



# ::: Profile of the German Water Industry 2008

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Josef-Wirmer-Straße 3 · 53123 Bonn  
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info@wvgw.de · www.wvgw.de

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::: Profile of the  
German Water Industry  
2008

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## Preface

With the 2008 Profile of the German water industry, the publishing associations ATT, BDEW, DBVW, DVGW, DWA and VKU provide for the second time a comprehensive overall picture of the efficiency of water supply and sewage disposal in Germany. Politicians, the public and all interested parties are thereby given the opportunity to extensively assess the water industry's capability, standard of performance and economic efficiency.

With the Water Industry Profile, the participating associations contribute to the discussion about the pattern of the future outline conditions of the water industry at national and European levels.

National politics aims at a modernization instead of liberalization of the water industry. Benchmarking represents an important aspect for this modernization of the regulatory framework. In 2002, the German Bundestag demanded the "introduction of a procedure to compare inter-corporate performance (benchmarking) in its resolution on a "Sustainable Water Industry in Germany". By the "Statement of the Associations of the Water Industry on Benchmarking in the Water Sector" in 2003, the water industry committed itself to develop a basic scheme for benchmarking and to promote a large-scale propagation of voluntary benchmarking. Thus, the water industry established the basis for the success of the benchmarking instrument. In the extended Statement of the Associations of 2005 (see Annex), the water industry undertook to regularly submit a Water Industry Profile. This overall concept was welcomed and acknowledged by the German Federal Government in its 2006 report on the modernization strategy.

The water sector will continue to transparently portray its performance characteristics in the Profile of the German Water Industry published at regular intervals. The main focuses of the Water Industry Profile were and will be continuously refined against the background of new findings and requirements. Also at European level, the European Parliament spoke out against liberalization and advocated the modernization scheme (resolution of 14 January 2004 about the "Green Paper on Services of General Interest"). The Parliament assesses benchmarking to be an integral component in this respect.

In the German water and wastewater industry, benchmarking has been successfully implemented long before these political resolutions were passed, mainly as an internal instrument within the undertakings. Generally, benchmarking comprises issues of quality, technical security, sustainability, customer service and profitability of business processes. The factors of success in benchmarking are the anonymity of corporate data and voluntary participation. So it is possible to identify potentials for improvement which ultimately benefit the citizens.

The German water supply and wastewater disposal industry is highly efficient. High standards are set in terms of efficiency, security, and quality of supply and disposal, customer service and sustainability. Customers rate the performance of the sector with regard to these aspects as very good.

To put it in a nutshell, the following core statements can be made to describe the German water industry:

## Core statements of the 2008 Water Industry Profile

1. In Germany, water supply and wastewater disposal are core tasks of public services of general interest within the competence of municipalities. The latter take the strategic decisions on the forms of organisation, participations and co-operations.
2. Germany has a pluralistic supply and disposal structure. Public and private companies do not conflict, but they complement each other.
3. Germany is in a comfortable resource situation. The long-term nationwide protection of water bodies is a national task to which the utilities make a substantial contribution.
4. Water consumption has declined significantly. It is stabilising at a low level. Consumers are careful with drinking water consumption. From an operational perspective, there is little room for any further downward margins as adequate capacities need to be made available for peak demand. A further reduction of water consumption supported by politics is not reasonable.
5. There are large regional differences in Germany in terms of the impact of climate change and demographic changes. As regionally positioned industry sector with tight municipal structures, the German water industry can well respond to this development in the light of its current structure.
6. The supply and disposal structure is reflected in the residential situation. About 100 undertakings supply approximately half of the drinking water in Germany.
7. Prices, quality, environmental requirements and water extraction rights are subject to strict control by the state.
8. All costs (extraction, processing, distribution, collection, treatment) are covered by water and wastewater charges due to legal requirements.
9. For the customers of the German water industry, security of supply and quality are of utmost importance.
10. Long-term interruptions of supply are unknown in Germany. This is due to the high technical standards of treatment and distribution and to the very good condition of the networks as compared to other European countries. German water supply utilities have by far the lowest water losses.
11. Drinking water of an excellent quality is at all times available to the citizens in sufficient quantities. The statutory requirements for the drinking water quality are complied with throughout the country.
12. In Germany, wastewater is treated almost nationwide with the highest EU purification standard in contrast to many other EU states.

13. With total investments of more than 100 billion € since 1990, the German water industry is one of the biggest customers for private industry as planning, construction and operation services are commissioned for the most part to external companies.
14. Drinking water prices and wastewater charges have remained stable for many years. The rates of increase are currently below the inflation index. If the respective water consumption and performance standards are taken into consideration, German citizens have to pay less for their drinking water per year than for instance French or English customers.
15. Performance characteristics of the German water industry are long-term security of supply and disposal, high drinking water quality, high standards in terms of wastewater disposal, high customer satisfaction, sustainable utilization of water resources and economic efficiency.
16. The German water industry undergoes a constant modernization process. It is essential to maintain and refine the high standards and to keep prices stable.
17. Voluntary benchmarking is used to a large extent throughout the industry sector. The number of projects and participating companies is growing.

The present Water Industry Profile was drawn up by:

**Association of Drinking Water from Reservoirs (Arbeitsgemeinschaft Trinkwassertalsperren e.V. – ATT)**

ATT is a non-profit association consisting of about 40 water supply utilities, water associations, impounding reservoir undertakings and administrative bodies, as well as university, examination and research institutes in the Federal Republic of Germany and the Grand Duchy of Luxembourg concerned with the production, treatment and distribution of drinking water from impounding reservoirs.

**German Association of Energy and Water Industries (Bundesverband der Energie- und Wasserwirtschaft e.V. – BDEW)**

BDEW represents approximately 1,800 companies of different scales and forms of organization, of which 1,100 are companies of the water industry. The spectrum of BDEW member companies ranges from local and municipal to regional and supra-regional suppliers. This great variety in the German energy and water market as well as in drinking water supply and wastewater disposal is unprecedented within the European Union. The BDEW members are the largest investors in the German industry. In 2006, the German energy and water industry spent more than 14 billion € for infrastructure development and modernization.

**German Alliance of Water Management Associations (Deutscher Bund verbandlicher Wasserwirtschaft e.V. – DBVW)**

DBVW is a union of eight regional associations. It represents the interests of water industry associations responsible for the maintenance and re-naturation of water bodies, coastal protection and flood control, drinking water supply, wastewater disposal and control of the soil water balance. Thus, approximately 2,000 associations of the water industry (public-law corporations with self-administration) are represented by DBVW.

**German Technical and Scientific Association for Gas and Water (Deutsche Vereinigung des Gas- und Wasserfaches e.V. Technisch-wissenschaftlicher Verein – DVGW)**

DVGW promotes the gas and water supply industry taking particular account of technical security, hygienic safety and environmental protection. With its approximately 12,000 members, DVGW elaborates generally accepted technical rules for gas and water. Furthermore, its tasks include the control and certification of products, persons and companies, the initiation and promotion of research projects and training for the whole spectrum of issues relating to the gas and water industry. The non-profit organization is independent and neutral in economic and political terms.

**German Association for Water, Wastewater and Waste (Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V. – DWA)**

DWA is a politically and economically independent association. Amongst a membership of approximately 14,000, there are municipalities, universities, engineers, public authorities and companies. By means of the DWA set of rules and standards elaborated by experts from all sectors of the water

industry and with its comprehensive training and education programme, the DWA gives its full support to sustainable water resources management.

### **Association of Local Utilities (Verband kommunaler Unternehmen e.V. – VKU)**

VKU represents the interests of the municipal utilities in the sectors of water supply and wastewater disposal as well as energy and waste management. Almost 1,400 member companies with a total turnover of approximately 71 billion € and 233,000 employees are organized within the VKU. The investment volume totals approx. 6.6 billion €. The municipal utilities provide economic and non-economic services of general interest to citizens, trade and industry. VKU stands for a representation of interests which shows and helps to safeguard the benefits of municipal responsibility in water supply and wastewater disposal. To this end, the VKU water and wastewater division represents an independent organization unit for more than 700 members.

## Introduction

With the 2008 Profile of the German Water Industry, the participating associations provide again (after the presentation of the first Profile in March 2006) a comprehensive overall picture of the performance of the supply and wastewater disposal sectors in Germany. Politicians, the public and all interested parties are thereby given the opportunity to extensively assess the performance of the German water industry in terms of its efficiency.

The most current data available have been used for the compilation of the 2008 Water Industry Profile. Data dating back further than to the year 2005 are specifically marked.

The sources and underlying information are amongst others

- : : : The BDEW 2005 Water Statistics which covers more than 1,300 undertakings and represents approx. 79 percent of the water output in Germany. Estimated data published in the 2005 Water Industry Profile have been validated through statistical methods.
- : : : The BDEW/DWA survey of "Economic data of wastewater disposal in 2005" dated March 2007, comprising 882 wastewater disposal utilities in Germany with 49 million inhabitants connected to the sewerage network. This corresponds to a proportion of approx. 59 percent of the population connected to the public sewage network.
- : : : further surveys, investigations and statistics of the publishing associations
- : : : Statistics and publications of the Federal Statistical Office and of European and international organizations
- : : : Results of current benchmarking projects

Throughout the Water Industry Profile, "water industry" means "water supply" and "wastewater disposal".

## Part A – Basic conditions

### 1 General

In Germany, water supply and wastewater disposal are core tasks of public services of general interest within the competence of the municipalities. Since these are matters of concern of the local communities, they fall under the municipalities' right of self-government according to Article 28, para 2 German Basic Law. These are services which are linked to specific obligations of general interest and are provided in the interest of the general public by mostly municipal utilities operating economically.

Therefore, water supply and wastewater disposal services are notably committed also to the sustainability concept as well as to environmental protection (Article 20a German Basic Law). In addition to their actual activities, the bodies performing these functions also assume tasks serving the protection of water bodies and thus ultimately the protection of the vital water resources as a whole.

37,105 employees alone work in the 1,099 water supply utilities (BDEW 2003 Water Statistics); 39,319 employees work in the wastewater utilities covered (Federal Statistical Office 2004). It is estimated that the total number of persons employed in the entire sector in Germany amounts to far more than 100,000.

In addition, the different regions are strengthened by numerous contracts awarded to small and medium-sized businesses.

Furthermore, the sector contributes to the improvement of the situation in terms of apprenticeship training positions and thus faces up to its social responsibility. Hence, it makes a contribution towards safeguarding jobs and apprenticeship training positions.

### 2 Forms of business organization

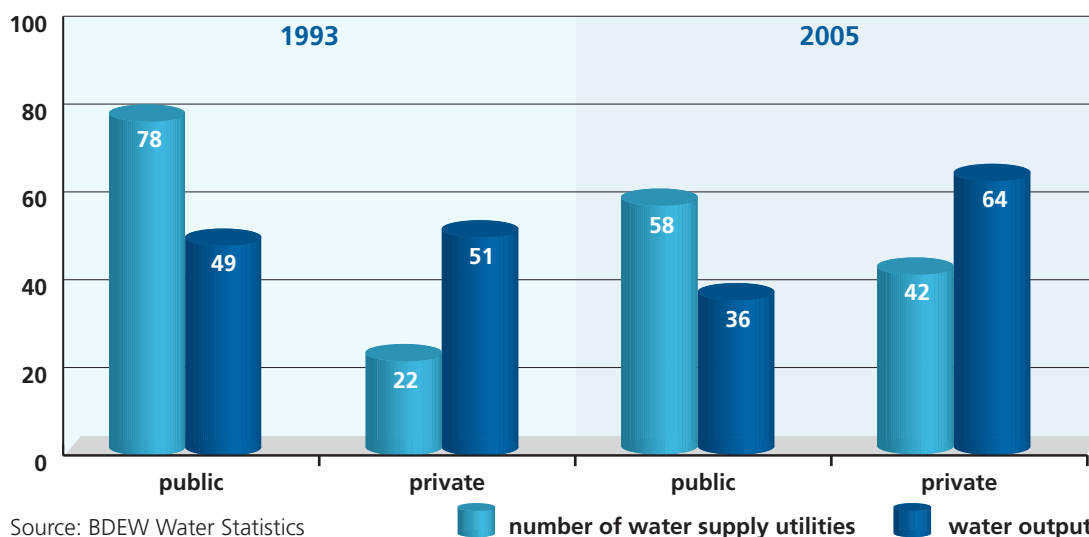
In the water supply sector, public and private forms of organization have existed for decades alongside each other. There is a tendency towards private forms of organization under private law.



## Development of the forms of business organization of public water supply

under public/private law (data in percent)

1



Related to the water output, public forms of business organization account for 36 percent while the share of private forms of organization amounts to 64 percent (2005, see Chart 1).

Within the public forms of business organization, the water and soil associations and special-purpose associations are predominant, whereas municipal and state-run utilities account altogether for only 5 percent (see Chart 2). During the past few years, the share of municipal utilities decreased considerably: from 29 percent in 1993 to 4 percent in 2005.

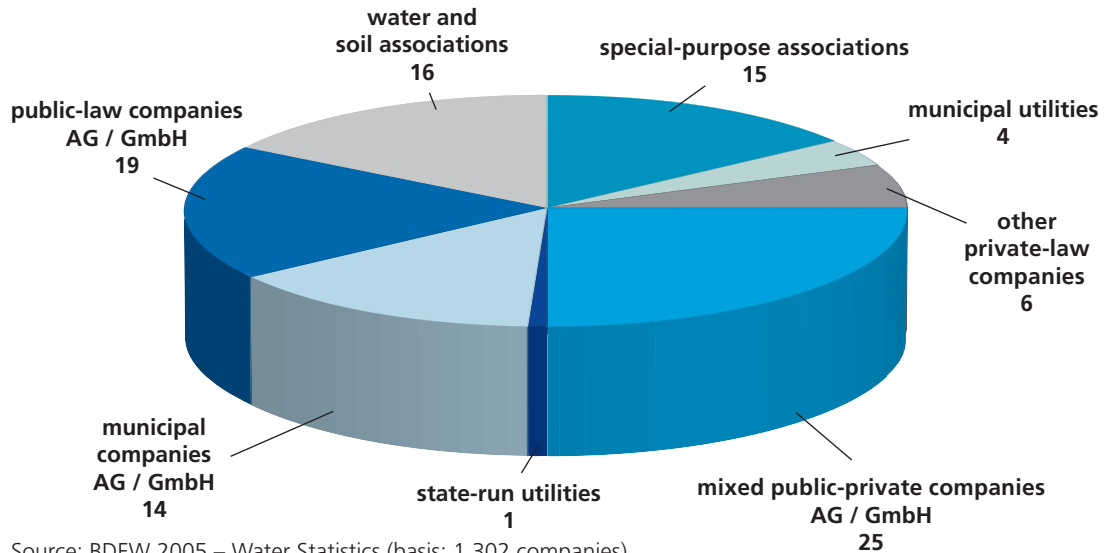
Within the private forms of business organization, mixed public-private corporations predominate in the form of stock and limited liability corporations – German abbreviations: AG/GmbH – (25 %), i.e. corporations with the participation of private companies. (see Chart 2).

The change of the branch towards private forms of business organization becomes apparent if the number of companies instead of the water output is taken into consideration (see Chart 1). The share of companies with public forms of organization decreased from 78 percent to 58 percent, whereas the share of those with private forms of organization increased from 22 percent to 42 percent (1993 to 2005).

## Forms of business organization in public water supply in 2005

2

Germany as a whole/Shares in percent related to water output



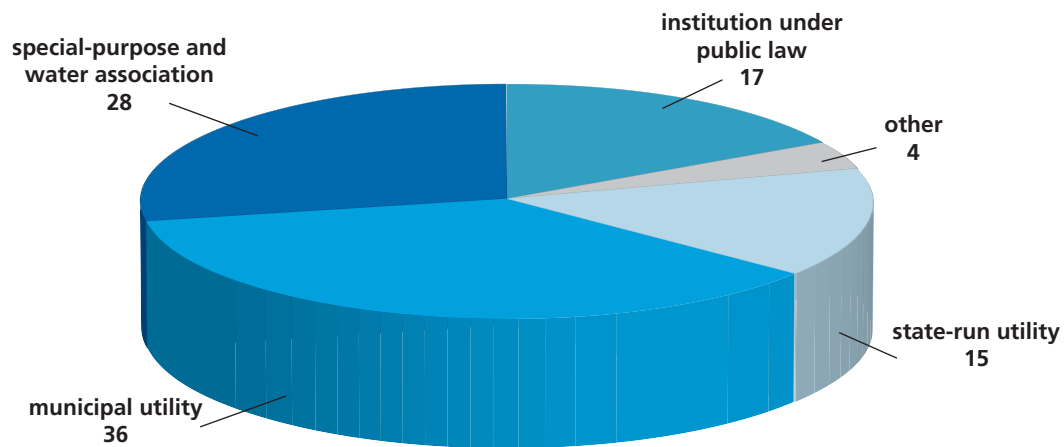
The above statements refer to the more than 1,300 undertakings in the 2005 BDEW Water Statistics which represent approximately 79 percent of the water output in Germany. In total, there are approx. 6,400 water supply utilities in Germany. Detailed data on the more than 5,000 undertakings not covered in the statistics, which provide approx. 21 percent of the water output, are not available. However, it is to be assumed that these undertakings are predominantly small state-run and municipal utilities.

In contrast to drinking water supply, wastewater disposal in Germany is dominated by public enterprises. This is attributable to the classification of wastewater disposal as a sovereign obligation of the municipalities. The largest share is held by municipal utilities as well as by special-purpose and water associations (see Chart 3).

### Forms of business organization of bodies providing wastewater disposal in 2005

3

Data in percent, weighted according to the population connected to the sewerage system



Source: BDEW/DWA – Economic data of wastewater disposal in 2005

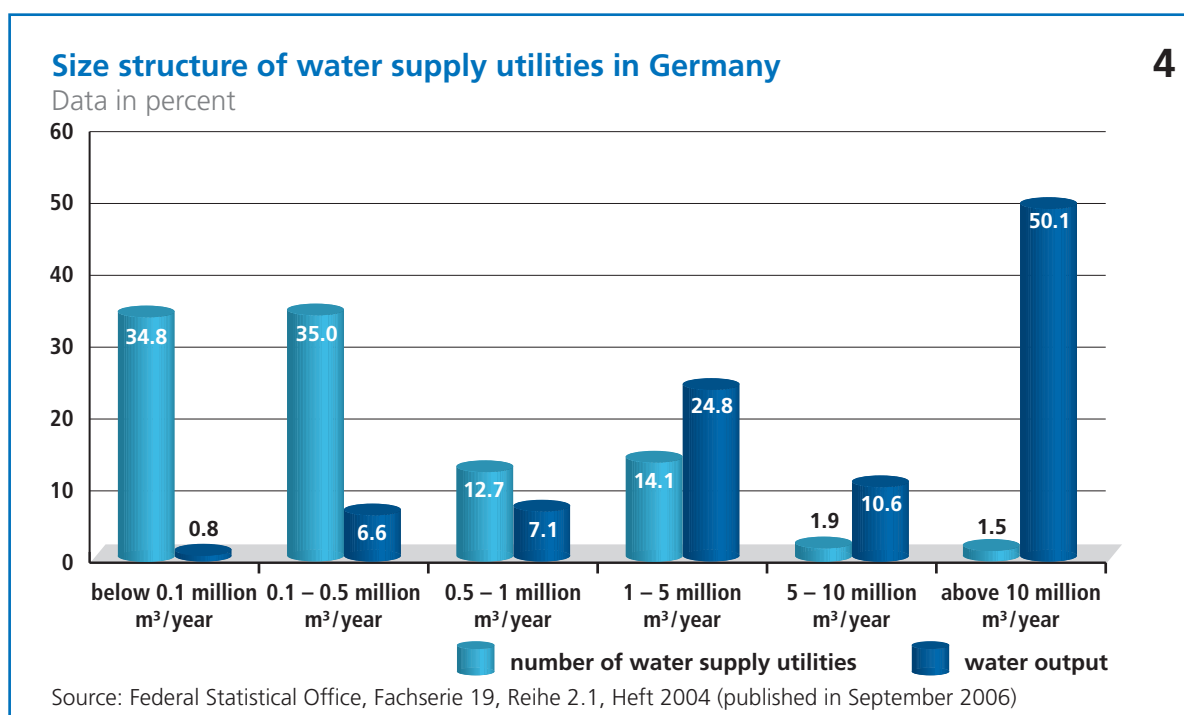
The above statements are based upon the data of almost 900 wastewater disposal utilities disposing the wastewater of 59 percent of the German inhabitants. In total, there are more than 6,900 wastewater disposal enterprises in Germany. The undertakings not covered here are predominantly operated by municipalities in the legal form of municipal utilities.

The bodies providing wastewater disposal are increasingly using entrepreneurial instruments, even if the undertaking itself has a public legal form.

Private wastewater utilities are mainly active in the operative business by means of management or operator contracts. The share of private forms of business organization in wastewater discharge is 10 percent and in wastewater treatment 12 percent (each related to the inhabitants covered; BDEW/DWA survey 2003).

### 3 Size structure of the utilities

In the drinking water sector, small undertakings supply a relatively small number of inhabitants in rural areas. In contrast to this, a small number of undertakings supply a large number of inhabitants in urban conurbations. Thus, half of the water output is supplied by only 1.5 percent of the companies (98 undertakings). The share of these large-scale companies is increasing; related to the water output, it has increased from 48.7 percent in 2001 to 50.1 percent (see Chart 4).

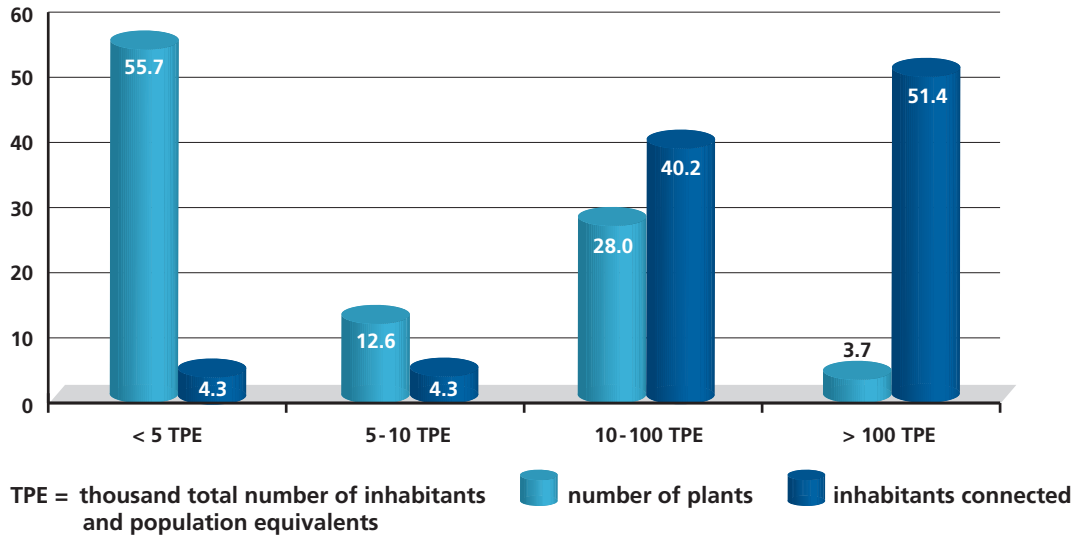


A comparable structure is obtained for the operators of wastewater facilities: In conurbations, a small number of large facilities dispose of the wastewater of a large number of inhabitants (see Chart 5).

## Size structure of wastewater plant operators

5

Data in percent



Source: DWA – performance benchmarking of municipal sewage treatment plants in 2006

## 4 General legal and economic conditions

### 4.1 General fiscal conditions

In Germany, there is no uniform taxation for the water supply and wastewater disposal industry. While basically a reduced turnover tax rate of 7 percent uniformly applies for the water supply industry, taxation of the wastewater disposal industry is more differentiated. Public wastewater disposal utilities as sovereign undertakings are exempted from corporate income and turnover tax. However, if wastewater is disposed of by private-law companies, these are subject to the full turnover tax rate of 19 percent, with the possibility of input-tax deduction.

Both at European and national level, the fiscal frame conditions of the water industry are currently under close scrutiny. The review of the positive and negative effects of a fiscal equality of water and wastewater is part of the report of the German federal government published as Printed Matter no. 16/1094 of 16 March 2006 ("Bericht der Bundesregierung zur Modernisierungsstrategie für die deutsche Wasserwirtschaft ..." – [Report of the federal government on the modernization strategy for the German water industry ...]).

## 4.2 Bases of pricing and charging

### 4.2.1 Commitment to the Local Tax Laws

Public-law utilities are subject to the Local Tax Laws of the federal states. According to these laws, the utilities are legally bound to comply with the cost coverage principle, including the costs for preservation of real-asset values and refinancing of the facilities. According to the provisions of the Local Tax Laws, the following principles have to be adhered to for the calculation of prices and charges:

- : : : The principle of equivalence, i.e. the prices or charges, respectively, must not be substantially above the value of the service for the citizens, irrespective of the costs of the service;
- : : : The cost coverage principle, i.e. all costs incurred by water supply and wastewater disposal must be covered by the price or the charge, respectively; neither is a long-term surplus cover admissible;
- : : : The prohibition of cost overrun
- : : : Taking the principle of preservation of net real-asset values into consideration
- : : : Breakdown of the fees of the consumer groups according to the costs incurred by type-classified customer groups
- : : : Wastewater charges can be levied separately for wastewater and precipitation water (split charges standard). The wastewater charge is determined according to the freshwater consumed. Supply from rainwater utilization facilities must be taken into account for the calculation of wastewater charges. The precipitation water charge is calculated on the basis of the drained area. Alternatively, the wastewater charge may be calculated only on the basis of the freshwater consumed (freshwater standard).
- : : : Taking account of the cost structure in fixing the base price and the volume price
- : : : Adequate interest for equity capital

### 4.2.2 Verifiability and transparency

The fixing of prices and charges is subject to strict statutory regulations and up to triple control. The legal review of the fees fixed takes place at several levels and depends on the pattern of the respective fee (prices or charges).

Fees of municipal utilities are controlled by the municipal or local council at the municipal level, or within the associations by the respective committees, and by the local supervisory authority. Supply utilities, either private or public, are subject to the additional supervision of the cartel authorities as far as they charge their services directly to the consumers (charges under private law). A review of the

prices or charges (fees under public law) can be initiated by the customer through control by a civil or administrative court.

#### 4.2.3 Cost structure

Secure and high-quality drinking water supply throughout the country requires a large-scale infrastructure, partly associated with high costs of development, such as the construction of impounding reservoirs and regional supply systems, if there are regional differences in terms of the water resources' distribution.

For water supply and wastewater disposal, a large variety of technical facilities are required for water abstraction, treatment, storage and distribution as well as for wastewater collection and purification. Supply and disposal are therefore characterized by a high plant intensity. As a result, there is a high share of investments (new construction, extension and renewal) in the total costs of utilities. Therefore, the share of fixed costs amounts to approximately 70 to 80 percent. This includes fixed costs for operation and maintenance of the facilities. Thus, e.g. maintenance and personnel costs only depend to a small extent on the operating performance.

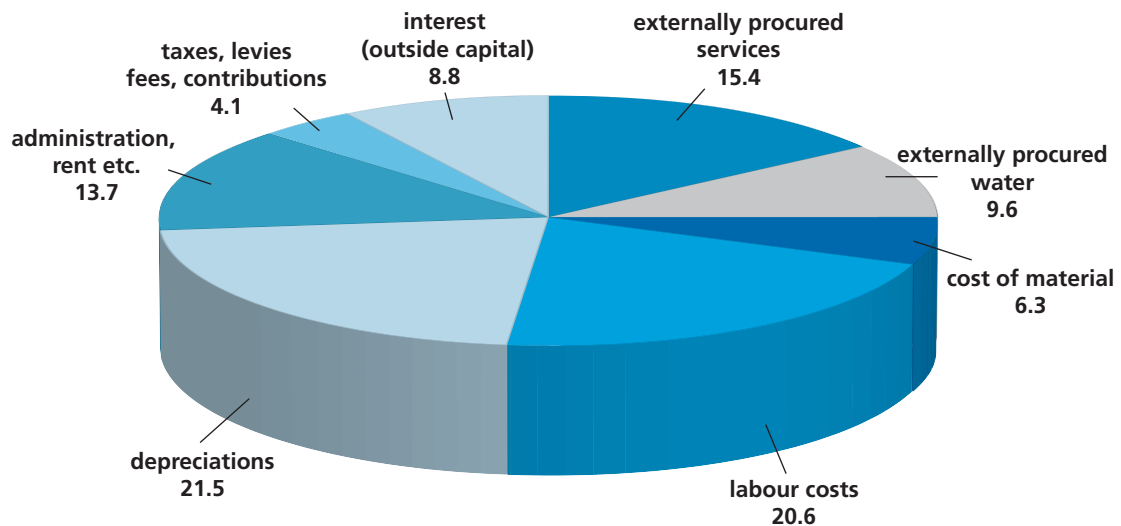
In contrast to the above, volume-dependent costs only exist to a small extent. They include electricity costs for pumping, costs of equipment for water treatment, water abstraction charges and the like. During the past few years, the cost structure of water supply has largely remained stable.

Due to this cost structure that is typical of the water industry, and the distinct decrease in water consumption during the past few years, a split-up into a base price/base charge and a volume-dependent price/charge or a stronger weighting of the base price are under discussion.

## Cost structure in water supply in 2004

6

Shares in percent



Source: Federal Statistical Office, Fachserie 4, Reihe 6.1, 2004 (published in November 2006)

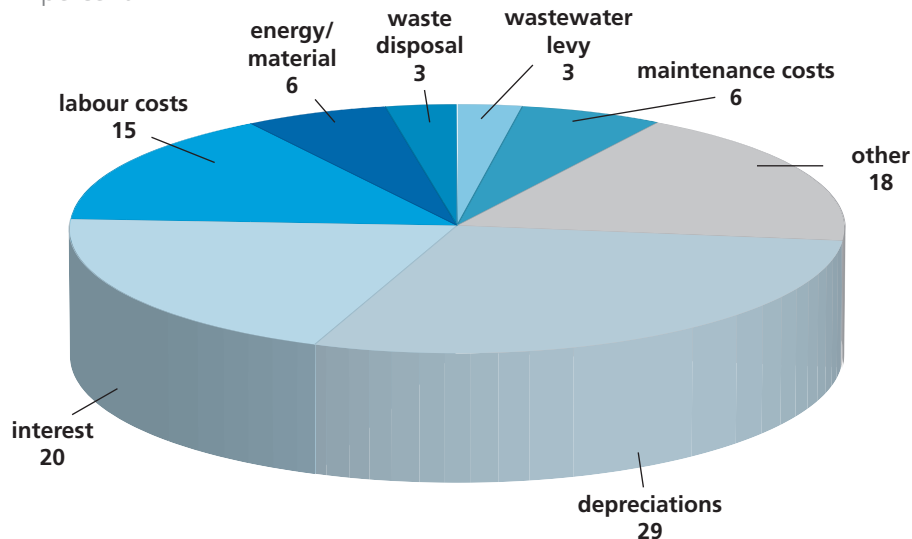
Additionally, in many places the concession fees have to be earned by means of the water prices. The concession fee is paid by the water supply utility to the municipality concerned. Further costs are incurred by the assurance of extinguishing water availability. According to the statutory provisions applicable in the different federal states in terms of fire prevention, it is for the municipalities to take the necessary measures. The extent of utilization of public drinking water supply for fire prevention depends on the availability of water resources, the efficiency of the pipeline network and the supply situation. Usually, fire protection on a local basis is subject to contractual agreements between the municipality and the water supply utility.



## Cost structure in wastewater disposal in 2005

7

Shares in percent



Source: BDEW/DWA economic data of wastewater disposal in 2005

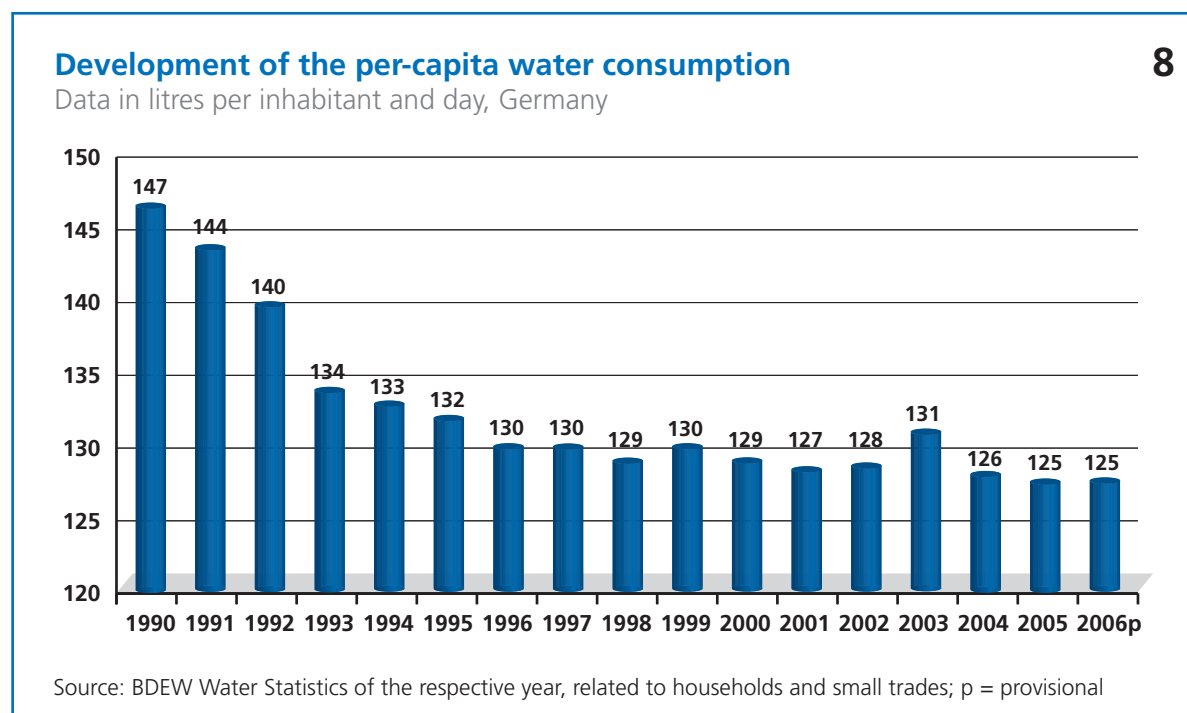
An important factor for the long-term security of supply and disposal is the allowance for costs of maintenance and renewal of technical facilities. A particular challenge is the long service life of the capital-intensive technical facilities. Drinking water and wastewater systems, for instance, have a service life of up to 100 years. Other facilities, such as impounding reservoirs, have an even longer service life. In places, the networks' service life is reduced due to the impact of under-usage (e.g. corrosion damages).

Due to the cost coverage principle in Germany, all costs have to be included in the water price, whereas in other EU countries not all the costs are represented in the water price (VEWA Survey carried out on behalf of BDEW: "Comparison of European Water and Wastewater Prices", 2006).

## 5 Current trends and developments

### 5.1 Drinking water consumption

The average per-capita water consumption in Germany has declined by approx. 15 percent since the early 1990ies, and currently amounts to 125 litres per inhabitant and day (see Chart 8).

