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Preface

This is the first time that the associations of the water industry have submitted a water industry profile.

With the Profile 2005 of the German water industry, the participating associations ATT, BGW, DBVW, DVGW, DWA and VKU, in coordination with the German Association of Cities (DST) and the German Association of Towns and Municipalities (DStGB), have provided a comprehensive overall picture of the water sector in Germany. Politicians, the public and all interested parties are thereby given the opportunity to extensively assess the performance of the German water industry. With the Water Industry Profile, the water industry demonstrates its capability, its standard of performance and its profitability. It provides fundamentals, data and background information.

With the Water Industry Profile, the participating associations contribute to the discussion about the pattern of the future outline conditions of the water and wastewater industry at national and European levels. In this context, the modernisation concept has established itself as a major objective, with benchmarking having become a significant aspect within the whole picture. In 2002, the German Bundestag has suggested the "introduction of a procedure to compare intercorporate performance (benchmarking)" in its resolution on a "Sustainable Water Industry in Germany" within the framework of its demand upon the Federal Government to develop a modernisation strategy for the German water industry. In its resolution of 14 January 2004 about the Green Paper on Services of General Interest, the European Parliament also assesses benchmarking to be an integral component of modernisation pursued also at a European level.

In the German water and wastewater industry, benchmarking has been and is successfully implemented for a long time and clearly before these Parliamentary resolutions have been passed, however mainly as an internal instrument within the undertakings.

The Water Industry Profile has been integrated into a conceptual national benchmarking approach as a task of the associations' self-administration, in principle already defined in the "Statement of the Associations of the Water Industry on Benchmarking in the Water Sector" from November 2003. Responding to the universal need for more information, the water industry continuously reports on the state and development of the water sector.

In its extended Statement of June 2005 (see Annex), the water industry committed itself to regularly submit a Water Industry Profile.

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

- **Results of nationwide statistical surveys of the associations, data of institutions and authorities**
- **Results of a nationwide survey on the investigation of customer satisfaction within the population**
- **Information about voluntary benchmarking projects**

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

The objectives of the German water industry are the long-term security of supply and disposal, high drinking water quality, a high wastewater disposal standard as well as high profitability, linked with customer satisfaction and sustainability. For this reason, benchmarking normally includes issues of quality, technical safety, sustainability, customer service and profitability of operational processes.

The factors of success in benchmarking are the anonymity of corporate data and voluntary participation. It is possible to derive potentials for improvement from which finally the citizens themselves benefit. For the utilities of water supply and wastewater disposal, the objective of benchmarking is at all times a "learning from the best" procedure, in order to increase efficiency.

The present Water Industry Profile was drawn up by:

ATT Association of Drinking Water from Reservoirs

BGW Federal Association of the German Gas and Water Industries

DBVW German Alliance of Water Management Associations

DVGW The German Technical and Scientific Association for Gas and Water

DWA German Association for Water, Wastewater and Waste

VKU Association of Local Utilities

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Core Statements of the Water Industry Profile 2005

With the Profile 2005 of the German water industry, the participating associations provide a comprehensive overall picture of the water sector in Germany. Politicians, the public and all interested parties are thereby given the opportunity to extensively assess the performance of the German water industry. With the Water Industry Profile, the water industry demonstrates its capability, its standard of performance and its profitability. It compiles fundamentals, data and background information.

The Water Industry Profile is based on statistical data collected on a long-term basis as well as on indicators resulting from various benchmarking projects and surveys on customer satisfaction.

1. Germany is in a comfortable resource situation. The long-term protection of water bodies is a national task to which the supply and disposal utilities make a substantial contribution. Various sources are used for water supply which require nationwide sustainable protection.

2. Water consumption has declined significantly. It has stabilised at a low level, and from an operational point of view, there is little room for any further downward margins. For peak consumption volumes, however, which hardly decline, it is necessary to provide capacities. A further reduction of water consumption supported by politics is not required.

3. Germany has a pluralistic supply and disposal structure. Public and private supply and disposal do not conflict. They complement each other. Public-private partnerships are on the increase.

4. The supply and disposal structure is reflected in the residential situation. About 100 undertakings supply approx. half of the drinking water in Germany.

5. In Germany, water supply and wastewater disposal are core tasks of public services of general interest within the competence of towns and municipalities. These make the strategic decisions on the forms of organisation, participations and cooperations.

6. Prices, quality, environmental regulations and water abstraction rights are subject to strict control by the state.

7. All costs (extraction, processing, distribution, collection, treatment) are covered by water and wastewater charges due to legal requirements.

