public organisational models

- **The Figure confirms the assumption that private parties primarily operate in densely populated areas**



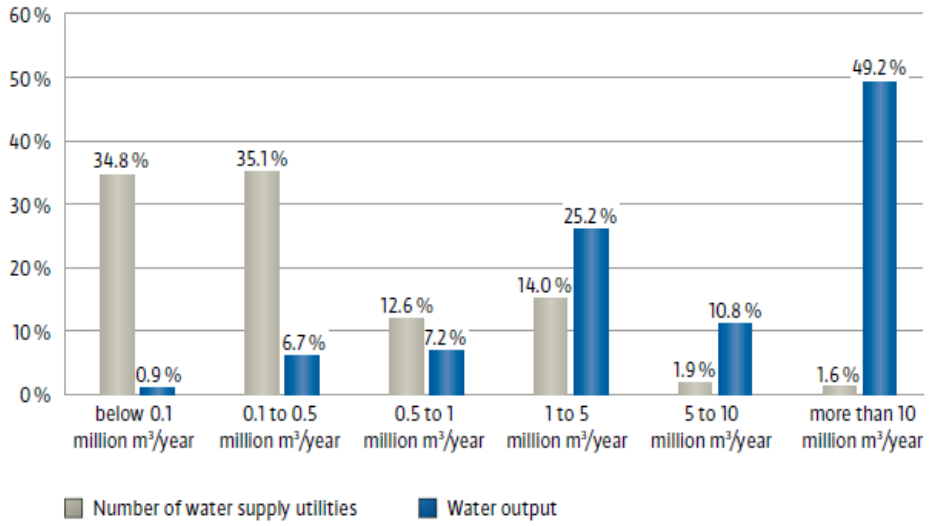
- **Under consideration of the water output, mixed public-private companies dominate the market with 26 %, followed by special purpose associations (17 %) and other private-law utilities (16 %)**



Source: BDEW et al. (2011): 34f.

Market Fragmentation

- **Less than 4 % of water utilities provide 60 % of the total water output in Germany**
- **Around 70 % of the water utilities are small companies with a water output of less than 0.5 million m³ per year**



Source: German Federal Statistical Office, Fachserie 19, Reihe 2.1, Heft 2007 (published in 09/2009)

market fragmentation

Source: BDEW et al. (2011): 36

Wastewater Utilities

- In contrary to the drinking water sector almost every wastewater utility acts under public law
- Most common organisational form is the owner-operated municipal utility (37 %), followed by different intermunicipal associations (28 %) and institutions under public law (13 %)
- The size structure of the German wastewater market is similar to the one in the drinking water sector

→ Although the market can be described as fragmentized, a few large providers take care of the wastewater services in metropolitan areas

Source: BDEW et al. (2011): 36ff.

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Level of Competition

1 General Characteristics

2 Legal Framework

3 Dimension & Structure

4 Competition

5 Role of Benchmarking

6 Economic Challenges

7 Lessons learnt

- Legal framework fosters the utilisation of local water resources, thus, favouring a fragmented water supply
- Lack of competition in the market: second pipe system and common carriage no adequate alternative
- Municipalities' opportunity to tender the water services or parts of it can help to force more competition for the market
- In Germany, concessions are the dominating model for the involvement of third private parties → concession contracts affect typically the task fulfilment and not the task responsibility
- In addition to concessions, operator models, management models and cooperation models are applied in the German water and sewage sector

Source: Dierkes/Hamann (2009): 17, 143ff., Mankel (2002): 42f., European Commission (1999)

Limitations

This process creates a kind of limited competition for the market:

- **Concession contracts are typically long-term, so that this form of competition is mainly restricted to the time of the tender**
- **Further, the advantages of a competitive concession bet can be missed, if the number of bidders is too low or (in the worst case) if there is no other competitor**
- **Recent EU directive on awarding of concessions (2014) has excluded the water and sanitation business as "often subject to specific and complex arrangements … given the importance of water as a public good of fundamental value …"**

Source: Garcia et al. (2005): 173, 180.