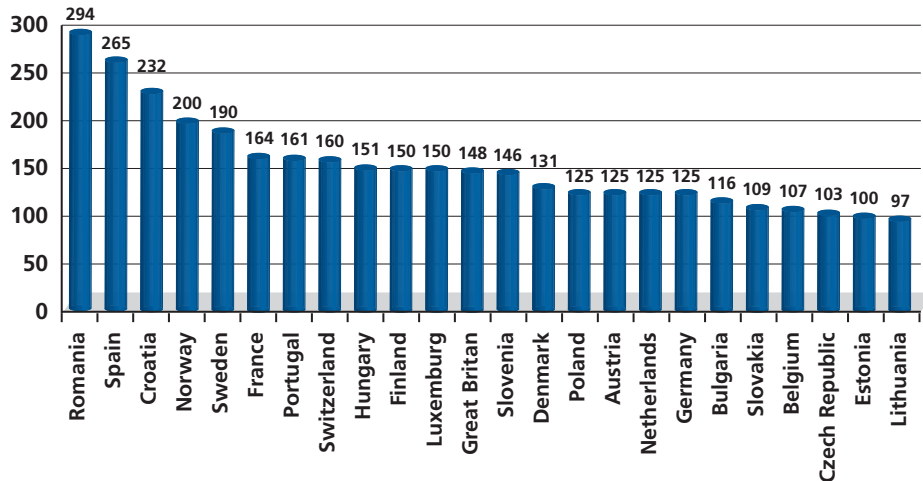


Throughout Europe, the per-capita daily consumption varies between 97 l and 294 l; with 125 l, Germany ranks in the lower third (see Chart 9). A comparison with other industrialized nations, like the USA (360 l to 589 l) or Canada (310 l), shows even more clearly that a careful and environmentally conscious use of the drinking water resources are prevailing in Germany.

## Comparison of per-capita water consumption at European level

9

Data in litres per inhabitant and day



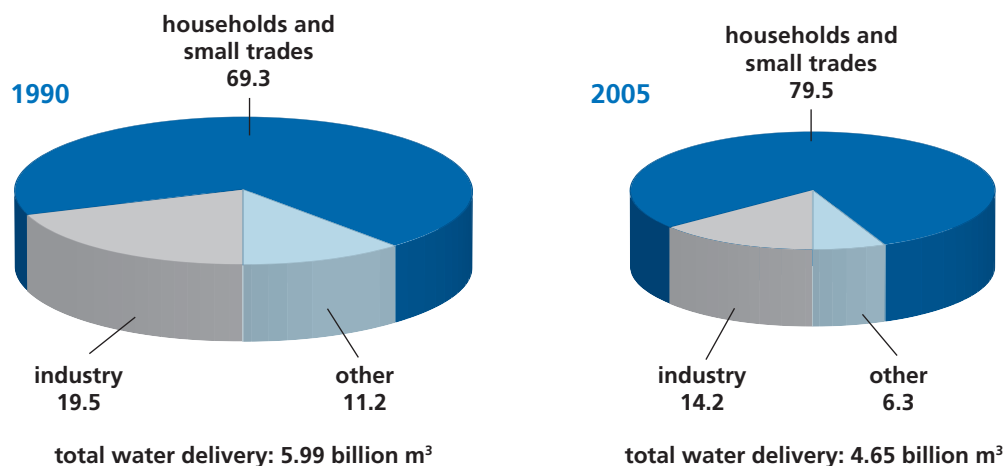
Source: OFWAT 2007, Germany: BDEW (2006); p = provisional

From 1990 to 2005, the water delivery volume of public water supply to the customers has declined from 5.99 to 4.65 billion m<sup>3</sup>, i.e. by approx. 22 percent (BDEW Statistics). A volume of water delivery to customers of 4.67 billion m<sup>3</sup> is forecasted for 2006. Though water consumption of households and small trades has decreased in total since 1990, this customer group gained in importance in terms of water supply. Today, it accounts for almost 80 percent of the water deliveries (see Chart 10).

## Change in water delivery volumes

10

Data in percent, water delivery according to costumer groups in 1990 and 2005



Source: BDEW Water Statistics

The volume of water delivery of public water supply to industry has continuously decreased since 1990. This decrease is attributable to the introduction of resource-friendly production processes and an increasing degree of self-production, but also the decrease in water purchases of industry. In Germany, industry covers 96 percent of its water demand by its own production. This leads to an increasing need for supply utilities to act as corporate managers in the industrial water supply. With 30 percent in England and Wales (2002/3), and 19 percent in France (2001), the share of industry supplied by public water utilities is substantially higher than in Germany (VEWA 2006 survey).

By now, the considerable decrease in the development of the per-capita consumption and the water deliveries to industry partly leads to an under-usage of the facilities and leaves little room for any further downward margins from an operational perspective. To avoid, for instance, deposits and corrosion as well as hygienic problems attributable to longer hydraulic residence times and lower flow velocities, water mains need to be intensively flushed. Operational changes are also required (though to differing degrees depending on the region concerned) in terms of wastewater collection and draining, such as sewer flushing and adjustments of wastewater treatment in sewage plants.

Nevertheless, utilities need to maintain the capacities required to cover peak demand, particularly during longer droughts. In the light of a forecasted increase in drought periods as a result of climate change, peak demand is likely to grow in terms of volume and duration. First signs of this development became apparent e.g. in summer 2006. The ratio between peak delivery and average delivery rose from between 1.0 and 1.8 in 2005 to a value of 1.2 to 1.9 in 2006 (VKU – Operational cost comparison/Benchmarking).

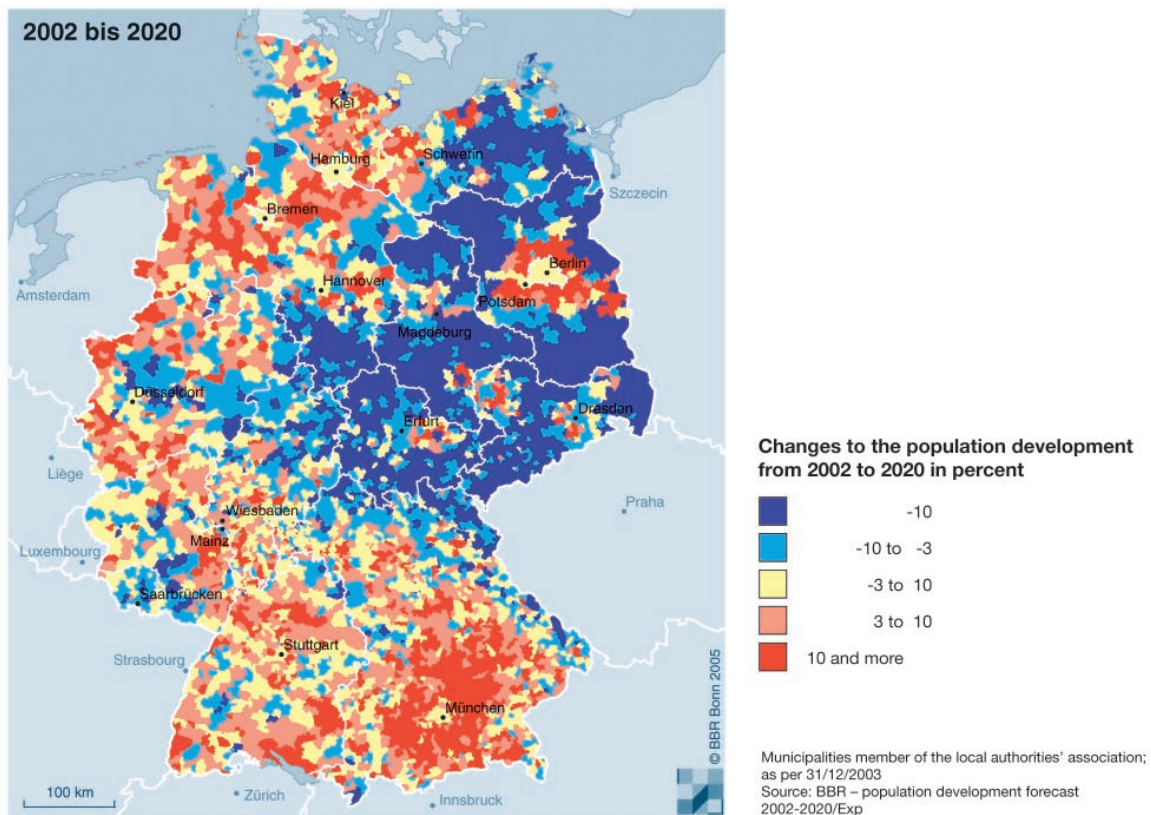
This means that supply utilities must keep the necessary infrastructure available without being able to downsize the mains in spite of a decline in water consumption, on an average. A further reduction of water consumption supported by politics is therefore not reasonable.

## 5.2 Demographic change

The decline in population growth that makes itself already felt in the light of the demographic change is a challenge to the water industry. According to forecasts of the Federal Statistical Office, the population in Germany will decrease from approx. 82 million today to only 59 million in 2050 (forecast leaving inward migration out of account). Especially in the federal states in Eastern Germany, today's negative trend of the population development will continue (see Chart 11). In total, the demographic change will intensify the decrease in water delivery already described as well as the associated infrastructural problems.

## Forecast of the population development

11



Due to multi-annual planning and operation periods of water supply and wastewater disposal facilities, many utilities have already initiated adequate short to long-term planning measures and precautions. They include, for instance, increased flushing of mains, adjustments of the dimensioning or even deconstruction of networks and facilities, and schemes for decentralized wastewater disposal. In total, the volume of water production does not decrease to the same extent as the water amount used by the customer. Against the background of the situation in Germany, a further reduction of water consumption supported by politics is therefore not required and counterproductive.

Should an adjustment or deconstruction of certain network sections be required, this will give rise to additional costs which, due to urban development measures, should be supported by the federal government and the federal states. Furthermore, problems in terms of the calculation of charges may arise in the event of large-scale deconstructions in connection with depreciated costs, e.g. for old plants. Solutions need to be developed for these problems. Due to the high fixed costs for water supply facilities, a stronger weighting of the base price in relation to the volume price is presently under discussion within the branch.

To be able to cope with these challenges, branch-wide concepts are required which can only be developed in a dialogue with all parties concerned. Water supply and wastewater disposal utilities should therefore be included at an early date in urban development planning processes.

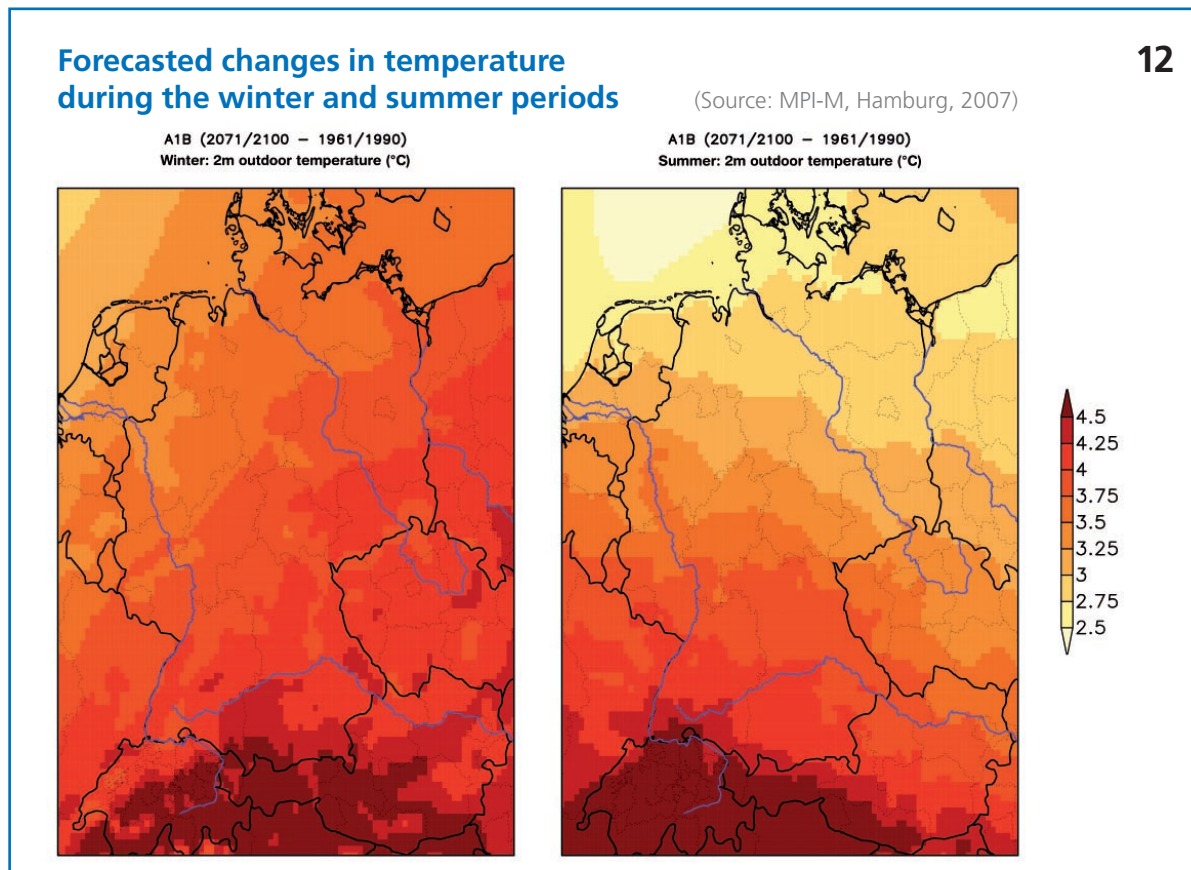
## 5.3 Climate change

The global climate change becomes also noticeable in Germany: temperature changes, changes in the distribution and frequency of precipitation and disaster occurrences also affect the undertakings of the German water industry.

The following rough scenario can be portrayed for Germany:

- : : : Rise of the average annual temperature from 2 °C to 4 °C during the next 100 years, with a distinct increase during the winter months
- : : : Increase in precipitation during the winter months and decrease during the summer months
- : : : Increase in the number of extreme occurrences, such as storms, dry spells, torrential rains, floods

There will be large regional differences in terms of the expected changes (see Charts 12 and 13). The effects on the water balance are not mono-causal. It is essential to take issues of more or less evaporation, changed flow-off behaviour, and possible vegetational changes into consideration. Therefore, reliable forecasts of the impact of climate change on the water industry are difficult to make today. According to a current EU resolution position, the temperature change is to be limited to 2 °C.

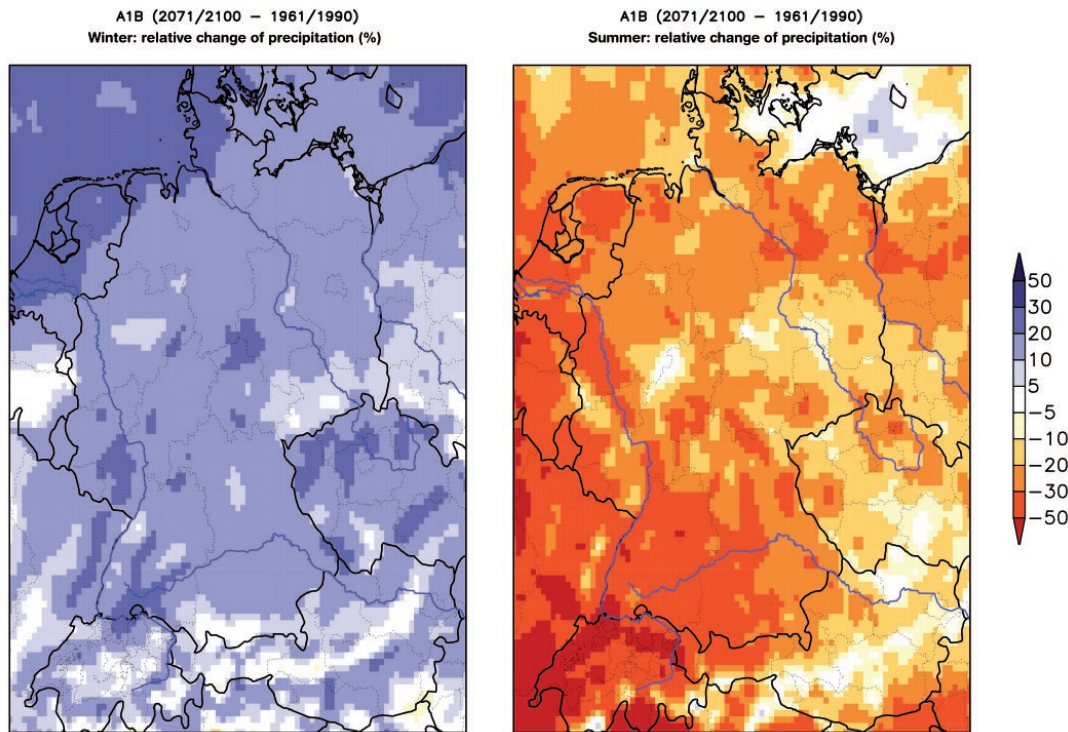




## Forecasted changes in precipitation during the winter and summer periods

(Source: MPI-M, Hamburg, 2007)

13



The water industry is faced with the following occurrences and aspects, which need however to be locally examined and assessed by the different undertakings:

### ::: Increase in the number of dry spells

- dimensioning of facilities in the light of a growing peak demand factor
- determination of the undertakings' own reserves
- sufficient water withdrawal rights
- joint demand coverage
- impact of concurrent utilizations within the catchment area

### ::: Increase in torrential rains and floods

- adequate protection of facilities (e.g. wells)
- sufficient impoundment volume of impounding reservoirs and sewage networks
- adjustment of security margins for the dimensioning of drainage systems
- change of the operating regime

In the field of residential areas' drainage, local asset protection should be given preference to as medium to long-term solution, supplemented by an adequate information policy addressed to abutting owners concerned. Moreover, decentralized retention of precipitation water is increasingly gaining in importance. Also in urban development, the problems of torrential rain need to be tackled through adequate free space planning. Solution approaches permitting higher flexibility will be required in future.

All things considered, it can be said that the climate change does not require a fundamental reorientation of the water industry in Germany. Numerous examples of past years, such as the extreme summer of 2003, the dry year 1976 or the river Elbe flood in 2002 have shown that the German water industry is well positioned to face potential problems resulting from the climate change. Through sustainable management and efficient utilization of water resources, it ensures secure and high-quality drinking water supply. The German water suppliers use 3 percent of the annual renewable water resources. The supply of the population with drinking water of highest quality is also ensured e.g. in hot summers when water demand is higher.

The regionally positioned water industry in Germany with tight municipal structures is optimally prepared to make allowance for the local/regional aspect of climate change. This enables appropriate solutions to be developed on the spot.

Activities of the federal government and of some federal states carried out to date with a view to adjusting to the climate change are to be welcomed. Thus, e.g. planning of flood control measures has been adjusted, research activities in this area have been intensified and climate protection concepts have been drawn up.



# Part B – Performance of the Water Industry

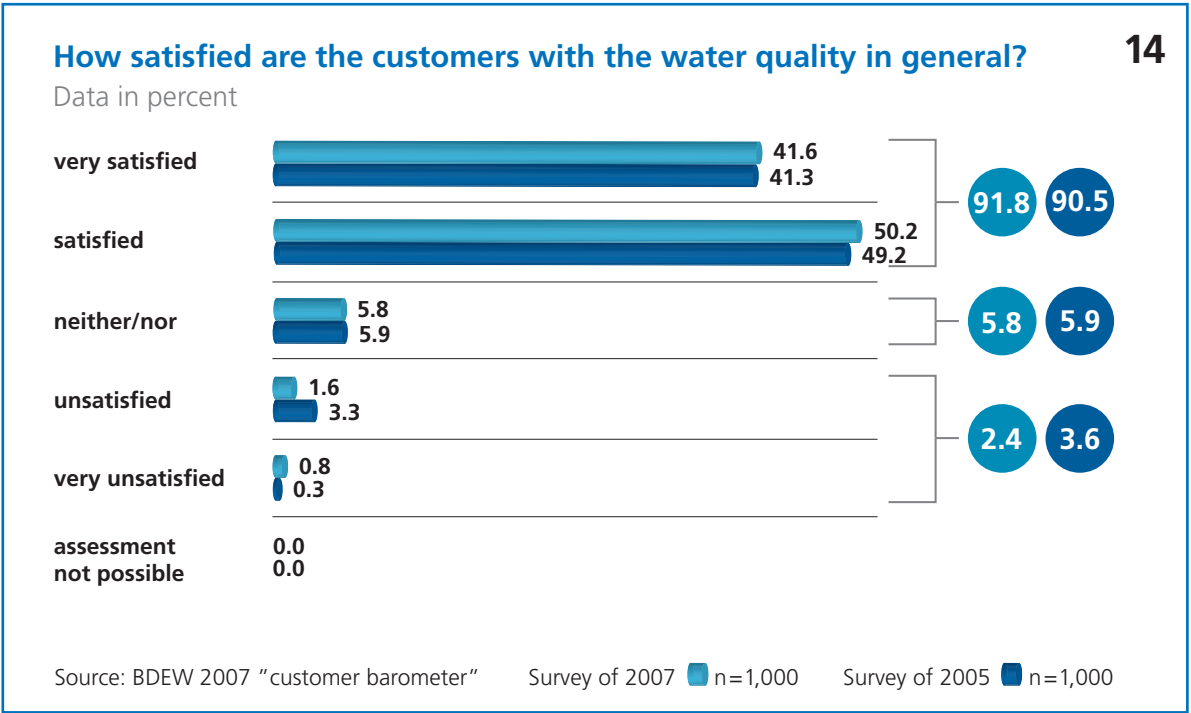
## 1 Customer satisfaction

In 2007, the customers were interviewed for the third time nationwide and representatively about water supply, and for the second time about wastewater disposal (BDEW 2007 customer barometer).

### 1.1 Drinking Water Supply

#### 1.1.1 Drinking water quality

Altogether, the drinking water quality is given good to very good marks by the customers. In general, the customers’ satisfaction with the drinking water quality has stabilized at a very high level: approx. 92 percent are “very satisfied” or “satisfied”.



#### 1.1.2 Service

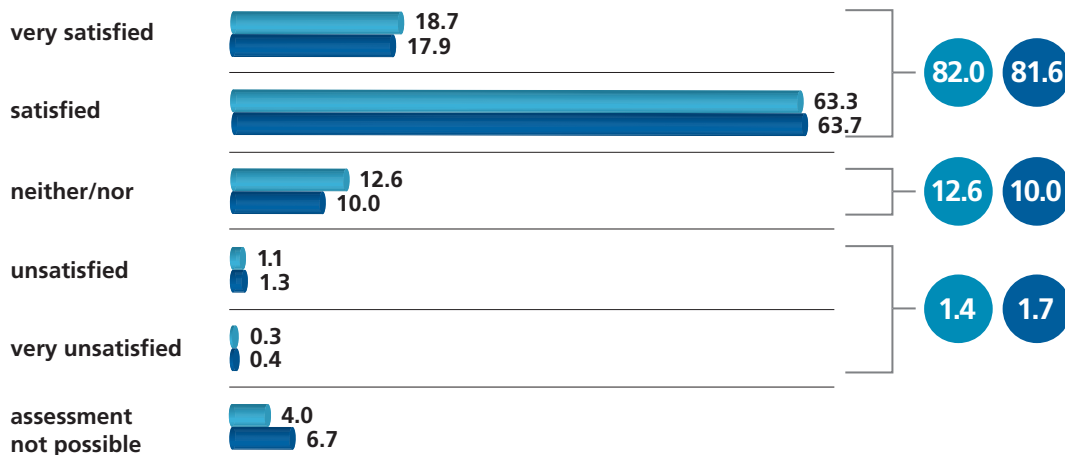
The customers’ satisfaction with their water provider’s service is continuously high.



## Customers' satisfaction with the service of their water provider

15

Data in percent



Source: BDEW 2007  
"customer barometer"

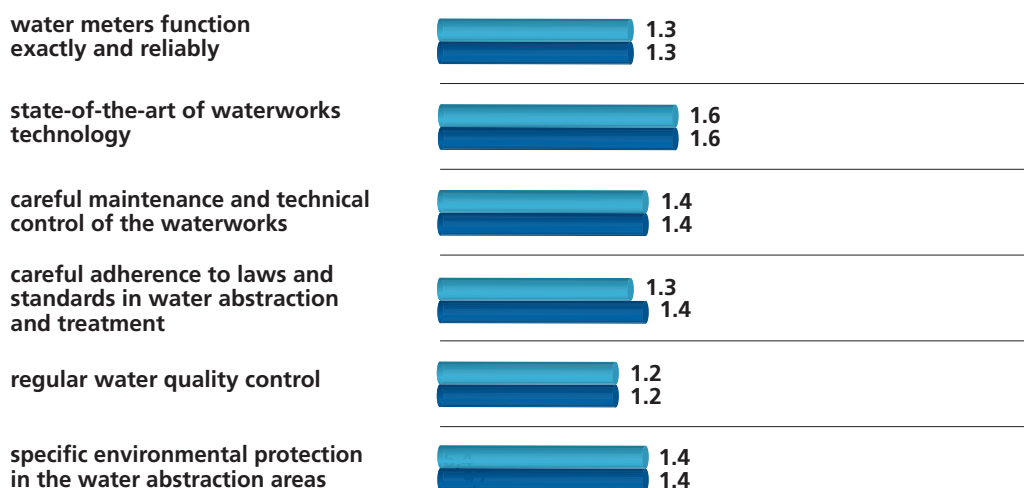
Survey of 2007 n=1,000  $\sigma=2.0$  Survey of 2005 n=1,000  $\sigma=2.0$

Also in 2007, the most important criteria for the persons interviewed are the regular testing of drinking water and the proper functioning of water meters.

## Which services are important to the customer?

16

Assessment scale: 1 (important) up to 5 (unimportant)



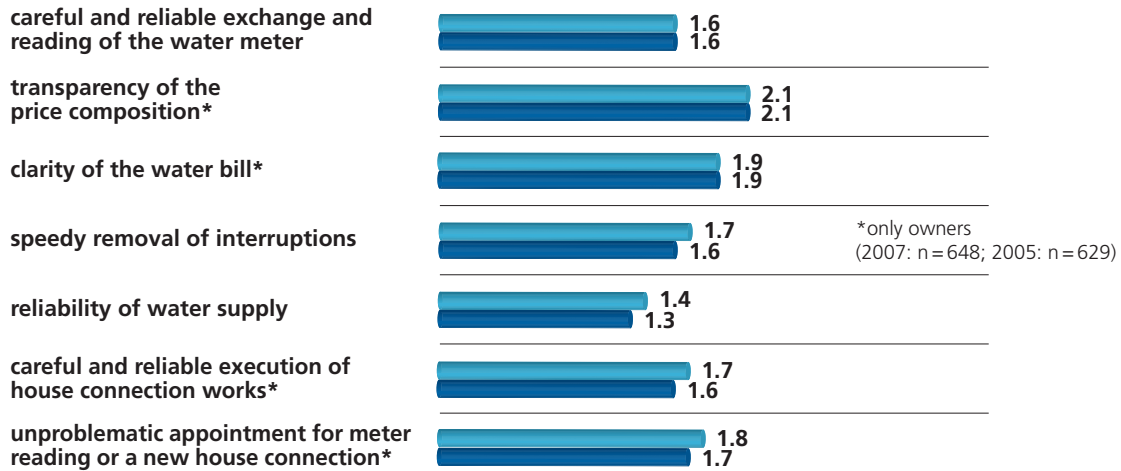
Source: BDEW 2007 "customer barometer" Survey of 2007 n=1,000 Survey of 2005 n=1,000

The best marks are given by the customers for their provider's services in terms of "Reliability of water supply" and "Careful and reliable meter exchange and reading".

## Assessment of the water providers' services

17

Assessment scale: 1 (very good) to 5 (poor)



Source: BDEW 2007 "customer barometer"

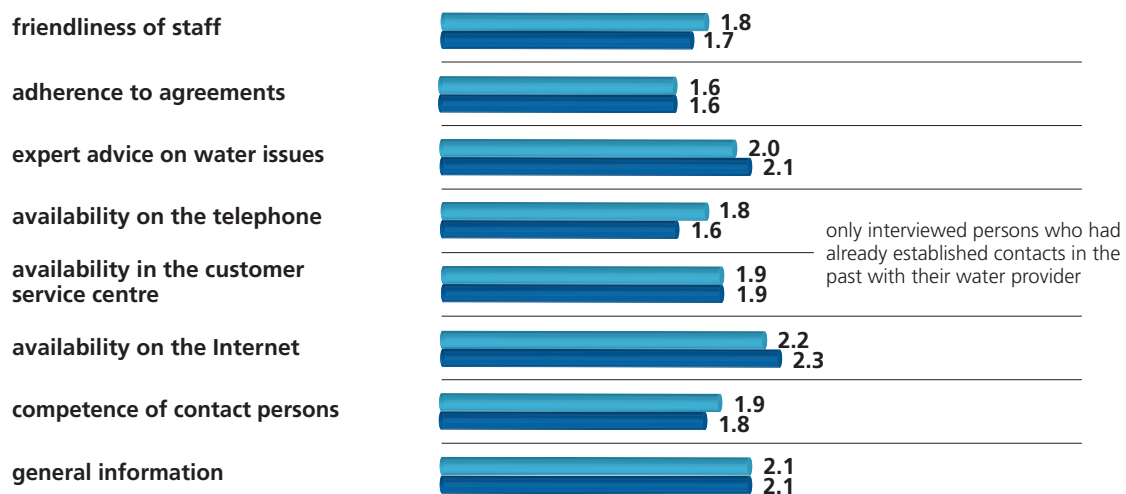
Survey of 2007 n=1,000 Survey of 2005 n=1,000

Customers having been in touch with their provider assessed its performance with marks from 1.6 to 2.3 (in 2007). Customers were very satisfied with the provider's adherence to agreements (1.6). There is a slight potential for improvement in terms of the provider's availability on the Internet.

## How satisfied are the customers with the service?

18

Assessment scale: 1 (very good) to 5 (poor)

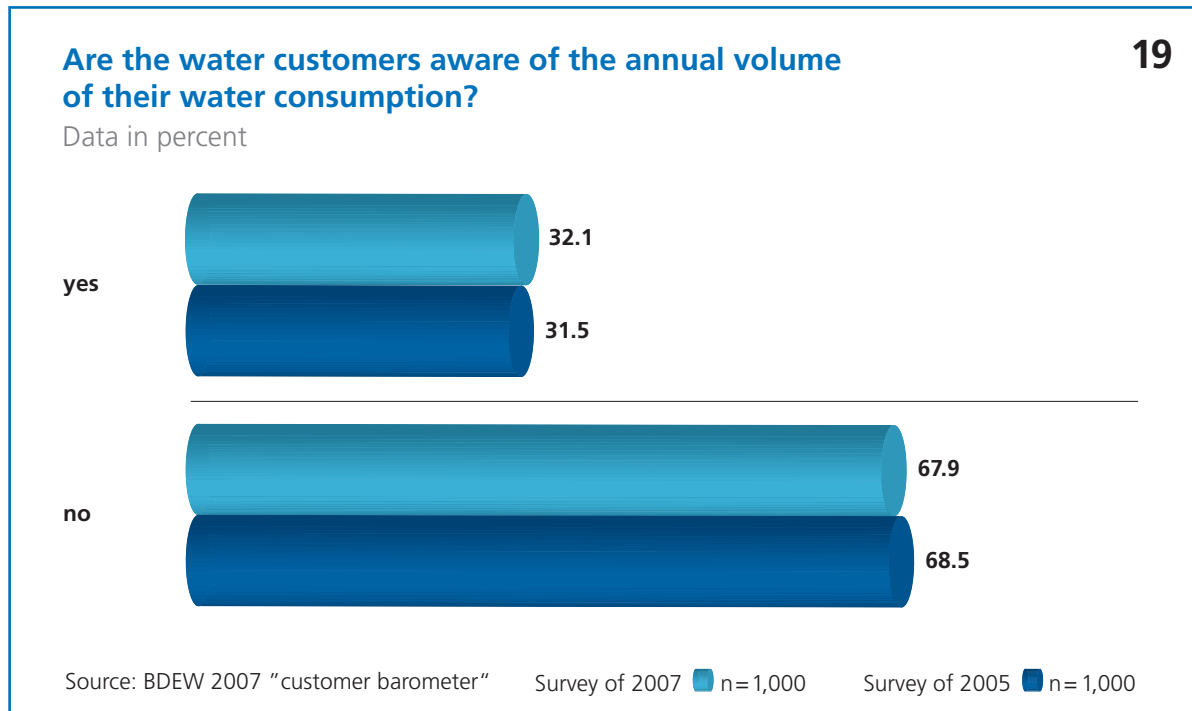


Source: BDEW 2007 "customer barometer"

Survey of 2007 n=560 Survey of 2005 n=487

### 1.1.3 Awareness of water consumption volume and drinking water prices

The share of customers claiming to be aware of their effective water consumption volume amounts to 32 percent.



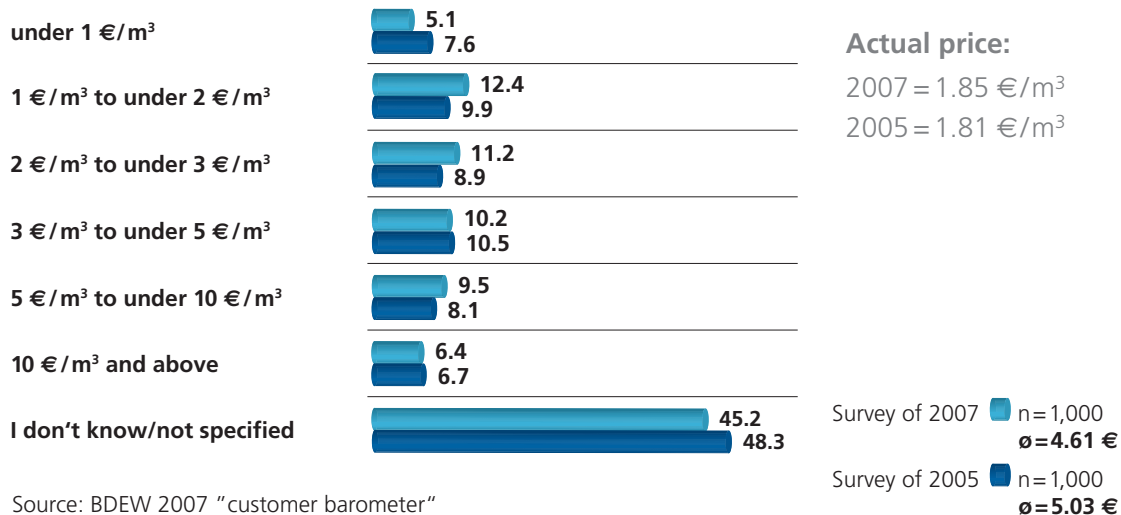
Almost 79 percent of the interviewed persons stated to economize water consumption. The main motive still is to save money (71%) or to protect the environment (60%).

In 2007, the share of customers who could not state their annual expenses for drinking water totalled 68 percent. With an average of 4.61 €, the price for 1,000 litres of drinking water is still estimated by the interviewed persons at more than double of the real average price of 1.85 € (2007).

## How do the customers estimate the price for 1,000 litres (= 1 m<sup>3</sup>) of drinking water?

20

Data in percent



### 1.1.4 Public image and rate of complaints

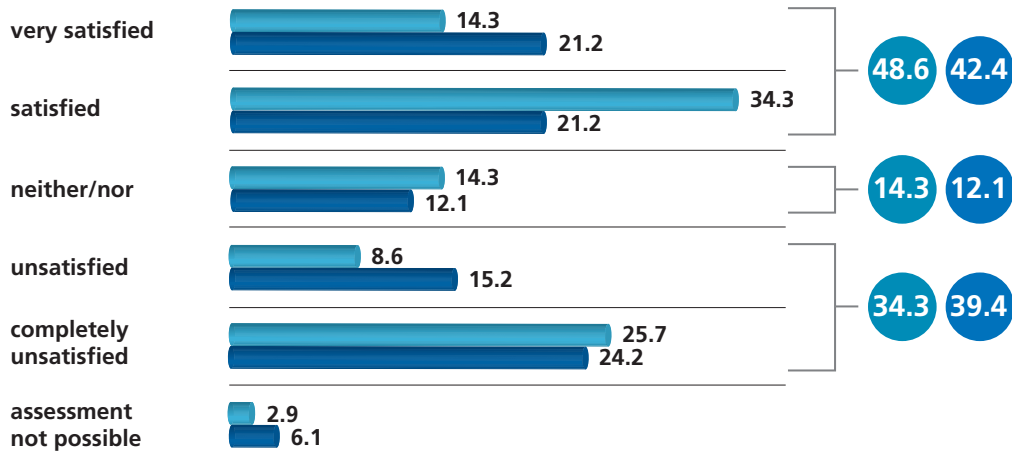
Altogether, the public image of the German water providers is thoroughly positive, which is also confirmed by the 2007 survey. The reliability and the quality awareness of the water provider are still given the best marks (1.6 and 1.8, respectively). Good marks were also given for the aspects of "fair water prices" (2.5 in all surveys since 2003) and "unbureaucratically working utility" (2.5) within a possible range of 1 to 5.