8. Long-term interruptions of supply are unknown in Germany. This is due to the high technical standards of treatment and distribution as well as to the very good condition of the networks in comparison to the European situation. German water supply utilities have by far the lowest network losses on a European scale.

9. Drinking water of an excellent quality and in sufficient quantities is at all times available to the citizens. The statutory requirements for the drinking water quality are complied with throughout the country.

10. In Germany, wastewater is treated almost nationwide with the highest EU purification standard in contrast to many EU states.

11. With total investments of approx. 8 billion € p.a., the German water industry is one of the biggest customers for the private industry. Maintenance services are almost the same size. In the wastewater sector, 70 percent of services for construction, planning etc. are commissioned to external companies.

12. Drinking water prices and wastewater charges have remained stable for about ten years. The rates of increase are almost identical to the increase of other costs of living. If one takes the respective water consumption into account, German citizens have to pay less for their drinking water per year than French or English consumers.

13. For the customers of the German water industry, security of supply and quality are of the utmost importance.

14. Voluntary benchmarking in the German water industry is a success story. The undertakings recognise and use potentials for improvement, from which finally all citizens benefit.

German water supply and wastewater disposal are highly efficient. The fields of efficiency, security and quality of supply and disposal and sustainability are subject to high standards. Customers assess the sector in these aspects as very good.

The high standards of the water industry are achieved by an efficient use of funds. The sector supports voluntary benchmarking within the modernisation strategy and aims at a broadly effective dissemination of voluntary benchmarking. The water industry has created the general framework for the success of the benchmarking instrument. Current data show a high acceptance and participation by the undertakings.

German water supply and wastewater disposal undergo a constant modernisation process. It is essential to preserve and develop further the established high standards regarding the features of security, quality and sustainability, thus keeping the price developments at the present low level for the future. The water industry will continue to regularly outline the performance features to customers and the public in a transparent way in the form of the Water Industry Profile.

Part I Statistical Data and Indicators

1. Introduction

With the Profile 2005 of the German Water Industry, the participating associations have provided a comprehensive overall picture of the water sector in Germany. Politicians, the public and all interested parties are thereby given the opportunity to extensively assess the performance of the German water industry. With the Water Industry Profile, the water industry demonstrates its capability, its standard of performance and its profitability. It provides fundamentals, data and background information.

The Water Industry Profile is based on statistical data collected on a long-term basis as well as on indicators which are the results of various benchmarking projects and surveys on customer satisfaction.

The most current data available of 2004 have been used for the compilation of the Water Industry Profile; earlier data are specifically marked.

The sources and underlying information for this data are, amongst others, the BGW Water Statistics which covers more than 1,200 undertakings and represents approx. 76 percent (31 December 2003: 82.5 million inhabitants, source: Yearbook of the Federal Statistical Office 2005) of the supplied inhabitants of Germany and includes the joint wastewater survey by BGW/DWA ("Market Data on Wastewater 2003") which comprises 906 wastewater disposal utilities in Germany with 39.6 million inhabitants connected to the sewerage network. This corresponds to a proportion of approx. 52 percent of the population connected to the public sewage network. Further sources are, amongst others, the statistics of the Federal Statistical Office as well as of numerous European and international organisations.

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

2. Structural Analysis

Core Statements

- **Germany is in a comfortable resource situation. The long-term protection of water bodies is a national task to which the supply and disposal utilities make a substantial contribution. Various sources are used for water supply which require sustainable nationwide protection.**
- **Water consumption has declined significantly. It has stabilised at a low level, and from an operational point of view, there is little room for any further downward margins. For peak consumption volumes, however, which hardly decline, it is necessary to provide capacities. A further reduction of water consumption supported by politics is not required.**
- **Germany has a pluralistic supply and disposal structure. Public and private supply and disposal do not conflict. They complement each other. Public-private partnerships are on the increase.**
- **The supply and disposal structure is reflected in the residential situation. About 100 undertakings supply approx. half of the drinking water volume in Germany.**
- **In Germany, water supply and wastewater disposal are core tasks of public services of general interest within the competence of the municipalities. These make the strategic decisions on the forms of organisation, participations and cooperations.**
- **Prices, quality, environmental requirements and water abstraction rights are subject to strict control by the state.**
- **All costs (abstraction, processing, distribution, collection, treatment) are covered by water and wastewater charges due to legal requirements.**

2.1 General residential and bio-geographical conditions

The Federal Republic of Germany is rich in water bodies. Only 20.9 percent of the annually renewable water resources are actually utilised by all users.