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Benchmarking

- Creating a competition via comparison is of particular interest in the German water market
- Different benchmarking projects, efficiency analysis as well as price comparisons are omnipresent
- In most German states (Bundesländer) water utilities have an opportunity to participate in regional, non-obligatory projects (metric as well as process benchmarking)
- 11 out of 16 states also provide a public report with general performance respectively efficiency results, which is typically anonymous
- Generally, the benchmarking projects are carried out periodically → performance changes over several years
- Basis: IWA standard for performance indicators
  →To enable sooner or later a nationwide benchmarking, a unification of these indicators is discussed

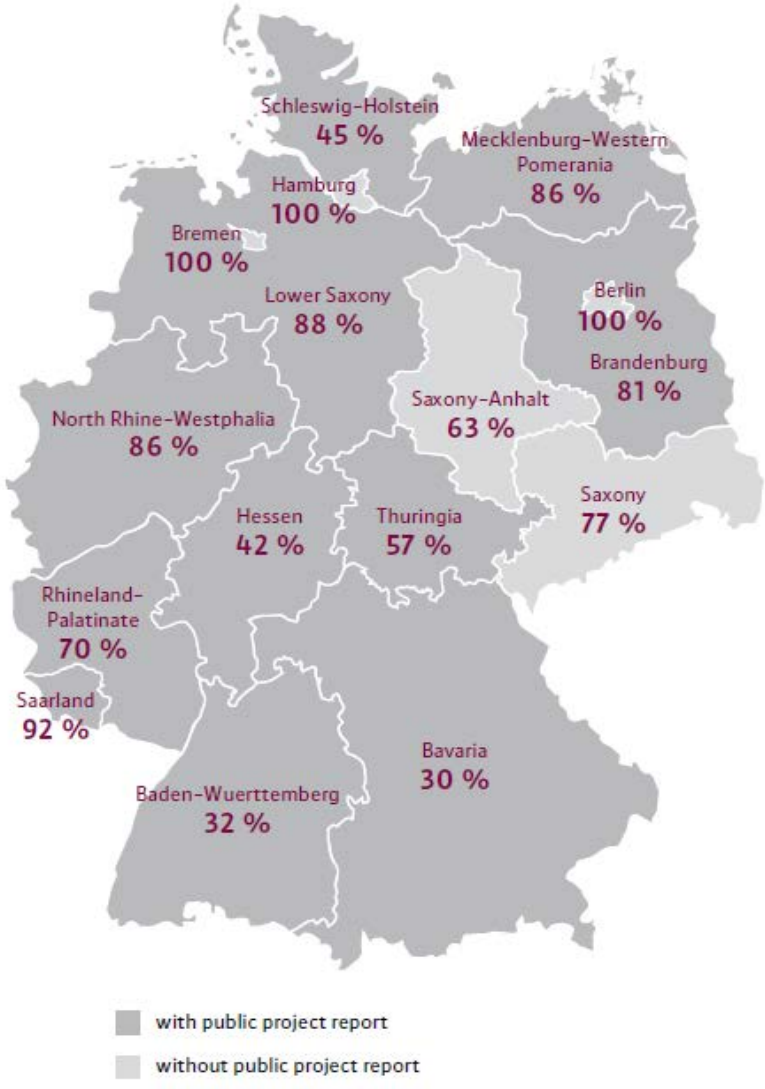
Source: BDEW (2012), Otillinger (2011): 26, Alegre et al. (2000), Hirner/Merkel (2005).

Regional Benchmarking - Participation

- **Regional benchmarking: participation rate of water utilities** (measured by drinking water provided)

- **Even if benchmarks are non-obligatory in Germany, many utilities make use of this opportunity**

- **However, the participation rates are obviously far from satisfactory, especially when the number of participating utilities is considered**



Source: BDEW (2012).