With 3.5 percent, the rate of complaints has been extraordinarily low for many years. The number of persons unsatisfied with the water providers' response to their complaints has continuously decreased: from 52 percent in 2003 to 34 percent today. At the same time, the number of customers who were "satisfied" or "very satisfied" with the response to their complaint rose to almost 49 percent. This shows, that the performance of water supply utilities improved in this respect.

## Customer satisfaction with providers' response to complaints

21

Data in percent



Source: BDEW 2007 "customer barometer"

Survey of 2007 n=35 ø=3.0  
Survey of 2005 n=33 ø=3.0

## 1.2 Wastewater disposal

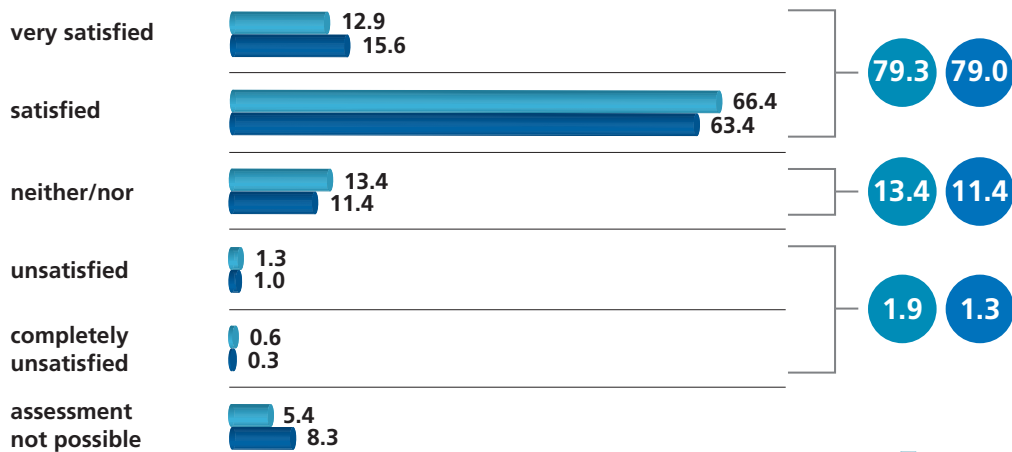
### 1.2.1 Service

The overall satisfaction of customers with their wastewater disposal utility is constantly high: Also in 2007, 79 percent of the customers are "very satisfied" or "satisfied".

## Overall satisfaction of customers with the services of their wastewater disposal utility

22

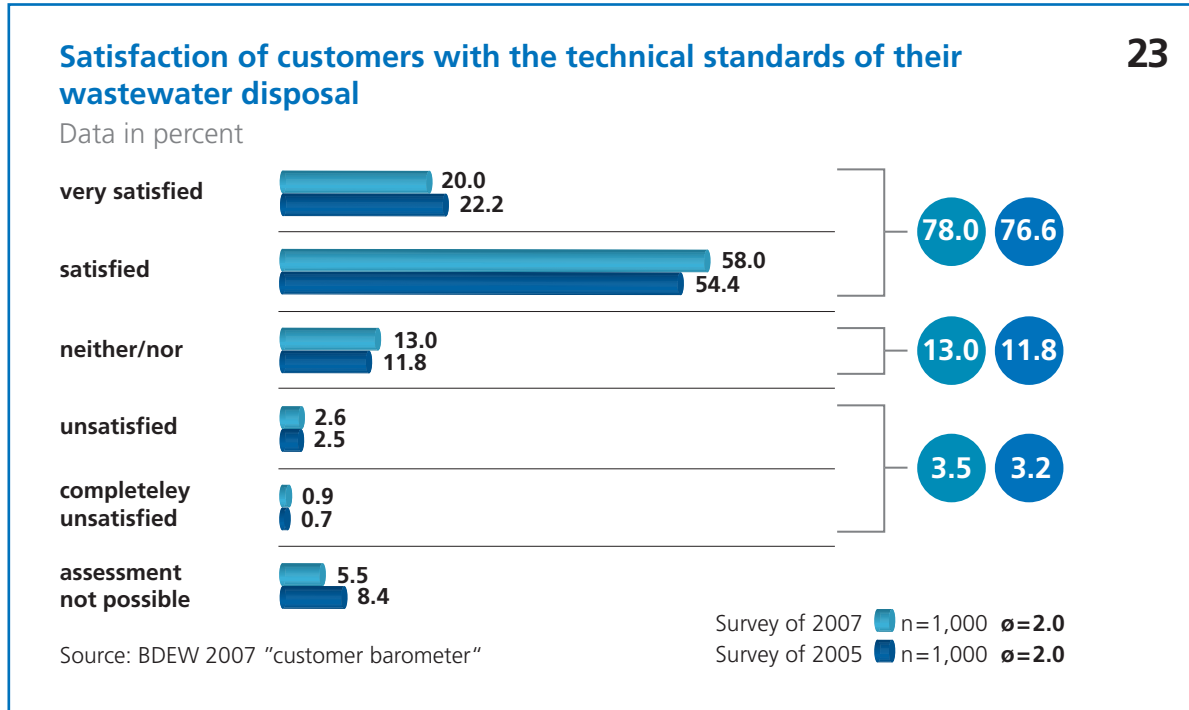
Data in percent



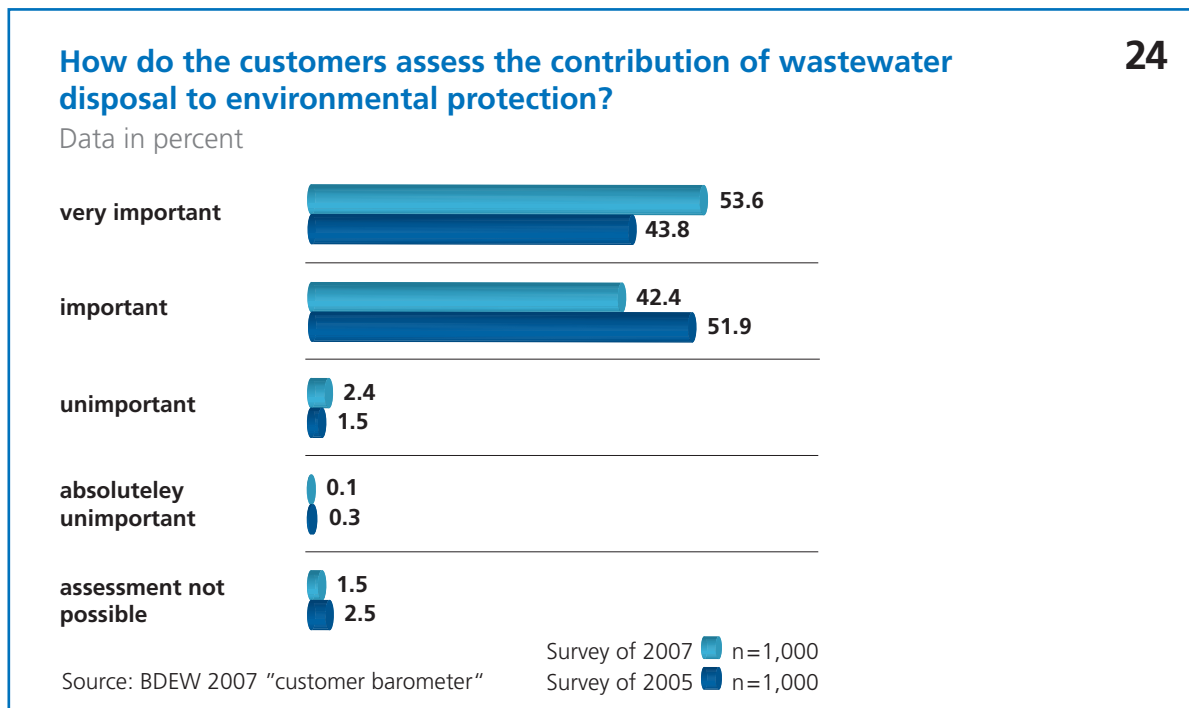
Source: BDEW 2007 "customer barometer"

Survey of 2007 n=1,000  
Survey of 2005 n=1,000

An increasing number of customers are satisfied with the technical standards of wastewater disposal: 78 percent are "very satisfied" or "satisfied". The customers' satisfaction is high.

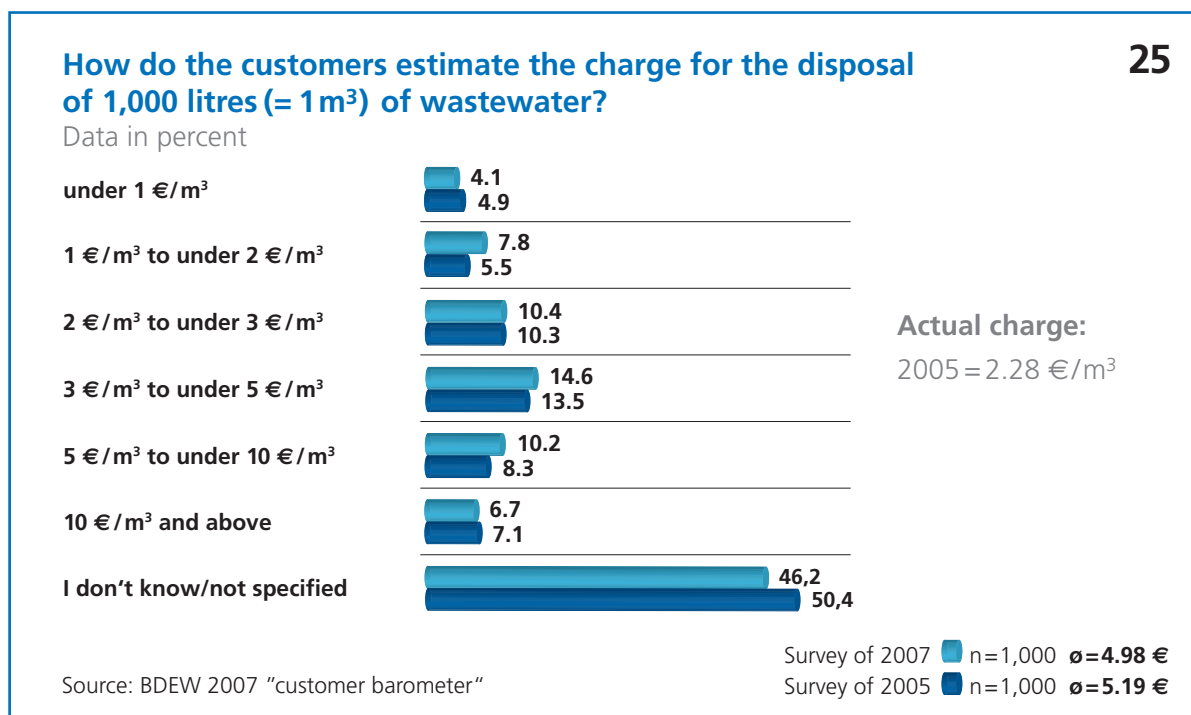


The contribution of wastewater disposal to environmental protection is still assessed as "important" to "very important" by approx. 96 percent of the interviewed persons.



### 1.2.2 Awareness of the wastewater disposal utility and the level of wastewater disposal charges

Also in 2007, only 48 percent of the interviewed persons knew their wastewater disposal utility – 1 percent more than in 2005. Like in 2005, the wastewater charge estimated in 2007 was essentially higher than the real charge. With an average price of 4.98 €, the charge for the disposal of 1,000 litres of wastewater is still assessed by the interviewed persons at more than double of the real average price of 2.28 € (2005). Almost half of the customers do not know the amount of the charge or do not make any comments.



Approx. 74 percent of house owners understand their wastewater bill, almost 13 percent do not understand their bill and about 14 percent do not make any comments. It still is in the interest of utilities to offer more appropriate information to the customers.



## 2 Security

### 2.1 Interruptions of supply

In Germany, data on interruptions of supply are not centrally recorded. Regional benchmarking projects enable transparency and information to be obtained in this respect. According to the projects carried out in Bavaria, Hesse, Thuringia and Baden-Württemberg, customers of the utilities under review were not affected by unplanned or unannounced interruptions of water supply of more than 12 hours. The investigated utilities deliver between 30 and 42 percent of the water output in the respective federal state.

In Germany, it is taken for granted that interruptions of water supply do not occur. However, this does not apply to the same extent internationally. The performance of the German water industry is far above average when compared at an international level.

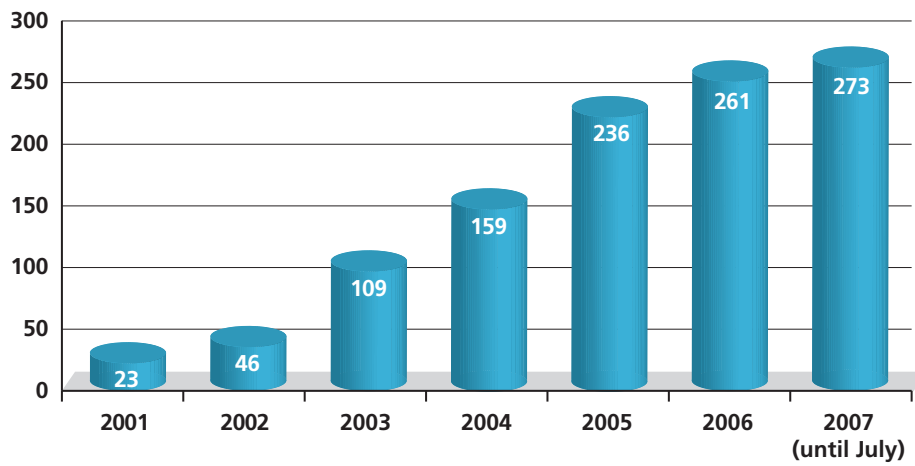
### 2.2 Organizational safety (Technical Safety Management)

Essential prerequisites for the observance of statutory and technical requirements and the fulfilment of demand-side quality standards in terms of water supply and wastewater disposal are adequate high-capacity facilities, correct and appropriate operation, sufficiently qualified personnel and measures of quality assurance. The maintenance of well-proven standards in the water industry is ensured by several components. The basis is formed by independent technical rules and regulations, particularly those of DVGW and DWA. Furthermore, many utilities make increasingly use of the possibility of having their Technical Safety Management (TSM) certified by independent experts (see Chart 26). Technical Safety Management increases the utilities' organizational safety and thus the technical safety of operation, especially in the event of disturbances and emergency situations.

## Development of TSM checks in the water supply and wastewater disposal sectors

26

Number of utilities per year



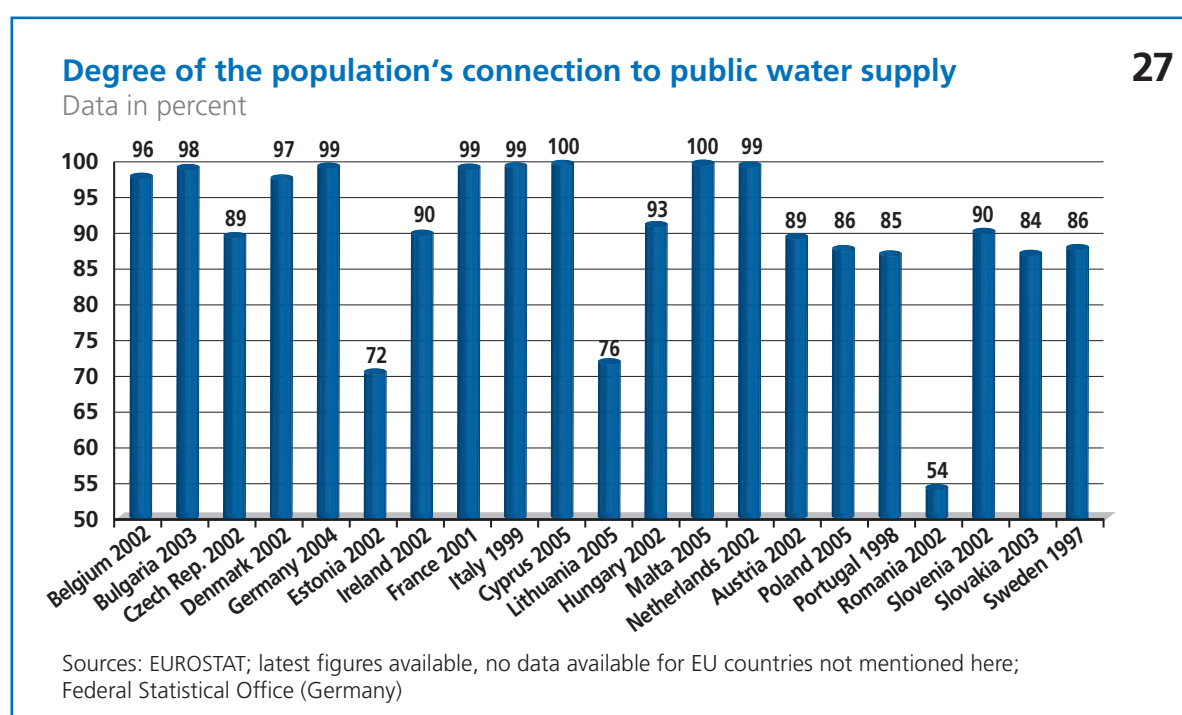
Source: DVGW + DWA

## 3 Quality

### 3.1 Connection degree and network length

In Germany, the degree of connection to the public water supply is above 99 percent and thus attains a very high level as compared to other European countries (see Chart 27).

Concerning the length of the drinking water network, there is no exact data available, but the total length of the drinking water network in Germany is likely to be 500,000 km (without house connections).

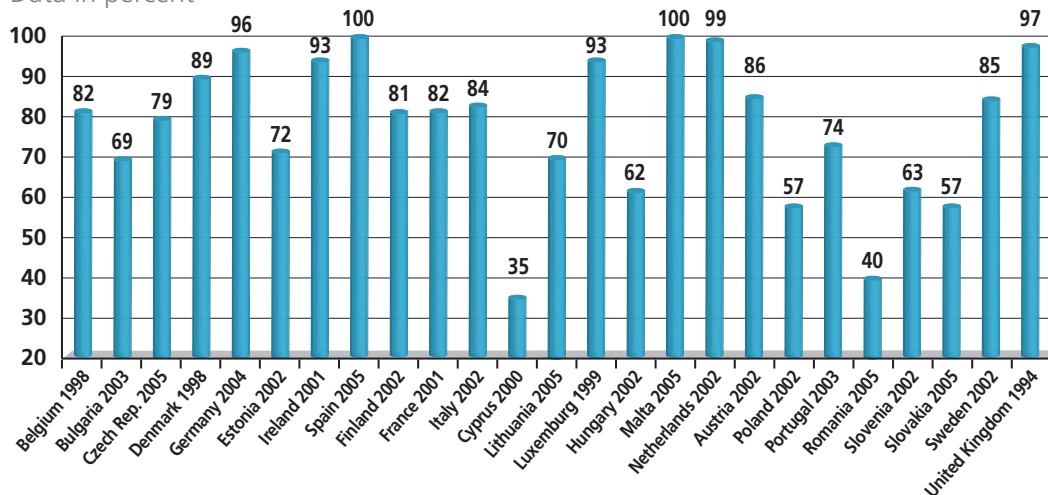


With a connection degree of 96 percent to the public sewage network, Germany is holding a top position as compared to other European countries (see Chart 28). The degree of connection to sewage networks and wastewater disposal plants has slightly increased since 2001. 90 percent of the population are connected to sewage treatment plants which meet highest EU standards (biological wastewater treatment with nutrient elimination, "3rd purification stage", see Chart 29).

## Degree of the population's connection to the sewage network regardless of the availability of sewage purification plants

28

Data in percent



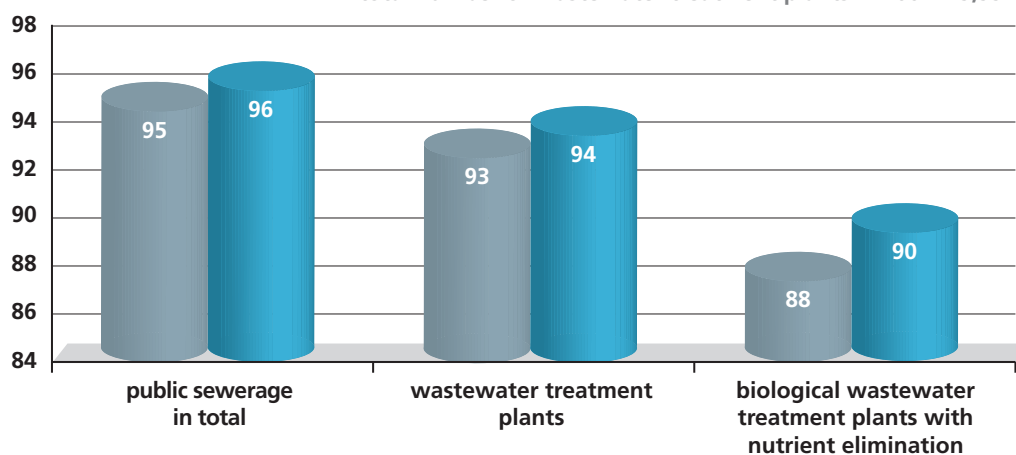
Sources: EUROSTAT; latest figures available, there are no data available for the EU countries not mentioned here; VEWA Survey of 2006 (Italy)

## Degree of the population's connection to wastewater treatment plants

29

in 2001 and 2004 (percent)

total number of wastewater treatment plants in 2001: 10,188  
total number of wastewater treatment plants in 2004: 9,994

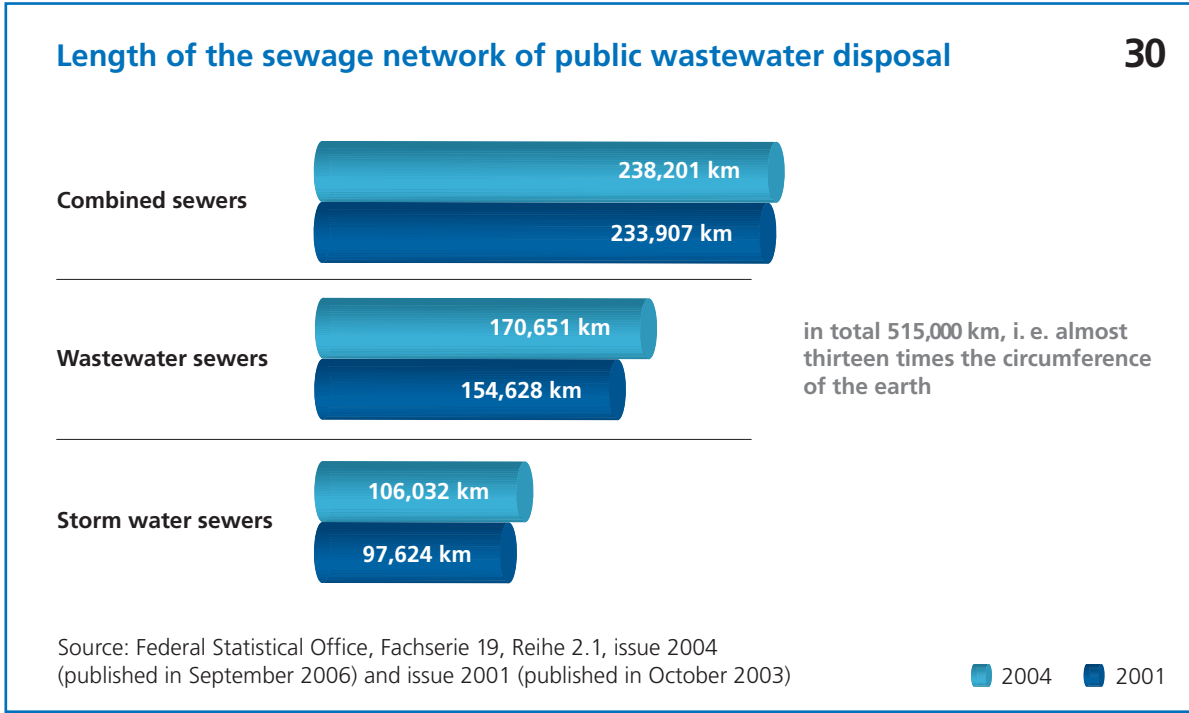


Source: Federal Statistical Office, Fachserie 19, Reihe 2.1, issue 2004 (published in September 2006) and issue 2001 (published in October 2003)

■ 2001 ■ 2004

The wastewater of households which are not connected to central wastewater systems is treated by decentralized sewage purification plants or the like, so that the degree of connection to wastewater treatment plants comes up to almost 100 % (99.5% in 2004, Federal Statistical Office, 2006). Decentralized wastewater disposal is supported by different information and advisory services as sewage purification plants partly need to be retrofitted by 2015.

The length of the German public sewage network totals approximately 515,000 km, combined sewers prevailing (see Chart 30). In addition, there are about 63,000 storm water drainage systems.



### 3.2 Water losses

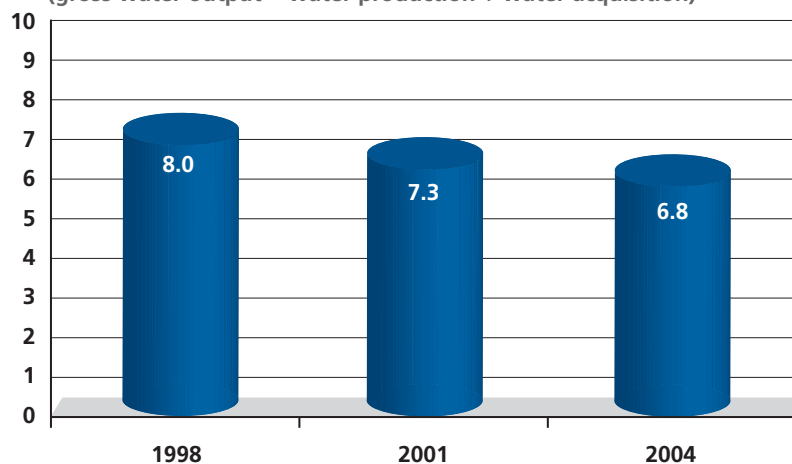
Low water losses within the public drinking water network are an important indicator of the quality of pipelines and security of supply. During the past few years, water losses in the German drinking water network have been decreasing (see Chart 31). With less than 7 percent, Germany has by far the lowest water losses as compared to other European countries (see Chart 32).

## Water losses in Germany

31

Data in percent, related to the gross water output

(gross water output = water production + water acquisition)



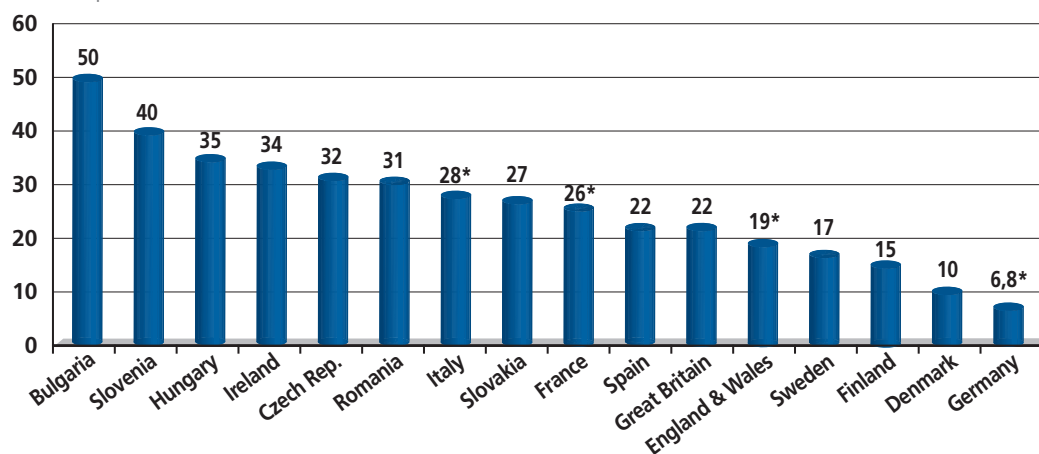
Extractions for operational purposes and fire control are rated as losses.

Source: Federal Statistical Office, Fachserie 19, issue 2.1, Heft 2004 (published in September 2006)

## Water losses in the public drinking water network: most important indicator of network quality and security of supply

32

Data in percent



\*Extractions for operational purposes and fire control are rated as losses.

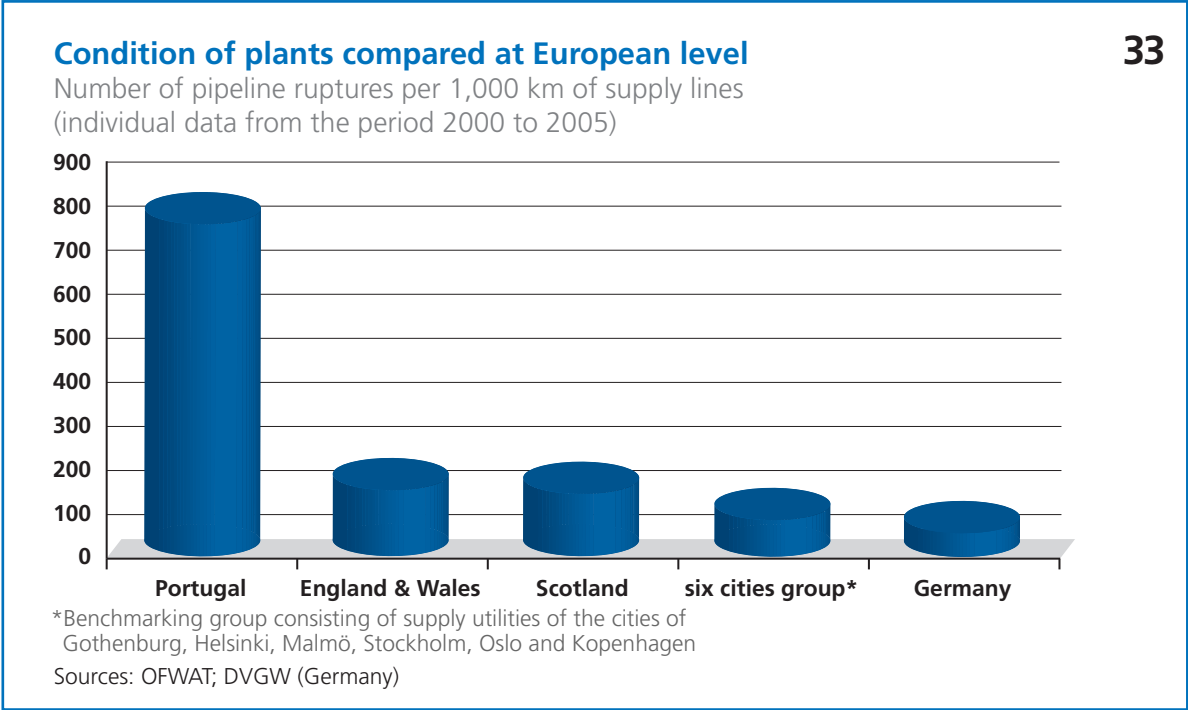
Sources: VEWA 2006 Survey (Italy, France, England & Wales);

Federal Statistical Office 2004 (Germany); remainder: EU Commission 2007

## 3.3 Condition of plants

On an average, the rates of damages to supply lines, house connections and mains fittings have been on a constantly low level in Germany during the past few years.

With less than 10 damages per year and per 100 km of supply line, on an average, Germany is holding a top position in Europe and in the world (see Chart 33).



With regard to wastewater, 90 percent of the sewage network operators had checked their entire network through inspection in 2001. In 2004, this percentage amounted already to 95. The knowledge of damages to the sewage system is the first step towards a tight sewage network. Approx. 20 percent of the public sewage system are in need of rehabilitation in the short or medium term. Another 21.5 percent show slight damages and need to be rehabilitated in the long term.

### 3.4 Drinking water quality

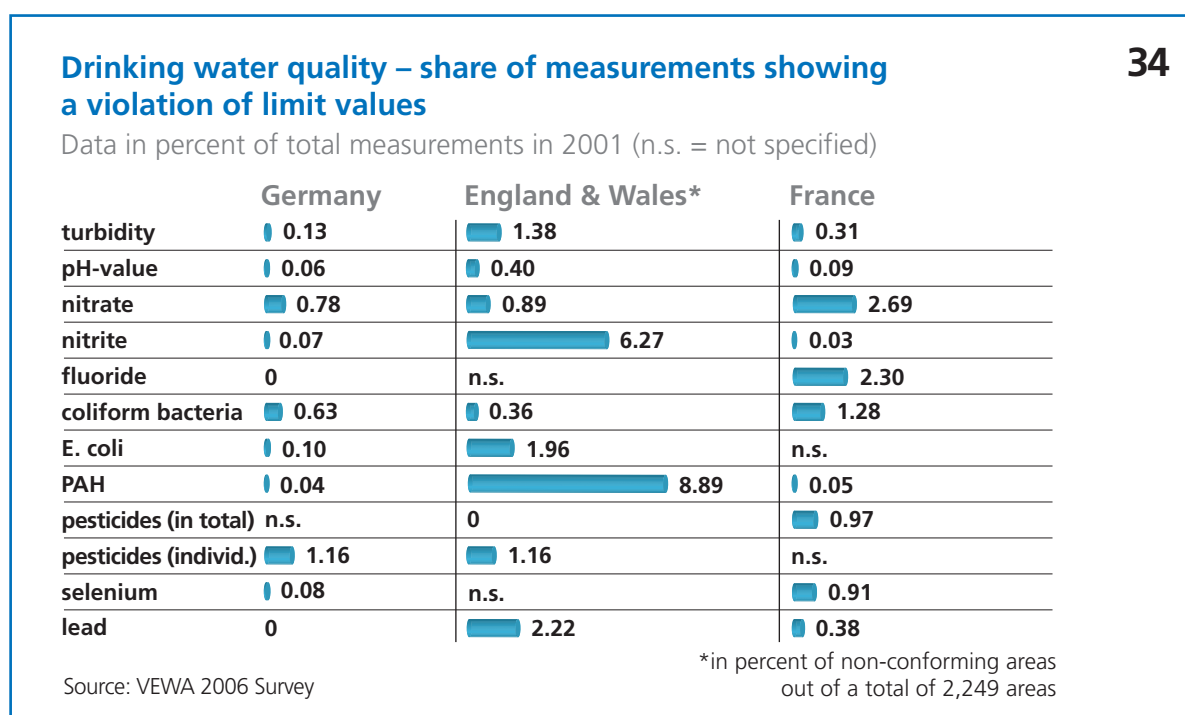
It is the task of the public drinking water supply to ensure the high drinking water quality required by the law. In Germany, the supervision of drinking water is based on the Drinking Water Ordinance through which the EC Drinking Water Directive (“Directive on the quality of water intended for human consumption”) was implemented into national legislation. The drinking water quality is controlled by the responsible health authorities of municipalities and administrative districts in Germany.

The latest report (2006) of the Federal Republic of Germany to the EU Commission on the EC Drinking Water Directive shows that the minimum number of investigations required by law is exceeded. The requirements of the Drinking Water Ordinance are met in 99.6 percent of the more than 1.1 million analyses. This is proven by the continuously high drinking water quality in Germany. 99.5 percent of previous analyses also met the requirements (Report 2001).



Concerning slight violations of upper limits, pesticides, nitrate and coliform bacteria have to be mentioned first. Where coliform bacteria occurred, upper limits were sporadically exceeded. These violations were however not confirmed by further analyses.

A Europe-wide comparison of the observance of the EC Drinking Water Directive would be informative. However, due to the available data basis, it is difficult to implement. The EU currently publishes figures for the period from 1996 to 1998 (status: 17/1/2008). The VEWA Survey (2006) determined the share of measurements in 2001 which exceeded the national limit values in Germany, England/Wales and France (see Chart 34). Nevertheless, these figures do not provide any findings about the extent to which the drinking water was impaired and how many persons supplied were affected.



Violations of upper parameter values are only tolerated pursuant to the EC Directive for a period of three years and on condition that they are remedied. In addition to European law, the German law provides a binding imperative to minimize chemical substances in the water. In many places, the use of disinfectants in water treatment can be foregone without reducing the high hygienic drinking water standard in Germany.

### 3.5 Wastewater disposal standards

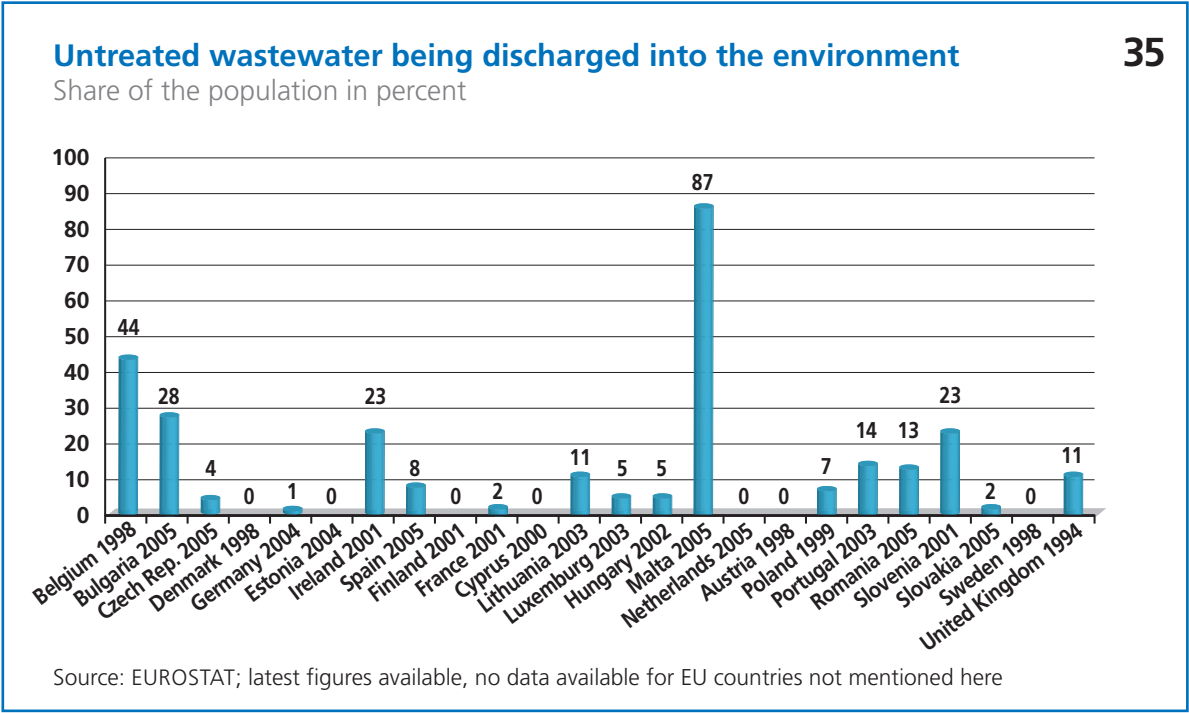
In Germany, 97 percent of the wastewater volume is treated with the highest EU standard (biological treatment with nutrient elimination, i.e. third purification stage pursuant to the EC Directive on "Urban Wastewater Treatment).



For specific local requirements or official standards, further elements may add to the above.

In Germany, the DWA performance comparison of municipal sewage treatment plants in 2006 determined for all sewage plants degradation degrees of 82 percent for nitrogen, and 91 percent for phosphorus. Smaller sewage plants which do not have to meet certain requirements in terms of nutrient elimination also showed good degradation values.

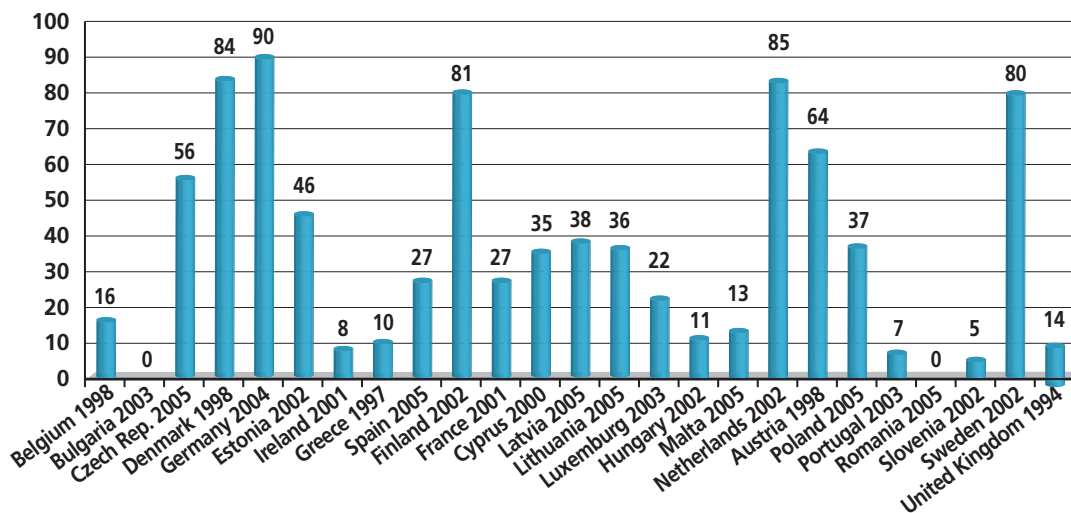
The latest report of the EU Commission (SEC (2007) 363) shows that Germany, in contrast to other member states, fully complies with the requirements of the EU. In this report, the EU Commission draws attention to the inadequate data basis, insufficient wastewater purification in some sensitive areas and the deficient specification of sensitive areas by other member states.



## Connection of the population to municipal sewage treatment plants with highest (=3rd) purification stage

36

Data in percent



Source: EUROSTAT; latest figures available, there are no figures available for the countries not mentioned here

The two following diagrams show the degree of implementation of the EU requirements concerning the treatment of wastewater purified by municipal sewage plants. According to EU legislation, it is left to the discretion of the member states to specify certain areas as "sensitive" areas. In those areas, wastewater purification has to comply with higher EU requirements.

Not all EU member states have specified "sensitive" areas. In Germany, the entire national territory except for the Lower Danube Basin has been specified as "sensitive" area, i.e. the highest EU standards are applicable here.

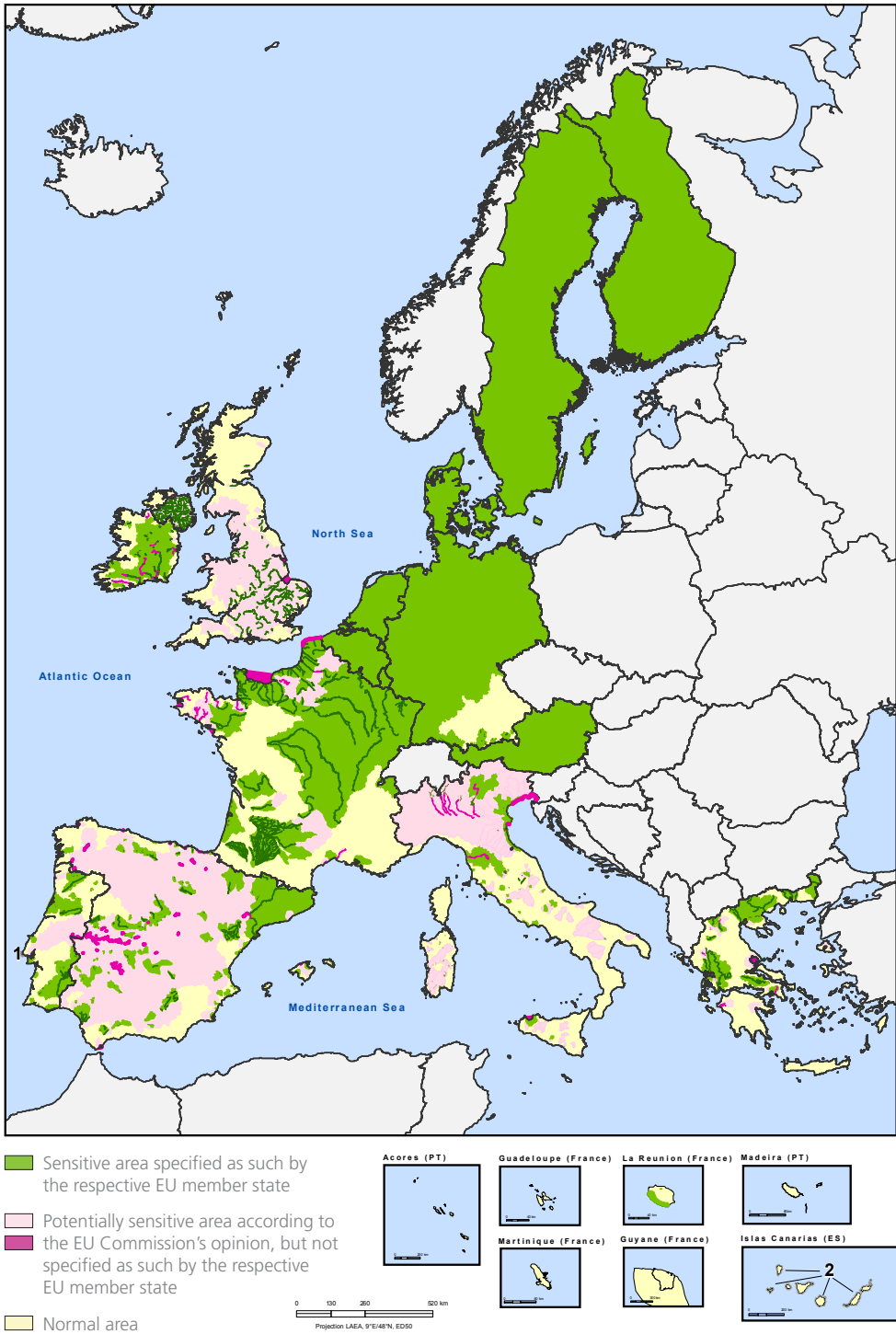
The large differences in terms of the implementation of the EC Directive on "Urban Wastewater Treatment" within the EU become also apparent when looking at the wastewater purification of big cities. Only in Germany, Austria, Denmark and Finland, wastewater purification of big cities meets

### Specification of sensitive areas by the EU member states

as per 01/01/2003 or 01/01/2005 (Italy)

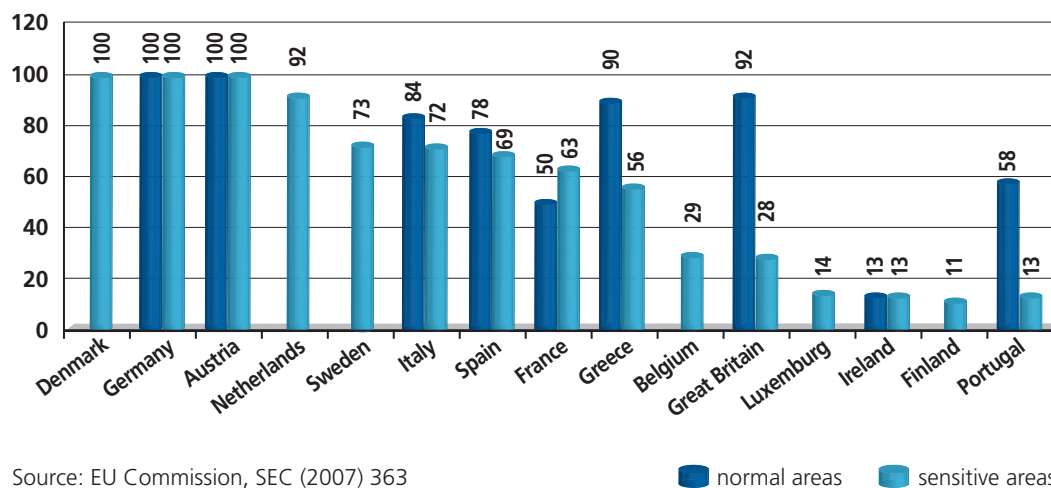
Source: EU Commission

37



### Implementation of the EC Directive on "Urban Wastewater Treatment" by the member states: Compliance with the Directive's requirements (normal and sensitive areas)

Data in percent of load in conformity

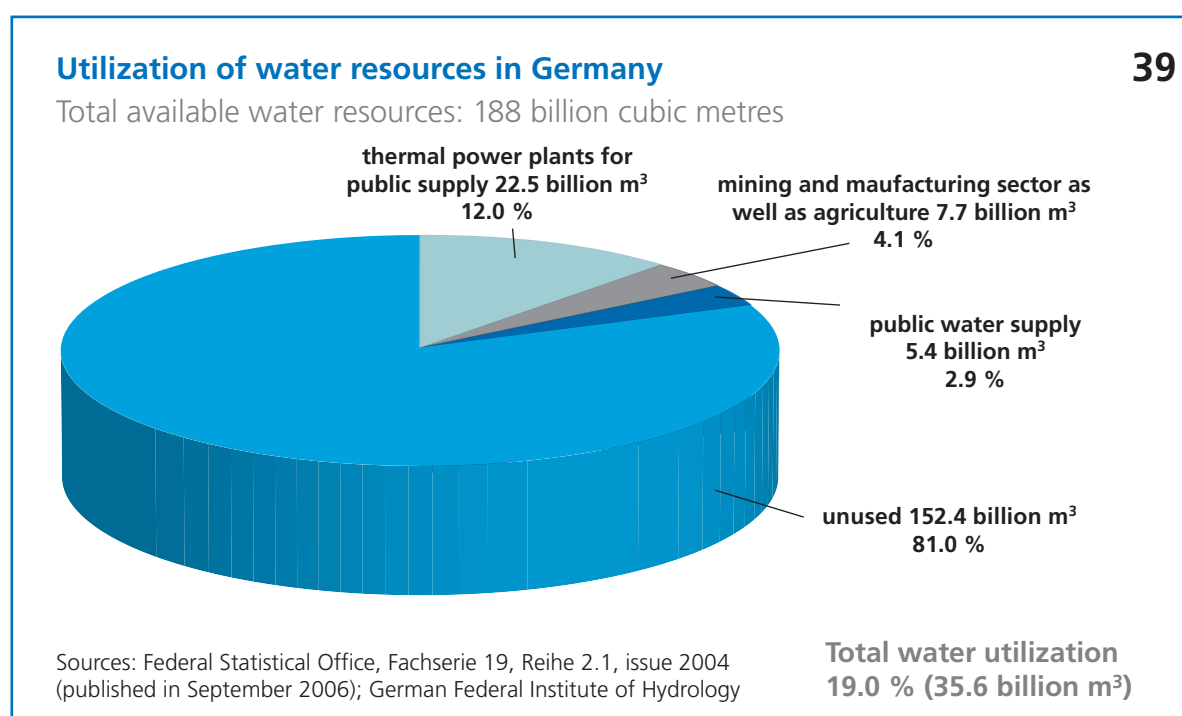


European standards. The latest report of the EU Commission shows that all 143 big German cities fully comply with the EU requirements for wastewater purification as per January 1st, 2003, whereas the wastewater treatment of 17 big European cities was inadequate in 2003.

## 4 Sustainability

### 4.1 Availability of resources and their utilization

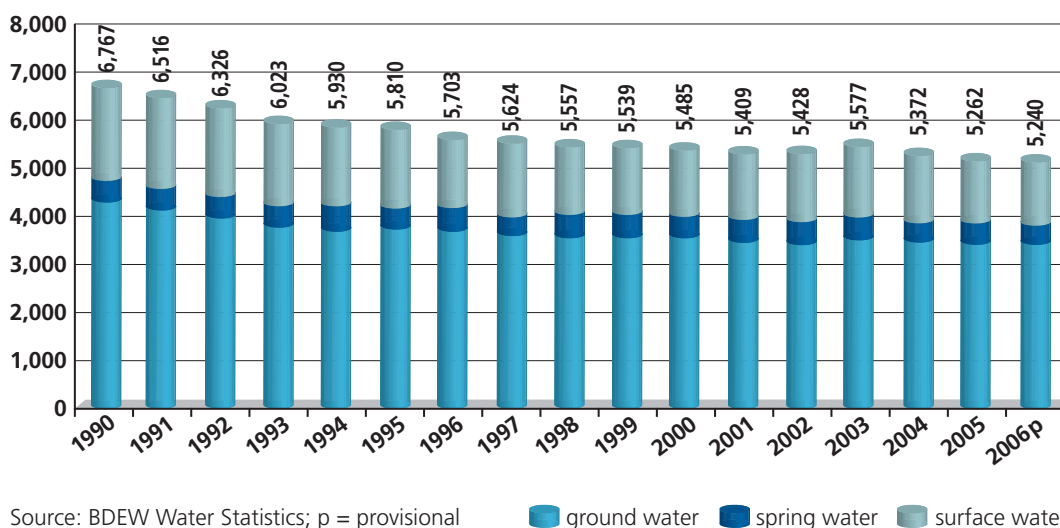
The Federal Republic of Germany is rich in water bodies. Germany's total annually renewable water reserve amounts to 188 billion m<sup>3</sup>. Only 19 percent of these resources are actually utilized by different users (see Chart 39). The public water supply uses approx. 5.4 billion m<sup>3</sup> per year, which accounts for only 2.9 percent of the available resources. In the light of such a comfortable situation, secure water supply is guaranteed in the long term, given a sustainable use of water resources.



The preferred use of local resources for drinking water abstraction is characteristic for Germany. With a share of approx. 74 percent, ground water (including spring water) is the most important resource for drinking water abstraction. The share of utilized surface water resources (impounding reservoirs, bank filtrate, enriched ground water, direct extractions from rivers and lakes) amounts to 26 percent. Since 1990, annual abstraction volumes have continuously decreased by about 23 percent (see Chart 40).

### Development of water abstraction for public drinking water supply in Germany

Data in million m<sup>3</sup>



## 4.2 Protection and status of resources

It is for the State to take care of the nationwide protection of water bodies. In addition, targets have been defined at European level, such as in the EC Water Framework Directive. The most important principles laid down in this Directive are the Polluter-Pays-Principle and the Precautionary Principle as well as the objective to achieve a "good status" of water bodies by the year 2015. In order to meet this European target, the member states are required to ensure the necessary protection of water resources with a view to preventing a deterioration of the quality and hence to reducing the extent of water treatment required for drinking water production. The first inventory made during the implementation of the EC Water Framework Directive shows the following results: The objective of "good status" is likely to be achieved for 14 percent of surface waters and 47 percent of groundwater. The main reasons for the non-fulfilment of targets in the case of surface waters are essentially the morphological impact and traverse structures as well as diffuse nutrient burdens mainly from agricultural sources. In the case of groundwater, the main reasons for not achieving the targets set are diffuse nitrogen burdens from agricultural sources (nitrate) with approx. 80 percent. In quantitative terms, groundwater bodies in Germany reach for the most part a good status.

## Groundwater status according to the Water Framework Directive's classification

41

Data in percent

status

47

53

chemical status

48

52

### Reasons

nutrients (mainly from agricultural sources) and other burdens

quantitative status

95

5

Source: German Federal Environmental Agency

likely

unlikely

Germany has identified its entire territory as nitrate vulnerable zone. The nitrogen excesses recorded contribute to a pollution of water bodies. The German federal government is required here to consistently implement the EC Nitrates Directive.

At the present time, 230 pesticide substances are allowed in Germany in 850 products. Certain pesticides or their degradation and reaction products (metabolites) verifiably concentrate in the environment and are persistent. According to a recent DVGW-TZW-Study from 2006, pesticide residues were found in water bodies used as raw water resources for drinking water abstraction. The diffuse pollution of water bodies with pesticide residues is still a problem that has to be taken seriously. It can only be solved if the protection of raw water resources is adequately taken into account already at the stage of the pesticides' authorization procedure. This should be done within the framework of the revision of the EC Pesticides' Authorization Directive by means of stricter authorization criteria for pesticides comprising also relevant metabolites, the embodiment of the EC Drinking Water Directive's limit values for pesticides in the new Pesticide Authorization Directive and stronger embodiment of the Precautionary Principle.

From the perspective of water bodies' protection, we have to be critical of the current trend towards increased cultivation of so-called energy crop. The objectives of bio-energy production can be attained only through intensified land use, increased utilization of idle land or by means of grassland changes. Enhanced fertilization of cultivable land and use of pesticides can lead to higher inputs of nitrate and pesticides into the raw water resources, and thus to an aggravation of the aforementioned risks.

The quality of drinking water depends to a large extent on the quality of the abstracted raw water. This is ensured by about 16,300 water protection areas having a share of 12.7 percent in the national territory of Germany (WasserBLICK WFD Reporting, 2007). The requirements to be met in water protection areas go beyond normal nationwide water protection levels. In addition, there exist areas which are managed by the operators in a resource-friendly manner. Especially co-operations between agriculture and water supply utilities have proved to be effective. On the basis of regulations of the German federal states, compensating payments are made to the agricultural sector. Figures for the Federal Republic of Germany as a whole are not available. Results from benchmarking projects and comparisons of performance indicators provide however additional information: For instance, 70 parties participating in a benchmarking project paid together approx. 1.4 million € of compensation payments in 2003.

The costs for the management of water protection and catchment areas and the cooperation with agriculture are included in the water price.

## 4.4 Plant maintenance

Drinking water and wastewater networks have a service life of up to 100 years. That means that these networks require continuous maintenance and renewal. Adequate maintenance and rehabilitation of drinking water networks can be tantamount to a renewal in qualitative terms. A technically and economically reasonable rate of the networks' renewal can only be assessed if the individual prerequisites are evaluated at the same time, such as mains material, network age, damage rates, leakages. Results obtained from different drinking water benchmarking projects show e.g. network renewal rates distinguished into company sizes from 0.40 to 0.98 percent (Hesse) and 0.43 to 1.28 percent (Bavaria).

Total investments in drinking water supply amount to more than 2 billion € annually; the major part of investments are spent on networks. As the German network has not been notably extended during the past few years, these investments are spent for the most part on plant maintenance. The previous rates of renewal of the drinking water network contribute to the fact that Germany is holding a top position worldwide in terms of the lowest damage rates and real water losses, and has thus almost no interruption of supply.

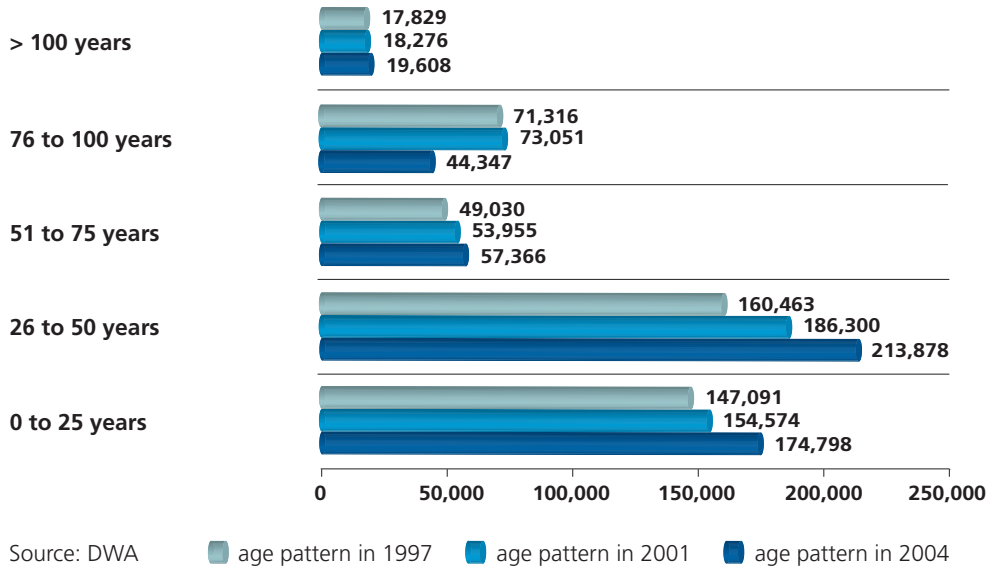
In the wastewater sector, almost one third of the existing sewers have been constructed during the past 25 years. As compared to 1997, a larger share of sewers has now a more recent date of construction.



## Development of the age pattern of the sewer network

42

Data in kilometres



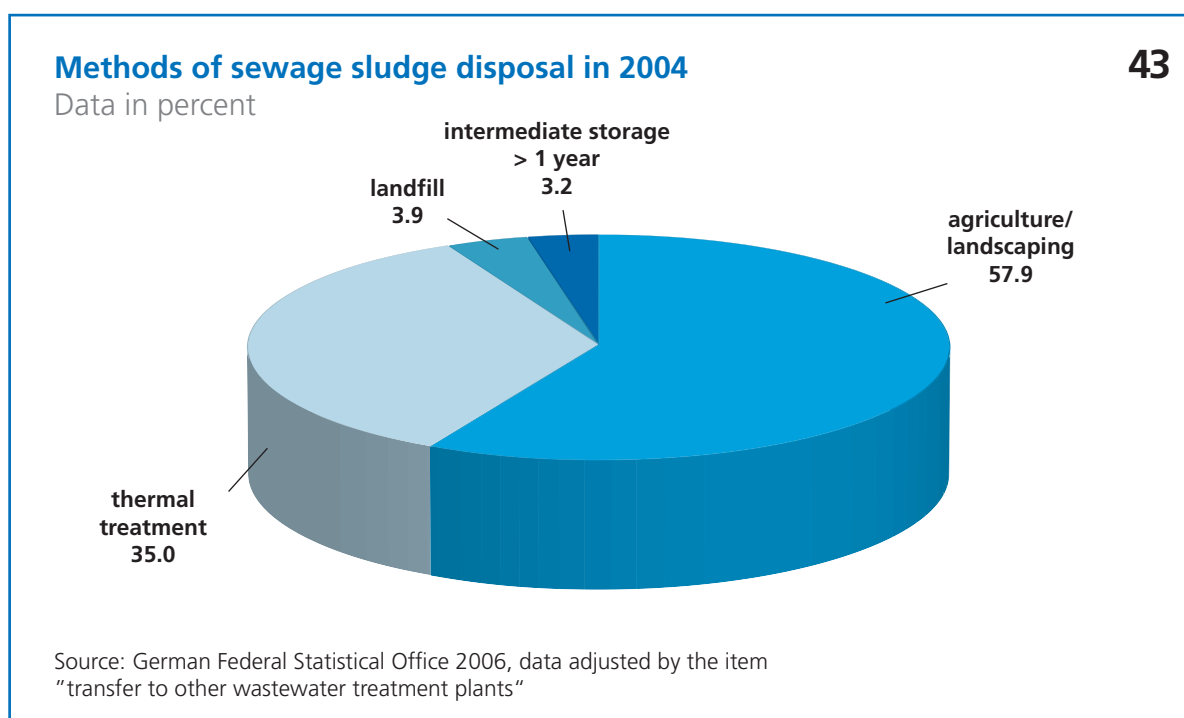
In 2004, the mean costs for sewer rehabilitation, determined on the basis of costs for repair, renovation and maintenance measures, amounted to approx. 540 € per meter of overhauled sewer. In 2003, 20.34 € were spent on an average for rehabilitation measures per inhabitant connected to the network. Projected to the entire German territory and 82.5 million German citizens, expenses for sewer rehabilitation can be estimated at about 1.6 billion € (DWA 2005 Survey).

## 4.5 Cost-cover percentage

If the principle of cost recovery is complied with, it can be assumed that the economic fundamentals for a long-term supply and disposal operation are ensured, with the existing standards being maintained. This is an essential prerequisite for sustainable water supply and wastewater disposal. In Germany, the average level of cost coverage amounts to 100 percent.

## 4.6 Sewage sludge

In Germany, the volume of sewage sludge currently amounts to approx. 2 million tonnes (Federal Statistical Office 2006). Stagnating or even slightly decreasing volumes are expected for the future. Chart 43 shows the distribution of sewage sludge in Germany according to the different ways of disposal. Thermal treatment procedures comprise mono-incineration, co-incineration as well as special procedures.



Over the past few years, thermal procedures have gained in importance. On the other hand, a decrease of landfilling has been recorded which is attributable to the prohibition of waste landfilling with higher contents of organic substances applicable since 2005. Also the share of sludge subjected to material recycling considerably decreased as compared to the late 1990ies when this share was to some extent clearly above 60 percent. Nevertheless, it becomes apparent that the recycling rate has stabilized at a level of approx. 57 percent since 2003.

The most recent DWA sewage sludge survey shows that the contents of pollutants in municipal sewage sludge in Germany are far below the limits of the applicable German Sewage Sludge Ordinance and of the applicable EC Directive, and that the positive development of the sewage sludge quality in general continues. Furthermore, the data shows that sewage sludge recycled in agriculture and landscaping has significantly lower contents of pollutants than the sludge subjected to thermal treatment. That means that sewage sludge of higher quality is recycled in agriculture and landscaping. Moreover, in order to allow for a precautionary soil and groundwater protection, it is recommended guaranteeing optimum sewage sludge quality and recycling by installing a quality system.

## 4.7 Advanced training of personnel

An essential component of sustainable action is continuous advanced training of personnel. The energy and water supply industry in Germany is holding a top position in this respect. 92.5 of the undertakings in this sector provide advanced training to their staff. This figure exceeds by far the average of 69.5 percent recorded for all companies in Germany. Related to the number of employees, the sector's rate of advanced training amounting to 55 percent is almost twice as high as the German average of approx. 30 percent (Federal Statistical Office 2007). There are no figures available for the wastewater branch.

# 5 Economic efficiency

## 5.1 Water prices and wastewater charges

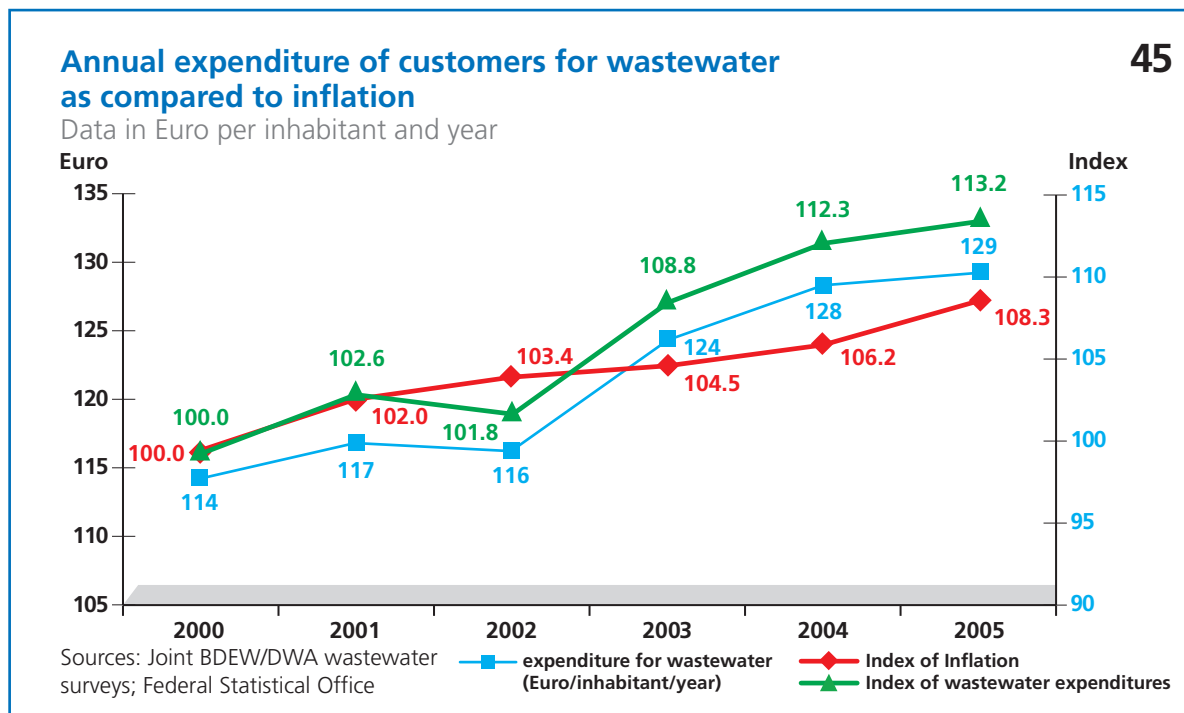
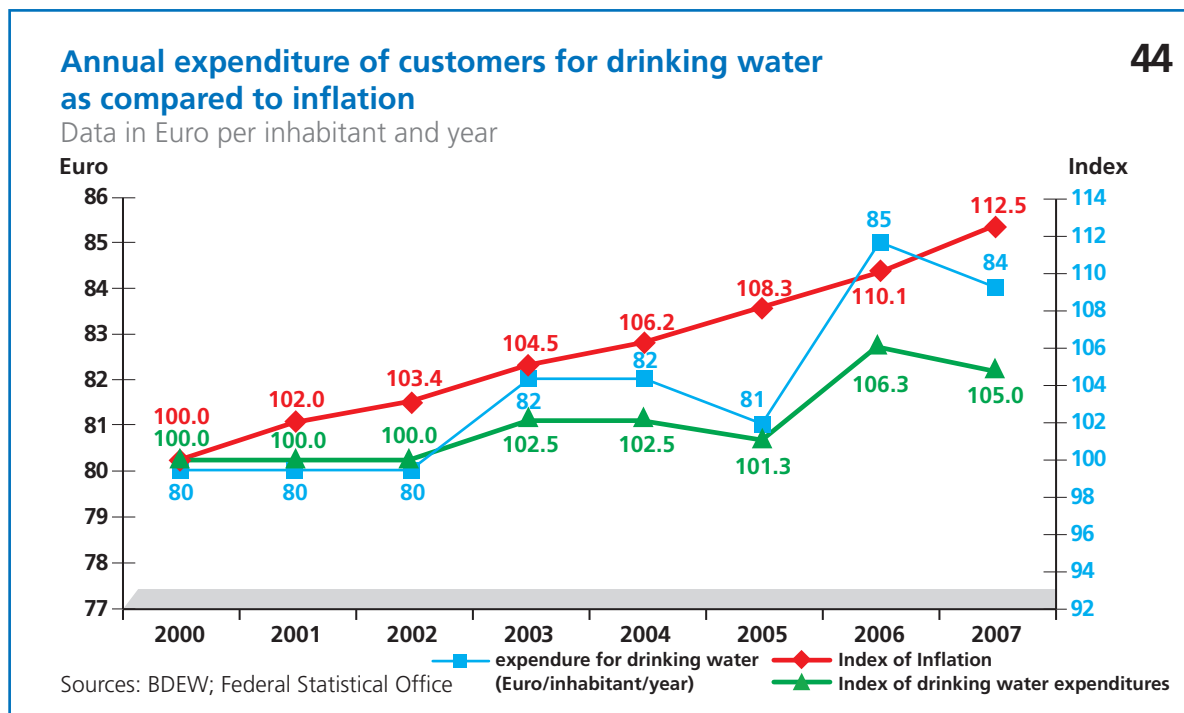
The average price for 1,000 litres of drinking water is 1.85 € (VAT and base rate included, 2007). Citizens pay less than 0.2 Cent per litre of drinking water. Every citizen pays about 23 Cent per day for his drinking water (125 litres), 9 Cent for a shower or 22 Cent for a bath (without house connection costs and wastewater). Given a water consumption of 125 litres per inhabitant and day, a citizen pays 7 € per month or 84 € per year on an average for his drinking water. The average wastewater charge is 10.75 € per month or 129 € (2005) per year. In summer 2007, a flat-rate offered by some providers in the German mobile telephone sector was for instance between 25 and 35 € (without subsidized apparatus).

Nutritionists recommend to adult persons drinking at least 1.5 litres per day and to children 1 to 1.3 litres. If a family of four covers its annual minimum demand for beverages totalling 1,825 litres through drinking water, it will have to pay 3.38 € (in 2007) per year (without house connection costs, possible water sparkler treatment, wastewater charges).

In 2007, drinking water prices in Germany have remained almost stable; they increased only by 0.5 percent, on an average. The price increase was thus again far below the average general price increase rate of 1.7 percent (German Federal Statistical Office). Since 1995, the general price index in Germany has risen by 17.3 percent. The citizens' per-capita burden for the drinking water price only increased by 7.7 percent over the same period.