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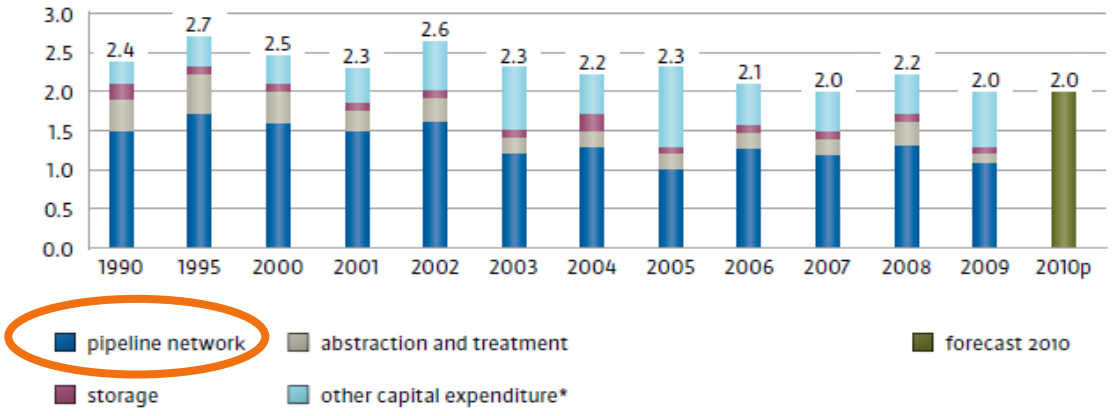
Investments – Drinking Water

- **Main target is to make continuous investments to avoid unplanned high expenditures and related price increases**
- **The investments of the water supply and wastewater removal industry amounted to approximately 110 billion Euros since the German reunification in 1990**
- **Development of capital expenditure in public water supply from 1990 to 2010** (according to asset areas, in billion Euros):



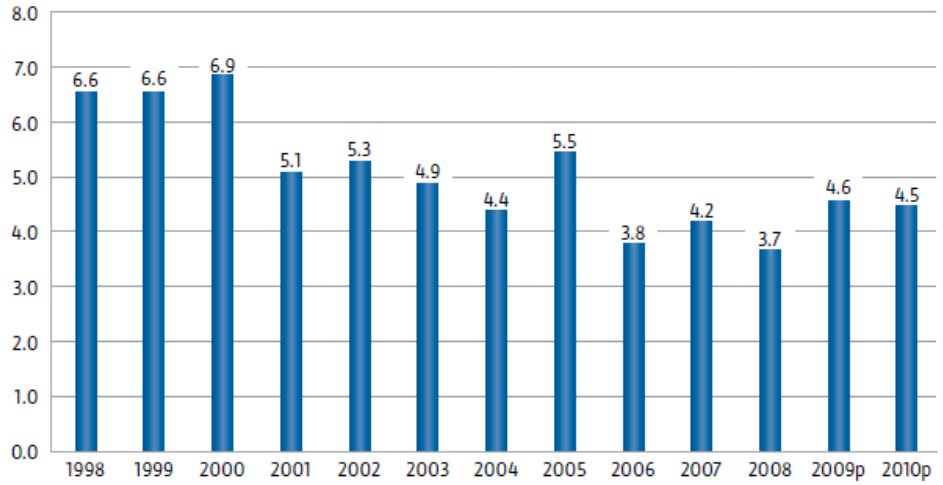
* other capital expenditure = meters and measuring devices, and capital expenditure which cannot be broken down into asset areas.

Source: BDEW Water Statistics

Source: BDEW et al. (2011): 76

Investments – Wastewater

- **Development of capital expenditure in public wastewater supply from 1998 to 2010** (in billion Euros):