If the drinking water costs per head and year are compared to those in other countries (taking account of the higher water consumption in those countries), Germany with 82 € (2003) is ranking behind England/Wales with 95 € and France with 85 € (without taking the different standards in terms of compliance with the drinking water quality, the condition of networks, interruptions of supply, water losses and subsidies into consideration; for more information see VEWA 2006 Survey).

The World Bank considers it problematic if citizens have to spend more than 4 percent of their available income for water services. In Germany and France, this value is considerably lower.



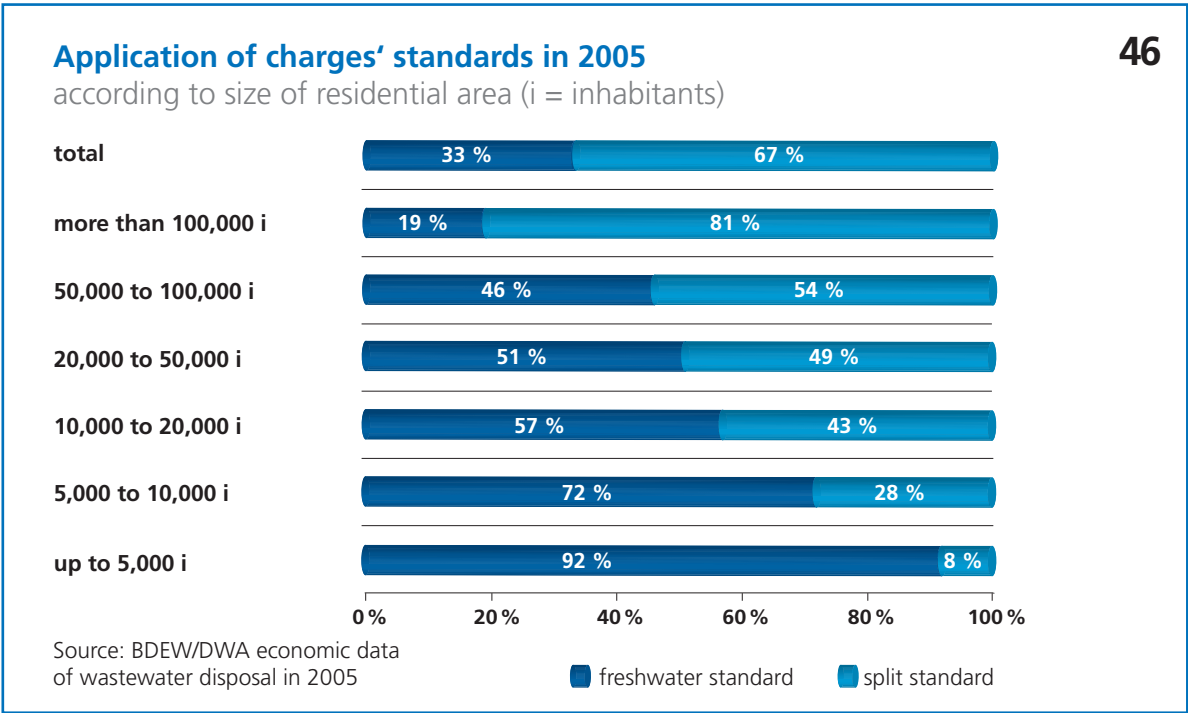
In 2005, citizens paid 129 € annually on an average for wastewater disposal, i.e. 35 Cent daily, connection costs included. In 2005, wastewater charges increased by 1.4 percent as compared to the preceding year. Thus, the increase is below the rate of inflation of 2.0 percent.

Wastewater charges can be levied in the form of

- • • a sewage charge based upon the freshwater consumed and an additional precipitation charge based on the drained area (split wastewater charges). Approx. 67 percent of inhabitants covered by the BDEW/DWA Survey receive an invoice with a distinction made between wastewater and precipitation water. In the case of split wastewater charges, the mean sewage charge is 2.05 €/m<sup>3</sup> and the precipitation charge 0.88 €/m<sup>2</sup> of sealed surface.
- • • a uniform charge according to the freshwater standard using the volume of freshwater consumed as an assessment basis. The costs for the collection and treatment of precipitation water are included in this uniform charge on a pro-rata basis. The discharge and treatment of 1,000 litres of wastewater costs the citizen 2.28 €, on an average.

In addition, it is possible to levy a basic charge enabling a more homogeneous distribution of the high fixed costs to be achieved among all inhabitants connected to wastewater disposal facilities.

At the same time, it contributes as a stabilizing element to cushioning the increase in charges. As a general rule, a basic charge is levied as a fixed annual amount.



The annual per-capita burden for wastewater disposal amounts to 111 € (2003) in Germany, 90 € (2003) in France and 93 € in England/Wales (2003; state allowances, subsidies and differences in the level of performance have not been taken into consideration; for further information cf. VEWA 2006 Survey). If these factors are taken into consideration, the charges to be paid by citizens in England/Wales are higher than those in France and Germany (VEWA 2006 Survey).

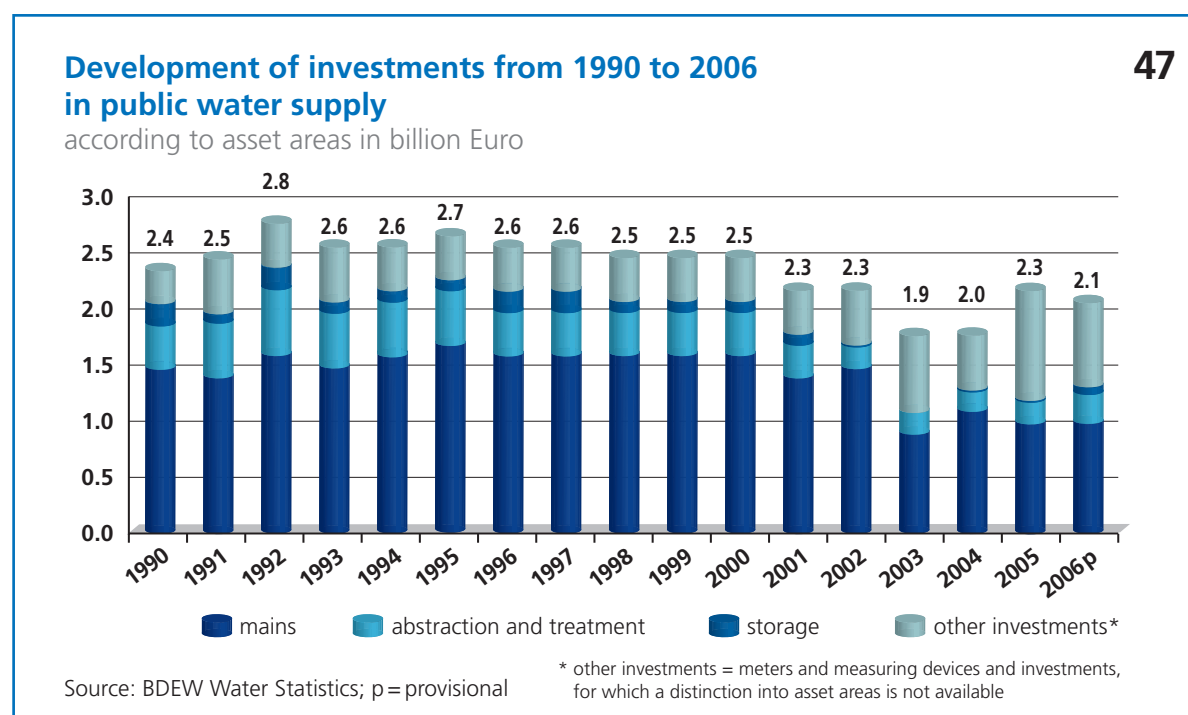
A comparison of the strict cubic metre prices as an indicator of the efficiency and performance of the supply utilities is therefore not relevant.

## 5.2 Investments

Continuous investments in the maintenance and renewal of infrastructure are a decisive factor for the long-term security of supply and disposal. Consequently, leaps in investments and thereby sudden significant increases of charges are avoided. Moreover, they lead to a blending in terms of the age of the supply and disposal facilities.

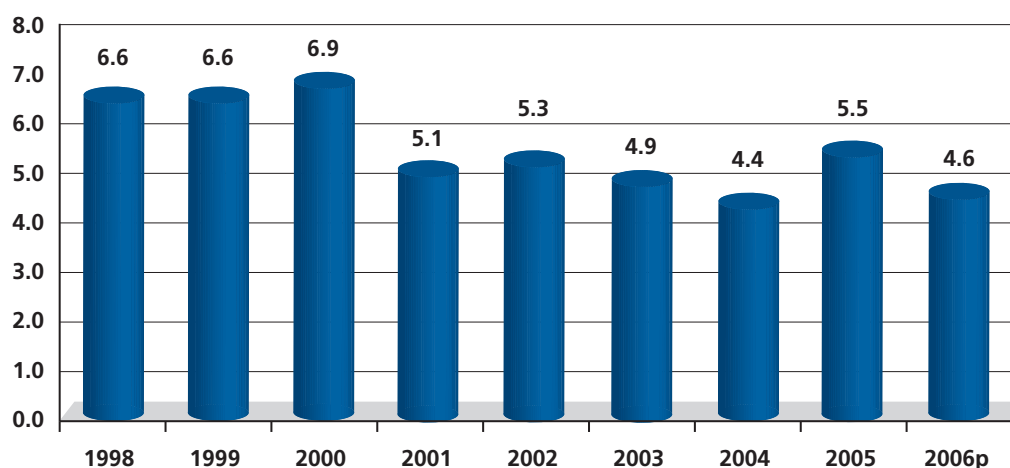
Since the German reunification, the water supply and wastewater disposal utilities have made total investments of far more than 100 billion € (see Charts 47 and 48).

In 2005 alone, water and wastewater utilities invested approx. 8 billion €. The major part of investments is spent on networks.



### Development of investments from 1998 to 2006 in public wastewater disposal

in billion Euro



Source: Joint BDEW/DWA wastewater survey; p = provisional

With approx. 5 billion € annually, the wastewater sector has made investments at a high level for many years. This volume of investments can be compared to that of the electricity industry, the machine-engineering industry or the food processing industry. The wastewater sector is an important driving force for small and medium-sized businesses in terms of employment and environmental aspects. The decrease as compared to the years before 2000 is attributable to the phasing-out of investments within the implementation of the EC Directive on Urban Wastewater Treatment.

Private enterprises are involved to a large extent in the provision of partial services in the wastewater sector. Measured against the total expenditure, approx. 70 percent of services in the field of planning, construction and operation are provided by private undertakings. That means that a considerable part of a disposal utility's investment volume is passed on to private service enterprises. The participation of the private sector in the form of e.g. construction and planning services in the wastewater sector is thus significantly higher than the legal form of waste disposal utilities suggests at first sight. Particularly construction services are provided by private undertakings to about 90 percent.

In Germany, the highest average investments are made in the drinking water sector: From 1995 to 2003, 0.54 € were invested per cubic metre. England/Wales ranked second with 0.53 € and France third with 0.33 €, followed by Italy with 0.15 € (taking inflation into account). In the wastewater sector, Germany is also holding a top position with 1.27 €, followed by England and Wales with 0.91 €, France with 0.72 € and Italy with 0.11 € (VEWA 2006 Survey). In Germany, all investment costs are included in prices and charges, whereas in other countries investments are financed to some extent by the municipalities themselves (VEWA 2006 Survey).

In total, it becomes apparent that the German water industry, as compared to other European countries, ensures a constantly high level of investment with a view to guaranteeing the security and quality of supply on a long-term basis.

### 5.3 Special charges (water abstraction levies, compensation payments, wastewater tax)

In Germany, drinking water prices are additionally increased by special state charges such as the water abstraction levy. They account for a substantial part of the water price. Furthermore, farmers in some federal states receive additional compensation for water-body-friendly management in water protection and catchment areas. These costs, too, are part of the water price in Germany.

**Table 1: Water cent per m<sup>3</sup> of yielded drinking water volume according to German federal states** (Research: BDEW)

federal state	amount of water cent	notes	annual payments	utilization
Baden-Wuerttemberg	5.1	since 1988 ("SchALVo")	amount not known	no purpose limitation
Bavaria	–			
Berlin	31		approx. 55 M. €	groundwater protection
Brandenburg	10.2	with two increases since 1984	approx. 20.2 M. €	implementation of the Water Framework Directive, maintenance of dikes, etc.
Bremen	5	existing since 1993, confirmed in 4/04	approx. 0.7 M. € from Water supply utilities	
Hamburg	7 or 8, resp.	since about 12 years, increased in 12/05	3.0 M. € from wsu*	
Hesse	–	abolished in 1/03		
Mecklenburg-Western Pomerania	1.8	continuation of the water abstraction levy of the former GDR, confirmed in 1/03	approx. 1.7 M. €	for "groundwater-friendly measures"
Lower Saxony	5.1	confirmed in 12/04	approx. 20 M. € from water providers	for "groundwater-friendly measures"
North Rhine Westphalia	4.5	since 1st February 2004	72 M. € for drinking and service water (2005)	federal state budget, implementation of WFD <sup>2)</sup>
Rhineland-Palatinate	–			
Schleswig-Holstein	5 or 11 <sup>1)</sup> resp.	since 1st January 2004	approx. 24.5 M. €	purpose limitation was reduced at 50 %
Saarland	(6 or 7 resp.)	introduction in 2007 proposed by the Saarland government	(probably up to 3 M. €)	(purpose limitation in some case)
Saxony	1.5		approx. 3.4 M. €	purpose limitation
Saxony Anhalt	–			
Thuringia	–			

1) 5 Cent: for industrial undertakings as final consumers, provided that more than 1,500 m<sup>3</sup> of water are purchased within the assessment period, 11 cent: by other final consumers

2) may be set off against expenses within the scope of cooperation with agriculture  
[WFD = Water Framework Directive]

\*wsu = water supply utilities



For the discharge of wastewater into a water body, the state raises a statutory extra levy which in the end is borne by the charge-payer. The amount of the wastewater tax depends on the residual contents of wastewater substances in the discharged wastewater. Originally, this was a steering instrument, but owing to the high standard of the German wastewater disposal, it has lost this steering effect. The wastewater tax accounts for 3 percent of the total wastewater disposal costs. From 1997 to 2004, the German federal states generated revenues of 300 million € to 415 million € annually from the wastewater tax (VEWA 2006 Survey).

## Part C – Benchmarking projects

### 1 Intention and development of the projects

Benchmarking means: to compare with each other and to improve one's performance by learning from the best within a comparison group. Systematic comparisons on the basis of indicators have been carried out in the German drinking water supply and wastewater disposal industry since 1949. In the German water industry, benchmarking has proven to be an efficient instrument to identify, get acquainted with, and adopt successful methods and processes from benchmarking partners.

The principle of benchmarking is based upon two prerequisites which make an essential contribution to success: voluntary participation and confidential treatment of information.

The German Associations of the water industry, ATT, BDEW, DBVW, DVGW, DWA and VKU, signed the extended "Statement of the Associations of the Water Industry on Benchmarking in the Water Sector" on 30 June 2005 and thus defined for themselves the support of benchmarking to be an integral part of their self-administration. The essential targets of the Statement are supported by the German Association of Cities (DST) and the German Association of Towns and Municipalities (DSt-GB). The signing associations undertake to cooperatively develop and refine the requisite conceptual framework for benchmarking in the water industry.

The German water industry's benchmarking concept is part of the modernization strategy for the regulatory framework of the German federal government. It was developed and promoted by the water sector itself in consultation with the political partners. The aim of the concept is to optimize processes and open up potentials for improvement. These aims cannot be realized by compulsory benchmarking based on statutory provisions, as practiced for instance in two EU countries.

The conceptual framework of ATT, BDEW, DBVW, DVGW, DWA and VKU ensures that the current flexibility and wide variety of benchmarking systems are maintained within the water industry. The DVGW/DWA leaflet "Benchmarking in der Wasserversorgung und Abwasserbeseitigung" [benchmarking in the water supply and wastewater disposal industry] and the code of practice on "Benchmarking für Wasserver- und Abwasserentsorgungsunternehmen" [benchmarking for water supply and wastewater disposal utilities] provide uniform rules and support to the projects. At the same time, the nationwide implementation of the International Water Association's (IWA) basic performance indicator system offers the possibility to make the different drinking water benchmarking projects comparable to some extent. For benchmarking projects of the wastewater industry, the DWA system of sample indicators (cf. "Unternehmensbenchmarking als Bestandteil der Modernisierungsstrategie – Kennzahlen und Auswertungsgrundsätze, DWA 2008") [corporate benchmarking as part of the modernization strategy – performance indicators and principles of assessment] provides as well a common basis for the projects compatible with the international IWA performance indicator system.

In Germany, voluntary benchmarking is carried out by independent private providers. On the one hand, this procedure ensures a high quality standard of the projects through free market mechanisms. On the other hand, competition and the free selection of providers lead to projects optimally adjusted to the particular issues addressed.

The selection of appropriate comparison partners plays an important role. Due to large differences in the technical, natural or legal frame conditions, the performance indicators of the benchmark partners differ from each other. Benchmarking projects which do not take account of this fact lead to incorrect results. This aspect is taken into consideration, for instance, by the regionalization of benchmarking projects in Germany or by the use of appropriate benchmarking methods. At the same time, it is seen to it that the aspects of security, customer service, sustainability and profitability are adequately taken into consideration along the lines of an economic approach.

The rising number of benchmarking projects and of companies carrying out such projects shows that the branch has accepted benchmarking and supports this concept. This is also revealed by an independent study carried out by the Duisburg-Essen University (Chair of Business Administration) in 2006, which showed as a result that benchmarking is accepted within the water sector, and that the companies consider the Profile of the Water Industry to be generally an appropriate instrument for the representation of the sector's performance.

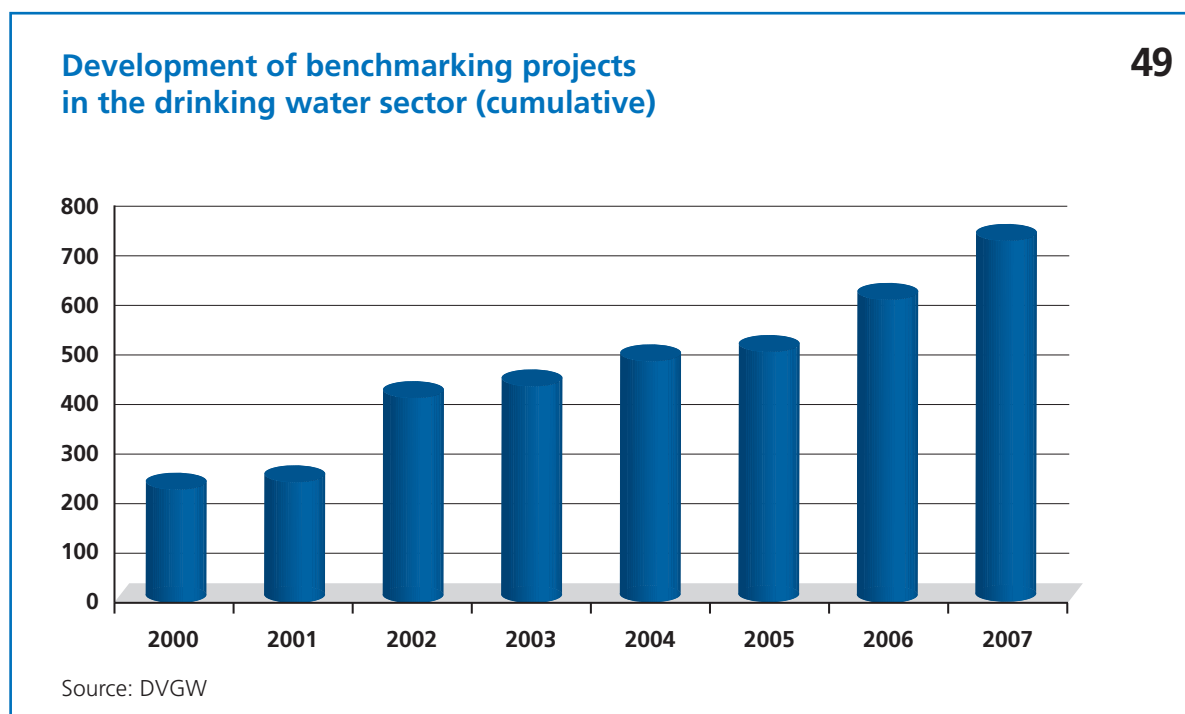
Furthermore, benchmarking makes a contribution towards keeping price increases in the German water industry clearly below the inflation rate, on an average.

## 2 Drinking water

To date, drinking water supply utilities have carried out benchmarking Germany-wide in more than 27 projects (see Table 2). These projects range from mere comparisons of performance indicators and the examination of entire companies/corporate sectors (corporate benchmarking) to individual process optimizations (e.g. setting-up of house connections, personnel benchmarking, collection of receivables).

Apart from Germany-wide projects which have also been successfully accepted (up to 54 survey cycles), projects have also been established in almost all federal states. Some of them are already carried out in the sixth cycle. Up to 100 companies of all sizes have participated in projects relating to the different federal states. As a result, more than 70 percent of the water volume delivered to customers have been covered in some federal states. Furthermore, politics and the public are informed about the results at regular intervals. Detailed project reports have been published mainly from Bavaria, Baden-Württemberg, Hesse, Thuringia and Rhineland-Palatinate.

Until the end of 2007, more than 750 companies participated in benchmarking. Their annual volume of water supplied of almost 3.3 billion m<sup>3</sup> corresponds to approx. 60 percent of the water output of public water supply in Germany.



The extensive publications of results and experiences obtained from benchmarking projects since the publication of the first "Profile of the German Water Industry" in 2005 in project reports of the federal states and in professional journals have made a contribution towards a considerable increase of the sector's transparency.

Apart from optimization measures carried out within the companies, benchmarking has been methodically refined as a result of the projects. This includes the development of hierarchical and compatible indicator systems, criteria for the formation of groups of actually comparable supply utilities and methods for the quantification of external influences on performance indicators (e.g. the degree of outsourcing).

### **Comparisons of performance indicators**

Comparisons of indicators form the basis of benchmarking projects, but they can also be carried out separately. Pure performance indicator comparisons serve the determination of positions and are frequently used as an entry into benchmarking. They are not performed with a view to developing concrete optimization measures. But as an assessment of the current situation they offer the possibility to identify strengths and weaknesses and thus to recognize fields of action enabling concrete measures to be developed for instance through further process benchmarking projects.

At the present time, three projects of performance indicator comparison are in course of implementation, one of them in the fifth run. In addition, the existing indicator systems are further particularized and extended through research projects.

### **Corporate benchmarking**

14 benchmarking projects focusing on the analysis of utilities as a whole or on sectors of the utility industry are currently carried out in Germany.

Performance indicators from corporate benchmarking projects can only be compared to one another if the basic conditions given at the respective level under review are taken into consideration. These basic conditions include in particular the hydrological, topographical, residential and geological circumstances which have a decisive influence on water supply processes.

Project reports, some of them extensive, are available on the corporate benchmarking projects of the German federal states (cf. 4 Project Details).

A survey of the fields which have revealed optimization potential from corporate benchmarking projects show that the entire value-added chain is included in the projects. Individual measures are for instance described in the following fields: staff deployment, degree of fulfilment of the drinking water analyses, improvement of maintenance strategies, organization of on-call duty, provision of raw and auxiliary materials. Some projects also identified other fields which offer optimization potential, such as the practice of labour protection, electricity purchases, cooperation with the agricultural sector as well as fleet and equipment management.

### **Process benchmarking**

The more detailed the benchmarking analysis, the more precise are the optimization potentials quantified and the implementation measures elaborated. The 11 process benchmarking projects currently realized with regard to drinking water supply focus particularly on human resources management, the operation of the pipeline network, setting-up of house connections, billing of consumption and metering, water supply and distribution, water abstraction and water treatment, customer service and operation of impounding reservoirs.

As a result of the benchmarking projects, the German drinking water supply industry has improved the following areas within the different undertakings:

#### **Security of supply**

: : : optimization of the fault clearance service (routes)

#### **Quality of supply**

: : : extension of advanced training

: : : streamlining of reporting procedures

### **Customer service**

- : : : reduction of the period required for dealing with questions and complaints
- : : : improvement of the availability of contacts for inquiries
- : : : introduction and optimization of the complaint management system
- : : : improvement of customer contacts through the internet
- : : : optimization of consumption billing

### **Sustainability**

- : : : enhancing the staff's professional skills
- : : : optimization of rehabilitation and flash strategies
- : : : optimization of inspection intervals

### **Profitability**

- : : : reduction of energy costs
- : : : reduction of laboratory costs
- : : : purchase at more reasonable prices
- : : : optimization of purification and maintenance intervals of networks and facilities
- : : : personnel deployment in the network area
- : : : efficiency of processes related to human resources management
- : : : reduction of loss of receivables
- : : : increase of the number of meter changes per day

Each individual measure thus contributes to a continuous improvement and ultimately to the modernization and price stability within the German water industry.

The following Table provides a survey of the benchmarking projects carried out in the drinking water sector.

More detailed information and concrete contacts for the different projects are made available by the associations ATT, BDEW, DBVW, DVGW, DWA and VKU (see last cover page). The regional sections of these associations within the German federal states are represented in many projects within the respective benchmarking task force.

**Table 2: Benchmarking projects and comparisons of performance indicators in the drinking water sector**

Ser. no.	Project name	Project type	Period	Participants	Network feed-in in million m³/a
01	process indicators for water supply and distribution, abstraction and treatment	<ul style="list-style-type: none"> <li>research project</li> <li>process benchmarking</li> </ul>	2005 to 2008 2nd cycle	12	
02	comparison of indicators in Mecklenburg-Western Pomerania	<ul style="list-style-type: none"> <li>indicator comparison</li> </ul>	since 2003 3rd cycle	36	143
03	Indicator comparisons project	<ul style="list-style-type: none"> <li>indicator comparison</li> </ul>	since 2000 5th cycle	57	344
04	Indicator comparison of the Wasserverbandstag e.V. of Lower Saxony	<ul style="list-style-type: none"> <li>indicator comparison</li> </ul>	since 2001 3rd cycle	22	171
05	benchmarking initiative of the Land Rhineland-Palatine	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	since 2004	96	162
06	benchmarking on water supply in Hessen	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	since 2005	34	223
07	associations' model of performance indicator comparison in Baden-Wuerttemberg	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	since 2005 2nd cycle	75 / 102	150 / 373
08	inter-utility performance benchmarking of metropolitan supply utilities	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	since 1949	24	785
09	corporate benchmarking on drinking water supply	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	since 2000 7th cycle	10	1,444.152
10	EffwB (Bavaria)	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	since 2000 3rd cycle started	95 / 84	324 / 196
11	project of the Land NRW	<ul style="list-style-type: none"> <li>corporate benchmarking</li> </ul>	on the point of starting		
12	benchmarking on water supply in Saarland (fed. state)	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	from 2007	29	63
13	BkV* / benchmarking of VKU – Water	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	since 1953 54th cycle	179	693
14	BkV* / benchmarking of VKU – special purpose associations	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	11th cycle	8	293
15	benchmarking on water supply in Thuringia	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	since 2003 2nd cycle	21 / 16	64 / 40
16	BKWasser	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	since 2000 6th cycle	50	45
17	benchmarking	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	since 2004	2	155
18	benchmarking on operation of impounding reservoirs	<ul style="list-style-type: none"> <li>corporate benchmarking</li> <li>process benchmarking</li> </ul>	since 2005	4	578
19	process benchmarking on water supply in Rhineland-Palatine	<ul style="list-style-type: none"> <li>process benchmarking</li> </ul>	on the point of starting		
20	benchmarking on implementation of consumption billing	<ul style="list-style-type: none"> <li>process benchmarking</li> </ul>	since 2001 4th cycle	38	263

\*) Operational cost comparison

Ser. no.	Project name	Project type	Period	Participants	Network feed-in in million m³/a
21	benchmarking on customer surveys	• process benchmarking	since 2002 7th cycle	26	212
22	benchmarking on house connection provision	• process benchmarking	since 2001 3rd cycle	32	235
23	benchmarking on support processes	• process benchmarking	since 2006	12	60
24	benchmarking on pipeline network operation	• process benchmarking	since 2001 3rd cycle	38	186
25	benchmarking on human resources management	• process benchmarking	since 2005 2nd cycle	2	
26	competitive water supply	• process benchmarking		50	270
27	benchmarking on drinking water laboratories	• process benchmarking	since 2006	6	855

### 3 Wastewater

In the wastewater sector, activities in terms of performance indicator comparisons as well as corporate and process benchmarking extend to a total of 28 projects which, to a large extent, are carried out over several years and cycles (see Table 3).

#### Comparison of performance indicators

Between 2000 and 2004, four indicator comparisons were initiated which are iterated annually or every two to three years. Related to the number of inhabitants connected to the wastewater facilities, including the wastewater share of industry and trade (expressed in total number of inhabitants and population equivalents, the participation was between one and five million PT. The German federal states of Mecklenburg-Western Pomerania and Rhineland-Palatinate cooperate in the projects. Many wastewater undertakings have already integrated the performance indicator comparison into their internal controlling. Some of the undertakings involved have identified a need for action on the basis of findings obtained from the indicator comparison, and have thus made the final step towards process benchmarking. In Rhineland-Palatinate, process benchmarking has been started as second stage after the 2007 indicator comparison.

#### Corporate benchmarking

Since 2002, seven projects have been realized or started at corporate level. Apart from a project carried out across the federal states, projects have been carried out in different federal states over the whole territory with the participation of several hundreds of companies providing wastewater disposal to approx. 53 million PT. Given a total capacity extendible to approx. 150 million PT in Germany, the participation in Germany-wide corporate benchmarking corresponds already today to 35 percent of the total plant capacity.

The project carried out across the German federal states organizes more than 35 operators, some of them since 2002, in different rounds of exchange of experience at the level of large German cities, wa-



ter associations instituted on a special statutory basis with wastewater disposal functions, municipalities from the region of Southern Germany or also at the level of participations of private partners.

In Bavaria, corporate benchmarking has been in progress since 2006 in the first cycle. In North Rhine-Westphalia, a project started in 2007 extending over the entire area of the Land. In Thuringia, two projects with considerable participation came into being in 2007. In Saxony-Anhalt, benchmarking is already carried out in the second and third iteration cycle; in the Germany-wide project, even the fifth iteration is in progress. This opens up an interesting survey of the corporate development over time.

Due to the definition of requirements for performance indicator systems, the determination of assessment principles and setting-up of an appropriate sample indicator system, the German Association for Water, Wastewater and Waste (DWA) has reduced the expenditure to companies participating in different projects, as they may use the data already available.

### **Process benchmarking**

To be able to assess the efficiency of wastewater disposal utilities, the function of wastewater disposal is distinguished for benchmarking into different processes which may represent segments of wastewater disposal, such as operation of the sewage network or sewage treatment plant. For the determination of concrete improvement potentials, a further breakdown into detailed sub-processes, such as "mechanical sewer network clearance" or "ventilation in the case of biological wastewater purification" is required. It is possible to examine monetary or purely technical indicators.

Up to the end of 2007, 18 projects have been carried out in Germany on process benchmarking, six of which were related to the operation and rehabilitation of sewer network facilities including their structures, and five related to the operation of sewage treatment plants. Another three projects dealt with questions of analytics in the operational laboratory and monitoring of indirect discharge. Indirect discharges are wastewater discharges from industry and trade into the public sewage plant, which have to meet certain quality requirements with a view to protecting the sewage plant and the staff working there.

Instead of dealing with the technical processes of wastewater discharge and treatment, process benchmarking may also look at the administrative structures of wastewater undertakings and make an in-depth examination of issues relating to human resources management or materials management and control. A sample project is available for each case, partly based upon experience gained over many years.

#### Process benchmarking on sewer construction, sewer rehabilitation, sewer network operation:

Between 1999 and 2006, 3 projects on sewer network operation were initiated, one of which had a participation of 23.4 PT (Total number of Inhabitants and Population Equivalents). Over the term of the project, this figure amounted to 87.2 million PT due to a repeated participation of companies. Approx. 4 million PT from smaller projects add to the above figure. Iteration cycles are planned to be carried out annually or every two years. In one case, undertakings are participating already for the eighth time. This is not least attributable to the distinct cost savings which in sub-processes may

account for up to 30 percent of the annual operation expenditure and which could not be realized through optimization measures. These cost savings may amount to a million Euro sum per year for individual operators.

Optimization measures are among others changes of pumping station and purification intervals. For example, maintenance management for pumping stations was introduced and the organization of pumping station inspections was improved. Sewer cleaning in line with requirements and adequate flushing schedules enabled higher efficiency to be achieved in another undertaking. A sophisticated sewer rehabilitation strategy with target-oriented prioritization also contributed to cost reduction as the improved coordination of the time and place of rehabilitation activities enabled synergies to be utilized.

Participation in the benchmarking project on the process of "sewer construction" totalled 35 million PT over the term of the project. Some participants are running through benchmarking already for the fifth time. The project serves to obtain transparency of costs for construction and rehabilitation processes. Due to the optimization of process cycles and of the process design it may be possible to achieve a reduction of the process duration of up to 20 percent. The project provides substantial support to the actual costing of measures.

A further benchmarking project focused on the costs of investment handling instead of construction costs. A comparison between external services and in-sourcing for construction projects enabled the optimum solution to be found for the degree of outsourcing and in-sourcing of engineering services.

Further increases in efficiency were achieved through concentration of the project planning for both drinking water and wastewater.

#### Process benchmarking on analytics and monitoring of indirect discharge:

Due to overlapping of technical issues, a common benchmarking scheme with a uniform method of survey was initially developed for the areas of wastewater analytics in in-house laboratories of sewage treatment plants and monitoring of indirect discharge on the sewage network. Subsequently, a distinction was made between the two processes of "analytics" and "monitoring of indirect discharge", which have been carried out for the second time since 2005 with a participation of 12 million PT in the process of "analytics" and 10 million PT in the process of "monitoring of indirect discharge".

Subsequent optimization approaches focus on a reduction of processing times in laboratories or the optimization of the kind and extent of monitoring activities. With regard to analytics, cause analyses show potentials in terms of the efficiency of sampling and the capacity utilization of individual laboratories. Likewise, measures concerning work organization and control were set up.

Moreover, these projects pioneered the development of informative quality indicators concerning the performance of indirect discharge monitoring and analytics.

#### Process benchmarking on wastewater treatment (sewage treatment plants):

Five benchmarking projects carried out between 1996 and 2007 dealt with the operation of sewage

treatment plants. Participation in these projects was between three and 37 million PT. The largest project on wastewater treatment focused on data management and data evaluation on an online platform. Since the start of the project in 2003, the fourth cycle is currently taking place. Optimization effects were achieved, for instance, in the field of ventilation during wastewater treatment which enabled energy and cost savings to be realized. For an efficient use or input of energy, energy data management was introduced, among other things, with a view to enhancing the transparency of energy demand, and the use of agitators in the sedimentation tank was optimized. Further results were achieved with regard to a reduced wastewater charge and cost reduction through recycling of sand screenings.

Further improvements were achieved e.g. with regard to the gas production during sludge decomposition, maintenance and staff assignment strategies, and the removal of screenings.

Similar investigations are currently carried out for sewage treatment plants of the chemical industry. Further issues dealt with were the review of staff structures, the assessment of the outsourcing degree and the analysis of the organisation of operation, including risk management. The result of these activities was e.g. the introduction of a management system and the optimization of the deployment of services of third private parties for maintenance work.

#### Process benchmarking on human resources management:

A participation of 10 million PT was recorded for a project on process benchmarking in the field of human resources management addressed to municipal undertakings providing public services of general interest. A comparison of the productivity of processes in the field of human resources management enabled an increase in the efficiency and quality of human resources processes to be attained. Moreover, synergies were identified for payroll accounting.

#### Process benchmarking on materials management and control:

One of the oldest process benchmarking projects in wastewater disposal was carried out for the first time in 1998 for processes of materials management and control; at the present time, this project is in the sixth cycle of implementation (including the pilot phase). The comparison of company organization and procurement structures, comparisons of procurement processes and e.g. efficiency analyses of purchasing departments enable the purchasing agents to substantially optimize their processes and purchasing performance.

#### Process benchmarking on administration/support processes:

Finally, a process benchmarking project on administration which is just on the point of being launched is worth mentioning. This project based on a comparison of indicators throughout Rhineland-Palatinate (German federal state) focuses on the administration of wastewater undertakings (sewer and sewage treatment). It is planned to carry out an annual iteration. With the participation of utilities from six federal states, a benchmarking project on support processes (materials management and control, EDP, business plan, human resources management and accounting processes) started in January 2007. The utilities participating in the project are mainly federal authorities responsible for water supply and wastewater disposal.

The following Table provides a survey of benchmarking projects carried out in the wastewater sector.

Further information and the names of persons to be contacted for the different projects can be obtained from the associations ATT, BDEW, DBVW, DVGW, DWA and VKU (see last cover page). The associations' regional sections within the German federal states are cooperating in many of these benchmarking projects in the respective task force.

**Table 3: Benchmarking projects and comparison of indicators in the wastewater sector**

Ser. no	Project	Description	Period	Participants	PT in million	Annual wastewater volume in million m <sup>3</sup> /a
A 1	performance indicator comparison	• performance indicator comparison at corporate level	since 2000, every 2 years, 5th cycle	55	4.6	263
A 2	performance indicator comparison (Wasserverbandstag e.V.) in Lower Saxony	• performance indicator comparison at corporate level	since 2002, 3rd cycle, annual participation possible	22	1	43
A 3	performance indicator comparison in Mecklenburg-Western Pomerania	• performance indicator comparison at corporate level	since 2003, annually, 3rd cycle	44	3	118.5
A 4	benchmarking initiative of the water industry of Rhineland-Palatinate	• performance indicator comparison as 1st stage for process benchmarking at the 2nd stage	since 2004, every 2 to 3 years, 2nd cycle	109	3.8	319
A 5	corporate benchmarking on wastewater	• corporate benchmarking	since 2002, annually, 5th cycle	103	101	
A 6	process benchmarking on materials management	• corporate benchmarking • process benchmarking	since 2002, annually, 5th cycle	39	66.9	
A 7	benchmarking within Wasserverbandstag e.V. Saxony-Anhalt	• performance indicator comparison • corporate benchmarking	since 2005, annually, 2nd and 3rd cycle	18	0.7	20
A 8	benchmarking on wastewater performance indicator comparison in Baden-Württemberg	• corporate benchmarking • process benchmarking	since 2006, 1st cycle	77		
A 9	benchmarking on wastewater Bavaria	• corporate benchmarking	since 2006, annually, 1st cycle	145		

Ser. no	Project	Description	Period	Participants	PT in million	Annual waste-water volume in million m <sup>3</sup> /a
A 10	benchmarking on wastewater disposal in Thuringia	• corporate benchmarking	since 2007, 1st cycle	15		
A 11	benchmarking on wastewater in North Rhine-Westphalia	• corporate benchmarking	since 2007, every 2 to 3 years, 1st cycle	approx. 100		
A 12	Op. cost comparison/benchmarking of the German Association of local utilities	• corporate benchmarking	since 1999, annually, 9th cycle	26	4.3	176
A 13	benchmarking in the wastewater industry phases 1 and 2	• process benchmarking	since 1998, annually	21	18.4	
A 14	benchmarking "operate a sewer network"	• process benchmarking	since 1999, annually, 8th cycle	12	87.2	
A 15	benchmarking "operate a sewer network"	• process benchmarking	since 2001, every 2 years, 2nd and 3rd cycle	47	35	
A 16	benchmarking on sewer construction	• process benchmarking	since 2002, annually, 5th cycle	47	35	
A 17	benchmarking on investments in sewer network	• process benchmarking	since 2004, 1st cycle	8	1.2	72
A 18	benchmarking "operate a sewer network" (NRW)	• process benchmarking	since 2006, every 2 years, 2nd cycle	11	0.6	111.9
A 19	benchmarking on analytics and indirect discharger monitoring	• process benchmarking • pilot project relating to no 20 and 21	since 2005, annually, 2nd cycle	15	29	2,306
A 20	benchmarking on analytics	• process benchmarking • follow-up project of no 19	since 2005, annually, 2nd cycle	13	30	2,379
A 21	benchmarking on indirect discharger monitoring	• process benchmarking • follow-up project of no 19	since 2005, annually, 2nd cycle	15	30	2,351
A 22	process benchmarking on sewage treatment plants – online	• process benchmarking	since 1996, every 1 to 2 years, 9th cycle	200	31	2,300
A 23	benchmarking "operate a sewer network"	• process benchmarking	since 2002, every 2 years, 3rd cycle	29	3.99	250

Ser. no	Project	Description	Period	Participants	PT in million	Annual waste-water volume in million m <sup>3</sup> /a
A 24	process benchmarking on sewage treatment – online	<ul style="list-style-type: none"> <li>process benchmarking</li> </ul>	since 2003, annually, 4th cycle	106	36.8	3,650
A 25	process benchmarking on sewage treatment plants of the chemical industry	<ul style="list-style-type: none"> <li>process benchmarking, application of the survey methodology of no 26 (process benchmarking on sewage treatment plants) to sewage plants of industry</li> </ul>	since 2005, every 1 to 2 years, 1st cycle	4	1.9	77
A 26	process benchmarking on sewage plants (in technical terms)	<ul style="list-style-type: none"> <li>process benchmarking, technical indicators only, detailed registration of auxiliary material and operating supplies</li> </ul>	since 2006, 1st cycle	9	1.4	72
A 27	benchmarking on human resources management	<ul style="list-style-type: none"> <li>process benchmarking, e.g. comparison of the efficiency of processes in human resources management</li> </ul>	since 2005, annually, 2nd cycle	15	10	
A 28	process benchmarking on wastewater in Rhineland-Palatinate	<ul style="list-style-type: none"> <li>process benchmarking, sewer network, sewage treatment plants, administration</li> </ul>	since 2007, annually, 1st cycle			

## 4 Project key facts

Further information and the names of persons to be contacted for the different projects can be obtained from the associations ATT, BDEW, DBVW, DVGW, DWA and VKU (see last cover page). The associations' regional sections within the German federal states are cooperating in some of these benchmarking projects in the respective task force.

# Water

## 1 Process indicators of water management, abstraction and treatment

### Brief description of the project:

This project is a research project intended to refine the existing IWA performance indicator system in terms of relevant processes in water production (water management, water abstraction and water treatment). A standard process model was developed for water production to serve as a basis for the performance indicator system, consisting of process indicators, variables and context information. The performance indicator system developed will be validated on the basis of two survey years. 12 water supply undertakings participate in the project as partners from the industry, composed of suppliers to remote and end-use customers (pure water supply utilities and multi-sector undertakings).

### Aims of the project:

The aim of the project is to develop micro-economic and technical indicators for the technical functions of water management, abstraction and treatment, and to validate them in practical implementation. The development of appropriate process indicators makes a contribution towards finding solutions for three problem areas:

- inventory/definition of positions concerning existing plants at a technical-operative level (entire utility, water works, functions, appliances)
- optimization of operation (in technical and economic terms) of existing plants
- use of experience gained in planning of new facilities/extensions of existing facilities

### References:

Merkel, W.; Wichmann, K. (2006): Optimierungspotenziale in der Wasserwirtschaft, Wassergewinnung und Wasseraufbereitung, gwf Wasser Abwasser 147 (2006), No 7-8, 522-527

**Project initiator:** German Federal Ministry of Education and Research, Project management: PTKA-WTE

**Total number of participants:** 5/7 (multiple-sector companies/pure water suppliers)

**Companies participating over several years:** 80/80 percent

### Project type:

Benchmarking on the basis of process indicators

### Project cycle:

Project is in the 2nd cycle, first survey carried out in 2005

## 2 Comparison of performance indicators (Mecklenburg Western Pomerania [German federal state])

### Short description of the project:

This comparison was started in 2004 at the initiative of the Mecklenburg-Western Pomerania association of water supply and wastewater disposal utilities within BDEW (German Association of Energy and Water Industries) and the BDEW Northern Germany regional group. The project focuses on a performance indicator comparison at corporate level which considers all areas of the five-pillar model for the drinking water and wastewater sectors collectively. In every year under review, 1 to 2 participants joined the project so that a coverage of about 77 percent is obtained in terms of drinking water supply related to the water output. This corresponds to approx. one third of all water supply utilities in Mecklenburg-Western Pomerania (as of 2001). The population supplied by the utilities participating in this project accounts for a share of 71 percent of the total population of the German federal state of Mecklenburg-Western Pomerania (in 2001). The comparison was based on the IWA performance indicator system.

### Aims of the project:

- definition of positions within the group of participating utilities with regard to the examined perspectives by means of indicators (e.g. persons employed per 1,000 house connections)
- description of the participating utilities by means of data variables (e.g. network length in km) and explanatory indicators (e.g. capacity of reservoirs) with regard to all aspects of water supply and wastewater disposal while maintaining the survey efforts at a reasonable level
- identification of fields of action for detailed and focused investigations
- elaboration of performance indicators typical of the Land

### References:

„Kennzahlenvergleich im Wasser- und Abwasserbereich in Mecklenburg-Vorpommern“ [Comparison of performance indicators in the water and wastewater sectors of Mecklenburg-Western Pomerania]; in: DVGW energie|wasser-praxis, 1/2006

**Project executing organizations:** The different utilities at the initiative of the association of water supply and wastewater disposal utilities of Mecklenburg-Western Pomerania within BDEW and the BDEW "Northern Germany" regional section"

**Total number of participants:** 21 (6 of which only on drinking water)

**Participants with annual mains network feed-in of:** 74 million m<sup>3</sup>

< 0.5 million m<sup>3</sup>: 0

0.5 – 1.0 million m<sup>3</sup>: 0

1.0 – 5.0 million m<sup>3</sup>: 17

> 5 million m<sup>3</sup>: 4

**Utilities participating over several years:** 62 percent

### Project type:

Project carried out within the respective Land (Mecklenburg-Western Pomerania), pure performance indicator comparison

### Project cycle:

annual, in parallel on wastewater and drinking water, 3rd cycle, fourth iteration will start in the IV. quarter of 2007, first survey in 2003



<b>3 Performance indicator comparison</b>							
<p><b>Short description of the project:</b> This project focused on a performance indicator comparison at corporate level examining all areas of the five-pillar model (profitability, security, quality, customer service and sustainability, based on the DVGW Note W 1100 „Benchmarking in Wasserversorgungsunternehmen“ – [Benchmarking in water supply utilities]) and the drinking water and wastewater sectors collectively. The IWA performance indicator system served as a basis.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• definition of positions within the group of participating utilities with regard to the examined perspectives by means of indicators (e.g. persons employed per 1,000 house connections)</li> <li>• description of the participating utilities by means of data variables (e.g. network length in km) and explanatory indicators (e.g. capacity of reservoirs) with regard to all aspects of water supply and wastewater disposal while maintaining the survey efforts at a reasonable level</li> <li>• identification of fields of action for detailed and focused investigations</li> <li>• no direct determination of potentials for improvement or of influence factors of specific occurrences, but a comparison/review of the effects of measures can be made over several years</li> </ul> <p><b>Project executing organizations:</b> the different utilities For participants from Lower Saxony, the project initiator is the Wasserverbandstag e. V. Bremen, Lower Saxony, Saxony-Anhalt (WVT)</p> <p><b>Total number of participants:</b> 57 (22 of them only on drinking water)</p> <p><b>Participants with an annual mains network feed-in of:</b> 343.5 million m<sup>3</sup></p> <table> <tr> <td>&lt; 0.5 million m<sup>3</sup>: 2</td><td>0.5 – 1.0 million m<sup>3</sup>: 2</td><td>1.0 – 5.0 million m<sup>3</sup>: 29</td><td>&gt; 5 million m<sup>3</sup>: 24</td></tr> </table> <p><b>Utilities participating over several years:</b> 40.4 percent</p> <p><b>Project type:</b> pure comparison of performance indicators</p> <p><b>Project cycle:</b> every two years, in parallel on wastewater and drinking water, project is in the 5th cycle, first survey carried out in 2000</p>				< 0.5 million m <sup>3</sup> : 2	0.5 – 1.0 million m <sup>3</sup> : 2	1.0 – 5.0 million m <sup>3</sup> : 29	> 5 million m <sup>3</sup> : 24
< 0.5 million m <sup>3</sup> : 2	0.5 – 1.0 million m <sup>3</sup> : 2	1.0 – 5.0 million m <sup>3</sup> : 29	> 5 million m <sup>3</sup> : 24				

<b>4 Comparison of performance indicators of the „Wasserverbandstag e. V.“ [Water Associations’ Federation] in Lower Saxony</b>							
<p><b>Short description of the project:</b> In 2002, a comprehensive concept was developed for the member associations of the Wasserverbandstag (WVT). With a view to ensuring comparability with other projects, the indicator comparison was brought in line with the performance indicator system of the International Water Association (IWA). This enabled the project to be combined with the performance indicator comparison of the BDEW regional section “North” in Lower Saxony as with the project of KOWAS [Cooperation of water supply associations]. The „five-pillar model” was used from the beginning. Consequently, it is possible to guarantee national and international standards of performance indicators. The project represents approx. 80 percent of the WVT member associations (related to the water volume) and thus almost 40 percent of water supply in Lower Saxony. A connection with in-depth process benchmarking projects is possible.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• definition of positions within the group of participating utilities with regard to the examined perspectives by means of indicators</li> <li>• description of the participating utilities by means of data variables and explanatory indicators with regard to all aspects of water supply and wastewater disposal while maintaining the survey efforts at a reasonable level</li> <li>• identification of fields of action for detailed and focused investigations</li> </ul> <p><b>Internet:</b> <a href="http://www.wasserverbandstag.de">www.wasserverbandstag.de</a></p> <p><b>Project executing organization:</b> Wasserverbandstag e. V., Bremen, Niedersachsen, Sachsen-Anhalt (WVT)</p> <p><b>Total number of participants:</b> 22 participants in the current project, 11 of them drinking water and wastewater associations (full function) and 11 drinking water associations</p> <table> <tr> <td>&lt; 0.5 million m<sup>3</sup>: 1</td><td>0.5 – 1.0 million m<sup>3</sup>: 0</td><td>1.0 – 5.0 million m<sup>3</sup>: 13</td><td>&gt; 5 million m<sup>3</sup>: 8</td></tr> </table> <p><b>Utilities participating over several years:</b> 100 percent</p> <p><b>Total mains network feed-in:</b> 171 million m<sup>3</sup></p> <p><b>Project type:</b> Project carried out within the respective German federal state, pure performance indicator comparison</p> <p><b>Project cycle:</b> annual, project executing organization WVT 3* in 7 years, first survey carried out in 2001</p>				< 0.5 million m <sup>3</sup> : 1	0.5 – 1.0 million m <sup>3</sup> : 0	1.0 – 5.0 million m <sup>3</sup> : 13	> 5 million m <sup>3</sup> : 8
< 0.5 million m <sup>3</sup> : 1	0.5 – 1.0 million m <sup>3</sup> : 0	1.0 – 5.0 million m <sup>3</sup> : 13	> 5 million m <sup>3</sup> : 8				



5 Benchmarking initiative of Wasserwirtschaft Rheinland-Pfalz [Water supply sector of Rhineland-Palatinate]		
<p><b>Short description of the project:</b></p> <ul style="list-style-type: none"> <li>• simple performance indicator comparison with a survey volume of approx. 40 questions</li> <li>• participants are the responsible regional and local authorities/utilities of the water supply sector in Rhineland-Palatinate</li> <li>• formation of performance indicators on structures/technology, security, quality, sustainability and economic efficiency</li> <li>• individual final report for each participant, final report for politics and the public</li> <li>• 1st stage of a two-stage approach (1st stage: indicator comparison, 2nd stage: process benchmarking)</li> <li>• An online platform is used for data collection and analysis.</li> <li>• The project is supported by moderators.</li> </ul> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• performance indicator comparison carried out over the entire supply area for utilities of the water supply sector in Rhineland-Palatinate</li> <li>• first definition of positions for the utilities participating in the project</li> </ul> <p><b>Internet:</b> <a href="http://www.wasserbenchmarking-rp.de">www.wasserbenchmarking-rp.de</a></p> <p><b>Reference:</b> Ministerium für Umwelt, Forsten und Verbraucherschutz: Benchmarking Wasserwirtschaft Rheinland-Pfalz, Kennzahlenvergleich der kommunalen Unternehmen der Wasserversorgung und Abwasserbeseitigung, Öffentlicher Projektbericht für das Jahr 2006, 2006</p>		
<p><b>Project executing organization:</b> Ministry for the Environment , Forestry and Consumer Protection Cooperation partners: Association of municipalities and cities in Rhineland-Palatinate, Federation of towns in Rhineland-Palatinate, VKU, DWA, DVGW, LGW</p>		
<p><b>Total number of participants:</b> 96 utilities</p>		
<p><b>Participants with annual mains network feed-in of:</b> 162 million m³ (water quantity supplied)</p>		
< 0.5 million m³: 19	0.5-1.5 million m³: 57	>1.5 million m³: 20
<p><b>Project type:</b> Project carried out within the respective German federal state (Rhineland-Palatinate): Benchmarking on the basis of corporate performance indicators</p> <p><b>Project-cycle:</b> every 2 – 3 year, next survey year 2007, first survey carried out in 2004</p>		

6 Benchmarking on water supply
<p><b>Short description of the project:</b> The project concept extends to all areas where the utilities provide their operational services. It refers both to the functions of administrative bodies and technical functions. It includes all aspects from water abstraction to customer billing. Simplified process surveys are also contained with a view to concretizing certain tasks. The aim was to objectively examine the efficiency of water supply in Hesse (German federal state). The project was aimed at providing support to utilities in terms of performance assessment; it implied a comprehensive performance indicator comparison and was based on voluntary participation and confidential treatment of information. The IWA performance indicator system served as a basis.</p> <p><b>Internet:</b> <a href="http://www.benchmarking-he.de">www.benchmarking-he.de</a></p> <p><b>References:</b> Benchmarking Wasserversorgung Hessen. Unternehmensvergleich mit Kennzahlen. Projektbericht für die Erhebung im Jahr 2005, o.J.; Benchmarking Wasserversorgung Hessen – Ergebnisse und Perspektiven, in: DVGW energie wasser-praxis, 7/8 2006, p. 62-66</p>
<p><b>Project executing organizations:</b> BDEW- and DVGW regional section of Hesse, in cooperation with the association of cities and municipalities in Hesse and the federation of towns in Hesse</p>
<p><b>Total number of participants:</b> 33, approx. 42 percent of water sales in Hesse were covered by the project</p>
<p><b>Project type:</b> Benchmarking on the basis of corporate performance indicators</p> <p><b>Project-cycle:</b> first survey carried out in 2005, the project will be continued</p>

7.1 Associations' model of performance indicator comparison in Baden-Württemberg (German federal state) in 2005			
<p><b>Short description of the project:</b> The project „Performance indicator comparison for Baden-Württemberg“, cooperatively carried out by the most important associations (central municipal associations and sector associations) is to enable at lowest possible efforts a first step towards performance comparison of water supply in Baden-Württemberg by means of about 37 performance indicators. Moreover, the project is to allow participants to make a first definition of their position.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• objective examination of the performance of the water supply sector in Baden-Württemberg</li> <li>• definition of the participants' positions, forming the basis for an internal, constructive analysis of possible potentials for improvement</li> <li>• opportunity to the participants to make an in-depth analysis of the current situation, to quantify structural prerequisites and lay the bases, both internally and externally, for future performance characteristics</li> <li>• anonymity, voluntary participation, confidential treatment of information</li> </ul> <p><b>Internet:</b> <a href="http://www.benchmarking-bw.de">www.benchmarking-bw.de</a></p> <p><b>Reference:</b> Verbändemodell Kennzahlenvergleich Wasserversorgung Baden-Württemberg: Ergebnisbericht für das Erhebungsjahr 2005, 2006</p>			
<p><b>Project executing organizations:</b> Federation of towns in Baden-Württemberg, Association of municipalities in Baden-Württemberg, DVGW Baden-Württemberg, VGW Baden-Württemberg, VKU Baden-Württemberg</p>			
<p><b>Total number of participants:</b> 75 (35/40) (multi-branch utilities/mere water suppliers)</p>			
<p><b>Participants with an annual supply mains feed-in of:</b> 150,474,786 million m<sup>3</sup> (multi-branch utilities)/84,943,174 million m<sup>3</sup> (mere water suppliers)</p>			
< 0.5 million m <sup>3</sup> : 1/6	0.5 – 1.0 million m <sup>3</sup> : 12/14	1.0 – 5.0 million m <sup>3</sup> : 17/16	> 5 million m <sup>3</sup> : 5/4
<p><b>Project type:</b> Project carried out within the respective German federal state (Baden-Württemberg), benchmarking on the basis of corporate performance indicators</p> <p><b>Project-cycle:</b> annual, the project is in the first cycle, first survey carried out in 2005</p>			

7.2 Associations' model of performance indicator comparison in Baden-Württemberg in 2006			
<p><b>Short description of the project:</b> The project „Performance indicator comparison for Baden-Württemberg“, cooperatively carried out by the most important associations (central municipal associations and sector associations) is to enable at lowest possible efforts a first step towards performance comparison of water supply in Baden-Württemberg by means of about 37 performance indicators. Moreover, the project is to allow participants to make a first definition of their position.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• objective examination of the performance of the water supply sector in Baden-Württemberg</li> <li>• definition of the participants' positions, forming the basis for an internal, constructive analysis of possible potentials for improvement</li> <li>• opportunity to the participants to make an in-depth analysis of the current situation, to quantify structural prerequisites and lay the bases, both internally and externally, for future performance characteristics</li> <li>• anonymity, voluntary participation, confidential treatment of information</li> </ul> <p><b>Internet:</b> <a href="http://www.benchmarking-bw.de">www.benchmarking-bw.de</a></p> <p><b>Reference:</b> Verbändemodell Kennzahlenvergleich Wasserversorgung Baden-Württemberg: Ergebnisbericht für das Erhebungsjahr 2005, 2006</p>			
<p><b>Project executing organizations:</b> Federation of towns in Baden-Württemberg, Association of municipalities in Baden-Württemberg, DVGW Baden-Württemberg, VGW Baden-Württemberg, VKU Baden-Württemberg</p>			
<p><b>Total number of participants:</b> 102 (multi-branch utilities/mere water suppliers)</p>			
<p><b>Participants with an annual mains network feed-in of:</b> 373.1 million m<sup>3</sup></p>			
< 0.5million m <sup>3</sup> : 22	0.5 – 1.0 million m <sup>3</sup> : 26	1.0 – 5.0 million m <sup>3</sup> : 38	> 5 million m <sup>3</sup> : 16
<p><b>Utilities participating over several years:</b> 44 percent</p>			
<p><b>Project type:</b> Project carried out within the respective German federal state (Baden-Württemberg), benchmarking on the basis of corporate performance indicators</p> <p><b>Project-cycle:</b> annual, the project is in the 2nd cycle, first survey carried out in 2005</p>			

<b>8 Überbetrieblicher Leistungsvergleich Großstädtischer Unternehmen</b> [performance benchmarking of utilities supplying big cities]			
<p><b>Short description of the project:</b>          ÜBV (Überbetrieblicher Leistungsvergleich großstädtischer Versorgungsunternehmen - [inter-utility performance benchmarking of big-city utilities]) is an association of utilities from Germany and Austria supplying big cities. The ÜBV was founded in 1949. Against the background of liberalization and the current discussion about sustainability of water supply, the former performance indicator comparison was developed into efficient benchmarking.          At intervals of at least two years, accompanying processes are analyzed and summarized in process benchmarking studies. The participating utilities compare their performance within the electricity, gas, water and heat sectors on the basis of economic performance indicators.</p> <p><b>Aims of the project:</b>          The comparison is based on input data and performance indicators collected both within the different sectors and at the different value-added levels. As a result, the utilities obtain a definition of their position on the basis of efficiency indicators.          To this end, the ÜBV main committee meeting is held every year to discuss the benchmarking results and possible potentials for improvement; moreover, optimization approaches are discussed among the participating utilities.</p> <p><b>Internet:</b> www.uebv.de</p>			
<b>Project executing organization:</b> ÜBV (represented by the ÜBV office – Stadtwerke Münster)			
<b>Total number of participants:</b> 24/2 (multi-branch utilities/mere water suppliers)			
<b>Participants with an annual mains network feed-in of:</b> approx. 785 million m³			
< 0.5 million m³: 0	0.5 – 1.0 million m³: 0	1.0 – 5.0 million m³: 0	> 5 million m³: 17/17

<b>9 Corporate benchmarking on drinking water supply</b>			
<p><b>Short description of the project:</b>          The corporate benchmarking on water is a project repeated at annual intervals in which both long-distance water supply utilities and utilities supplying end-use customers may participate. The project is based on the German version of the IWA performance indicator system. In addition, main topics changing every year are offered with a view to consolidating the findings (for 2006 e.g. comparison of maintenance strategies). The two Workshops held during each survey year serve to describe the results and exchange information and experience among experts of the participating utilities. If required, additional lectures are given by expert speakers during the Workshops. An online-platform for data collection and analysis is used for the project. The project is supported by moderators.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• establish comparability among the utilities</li> <li>• carry out transparent, sustainable and verifiable definitions of positions according to the five-pillar model</li> <li>• identify potentials for improvement in terms of an increase of economic efficiency</li> <li>• elaborate an action plan for the implementation of measures</li> <li>• long-term monitoring through generation of time series</li> </ul> <p><b>Reference:</b>          Ein Erfolgsmodell: „Unternehmensbenchmarking Trinkwasserversorgung“, in: DVGW energie wasser-praxis, 7/8 2007</p>			
<b>Total number of participants:</b> 10			
<b>Participants with an annual mains network feed-in of:</b> 1,444,152,168 m³			
< 0.5 million m³: 0	0.5 – 1.0 million m³: 0	1.0 – 5.0 million m³: 2	> 5 million m³: 39
<b>Utilities participating over several years:</b> 82.35 percent			
<p><b>Project type:</b>          Benchmarking on the basis of corporate performance indicators</p> <p><b>Project cycle:</b>          annual, the project is in the 7th cycle, first survey carried out in 2000</p>			

### 10.1 Examination of the efficiency and quality of municipal water supply in Bavaria (EffWB) in 2000

#### Short description of the project:

The examination of the efficiency and quality of municipal water supply in Bavaria (EffWB) is characterized by an integral approach: Through 54 performance indicators and an index value, the aspects of efficiency, security, quality, sustainability and customer service are evaluated in a transparent and verifiable manner. The concept is completed by the survey of up to five processes (construction of new supply pipes, renewal of pipes, construction of house connection, meter change, consumption billing) thus enabling the utilities' own performance to be assessed and an optimized definition of the position of the participating utilities to be made.

#### Aims of the project:

- objective examination of the performance of water supply in Bavaria
- definition of the participants' position forming the basis for an internal constructive analysis of possible potentials for improvement
- opportunity to the participants to make an in-depth analysis of the current situation, to quantify structural prerequisites and lay the bases, both internally and externally, for future performance characteristics
- anonymity, voluntary participation, confidential treatment of information

**Internet:** [www.effwb.de](http://www.effwb.de)

#### Reference:

Effizienz- und Qualitätsuntersuchung der kommunalen Wasserversorgung in Bayern (EffWB): Abschlussbericht für das Erhebungsjahr 2000, 2002

**Project executing organization:** Bavarian State Ministry for the Environment, Health and Consumer Protection, represented by the Bavarian State Office for the Environment, VBDEW (DVGW regional group "Bavaria"), Bavarian Association of municipalities, Bavarian Federation of towns

**Total number of participants:** 95

**Participants with an annual mains network feed-in of:** 323.5 million m<sup>3</sup>

< 0.5million m<sup>3</sup>: 33

0.5 – 1.0 million m<sup>3</sup>: 20

1.0 – 5.0 million m<sup>3</sup>: 31

> 5 million m<sup>3</sup>: 11

#### Project type:

Project carried out within the respective German federal state (Bavaria), benchmarking on the basis of corporate performance indicators

#### Project cycle:

every 3 years, the project is in the 1st cycle, survey carried out for the first time in 2000

### 10.2 Examination of the efficiency and quality of municipal water supply in Bavaria (EffWB) in 2003

#### Short description of the project:

The examination of the efficiency and quality of municipal water supply in Bavaria (EffWB) is characterized by an integral approach: Through 54 performance indicators and an index value, the aspects of efficiency, security, quality, sustainability and customer service are evaluated in a transparent and verifiable manner. The concept is completed by the survey of up to five processes (construction of new supply pipes, renewal of pipes, construction of house connection, meter change, consumption billing) thus enabling the utilities' own performance to be assessed and an optimized definition of the position of the participating utilities to be made.

#### Aims of the project:

- objective examination of the performance of water supply in Bavaria
- definition of the participants' position forming the basis for an internal constructive analysis of possible potentials for improvement
- opportunity to the participants to make an in-depth analysis of the current situation, to quantify structural prerequisites and lay the bases, both internally and externally, for future performance characteristics
- anonymity, voluntary participation, confidential treatment of information

**Internet:** [www.effwb.de](http://www.effwb.de)

#### Reference:

Effizienz- und Qualitätsuntersuchung der kommunalen Wasserversorgung in Bayern (EffWB): Abschlussbericht für das Erhebungsjahr 2003, 2004

**Project executing organization:** Bavarian State Ministry for the Environment, Health and Consumer Protection, represented by the Bavarian State Office for the Environment, VBDEW (DVGW regional group "Bavaria"), Bavarian Association of municipalities, Bavarian Federation of towns

**Total number of participants:** 84

**Participants with an annual mains network feed-in of:** 195.7 million m<sup>3</sup>

< 0.5 million m<sup>3</sup>: 11

0.5 – 1.0 million m<sup>3</sup>: 29

1.0 – 5.0 million m<sup>3</sup>: 34

> 5 million m<sup>3</sup>: 10

**Utilities participating over several years:** 45 percent

#### Project type:

Project carried out within the respective German federal state (Bavaria), benchmarking on the basis of corporate performance indicators

#### Project cycle:

every 3 years, the project is in the 2nd cycle, survey carried out for the first time in 2000, termination of the 3rd survey cycle probably during the first quarter of 2008

#### 11 Project of the Land NRW (North Rhine-Westphalia [German federal state])

**Short description of the project:**

Integral performance benchmarking on water supply – from water abstraction to consumption billing. The project is aimed at collecting performance indicators in terms of economic efficiency, security, quality, sustainability and customer service. Different modules providing differing survey depths (basic and consolidation module) are offered. Data can also be collected by means of an online platform.

**Internet:** [www.benchmarking-nrw.de](http://www.benchmarking-nrw.de)

**Project executing organizations:** Ministry of economics, medium-sized businesses and energy of the Land North Rhine-Westphalia, Ministry of the Interior of the Land North Rhine-Westphalia, Ministry for the Environment and Nature Conservation, Agriculture and Consumer Protection of the Land North Rhine-Westphalia, VKU, BDEW regional section of North Rhine-Westphalia

**Project type:**

Project carried out within the respective federal state (North-Rhine Westphalia)

**Project cycle:**

Start of the project scheduled for the 1st quarter of 2008, inquiry to utilities in January 2008

#### 12 Benchmarking on water supply in the Saarland (German federal state)

**Short description of the project:**

By the project on „Benchmarking on water supply within the Saarland“ the technical committee on water of the VGW regional section picks up on the Associations' declaration on „Benchmarking“. The aim is to achieve federal-state-wide benchmarking in the Saarland, based upon voluntary participation of the water supply utilities. An online platform is used for data collection and analysis. Apart from corporate benchmarking, the customer-oriented processes, such as “construct house connections”, “carry out meter changes” and “execute consumption billing” are considered. The project is supported by moderators.

**Aims of the project:**

- benchmarking on the basis of voluntary participation covering as far as possible the entire territory of the Saarland
- implementation of a reliable definition of the participants' positions
- joint cause analysis with participants
- determination of coordinated potentials for improvement
- elaboration of a „Profile of the Saarland water supply sector“

**Internet:** [www.wasserbenchmarking-saarland.de](http://www.wasserbenchmarking-saarland.de)

**Project executing organization:** Association of the Saarland gas and water industry

**Total number of participants:** 19/10 (water suppliers/multi-branch utilities)

**Participants with an annual mains network feed-in of:** 62.8 million m<sup>3</sup>

< 0.5 million m <sup>3</sup> : 3	0.5 – 1.0 million m <sup>3</sup> : 11	1.0 – 5.0 million m <sup>3</sup> : 13	> 5 million m <sup>3</sup> : 2
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**Project type:**

Project carried out within the respective federal state (Saarland), benchmarking on the basis of corporate performance indicators

**Project cycle:**

Performance benchmarking at regular intervals is intended; the project is in the 1st cycle, first survey carried out in 2007

### 13 BkV/Benchmarking on water of the Association of municipal utilities

#### Short description of the project:

BkV/Benchmarking is a Germany-wide association of 200 municipal supply and disposal utilities which can compare their performance with one another in the fields of water, wastewater, electricity, gas, district heat and public baths. Furthermore, there is a separate performance comparison for special-purpose associations/distributors. BkV-Wasser was adapted in 2004 to the essential elements of the International Water Association's (IWA) system. The focus of BkV-Wasser is on distribution to final customers. With a view to minimizing the survey effort, there are different survey depths. Apart from the pure sector perspective, BkV-Wasser focuses on the representation of value-added levels. In terms of „profitability“ benchmarking, focus is on contribution costing. Through additional query of success factors, BkV/Benchmarking constitutes hypotheses-based benchmarking. Implementation of the online system in 2006 enables participants to carry out extensive web-based evaluations on their own (e.g. comparison with best-practice undertakings). To offer a discussion forum to participants, BkV/Benchmarking is involved in a comprehensive event management so that the results are presented and analysed within different groups.

#### Aims of the project:

- definition of positions on the basis of efficiency indicators
- identification of optimization potentials at all value-added levels (provision/trading, network, sales) and at the level of administration
- verification or falsification of hypotheses established
- communication platform provided through series of events

Internet: [www.vku.de](http://www.vku.de)

**Project executing organization:** Association of municipal utilities

**Total number of participants without special-purpose associations/distributors:** 167/12 (multi-branch utilities/mere water suppliers)

**Participants with an annual mains network feed-in of:** 633.5/59.8 million m³

< 0.5 million m³: 2/0	0.5 – 1.0 million m³: 28/0	1.0 – 5.0 million m³: 98/7	> 5 million m³: 39/5
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#### Project type:

Germany-wide comparison, benchmarking on the basis of corporate performance indicators and process indicators

#### Project cycle:

annual, the project is in the 54th cycle, first survey carried out in 1953

### 14 BkV/Benchmarking of VKU – Zweckverbände [Association of municipal utilities – special-purpose associations]

#### Short description of the project:

BkV/Benchmarking is a Germany-wide association of 200 municipal supply and disposal utilities which can compare their performance with one another in the fields of water, wastewater, electricity, gas, district heat and public baths. To take the specific circumstances of special-purpose associations/distributors (which is a common form of organization) into account, a separate performance comparison is carried out for this group in addition to the operational cost comparison on water. BkV/Benchmarking for special-purpose associations was adapted already in 2004 to the essential elements of the International Water Association's (IWA) system. With a view to minimizing the survey effort, there are different survey depths. Apart from the pure sector perspective, BkV-Wasser focuses on the representation of value-added levels. In terms of „profitability“ benchmarking, focus is on contribution costing. Through additional query of success factors, BkV/Benchmarking constitutes hypotheses-based benchmarking. Implementation of the online system in 2006 enables participants to carry out extensive web-based evaluations on their own. Furthermore, a comprehensive event management enables participants to discuss the results in technical terms. From the reference year 2007, participants of BkV-special purpose associations can compare their performance not only with one another but also with other participants of BkV-Water.