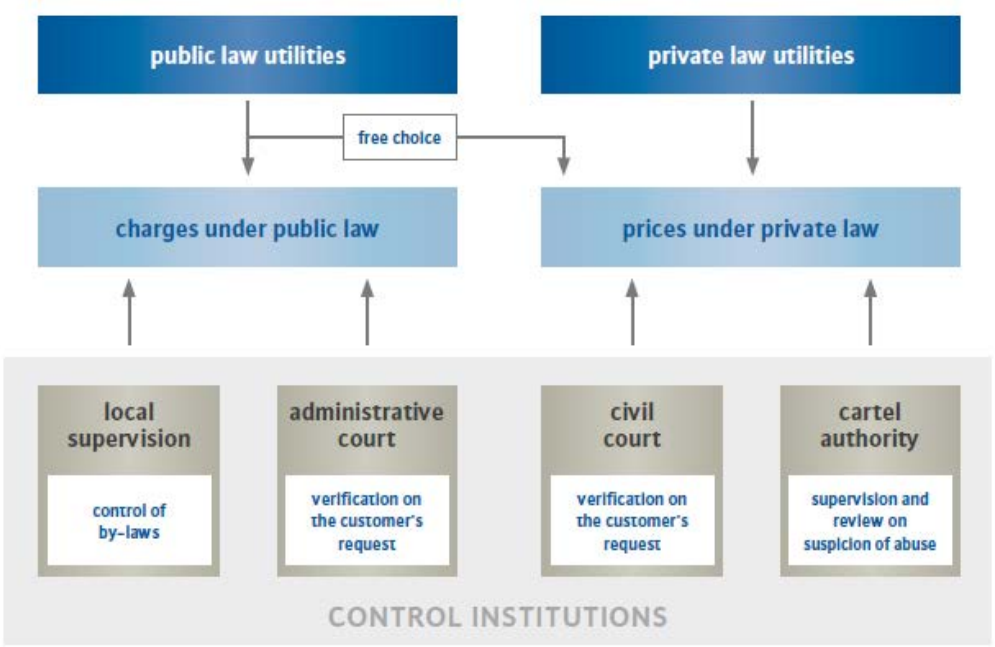
Source: BDEW/DWA/Deutscher Städtetag – wastewater survey, p = provisional

- **Development in the wastewater sector is characterized by a less homogeneous trend**
- **Capital expenditures in the wastewater sector are more than twice as large as those in the water supply sector**

Source: BDEW et al. (2011): 77.

Water Pricing – Control Institutions

- **Subsidies play a minor or almost no role in the German water supply - more important issue is a cost-covering price structure**
- **Depending on the company's legal form, water pricing is subject to different frameworks/control institutions:**



Source: VKU

Source: BDEW et al. (2011): 24,

Water Pricing – Calculation Requirements

1 General Characteristics

2 Legal Framework

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- Requirements for charges of companies under public law
  → Municipal Charges Acts of the different states
- Water prices of companies under private law
  → not subject to specific regulations, but...

"[...] according to the rulings of the German Federal Supreme Court, the principles applied to the calculation of charges are to be applied in the same way to the calculation of prices."
(BDEW et al. (2011): 13)

Main obligations and principles are:

- Principle of equivalence (proportionality)
- Principle of cost recovery
- Prohibition of cost overrun
- Principle of equality or equal treatment
- Economic principles

Source: Reif (2002b): 52, BDEW et al. (2011)

Main Challenges - Water Pricing

- In the German drinking water supply sector dominates a **two-part tariff model**
- Companies have to face extremely **high fixed costs of about 80 %**
- Fix share of the tariffs is with about **10 – 20 % very small**
- → **Revenues are extremely depending on the volumetric component**

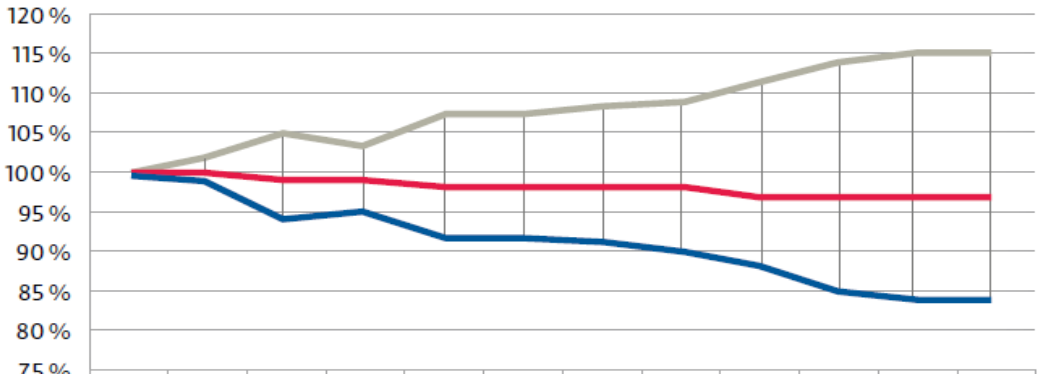
difference between the companies' cost and revenue structures is developing in a cost coverage gap