#### Aims of the project:

- definition of positions on the basis of efficiency indicators
- identification of optimization potentials over all value-added levels (provision, network, distribution) and at the level of administration
- verification or falsification of hypotheses established
- communication platform provided through series of events

Internet: [www.vku.de](http://www.vku.de)

**Project executing organization:** Association of municipal utilities

**Total number of participants:** 8

**Participants with an annual mains network feed-in of:** 293 million m³

< 0.5 million m³: 0	0.5 – 1.0 million m³: 0	1.0 – 5.0 million m³: 0	> 5 million m³: 8
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#### Project type

Germany-wide comparison, benchmarking on the basis of corporate performance indicators

#### Project cycle:

annual, the project is in the 11th cycle, first survey carried out in 1996

<b>15 Benchmarking on water supply in Thuringia (German federal state)</b>
<p><b>Short description of the project:</b> The project „Benchmarking on water supply in Thuringia“ is addressed to all water supply utilities in Thuringia (supply to end-use customers) and includes both performance and process benchmarking. Currently, the project is in the 2nd survey cycle with 2006 as base year.</p> <p><b>Aims of the project:</b> The aim of the project is to collect data on the efficiency and effectiveness of the provision of water supply services with a view to identifying and utilizing potentials for improvement through a comparison with best performers.</p> <p><b>Reference:</b> Benchmarking der Wasserversorgung in Thüringen. Projektbericht für das Erhebungsjahr 2003</p>
<b>Total number of participants:</b> 1st survey cycle: 21 participants; 2nd survey cycle: 16 participants
<b>Participants with an annual mains network feed-in of:</b> approx. 40 million m³
<b>Utilities participating over several years:</b> 81 percent
<p><b>Project type:</b> Project carried out within the respective federal state (Thuringia), benchmarking on the basis of corporate performance indicators and process indicators</p> <p><b>Project cycle:</b> every 3 years, the project is in the 2nd cycle, first survey carried out in 2004 (base year 2003)</p>

<b>16 BKWasser</b>			
<b>Short description of the project:</b> Indicator-based benchmarking for the utilities of public water supply and municipal wastewater disposal in Hesse (German federal state), especially for small and medium-sized enterprises. Multi-stage benchmarking based on the IWA scheme: corporate performance indicators process indicators, exchange of experience, consolidation through guidelines on cost accounting and operational data acquisition with adequate training. BKWasser was initiated by the Ministry for the Environment of Hesse and is now offered by independent project management agencies. Support is provided by the Association of cities and municipalities in Hesse. There is a project adviser for the qualitative refinement of BKWasser.			
<b>Aims of the project:</b> Definition of the utilities' positions, gain in information for operational steering functions, identification of potentials for improvement, cost-cutting potential, consolidation of strategic decisions, aid for the documentation of regional particularities (argumentation backup); documentation of performance and quality standards, also in terms of sustainability; allowance for the EU requirements for benchmarking on services of general public interest			
<b>Internet:</b> <a href="http://www.bkwasser.de">www.bkwasser.de</a>			
<b>Total number of participants:</b> 50			
<b>Participants with an annual mains network feed-in of:</b> 44.7 million m³			
< 0.5 million m³: 17	0.5 – 1.0 million m³: 18	1.0 – 5.0 million m³: 15	> 5 million m³: 0
<b>Utilities participating over several years:</b> 62 percent			
<b>Project:</b> Project carried out within the respective federal state (Hesse), benchmarking on the basis of corporate performance indicators and process indicators			
<b>Project cycle:</b> the project is in the 6th cycle, first survey carried out in 2000			



<b>17 Benchmarking on impounding reservoirs</b>			
<p><b>Short description of the project:</b> At the initiative of Aggerverband and Wupperverband [associations of water supply utilities named after the rivers Agger and Wupper], a full-cost benchmarking methodology was developed which is to enable impounding reservoirs to be compared to one another while taking bio-geographic and technical conditions into consideration. The project results will be included in the ATT [Association of Drinking Water from Reservoirs] guidelines for benchmarking on impounding reservoirs. An online platform is used for data collection and analysis. The project is supported by moderators.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• develop a full-cost benchmarking methodology for impounding reservoirs</li> <li>• achieve comparability between the benchmarking objects of different undertakings</li> <li>• undertake a definition of positions through profitability and performance comparisons (using the best value as a basis)</li> <li>• identify potentials for improvement to increase profitability or optimize the operation of impounding reservoirs</li> <li>• elaborate an action plan for the implementation of adequate measures</li> </ul>			
<b>Project executing organizations:</b> Aggerverband and Wupperverband			
<b>Total number of participants:</b> 2/4 (impounding reservoir operators/impounding reservoirs)			
<b>Impounding reservoir operators/impounding reservoirs with a total retaining capacity volume of:</b> 155 million m³			
< 10 million m³: -/-	10 – 50 million m³: 2/3	50 – 100 million m³: 1/1	>100 million m³: -/-
<p><b>Project type:</b> Benchmarking on the basis of corporate performance indicators</p> <p><b>Project cycle:</b> Currently, the project is at the pilot stage; after finalization of the project, further survey cycles are planned to be performed, first survey carried out in 2004.</p>			

<b>18 Benchmarking on operation of impounding reservoirs</b>			
<p><b>Short description of the project:</b> At the initiative of the Benchmarking Task Force „Large Operators“ of the ATT [Association of Drinking Water from Reservoirs] Committee on „Construction and operation of impounding reservoirs“, a benchmarking methodology is developed through the project which is to enable impounding reservoirs to be compared to one another (for the time being under the aspect of manpower assignment) while taking bio-geographic and technical conditions into consideration. The project results will be included in the ATT guidelines for benchmarking on impounding reservoirs. An online platform is used for data collection and analysis. The project is supported by moderators.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• development of a benchmarking methodology for impounding reservoirs operation</li> <li>• improvement of manpower assignment at the impounding reservoirs under review</li> <li>• establishment of a full-cost benchmarking approach</li> </ul> <p><b>Internet:</b> <a href="http://www.trinkwassertalsperren.de">www.trinkwassertalsperren.de</a></p>			
<b>Project executing organization:</b> Association of Drinking Water from Reservoirs (ATT)			
<b>Total number of participants:</b> 4/8 (impounding reservoir operators/impounding reservoirs)			
<b>Impounding reservoir operators/impounding reservoirs with a permanent retaining capacity volume of:</b> 578 million m³			
< 10 million m³: 2/2	10 – 50 million m³: 2/2	50 – 100 million m³: 2/2	> 100 million m³: 2/2
<p><b>Project type</b> Benchmarking on the basis of corporate performance indicators and process indicators</p> <p><b>Project cycle:</b> Currently, the project is at the pilot stage; after finalization of the project, further survey cycles are planned to be performed, first survey carried out in 2005.</p>			



## 19 Process benchmarking on water supply in Rhineland-Palatinate (German federal state)

### Short description of the project:

Based on the „Benchmarking cooperation agreement“ of September 2005, and the already finalized performance indicator comparison carried out throughout Rhineland-Palatinate, the go-ahead for process benchmarking on selected processes relating to water supply functions has been given from the 3rd quarter of 2007.

A module offered for the project comprises the processes of water management, water abstraction and water treatment, and a further module applies to the processes of water transport, water storage and water distribution. Participation in one module can be independent from the remaining modules. In addition, a third module offers for the first time the possibility to submit administrative processes in water supply to process benchmarking.

A sophisticated fully developed online platform is used for data collection and analysis.

### Aims of the project:

- achieve comparability between the benchmarking objects of different utilities
- carry out a definition of positions
- perform operational comparisons (taking the best value as a basis)
- carry out analyses of variance
- develop measures for further operation optimization

**Internet:** [www.wasserbenchmarking-rp.de](http://www.wasserbenchmarking-rp.de)

**Project executing organizations:** Federation of towns in Rhineland-Palatinate, Association of municipalities and cities in Rhineland-Palatinate, Ministry for the Environment and Forestry in Rhineland-Palatinate, German Association for Gas and Water (DVGW), Association of Local Utilities (VKU), German Association for Water, Wastewater and Waste (DWA), regional association of Hesse/ Rhineland-Palatinate /Saarland, regional association the gas and water industry of Rhineland-Palatinate (LGW)

**Total number of participants:** Participants are registered at present.

### Project type:

Project carried out within the respective German federal state (Rhineland-Palatinate), benchmarking on the basis of process indicators

### Project cycle:

annual, the project is in the 1st cycle, first survey carried out in 2006

## 20 Benchmarking on consumption accounting

### Short description of the project:

Comparison of the processes of annual consumption accounting for drinking water supply and wastewater disposal (centralized and decentralized), monthly accounting of customers at special rates, master data maintenance and claim management. In addition, comparison of processes for the survey of water meter readings and of regular meter changes according to the calibration term (including the sampling procedure). The performance indicator system used was cooperatively developed with the participants.

### Aims of the project:

- comparison of meter reading procedures; e.g. comparison of meter reading through the customer, radio system reading, data entry by means of cards, e-mail, Internet, etc; determination of optimum approaches in terms of customer satisfaction and necessary efforts
- comparison of procedures of consumption accounting; e.g. comparison of cyclical accounting and effective-date accounting; different methods of invoice printing and mailing, procedures of invoice corrections, etc; determination of optimum approaches in terms of customer satisfaction and required efforts
- comparison of meter change procedures; e.g. size of teams, working hours used for the change, notification procedure, time required for the meter change, procedures of meter reading and transmission of readings in case of meter change (including the use of mobile data collection); determination of optimum approaches in terms of customer satisfaction and required efforts
- For the 3rd cycle – with the participation of KOWAB [Cooperation of the water and wastewater sectors] – the aim was to find possibilities of cooperation in the field of consumption accounting.

### References:

„Potenziale erkennen: Benchmarking“, wwt issue 06/2001, page 10; „Benchmarking für kommunale Wasser- und Abwasserunternehmen abgeschlossen“, Der Überblick Ausgabe 09/2001, page 44; „Monopolisten im Wettbewerb“, QZ issue 02/2002, page 141

**Project executing organizations:** the different utilities (the project executing organization for the 3rd cycle was „KOWAB Kooperation Wasser und Abwasser Brandenburg – Ost.“)

**Total number of participants:** 35

**Participants with an annual mains network feed-in of:** 244.5 million m<sup>3</sup>

< 0.5 million m<sup>3</sup>: 6

0.5 – 1.0 million m<sup>3</sup>: 0

1.0 – 5.0 million m<sup>3</sup>: 12

> 5 million m<sup>3</sup>: 17

**Utilities participating over several years:** 8.6 percent

### Project type:

Benchmarking on the basis of process indicators

### Project cycle:

every two years, the project is in the 4th cycle, first survey carried out in 2001

<b>21 Customer survey</b>			
<p><b>Short description of the project:</b> Survey of the customers of a water supplier/ wastewater disposal utility by means of a questionnaire and through online inquiry about customer satisfaction. The results will be individually evaluated for the participating companies, and appropriate measures will be recommended. At the same time, the data are compared to those available from more than 5,400 questionnaires from 23 utilities/regions.</p> <p><b>Aims of the project:</b> Findings e.g. on quality of contacts, quality of organization and information and recommended action. To this end, reliable answers to the following questions:</p> <ul style="list-style-type: none"> <li>• „What should we pay particular attention to in order to satisfy our customers?“</li> <li>• „In which fields must/can we achieve improvements to satisfy our customers?“</li> <li>• „Where do we currently not have to make additional efforts to increase customer satisfaction?“</li> <li>• The aim of the 2nd cycle – with the participation of KOWAB – was among others to find possibilities of cooperation in the field of customer service.</li> </ul> <p><b>Reference:</b> „Sind die Kunden zufrieden?“, wwt issue 06/2002; „Kundenzufriedenheit in der Wasserversorgung“, DVGW energie wasser-praxis, 7/8 2003</p>			
<p><b>Project executing organizations:</b> the different utilities (The project executing organization for the 2nd cycle was KOWAB Kooperation Wasser und Abwasser Brandenburg - Ost.)</p>			
<p><b>Total number of participants:</b> 24 utilities</p>			
< 0.5 million m³: 3	0.5 – 1.0 million m³: 0	1.0 – 5.0 million m³: 8	> 5 million m³: 13
<p><b>Utilities participating over several years:</b> 12.5 percent</p>			<p><b>Total mains network feed-in:</b> 1844 million m³</p>
<p><b>Project type:</b> Project carried out within the respective German federal state (Brandenburg)</p> <p><b>Project cycle:</b> depending on the participants' request; the project is in the 4th cycle, first survey carried out in 2002</p>			

<b>22 Benchmarking on provision of house connections</b>			
<p><b>Short description of the project:</b> The process „provide house connection“ comprises all activities from the customer's request for connection to the house connection's documentation in the plan. Where activities are carried out by third parties, these have to be taken into consideration as well. The process review is completed by questions about renewal/rehabilitation of house connections as comprehensive survey.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• Comparison of the overall expenditure required for the provision of house connection and their partial processes concerning application, execution of construction work, accounting</li> <li>• identification of optimization potentials for the sequence of activities</li> </ul> <p><b>Reference:</b> „Potenziale erkennen: Benchmarking“, wwt issue 06/2001, page 10; „Benchmarking für kommunale Wasser- und Abwasserunternehmen abgeschlossen“, Der Überblick issue 09/2001, page 44; „Monopolisten im Wettbewerb“, QZ issue 02/2002, page 141</p>			
<p><b>Project executing organizations:</b> the different utilities</p>			
<p><b>Total number of participants:</b> 32 utilities and associations</p>			
<p><b>Participants with an annual mains network feed-in of:</b> 230 million m³</p>			
< 0.5 million m³: 5	0.5 – 1.0 million m³: 0	1.0 – 5.0 million m³: 10	> 5 million m³: 16
<p><b>Utilities participating over several years:</b> 3.2 percent</p>			
<p><b>Project type:</b> Benchmarking on the basis of process indicators</p> <p><b>Project cycle:</b> every two years; the project is in the 3rd cycle, first survey carried out in 2001</p>			

## 23 Benchmarking on support processes

### Short description of the project:

- field under review: Support processes focusing on commercial functions
- detailed analysis of selected sub-processes, e.g. provision of services and material, check purchase invoices and make an entry in the accounts, hosting of EDP, personnel management and accounting, billing of ancillary services, establishing an economic plan, drawing-up annual accounts, provision of financial resources etc.
- comprehensive consideration of the entire undertaking's structure (e.g. interfaces „technical-commercial issues“, outsourcing degree etc.) and of the frame conditions (e.g. legal form, EDP system etc.)
- Apart from the core processes, support processes are also of great importance to efficient corporate management. Frequently, the impression arises within the utilities that increasing efforts are undertaken for the implementation of these activities.

### Aims of the project:

- fact-based comparison for undertakings of the water industry, providing findings on the efficiency of support processes
- The project focuses on processes with commercial functions, which in many cases do not only concern the commercial field but usually represent inter-divisional processes (e.g. establishment of an economic plan).

**Project executing organizations:** the different utilities

**Total number of participants:** 12 utilities and associations

**Participants with an annual mains network feed-in of:** 60 million m<sup>3</sup>

< 0.5 million m <sup>3</sup> : 3	0.5 – 1.0 million m <sup>3</sup> : 0	1.0 – 5.0 million m <sup>3</sup> : 3	> 5 million m <sup>3</sup> : 6
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### Project type:

Benchmarking on the basis of process indicators

### Project cycle:

probably every two years, the project is in the 1st cycle, first survey carried out in 2006

## 24 Benchmarking „operate a mains network“

### Short description of the project:

The project „operate a mains network“ includes a comparison of processes for the operation of the water distribution mains (mains network, reservoirs, pressure-increase facilities) taking account of the interfaces with the processes of network documentation, investment activities and meter changes. The performance indicator system used is based on the IWA system which was completed or extended for the process reviews. The extensions were developed cooperatively with the participants.

### Aims of the project:

- review of the utility's size and structure, staff structure, technical equipment, EDP, machinery equipment, expenditure (extraneous services/services rendered for own account), network structure (age, material, length)
- comparison of the procedures for work scheduling and reporting, standby duty, meter change and network documentation
- comparison of the procedures for mains repair/overhaul, flashing and inspection of mains
- determination of optimization potentials in terms of costs, quality and efficiency and elaboration of implementation strategies

### Reference:

„Prozess-Benchmarking Rohrnetz betreiben“ and „Kundenorientierung: Modernisierungspotenziale aufdecken und erschließen“, in: DVGW energie|wasser-praxis, 7/8 2005, page 16

**Project executing organizations:** the different utilities

**Total number of participants:** 37 utilities and associations

**Participants with an annual mains network feed-in of:** 184.5 million m<sup>3</sup>

< 0.5 million m <sup>3</sup> : 3	0.5 – 1.0 million m <sup>3</sup> : 0	1.0 – 5.0 million m <sup>3</sup> : 17	> 5 million m <sup>3</sup> : 17
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**Utilities participating over several years:** 2.7 percent

### Project type:

Benchmarking on the basis of process indicators

### Project cycle:

every two years, the project is in the 3rd cycle, first survey carried out in 2001



<b>25 Benchmarking on human resources management</b>
<p><b>Short description of the project:</b> Benchmarking on human resources management for utilities with (previous) public participation establishes a new panel at the benchmarking platform for staff processes with the aim to take account of the specific characteristics of utilities rooted in a municipal environment. All utilities working in the field of public services of general interest can participate in the project.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• model the personnel function in a comprehensive manner while taking specific account of the particular characteristics of the participating parties</li> <li>• enable the participants to compare their performance within their own sector and to learn from other participants how to succeed in organizing individual personnel processes more efficiently and at a higher quality level</li> <li>• ensure at the same time comparability with participants from the private sector with a view to enabling them to compare with similar and leading companies from the private sector to learn from the best performers</li> </ul>
<p><b>Total number of participants:</b> 15 10 participants booked from the wastewater sector 2 participants booked from the water supply sector 3 participants booked from other sectors providing services of general interest</p>
<b>Utilities participating over several years:</b> 88 percent
<p><b>Project type:</b> Benchmarking on the basis of process indicators</p> <p><b>Project cycle:</b> annual, the project is in the 2nd cycle, survey carried out for the first time in 2005</p>

<b>26 Competitive water supply and wastewater disposal</b>			
<b>Short description of the project</b> The German water and wastewater industry is characterized by a high quality and customer satisfaction as well as by sustainable economic development. Owing to the sector's structures, there was no need to date to furnish proof of the economic efficiency of the services provided. The methodology of the project is to compare the values of time required and costs incurred by the participating companies to those of companies competing with one another. The latter participate as well in the performance benchmarking. In addition, comparative values from public calls for tender of the past few years are used for the respective levels of value added. As a result, participants obtain findings about their position in a competitive environment and information about concrete measures which they can implement to increase their own efficiency. Both municipal utilities and undertakings of a private and mixed structure participate in the performance benchmarking. The analysis comprises the fields of water management, abstraction and treatment, long-distance water transport, supply mains, house connections, wastewater collection, wastewater transport mains, wastewater treatment, sewage sludge treatment, and disposal. These functions are exclusively fulfilled by experts of the respective sector. Particularly the combination of the tasks of water management in residential areas, business economy and the know-how of organisational and management advice enables us to recommend concrete action plans and ensures a very high satisfaction of our customers.			
<b>Aims of the project:</b> <ul style="list-style-type: none"><li>• transparency in all relevant business processes</li><li>• analysis of the undertaking's potentials</li><li>• implementation of all possibilities identified for an efficiency increase and business expansion</li><li>• avoid manpower reduction through successful crowding-out competition</li><li>• integrate benchmarking as a component of the undertaking's own controlling</li></ul>			
<b>Total number of participants:</b> 20/30/35 (multi-branch undertakings/mere water suppliers/mere wastewater disposal undertakings)			
<b>Participants with an annual mains network feed-in of:</b> 120/150 million m³			
< 0.5 million m³: 0/0	0.5 – 1.0 million m³: 4/5	1.0 – 5.0 million m³: 10/12	> 5 million m³: 6/13
<b>Project type:</b> Benchmarking on the basis of process indicators, surveys are carried out continuously			

## 27 Benchmarking on drinking water laboratories

### Short description of the project:

Six laboratories of drinking water suppliers or examination centres working on behalf of these suppliers (associated companies) participated on a voluntary basis in the benchmarking project with a role model character. A process model for quality control through water laboratories was developed and the necessary basic conditions for reasonable comparisons were determined in the project. Some first approaches were obtained in terms of process improvements: degrees of utilization in the selected sub-processes, logistics and manpower assignment concepts, in particular for sampling, measures to reduce the rate of absenteeism, automation degree of the process chain, economic efficiency of special analytics, in particular of organics, and investment strategies for appliances. Concerning the „expenditure for quality control per cubic meter of water delivered“, a share of 10 to 20 percent is left to internal laboratory optimization.

### Reference:

Petersohn, D., Klein, D., Pättsch, B.: Benchmarking von Trinkwasserlaboratorien, in: DVGW energie|wasser-praxis, 58th volume, 11/2007, p. 56-69

The names of contact persons can be obtained from the associations (see last cover page.)

**Total number of participants:** 6

### Project:

Benchmarking on the basis of process indicators

### Project cycle:

Pilot project terminated, next survey planned for 2009



# Wastewater

<b>A 1 Performance indicator comparison</b>			
<b>Short description of the project:</b> This project focused on a performance indicator comparison at corporate level examining all areas of the five-pillar model (profitability, security, quality, customer service and sustainability, based on the DVGW Note W 1100 „Benchmarking in Wasserversorgungsunternehmen“ – [Benchmarking in water supply utilities]) and the drinking water and wastewater sectors collectively. The IWA performance indicator system served as a basis to the project.			
<b>Aims of the project:</b> <ul style="list-style-type: none"> <li>definition of positions within the group of participating utilities with regard to the examined perspectives by means of indicators (e.g. persons employed per 1,000 house connections)</li> <li>description of the participating utilities by means of data variables (e.g. network length in km) and explanatory indicators (e.g. capacity of reservoirs) with regard to all aspects of water supply and wastewater disposal while maintaining the survey efforts at a reasonable level</li> <li>identification of fields of action for detailed and focused investigations</li> <li>no direct determination of potentials for improvement or influence factors concerning detailed processes, but comparison/review of the effects of measures over several years is possible</li> </ul>			
Participants use the regular performance indicator comparison for monitoring their modernisation activities (process and organisation optimizations). The majority of participants have already integrated the performance indicators from the project into their internal controlling.			
<b>Project executing organizations:</b> the different utilities For participants from Lower Saxony, the project initiator is the „Wasserverbandstag e. V. Bremen, Lower Saxony, Saxony-Anhalt (WVT) (see separate project sheet).			
<b>Total number of participants:</b> 55 (10 of which only on wastewater)			
up to 1,000 PT*: 8	1,000 to 10,000 PT*: 0	10,000 to 100,000 PT*: 34	more than 100,000 PT*: 13
<b>Utilities participating over several years:</b> 64 percent			
<b>*) Actual <u>PTs</u> (total number of inhabitants and population equivalents):</b> 4.6 million  <b>Volume of treated sewage:</b> 263 million m³ (industrial wastewater and storm-water included in both cases)			
<b>Project type:</b> pure performance indicator comparison			
<b>Project cycle:</b> every two years, the project is carried out in parallel on water and wastewater, the project is in the 5th cycle, first survey carried out in 2000			

<b>A 2 Comparison of performance indicators of the „Wasserverbandstag e. V.“ [Water Associations' Federation] in Lower Saxony</b>			
<b>Short description of the project:</b> In 2002, a comprehensive concept was developed for the member associations of the Wasserverbandstag (WVT). With a view to ensuring comparability with other projects, the indicator comparison was brought in line with the performance indicator system of the International Water Association (IWA) and is currently adapted to the recommendations of DWA. The „five-pillar model“ was used from the beginning. Consequently, it is possible to guarantee national and international standards of performance indicators.			
<b>Aims of the project:</b> <ul style="list-style-type: none"> <li>definition of positions within the group of participating utilities with regard to the examined perspectives by means of indicators</li> <li>description of the participating utilities by means of data variables and explanatory indicators with regard to all aspects of water supply/wastewater disposal while maintaining the survey efforts at a reasonable level</li> <li>identification of fields of action for detailed and focused investigations</li> <li>no direct determination of potentials for improvement or influence factors at the level of detailed processes, but a comparison/examination of the effects of measures over several years is possible</li> </ul>			
<b>Project executing organizations:</b> Wasserverbandstag e. V., Bremen, Lower Saxony, Saxony-Anhalt (WVT)			
<b>Total number of participants:</b> 22 participants in the current project, 11 of them drinking water and wastewater associations (full function) and 11 drinking water associations <b>Participants with actually connected PT:</b> all			
up to 1,000 PT: 0	1,000 to 10,000 PT: 1	10,000 to 100,000 PT: 8	more than 100,000 PT: 2
<b>Utilities participating over several years:</b> 100 percent			
<b>Actual PTs:</b> 1 million <b>Volume of treated sewage:</b> 43 million m³ (industrial wastewater and storm-water included in both cases)			
<b>Project type:</b> pure performance indicator comparison; possibility of more detailed process benchmarking <b>Project cycle:</b> annual, three times in 7 years through project executing organization WVT, the project is in the 2nd cycle, first survey carried out in 2002			

<b>A 3 Comparison of performance indicators of Mecklenburg Western Pomerania (German federal state)</b>			
<b>Short description of the project:</b> This comparison was started in 2004 at the initiative of the Mecklenburg-Western Pomerania association of water supply and wastewater disposal utilities within BDEW (German Association of Energy and Water Industries) and the BDEW Northern Germany regional section. The project focuses on a performance indicator comparison at corporate level which considers all areas of the five-pillar model for the drinking water and wastewater sectors collectively. Related to the annual volume of wastewater treated, approx. 70 percent of Mecklenburg-Western Pomerania have been covered by the project concerning wastewater disposal. The comparison was based on the IWA performance indicator system and the sample indicator system of DWA.			
<b>Aims of the project:</b> <ul style="list-style-type: none"> <li>definition of positions within the group of participating utilities with regard to the examined perspectives by means of indicators (e.g. persons employed per 1,000 house connections)</li> <li>description of the participating utilities by means of data variables (e.g. network length in km) and explanatory indicators (e.g. capacity of reservoirs) with regard to all aspects of water supply/wastewater disposal while maintaining the survey efforts at a reasonable level</li> <li>identification of fields of action for detailed and focused investigations</li> <li>no direct determination of potentials for improvement or influence factors at the level of detailed processes, but a comparison/examination of the effects of measures over several years is possible</li> </ul>			
<b>Reference:</b> „Kennzahlenvergleich im Wasser und Abwasserbereich in Mecklenburg-Vorpommern“, in: DVGW energie wasser-praxis, 1/2006			
<b>Project executing organizations:</b> The different utilities at the initiative of the association of water supply and wastewater disposal utilities of Mecklenburg-Western Pomerania within BDEW and the BDEW regional section of Northern Germany			
<b>Total number of participants:</b> 44 utilities and associations (6 of them only on drinking water) <b>Participants with actually connected PTs:</b> all			
up to 1,000 PT: 6	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 30	more than 100,000 PT: 8
<b>Utilities participating over several years:</b> 66.7 percent			
<b>Actual TPs:</b> 3 million <b>Volume of treated sewage:</b> 118.5 million m <sup>3</sup> (industrial wastewater and storm-water included in both cases)			
<b>Project type:</b> Project carried out throughout the federal state of Mecklenburg-Western Pomerania at the initiative of BDEW, pure performance indicator comparison <b>Project cycle:</b> annual, the project is carried out in parallel on wastewater and drinking water, 3rd cycle, the fourth iteration will start in the fourth quarter of 2007, first survey carried out in 2003 Five participants are already performing process benchmarking on the basis of findings from the performance indicator comparison.			

<b>A 4 Benchmarking initiative of the water supply sector in Rhineland-Palatinate (German federal state)</b>		
<b>Short description of the project:</b> <ul style="list-style-type: none"><li>• simple performance indicator comparison with a survey volume of approx. 50 questions</li><li>• participants are the responsible regional and local authorities/utilities of the wastewater disposal sector in Rhineland-Palatinate</li><li>• formation of performance indicators on structures/technology, security, quality, sustainability and economic efficiency</li><li>• individual final report for each participant, final report for politics and the public</li><li>• 1st stage of a two-stage approach (1st stage: indicator comparison, 2nd stage: process benchmarking)</li><li>• an online platform is used for data collection and analysis</li><li>• The project is supported by moderators.</li></ul>		
<b>Aims of the project:</b> <ul style="list-style-type: none"><li>• performance indicator comparison carried out over the entire area for utilities of the wastewater disposal sector in Rhineland-Palatinate</li><li>• definition of positions for the utilities participating in the project</li></ul>		
<b>Internet:</b> <a href="http://www.wasserbenchmarking-rp.de">www.wasserbenchmarking-rp.de</a>		
<b>Reference:</b> Ministerium für Umwelt, Forsten und Verbraucherschutz : Benchmarking Wasserwirtschaft Rheinland-Pfalz, Kennzahlenvergleich der kommunalen Unternehmen der Wasserversorgung und Abwasserbeseitigung, Öffentlicher Projektbericht für das Jahr 2006		
<b>Project executing organization:</b> Ministry for the Environment, Forestry and Consumer Protection in Rhineland-Palatinate, cooperation partners: Association of cities and municipalities in Rhineland-Palatinate, Federation of towns in Rhineland-Palatinate, VKU, DWA, DVGW, LGW		
<b>Total number of participants:</b> 109 utilities (regional and local authorities)		
up to 15,000 PT: 49	15,000 to 30,000 PT: 45	more than 30,000 PT: 15
<b>Utilities participating over several years:</b> to date, only one survey carried out		
<b>Actual PTs:</b> 3.8 million		
<b>Volume of treated sewage:</b> 319 million m³ (including in both cases industrial wastewater and storm-water)		
<b>Project type:</b> pure performance indicator comparison		
<b>Project cycle:</b> every 2-3 years (next survey year 2007), the project is in the 2nd cycle, first survey carried out in 2004		

<b>A 5 Corporate benchmarking on wastewater</b>			
<b>Short description of the project:</b> <ul style="list-style-type: none"> <li>• first Germany-wide corporate benchmarking</li> <li>• the project was the result of several years of experience gained in process benchmarking</li> <li>• cause analysis, action plan</li> <li>• use of an online platform for data collection and analysis</li> <li>• at the present time, evaluations for approx. 25 utilities in 4 different rounds of exchange of experience</li> <li>• comparison with federal-state-wide projects is possible</li> <li>• The project is supported by moderators.</li> </ul> <b>Aims of the project:</b> <ul style="list-style-type: none"> <li>• inter-utility performance benchmarking of undertakings of the same sector</li> <li>• identification of „weak points“ as preparation to process benchmarking</li> <li>• separate micro-economic analysis of core processes and support processes</li> <li>• exchange of experience with other participants</li> <li>• analysis of the corporate development over time</li> </ul>			
<b>Total number of participants:</b> 103			
Up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 23	more than 100,000 PT: 80
<b>Utilities participating over several years:</b> 95 percent			
<b>Actual PTs:</b> 101 million			
<b>Project type:</b> Benchmarking on the basis of corporate performance indicators			
<b>Project cycle:</b> annual, the project is in the 5th cycle, first survey carried out in 2002			

<b>A 6 Process benchmarking on materials management and control</b>			
<b>Project characteristics:</b> <ul style="list-style-type: none"> <li>• process benchmarking</li> <li>• cause analysis, action plan</li> <li>• use of an online platform for data collection and analysis</li> <li>• The project is supported by moderators.</li> </ul> <b>Aims of the project:</b> <ul style="list-style-type: none"> <li>• comparison of company organization and procurement structure</li> <li>• comparison of procurement processes for C-items</li> <li>• efficiency analysis of the purchasing department</li> <li>• continuous comparison of conditions</li> <li>• exchange of experience on focal topics changing every year</li> </ul>			
<b>Total number of participants:</b> 39			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 39
<b>Utilities participating over several years:</b> 95 percent			
<b>Actual PTs:</b> 66.9 million			
<b>Project type:</b> Benchmarking on the basis of corporate performance indicators, benchmarking on the basis of process indicators			
<b>Project cycle:</b> annual, the project is in the 5th cycle, first survey carried out in 2002			



#### A 7 Benchmarking within the Wasserverbandstag e. V. [Water Associations' Federation] in Saxony-Anhalt (German federal state)

##### Short description of the project:

The project was started in 2005 on the basis of the survey year 2004 with 11 participants. The project met with great interest in Saxony-Anhalt, which led to an increase in the number of participants in the second cycle (survey years 2005 + 2006) to 18. Moreover, further associations expressed their interest in the next project cycle.

##### Aims of the project:

During the first survey cycle, a pure performance indicator comparison was carried out on the basis of the complete IWA questionnaire which was adjusted by the participants to their own needs. During the second and third cycles, an extension to overall corporate benchmarking will be applied in particular for small and medium-sized authorities. Corporate benchmarking is to enable optimization fields to be quantified. The combination of multi-annual indicator comparison and the comparison of event-specific comparisons shall enable optimization potentials to be defined and implemented within the different functional areas. The participants are mostly small and medium-sized authorities for which an integral perspective „from top to bottom“ is partly necessary as a demarcation between functional divisions and departments does not exist in any case. Consequently, a cross-divisional analysis is desirable, in particular in terms of financial, personnel and operating performance data.

**Project executing organization:** Water Associations' Federation of Bremen, Lower Saxony, Saxony-Anhalt, branch office in Saxony-Anhalt (WVT-LSA), Magdeburg

##### Total number of participants: 18 with the following task assignments:

9 participants responsible for drinking water supply and wastewater disposal  
 9 participants responsible for wastewater disposal only  
 16 participants fully working on wastewater interception and wastewater treatment  
 2 participants with the sub-function of wastewater interception and wastewater treatment  
 All participants are operating wastewater networks and are thus undertakings carrying out direct disposal at the final customer's premises.

up to 1,000 PT: 0	1,000 to 10,000 PT: 4	10,000 to 100,000 PT: 14	more than 100,000 PT: 0
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**Utilities participating over several years:** 100 percent

**Actual PTs:** approx. 0.7 million

**Volume of treated sewage:** approx. 20 million m<sup>3</sup> (including in both cases industrial wastewater and storm-water)

##### Project type:

pure performance indicator comparison, benchmarking on the basis of corporate performance indicators

##### Project cycle:

annual, the project is in the 2nd + 3rd cycle, first survey carried out in 2005, evaluation in 2006, survey year 2004

#### A 8 Benchmarking of performance indicator comparisons of the wastewater sector in Baden-Württemberg (German federal state)

##### Short description of the project:

Through „Benchmarking on wastewater disposal in Baden-Württemberg“ the project initiators take up the associations' declaration on the „benchmarking“ subject. The aim is to implement benchmarking on a voluntary basis throughout the territory of the Land Baden-Württemberg. To this end, the experiences gained from the DWA research and development project on „Unternehmensbenchmarking als Bestandteil der Modernisierungsstrategie – Kennzahlen und Auswertungsgrundsätze“ [corporate benchmarking as an element of the modernization strategy – performance indicators and principles of assessment] (terminated in January 2007) were applied for the first time on a broad basis.

A simple and adequate benchmarking system enables a first aggregated definition of positions of utilities to be obtained at the first stage. At the second stage, the findings obtained can then be utilized to carry out refined benchmarking (e.g. process benchmarking) for an in-depth analysis. Particular characteristics:

- operators fulfilling only a sub-task may also participate in the project
- use of an online platform for data collection and analysis
- support through moderators

##### Aims of the project:

- performance indicator comparison throughout Baden-Württemberg
- definition of the position of each participant
- statements on the basis of the five-pillar model: security of disposal, quality (wastewater disposal standards), profitability (economic efficiency), customer service (customer satisfaction) and sustainability
- representation of the wastewater disposal sector's performance in Baden-Württemberg
- possible consolidation of findings (additional workshops and offers of process benchmarking)

**Project executing organizations:** DWA-regional section of Baden-Württemberg, Association of cities and municipalities in Baden-Württemberg, Federation of towns in Baden-Württemberg

up to 1,000 PT: 0	1,000 to 10,000 PT: 11	10,000 to 100,000 PT: 44	more than 100,000 PT: 23
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**Utilities participating over several years:** 0 percent

**Actual TPs:** data collection until the end of September 2007

**Volume of treated sewage:** data collection until the end of September 2007  
 (including in both cases industrial wastewater and storm-water)

**Project type:** Benchmarking on the basis of corporate performance indicators

**Project cycle:** not specified, the project is in the 1st cycle, first survey carried out in 2006



#### A 9 Benchmarking on wastewater disposal in Bavaria (German federal state)

**Short description of the project:**

Through „Benchmarking on wastewater disposal in Bavaria“ the project initiators take up the associations' declaration on the „benchmarking“ subject. The aim is to implement Bavaria-wide benchmarking on a voluntary basis. Particular characteristics of the project:

- multiple-stage system for participants of different sizes and spectrum of functions
- low survey effort and high validity of results
- operators fulfilling only a sub-task may also participate in the project
- use of an online platform for data collection and analysis
- support through moderators

**Aims of the project:**

- benchmarking throughout Bavaria
- definition of the position of each participant
- statements on the basis of the five-pillar model: security of disposal, quality (wastewater disposal standards), profitability (economic efficiency), customer service (customer satisfaction) and sustainability
- cause analysis carried out cooperatively with participants
- determination of coordinated optimization potentials
- representation of the wastewater disposal sector's performance in Bavaria

**Project executing organizations:**

Bavarian State Ministry for the Environment, Health and Consumer Protection, Association of Bavarian municipalities, Federation of Bavarian Towns, German Association for Water, Wastewater and Waste (DWA) regional section of Bavaria

**Total number of participants:** more than 145 (as per 30/08/07)

up to 1,000 PT: 3

1,000 to 10,000 PT: 59

10,000 to 100,000 PT: 65

more than 100,000 PT: 14

**Utilities participating over several years:** 0 percent

**Actual PTs:** data collection until the end of October 2007

**Volume of treated sewage:** data collection until the end of October 2007

Project results are expected for the first half of 2008.

**Project type:**

Benchmarking on the basis of corporate performance indicators

**Project cycle:**

annual, the project is in the 1st cycle, first survey carried out in 2006

#### A 10 Benchmarking on wastewater disposal in Thuringia (German federal state)

**Short description of the project:**

The project „Benchmarking on wastewater disposal in Thuringia“ is addressed to all wastewater disposal utilities in Thuringia. The project analyses the overall performance of the wastewater disposal utility and is not restricted to individual processes.

**Aims of the project:**

The aim of the project is to collect data on the efficiency and effectiveness of services provided in terms of wastewater disposal with a view to identifying and implementing potentials for improvement through a comparison with best performers.

**Total number of participants:** 15

**Utilities participating over several years:** 1st survey cycle

**Project type:**

Benchmarking on the basis of corporate performance indicators

**Project cycle:**

The project is in the 1st cycle, first survey carried out in 2007

<b>A 11 Benchmarking on wastewater disposal in North Rhine-Westphalia (NRW - German federal state)</b>
<p><b>Short description of the project:</b></p> <ul style="list-style-type: none"> <li>region-wide benchmarking on the basis of voluntary participation of wastewater system operators</li> <li>survey volume adjusted to the corporate size of operators</li> <li>collection of data by using an online platform</li> <li>elaboration of an anonymised result report for politics and the public providing latest data from NRW and a relevant individual result report for each utility participating in the project</li> <li>support through moderators</li> </ul> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>definition of the utility's position</li> <li>support to internal steering processes</li> <li>elaboration of possible optimization potentials</li> <li>acquisition of findings concerning particular characteristics within the utility</li> <li>representation of the wastewater disposal sector's performance in NRW</li> </ul>
<p><b>Project executing organizations:</b></p> <p>DWA-regional NRW section, Association of cities and municipalities in NRW, Federation of towns in NRW and Federation of the water industry associations in NRW</p>
<p><b>Total number of participants:</b></p> <p>ca. 100</p>
<p><b>Project type:</b></p> <p>Benchmarking on the basis of corporate performance indicators</p>
<p><b>Project cycle:</b></p> <p>every 2-3 years, project is in the 1<sup>st</sup> cycle, start of the project in September 2007, first survey carried out in 2007 for the survey year 2006</p>

<b>A 12 BkV/Benchmarking of the Association of municipal utilities</b>			
<b>Short description of the project:</b> BkV/Benchmarking is a Germany-wide association of 200 municipal supply and disposal utilities which can compare their performance with one another in the water, wastewater, electricity, gas, district heat and public baths sectors. BkV-Abwasser (wastewater) has been brought in line with the structure of the International Water Association's (IWA) system. With a view to minimizing the survey effort, there are different survey depths within all sectors. Apart from the pure sector perspective, BkV-Abwasser focuses on the representation of value-added levels. Through additional query of success factors, BkV/Benchmarking constitutes hypotheses-based benchmarking. Implementation of the online system in 2006 enables participants to carry out extensive web-based evaluations on their own (e.g. comparison with best-practice undertakings). To offer a discussion forum to participants, BkV/Benchmarking is integrated into comprehensive event management so that the results are presented and analysed within different groups.			
<b>Aims of the project:</b> <ul style="list-style-type: none"><li>• definition of positions on the basis of efficiency indicators</li><li>• identification of optimization potentials across all levels of value added (network, treatment, sales) and at the level of administration</li><li>• verification or falsification of hypotheses established</li><li>• communication platform provided through series of events</li></ul>			
The optimization measures identified and implemented as a result of participation in BkV/Benchmarking relate to all levels of value added, such as <ul style="list-style-type: none"><li>• manpower reduction in sewage works</li><li>• outsourcing of maintenance work in the sewer network</li><li>• change of cleaning intervals</li><li>• adaptation of cost accounting to the system of BkV/Benchmarking</li></ul>			
As not only the wastewater sector but also all other essential lines of business of municipal supply and disposal utilities are analysed, combination utilities with their own wastewater activities can also participate e.g. in a cross-sector corporate benchmarking dealing with the comparison and evaluation of the most important balance indicators.			
<b>Internet:</b> www.vku.de			
<b>Project executing organization:</b> Association of municipal utilities			
<b>Total number of participants:</b> 26			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 19	more than 100,000 PT: 7
<b>Actual PTs:</b> 4.3 million <b>Volume of treated sewage:</b> 176 million m³			
<b>Project type:</b> Benchmarking on the basis of corporate performance indicators, Benchmarking on the basis of process indicators			
<b>Project cycle:</b> annual, the project is in the 9th cycle, first survey carried out in 1999			

### A 13 Benchmarking in the wastewater industry – Phases I and II

#### Short description of the project:

- Pilot project of wastewater system operators to develop a benchmarking approach for the German-speaking wastewater industry, including implementation in two sub-processes of the water industry
- basis provided for further projects, in particular the subsequent development of continuous process benchmarking by means of an online platform
- The project is supported by moderators.

#### Aims of the project:

- development of a benchmarking approach for the German-speaking wastewater industry
- selection of appropriate processes
- development of output variables and influence factors for the processes „sewer network rehabilitation, modernization and extension“ and „materials provision, inventory management and disposal“
- implementation of process benchmarking as pilot project
- exchange of experience among participants

#### Reference:

Wibbe S. (1999): Benchmarking in der Abwasserwirtschaft, Korrespondenz Abwasser, 46, 1432-1436

#### Project executing organizations:

In Phase I: 14 operators from Germany and Switzerland, in Phase II: 21 operators from Germany, Austria and Switzerland

#### Total number of participants: 21

up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 21
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**Actual PTs:** 18.4 million

#### Project type:

Benchmarking on the basis of process indicators

#### Project cycle:

annual, first survey carried out in 1998

### A 14 Benchmarking „operate sewer network“

#### Short description of the project:

- continuation of the pilot project on the development of a benchmarking approach for the German-speaking wastewater industry
- development of process benchmarking for the process „operate sewer network“ and different sub-processes
- continuation and continuous refinement of the approach as pilot project by means of an online-platform
- in 2007, 30 participants in 4 different groups
- The project is supported by moderators.

#### Aims of the project:

- development of a benchmarking approach for the German-speaking wastewater industry
- process model definition
- development of output variables and influence factors for the processes
- implementation of process benchmarking as pilot project and as online benchmarking
- exchange of experience among participants
- continuous improvement process of participants and pursuit of the efficiency of measures

#### Total number of participants: 12

up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 20	more than 100,000 PT: 107
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**Utilities participating over several years:** 84 percent

**Actual PTs:** 87.2 million

#### Project type:

Benchmarking on the basis of process indicators

#### Project cycle:

annual, the project is in the 8th cycle, first survey carried out in 1999

#### A 15 Benchmarking „operate sewer network“

##### Short description of the project:

- comparison with other municipal sewer network operators for the overall process „operate sewer network“ and all objects/facilities of the sewer network including pump stations and special structures, and detailed analysis of selected sub-processes with a view to drawing conclusions from this analysis for improvements and efficiency increases for one's own operation
- comparison of the processes of mechanical sewer cleaning, corrective maintenance/repair, inspection (TV-inspection)
- comparison of the processes of pump station monitoring, maintenance, inspection and repair
- comparison of the processes of operations scheduling, reporting and network documentation, organization of on-call duty
- overall analysis of the entire undertaking's structure (e.g. degree of outsourcing etc.) and of ambient conditions (e.g. population density etc.)

##### Aims of the project:

- identify through detailed comparison one's own state of development and well-functioning factors of success for concrete processes
- identification of optimization potentials concerning the operation of the sewer network and sub-processes
- identification of interactions between operation and maintenance of the sewer network, on the one hand, and rehabilitation and renewal strategies, on the other hand

**Total number of participants:** 20 associations

**Participants with actually connected PTs:** 100 percent

up to 1,000 PT: 1	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 13	more than 100,000 PT: 6
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**Actual PTs:** 3.3 million

**Volume of treated sewage:** 124.7 million m<sup>3</sup>  
(including in both cases industrial wastewater and storm-water)

##### Project type:

Benchmarking on the basis of process indicators

##### Project cycle:

every two years, the project is in the 2nd cycle, the 3rd cycle will start in autumn 2007, in addition, parallel project comprising three cycles in Switzerland with 17 participants, first survey carried out in 2001

#### A 16 Benchmarking on „sewer construction“

##### Short description of the project:

Continuation of the developed benchmarking approach from the year 1998 pursued since 2002 as a continuous comparison. The project is based on comprehensive data on construction and planning activities and on data concerning individual projects. With more than 800 different sewer construction projects, it provides a unique data base providing transparency of rehabilitation measures and enabling a costing analysis to be performed.

An online platform is used for data collection and analysis. The project is supported by moderators.

##### Aims of the project:

- transparency of costs and durations of the sewer construction and planning process
- transparency and actual costing of rehabilitation projects
- exchange of experience among participants
- continuous process of participants' improvements

##### Reference:

Bertzbach, F.: Erfahrungen mit dem Benchmarking Kanalbau, DWA-Bundestagung 2005

**Total number of participants:** 47

up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 47
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**Utilities participating over several years:** 100 percent (all participants cooperated at least 2 years.)

**Actual PTs:** 35 million PT

##### Project type:

Benchmarking on the basis of process indicators

##### Project cycle:

annual, the project is in the 5th cycle, first survey carried out in 2002



<b>A 17 Benchmarking on investments in the sewer network</b>			
<b>Short description of the project:</b> Comparison of the course of investment measures in the drinking water and wastewater networks. Investments in plants were not taken into consideration. There were no individual „model-type measures“ subjected to the comparison but a mean-value comparison was carried out for all measures in network construction. With a view to ensuring comparability, typical similar measures were defined.			
<b>Aims of the project:</b> <ul style="list-style-type: none"> <li>• obtain findings about the efficiency of investment handling (process). Focus was not on a comparison of the absolute amount of construction costs.</li> <li>• The following aspects and requirements were to be taken into consideration or met by the process comparison:               <ul style="list-style-type: none"> <li>- issues of promotional funds are taken into account as a sub-process</li> <li>- underline efficiency differences between the utility's own or extraneous implementation at the different stages</li> <li>- take road-works, drinking water and wastewater as influence factors into consideration</li> <li>- enable comparisons to be made between own services to be activated and extraneous services. That means that all services provided by the utility itself and extraneous services required for the implementation of measures are analysed by considering their actual amount (not only as shown on the books).</li> <li>- show the differences between cost estimations (target values) and real costs internally and externally incurred (actual values)</li> <li>- lay the bases for decisions on whether or not carry out measures on one's own</li> </ul> </li> </ul>			
<b>Total number of participants:</b> 8 associations <b>Participants with actually connected PT:</b> all			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 3	more than 100,000 PT: 5
<b>Utilities participating over several years:</b> A follow-up project has not been launched yet.			
<b>Actual PTs:</b> 1.2 million <b>Volume of treated wastewater:</b> 72 million m³ (including in both cases industrial wastewater and storm-water)			
<b>Project type:</b> Benchmarking on the basis of process indicators  <b>Project cycle:</b> The project is in the 1st cycle, first survey carried out in 2003			

<b>A 18 Benchmarking „operate a sewer network“ in North Rhine-Westphalia (NRW – German federal state)</b>			
<b>Short description of the project:</b> Comparison of the processes of mechanical sewer cleaning, corrective maintenance/repair, inspection (TV-inspection), pump station monitoring, maintenance, inspection and repair. Comparison of the methods of rat control. Comparison of the processes of operations scheduling, reporting and network documentation. Organization of on-call duty.			
<b>Aims of the project:</b> Identification of optimization potentials concerning sewer network operation and sub-processes, such as: <ul style="list-style-type: none"> <li>• order processing by means of the transponder technology</li> <li>• optimization of the long-term rehabilitation strategy</li> <li>• implementation of job order management by means of a software specifically developed for the utility's needs</li> <li>• dynamic set-up of flushing schedules for sewer cleaning</li> </ul>			
<b>Reference:</b> „Benchmarking project terminated“, Abwasser Report issue 04/2006, page 16			
<b>Total number of participants:</b> 11 associations <b>Participants with actually connected PT:</b> all			
up to 1,000 PT: 0	1,000 to 10,000 PT: 1	10,000 to 100,000 PT: 9	more than 100,000 PT: 1
<b>Utilities participating over several years:</b> Only one project has been finalized to date.			
<b>Actual PTs:</b> 0.6 million <b>Volume of treated wastewater:</b> 111.9 million m³ (including in both cases industrial wastewater and storm-water)			
<b>Project type:</b> Benchmarking on the basis of process indicators  <b>Project cycle:</b> every two years, the project is in the 2nd cycle, first survey carried out in 2006			

<b>A 19 Benchmarking on „analytics and indirect discharger monitoring“</b>			
<p><b>Short description of the project:</b> Development of process benchmarking for the processes of „analytics“ and „indirect discharger monitoring“. Due to overlaps in the fields of analysis and sampling, the processes were analysed together at the beginning; to this end, a common survey methodology was developed. An online platform is used for data collection and analysis. The project is supported by moderators.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• development of a benchmarking approach for the German-speaking wastewater industry</li> <li>• definition of a process model</li> <li>• development of output variables and influence factors for the processes</li> <li>• implementation of process benchmarking as pilot scheme and online benchmarking</li> <li>• exchange of experience among participants</li> <li>• continuous improvement process of participants</li> </ul> <p>Concerning the process of „analytics“, focus is to be on „analytics for sewage treatment plants“ and on the elaboration of the following aspects eligible for optimization:</p> <ul style="list-style-type: none"> <li>• review of the examination scope</li> <li>• examination of the efficiency of sampling</li> <li>• examination of the systematic use of online equipment</li> </ul> <p>Furthermore, the „laboratory efficiency“ is to be analyzed and measures for improvement are to be identified through:</p> <ul style="list-style-type: none"> <li>• verification of the efficiency and necessity of methods applied</li> <li>• review of sample statistics</li> <li>• safeguarding of efficient and qualitative work sequences</li> <li>• review quality assurance efforts</li> </ul> <p><b>Reference:</b> Bertzbach, F.; Gehle, T.: „Benchmarking in der Indirekteinleiterüberwachung“, Korrespondenz Abwasser 10/2006</p>			
<b>Total number of participants:</b> 15			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 15
<b>Utilities participating over several years:</b> 64 percent			
<p><b>Sewage treatment plant dimensioning value:</b> 29 million PT</p> <p><b>Volume of treated sewage:</b> 2,306 million m<sup>3</sup> (including in both cases industrial wastewater and storm-water)</p>			
<p><b>Project type:</b> Benchmarking on the basis of process indicators</p> <p><b>Project cycle:</b> annual, the project is in the 2nd cycle, first survey carried out in 2005</p>			

<b>A 20 Benchmarking on „analytics“</b>			
<p><b>Short description of the project:</b> Benchmarking on „analytics“ is the continuation of the pilot scheme „Benchmarking on analytics and indirect discharger monitoring“. Benchmarking on „analytics“ looks at both the laboratory efficiency and the „analytical strategy for sewage treatment plants“. The project is multi-faceted and participants have the possibility to analyse individual items more closely through selection of the subject for in-depth analysis. The project is supported by an online platform. One or two workshops will be held for dealing with certain topics more closely.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• definition of the participants' positions</li> <li>• joint cause analysis for the determination of optimization measures</li> <li>• exchange of experience</li> <li>• continuous improvement processes of the participants</li> </ul> <p>The results obtained from the pilot project „Benchmarking on analytics and indirect discharger monitoring“ are to be verified; the subjects selected for an in-depth investigation are to be analysed more closely:</p> <ul style="list-style-type: none"> <li>• reasons for differences in efficiency of laboratories</li> <li>• evaluation and advice as further laboratory services</li> <li>• activities for online analytics</li> </ul>			
<b>Total number of participants:</b> 13			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 13
<b>Utilities participating over several years:</b> 50 percent			
<p><b>Actual PTs:</b> 12 million</p> <p><b>Volume of treated sewage:</b> 2,379 million m<sup>3</sup> (including in both cases industrial wastewater and storm-water)</p>			
<p><b>Project type:</b> Benchmarking on the basis of process indicators</p> <p><b>Project cycle:</b> annual, the project is in the 2nd cycle Data collection is terminated at the beginning of 2007, first survey carried out in 2005</p>			

<b>A 21 Benchmarking on „indirect discharger monitoring“</b>			
<p><b>Short description of the project:</b>  Benchmarking on „indirect discharger monitoring“ is the continuation of the pilot scheme on „Benchmarking on analytics and indirect discharger monitoring“. It represents a continuous platform for the exchange of experience in terms of the functions of indirect discharger monitoring. In particular the different strategies and main fields of monitoring activities are examined more closely. An online platform is used for data collection and analysis. The project is supported by moderators.</p> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• definition of the participants' positions</li> <li>• joint cause analysis to determine optimization measures</li> <li>• exchange of experience among participants</li> <li>• continuous elaboration of possibilities of improvement for the participants</li> </ul> <p>The results obtained from the 2005 survey year are to be verified and the topics selected for closer examination will be analysed:</p> <ul style="list-style-type: none"> <li>• activities and frequency of monitoring</li> <li>• quality indicators for indirect discharger monitoring</li> <li>• exchange of experience in terms of on-call service</li> </ul> <p><b>Reference:</b>  Bertzbach, F.; Gehle, T.: „Benchmarking in der Indirekteinleiterüberwachung“, Korrespondenz Abwasser 10/2006</p>			
<b>Total number of participants:</b> 15			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 15
<b>Utilities participating over several years:</b> 57 percent			
<p><b>Actual PTs:</b> 10 million</p> <p><b>Volume of treated sewage:</b> 2,351 million m<sup>3</sup>  (including in both cases industrial wastewater and storm-water)</p>			
<p><b>Project type:</b>  Benchmarking on the basis of process indicators</p> <p><b>Project cycle:</b>  annual, the project is in the 2nd cycle, data collection was terminated in early September 2007, first survey carried out in 2005</p>			

<b>A 22 Process benchmarking on sewage treatment plants – moderated</b>			
<p><b>Short description of the project:</b></p> <ul style="list-style-type: none"> <li>• first Germany-wide benchmarking project in the German-speaking wastewater industry (1996)</li> <li>• cause analysis, action plan</li> <li>• An online platform is used for data collection and analysis with detailed moderation assistance (up to seven sessions).</li> </ul> <p><b>Aims of the project:</b></p> <ul style="list-style-type: none"> <li>• definition of positions</li> <li>• benchmark determination</li> <li>• determination of optimization potentials and measures</li> <li>• exchange of experience and information among participants</li> </ul> <p><b>Further project objectives:</b></p> <ul style="list-style-type: none"> <li>• optimization of blower start-up and control behaviour</li> <li>• energy savings through optimization of agitator application</li> <li>• load management review</li> <li>• optimization of gas production during sludge digestion</li> <li>• optimization of screenings removal</li> <li>• review of the costs of disposal of screenings, grit chamber trappings, sludge</li> <li>• review of the maintenance concept after expiry of warranty</li> </ul> <p>The project is supported by moderators.</p>			
<b>Total number of participants (sewage treatment plants):</b> Since the 1996 survey year, 8 project cycles have been carried out with the participation of approx. 200 sewage treatment plants.			
<b>Detailed listing (according to survey years):</b> 1996: 4 sewage treatment plants (pilot project), 1998: approx. 100 sewage treatment plants of 2 operators (promoted research project of BMBF), 1998: 18 sewage treatment plants, 1999: 31 sewage treatment plants, 2001: 19 sewage treatment plants, 2003: 11 sewage treatment plants, 2004: 11 sewage treatment plants, 2006: 9 sewage treatment plants			
<p><b>Actual PTs:</b> approx. 31.0 million</p> <p><b>Volume of treated sewage:</b> approx. 2,300 million m<sup>3</sup></p>			
<p><b>Project type:</b>  Benchmarking on the basis of process indicators</p> <p><b>Project cycle:</b>  every 1 – 2 years, the project is in the 9th cycle, first survey carried out in 1996</p>			



### A 23 Benchmarking on „sewage treatment plant operators“

**Short description of the project:** The project is carried out with reference to sewage treatment plants. 95 sewage treatment plants of 1,000 to 250,000 PT participated in the three cycles which have been carried out to date. In parallel, 3 cycles have been carried out in Switzerland. The project focuses on the following aspects:

- processes of wastewater and sludge treatment
- comparison of the manpower structure (ATV-M 271 [manpower requirements for municipal sewage treatment plants]), degree of outsourcing
- comparison of the organisation of operation, including risk management
- energy analysis; processes concerning „operate aeration“, „carry out laboratory/factory production control“, „manage sludge dewatering“
- facility and surface management

**Aims of the project:**

- comparison with other sewage treatment plants in terms of the costs of wastewater treatment and sludge treatment and disposal
- determination of the relevant cost types
- description of sewage treatment plants in terms of their weighted age, the load on the wastewater road (separate determination of the industry's share, hydraulic load etc.)
- representation of the most important discharge values and relation to effluent standards
- implementation of the requirements of DWA-M 1000 (benefit of a management system for sewage treatment plants)
- consideration of staff assignment as compared to ATV-M 271 taking account of work not contained in ATV-M 271 and the deployment of third parties/extraneous services (benefit of framework agreements with subcontractors)
- optimization of the energy input on the basis of an energy analysis carried out for the entire plant, main processes and the different plant components (load management, energy purchase, energy consumption, own generation through block-type CHP plants)
- comparison of the strategies of sewage sludge disposal (tendering procedures, P-recycling etc.)

**References:** „Kläranlagen im Vergleich“; wwt 5/2003; page 8; „Abwasserentsorgung“; gwa 6/2003; „Benchmarking in der Abwasserentsorgung“; Umwelt Focus 4/2005; page 11

**Total number of participants:** 29 associations

**Participants with actually connected PT:** all

up to 1,000 PT: 0

1,000 to 10,000 PT: 0

10,000 to 100,000 PT: 16

more than 100,000 PT: 12

**Utilities participating over several years:** 7 percent

**Actual PTs:** 3.99 million

**Volume of treated sewage:** approx. 250 million m<sup>3</sup> (including in both cases industrial wastewater and storm-water)

**Project type:** Benchmarking on the basis of process indicators

**Project cycle:** every two years, the project is in the 3rd cycle, in addition parallel project comprising three cycles in Switzerland with 33 participants, first survey carried out in 2002

### A 24 Process benchmarking on sewage treatment plants – online

**Short description of the project:**

- process benchmarking
- implementation according to the steps laid down in the DWA Guidelines and the leaflet (DWA-M 1100)
- cause analysis, action plan
- utilization of an online platform
- changing focal topics

**Aims of the project:**

- definition of positions
- determination of benchmarks
- determination of optimization potentials and measures
- exchange of experience and information among participants

**Further objectives:**

- optimization of the blower start-up and control behaviour
- energy savings through optimization of agitator application
- load management review
- optimization of gas production during sludge digestion
- optimization of screenings removal
- review of the costs of disposal of screenings, grit chamber trappings, sludge
- review of the maintenance concept after expiry of warranty
- implementation of an energy analysis
- review of a reasonable centralization of purchases

The project is supported by moderators.

**Total number of participants:** 106

Up to 1,000 PT: 0

1,000 to 10,000 PT: 3

10,000 to 100,000 PT: 33

more than 100,000 PT: 70

**Participants participating over several years:** 100 percent (all utilities from the survey years 2003 to 2005 participated as well in the 2006 survey year (some of them with other sewage treatment plants)!

**Actual PTs:** 36.8 million (indicated as annual mean), **Volume of treated sewage:** 3,650 Mio. m<sup>3</sup>

**Project type:** Benchmarking on the basis of process indicators

**Project cycle:** annual, the project is in the 4th cycle, first survey carried out in 2003

A 25 Process benchmarking on wastewater treatment plants of the chemical industry			
<b>Short description of the project:</b> <ul style="list-style-type: none"> <li>• process benchmarking for wastewater treatment plants of the chemical industry</li> <li>• implementation according to the steps described in the DWA work reports</li> <li>• cause analysis, action plan</li> <li>• utilization of an online platform</li> </ul> <b>Aims of the project:</b> <ul style="list-style-type: none"> <li>• transfer of the survey methodology applied to benchmarking on sewage treatment plants to wastewater treatment plants of the chemical industry</li> <li>• definition of positions</li> <li>• determination of benchmarks</li> <li>• determination of optimization potentials and measures</li> <li>• exchange of experience and information among participants</li> </ul> The project is supported by moderators.			
<b>Total number of participants: 4</b>			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 4
<b>Actual PTs:</b> 1.9 million <b>Volume of treated wastewater:</b> 77 million m <sup>3</sup> (including in both cases industrial wastewater and storm-water)			
<b>Project type:</b> Benchmarking on the basis of process indicators  <b>Project cycle:</b> every 1 – 2 years, the project is in the 1st cycle, first survey carried out in 2005, next survey in 2008 for survey year 2007			

A 26 Process benchmarking on sewage treatment plants in technical terms			
<b>Short description of the project:</b> <ul style="list-style-type: none"> <li>• process benchmarking using exclusively technical indicators at the initiative of the DWA regional association „North“</li> <li>• detailed recording of auxiliary materials and operating supplies</li> <li>• implementation according to the steps described in the DWA work reports</li> <li>• cause analysis, action plan</li> <li>• utilization of an online platform</li> </ul> <b>Aims of the project:</b> <ul style="list-style-type: none"> <li>• definition of positions</li> <li>• determination of optimization potentials and measures</li> <li>• exchange of experience and information among participants</li> </ul> The project is supported by moderators.			
<b>Project executing organization:</b> DWA regional association „North“			
<b>Total number of participants: 9</b>			
up to 1,000 PT: 0	1,000 to 10,000 PT: 0	10,000 to 100,000 PT: 0	more than 100,000 PT: 9
<b>Utilities participating over several years:</b> 0 percent			
<b>Actual PTs:</b> 1.4 million (annual mean) <b>Volume of treated sewage:</b> 72 million m <sup>3</sup> (including in both cases industrial wastewater and storm-water)			
<b>Project type:</b> Benchmarking on the basis of process indicators  <b>Project cycle:</b> the project is in the 1 <sup>st</sup> cycle, first survey carried out in 2006			

#### A 27 Benchmarking on human resources management

**Short description of the project:**

Benchmarking on human resources management for utilities with (previous) public participation establishes a new product for the field of human resources processes with the aim to take account of the specific characteristics of utilities rooted in a municipal environment. All utilities working in the field of public services of general interest can participate in the project. The project is supported by moderators.

**Aims of the project:**

- comprehensively model the personnel function while taking specific account of the particular characteristics of the participating parties
- enable the participants to compare their performance within their own sector and to learn from other participants how to succeed in organizing individual personnel processes more efficiently or at a higher quality level
- ensure at the same time comparability with participants from the private sector with a view to enabling utilities to compare with similar and leading companies from the private sector to learn from the best performers
- ensure for participants from the water industry the consistency of indicators with other benchmarking projects

**Further objectives and short description:**

- assessment of the complexity of basic conditions in human resources management
- comparison of the productivity of human resources processes
- identification of synergies in payroll accounting
- utilization of an online platform

**Total number of participants:** 15

10 participants booked from the wastewater sector

2 participants booked from the water supply sector

3 participants booked from other sectors providing services of general interest

**Utilities participating over several years:** 88 percent

**Actual PTs:** approx. 10 million

**Project type:**

Benchmarking on the basis of process indicators

**Project cycle:**

annual, the project is in the 2nd cycle, first survey carried out in 2005

#### A 28 Process benchmarking on wastewater disposal in Rhineland-Palatinate (German federal state)

**Short description of the project:**

Based on the „Benchmarking cooperation agreement“ of September 2005, and the already finalized performance indicator comparison carried out throughout Rhineland-Palatinate, the go-ahead for process benchmarking on selected processes relating to wastewater disposal functions has been given from the 3rd quarter of 2007.

The project is supported by moderators. It offers the modules “sewer network”, “sewage treatment plants” and “administration”. Participation in one module can be independent from the remaining modules. An online platform is used for data collection and analysis.

**Aims of the project:**

- performance indicator comparison throughout Rhineland-Palatinate comprising approx. 163 questions
- definition of the positions of participating utilities
- setup and maintenance of a structured process and data model in the administrative field
- increase in the transparency of tasks or processes, work sequences and results for all performance characteristics of administration

**Project executing organizations:** Association of cities and municipalities in Rhineland-Palatinate, German Association for Gas and Water (DVGW), German Association for Water, Wastewater and Waste (DWA), regional section of Hesse/Rhineland-Palatinate/Saarland, Regional Association of the Gas and Water Industry of Rhineland-Palatinate (LGW)

**Total number of participants:** Start of the project in the 4th quarter of 2007

**Project type:**

Benchmarking on the basis of process indicators

**Project cycle:**

annual, the project is in the 1st cycle, first survey carried out in 2007, first results are expected for the 2nd quarter of 2008



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## Annex



# Statement of the Associations of the Water Industry on Benchmarking in the Water Sector<sup>1)</sup>

June 2005

On 22 March 2002, the German Bundestag passed the resolution on a „Sustainable Water Industry in Germany“, striving for a modernisation of supply and treatment. For this purpose, the resolution, amongst other things, called for a procedure for performance comparisons among the enterprises (benchmarking). The associations of the water industry,

**ATT** – Association of Drinking Water from Reservoirs  
**BGW** – Federal Association of the German Gas and Water Industries  
**DBVW** – German Alliance of Watermanagement Association  
**DVGW** – German Technical and Scientific Association for Gas and Water  
**DWA** – German Association for Water, Wastewater and Waste  
**VKU** – Association of Local Utilities

agree with the German Government and Bundestag that performance comparisons serve the purpose of modernisation, and are prepared to jointly draw up and develop further the required conceptional framework for benchmarking in the water industry in terms of a self-administration. The outline concept will ensure that performance and process comparisons of different contents are possible, thus taking account of Germany's long-standing experience. The associations of the water industry assume the following principles in the implementation of their joint benchmarking approach:

- ▶ Voluntary benchmarking is a well-proven instrument for the **optimisation of the technical and economic performance and efficiency** of enterprises.
- ▶ Optimisation objectives include, besides the **increase of economic efficiency and customer satisfaction, the security of supply and treatment, quality and sustainability** of the water industry.
- ▶ The associations of the water industry recommend their members a **voluntary participation** in benchmarking projects, and support their **broadly effective implementation**.
- ▶ The associations assist the enterprises by issuing joint and coordinated notes, reports and supplementary information on the benchmarking issue.
- ▶ The dissemination of the benchmarking is backed by a guideline jointly set up by DVGW and DWA in coordination with and with the textual support of the other associations.

- ▶ DVGW and DWA formulate principles for benchmarking requirements for drinking water supply and wastewater disposal in a joint paper in cooperation with the other associations.
- ▶ Within the framework of a uniform concept, the associations consider it helpful to maintain the present **flexibility and diversity of the benchmarking systems** in the water industry. In this context, on the one hand the existing, successfully practised models and concepts are to be continuously developed further, and on the other hand, developments are to be supported which provide for international, European and national comparisons and positions.

The factors for the successful application and broad acceptance of benchmarking include:

- ▶ Continuous adaptation to the optimisation objectives
- ▶ Confidentiality of company data, since these have to be disclosed in the project in order to identify innovative approaches
- ▶ Comparison and analysis of indicators in order to provide for an increase in performance.

To achieve these objectives, compatible structures are required within which benchmarking systems can be applied which are tailored to the respective question. Benchmarking on this basis will lead to a further high-level development of the water industry.

The associations generally welcome the need for information on the part of politics, the public and enterprises. Accordingly, the associations will regularly report on the state and development of the water industry in the form of an aggregated, anonymised „Water Industry Profile“.

The following information is provided as core parts of the Water Industry Profile:

- ▶ Results of nationwide data collections by the associations, data of institutions and authorities
- ▶ Results of a nationwide survey on customer satisfaction levels within the population
- ▶ Information on voluntary benchmarking projects.

The Water Industry Profile will have to be continuously developed further against the background of new findings and requirements.

ATT Chairman  
Gummersbach, 30.06.2005

BGW Vice President  
Berlin, 30.06.2005

DBVW President  
Hannover, 30.06.2005

DVGW President  
Bonn, 30.06.2005

DWA President  
Hennef, 30.06.2005

VKU President  
Köln, 30.06.2005

<sup>1)</sup> Translation of the German original version



## Contact Information:

### **Arbeitsgemeinschaft Trinkwassertalsperren e. V. (ATT)**

Herr Prof. Dr. Lothar Scheuer  
c/o Aggerverband  
Sonnenstr. 40  
51645 Gummersbach  
phone: +49 2261 36-210  
fax: +49 2261 36-8210  
lothar.scheuer@aggerverband.de  
www.trinkwassertalsperren.de

### **Deutscher Bund der verbandlichen Wasserwirtschaft e. V. (DBVW)**

c/o Wasserverbandstag e. V.  
Bremen, Niedersachsen, Sachsen-Anhalt  
Frau Dipl.-Ing. Dörte Burg  
Am Mittelfelde 169  
30519 Hannover  
phone: +49 511 87966-17  
fax: +49 511 87966-19  
post@wasserverbandstag.de  
www.dbvw.de

### **Deutsche Vereinigung für Wasserwirt- schaft, Abwasser und Abfall e. V. (DWA)**

Frau Dipl.-Biol. Sabine Thaler  
Theodor-Heuss-Allee 17  
53773 Hennef  
phone: +49 2242 872-142  
fax: +49 2242 872-135  
thaler@dwa.de  
www.dwa.de

### **Bundesverband der Energie- und Wasserwirtschaft e.V. (BDEW)**

Frau Vera Szymansky M.A.  
Reinhardtstr. 32  
10117 Berlin  
phone: +49 30 300199-1212  
fax: +49 30 300199-3212  
branchenbild@bdew.de  
www.bdew.de

### **Deutsche Vereinigung des Gas- und Wasserfaches e.V. Technisch-wissenschaftlicher Verein (DVGW)**

Herr Dr.-Ing. Volker Bartsch  
Josef-Wirmer-Straße 1–3  
53123 Bonn  
phone: +49 228 9188-5  
fax: +49 228 9188-990  
info@dvgw.de  
www.dvgw.de

### **Verband kommunaler Unternehmen e.V. (VKU)**

Herr Thomas Abel  
Hausvogteiplatz 3-4  
10117 Berlin  
phone: +49 30 58580-0  
fax: +49 30 58580-101  
abel@vku.de  
www.vku.de/wasser

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