German "water utilities sell less water to fewer people at increasing costs for infrastructure maintenance and renewal"
(Petry/Castell-Exner (2012):19)

Source: VKU (2011): 2; Merkel (2009): 78; Umweltbundesamt (1998): 51

Main Challenges – Tariff Design

- **Effects of decreasing water deliveries on total and specific costs** (relative evolution over time)



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
water delivery [m³]	100 %	98%	94 %	95 %	92 %	92 %	91 %	90 %	87 %	85 %	84 %	84 %
total costs [€]	100 %	100 %	99 %	99 %	98 %	98 %	98 %	98 %	97 %	97 %	97 %	97 %
specific costs [€/m³]	100 %	102 %	105 %	104 %	107 %	107 %	108 %	109 %	112 %	114 %	115 %	115 %

Source: VKU-expert´s report Holländer et al., 2009

- **→ specific costs significantly increase with declining water consumption**

currently hot debate on adjustments of tariff designs

Source: BDEW et al. (2011): 43, e.g. Oelmann/Haneke (2008)

Main Challenges – Prices

Water prices strongly differ over the country

- **raises questions about price fairness among the population**
- **(non-coordinated) intervention of cartel authorities create uncertainties among the utilities**

Issue on legally accepted tariff respectively price calculation still remains not clearly resolved, in spite of current initiatives from the water associations for a price calculation guideline

- **However, prices are generally affordable and the water costs do not play a decisive role in total household budget**

Source: see Hirschhausen et al. (2010): 76), Reif (2002a): 19; BDEW (2010); BDEW/VKU (2012)

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Lessons learnt I

- The high level of fragmentation could potentially hinder economies of scale & size and thereby foster inefficiencies
- However, the systems are in good condition and the water quality and reliability of service is very high, which should be the overall target
- Quality regulation of both water and wastewater services is strict, well established and uniform throughout the country
- Competition for the market is made possible and is applied (no significant role in Germany)
- Benchmarking projects are on the right track, but the participation rate should be expanded
  → Moreover, national/trans-national efforts to be fostered

Source: Boschek (2002), Bundesministerium für Gesundheit (2011) and conclusions from this presentation

Lessons learnt II

- The German water sector model encourages self-responsible acting and sets incentives for high-quality water services.
- Water prices getting more and more in focus of public debates and within the water sector
  → greater clarity and transparency should be aimed at, since they are important for both customers and utilities
  → increasingly, cost efficiency becomes a dominant issue
- Economic regulation is established in decentralised approaches, so that uniform efficiency standards do not exist, fulfilment is not transparent
  - for public utilities by the federal states
  - for private utilities by municipalities, controlled by cartel authorities of the federal states
- The German water sector is continuously balancing central regulation and decentralised self-organisation

Good water services without a regulator?

Technical/organisational dimension

1. **Optimum (self-)regulatory power where it is most needed**
2. **Implementation is enforced**
   - **by national laws**
   - **by regular governmental inspections**

Economic dimension

3. **Legal standards on adequate tariffing**
   - **ex-ante approval of charges is mandatory**
   - **price setting is widely to be approved by municipal bodies**
4. **Economic supervision is installed**
   - **ex-post charge/price control (upon request/suspicion)**

Conclusions

- **Long-term tradition of self-governance seems to be a prerequisite for the proper functioning of the non-regulated water sector**
- **The German self-organised water market model works well under the specific German conditions and it provides sufficient adaptive power to work under future challenges**
- **Could the German model be transferred to other countries?**

→ Yes: Examples from NL, Scandinavian countries, Austria, CH etc. show similar structures with good performance
→ However: Specific national background and tradition have to be taken into account. The freedom of self-responsible sector management and central regulation should be balanced continuously

Thank you

for your attention !

Wolf Merkel

w.merkel@iww-online.de

IWW Water Centre, Mülheim an der Ruhr, Germany

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