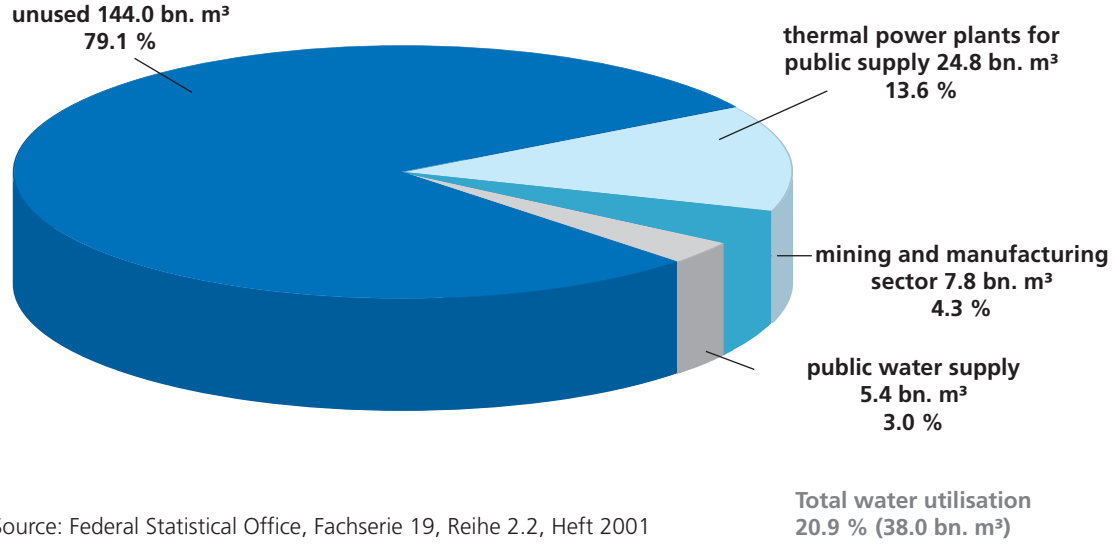
Germany has a total area of 357,030 km². It has 82,532,000 inhabitants (as of 31 December 2003). Its population density amounts to 231 persons / km² (source: Federal Statistical Office 2005).

In 2001, the Federal Republic of Germany had a total annually renewable water reserve of 182 billion m³. The public water supply uses 5.4 billion m³ from this per year, which accounts for approx. 3 percent of the resources. In view of such a comfortable situation, a long-term provision of water supply in Germany is ensured, given a sustainable use of the water resource. To secure a nationwide supply in high-quality drinking water, however, an extensive infrastructure with in part high development costs, e.g. the construction of impounding reservoirs as well as regional supply systems is necessary as the water resources are distributed very differently at regional level.

The privileged use of local resources for drinking water abstraction is characteristic for Germany.

Water utilisation in Germany 2001 **1**

Total available water resources 182 billion cubic metres



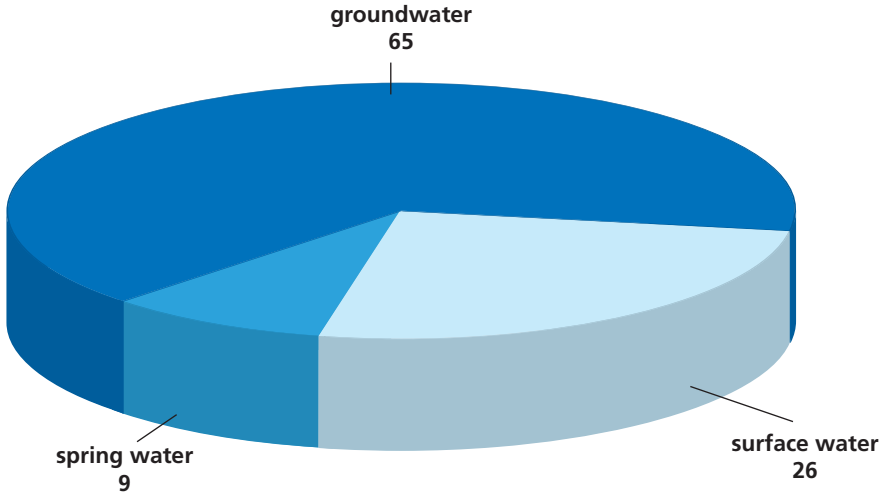
Source: Federal Statistical Office, Fachserie 19, Reihe 2.2, Heft 2001

Total water utilisation
20.9 % (38.0 bn. m³)

With a share of 65 percent, groundwater is the most important resource for drinking water abstraction. This is indicative of the importance of a sustainable protection of groundwater against contamination.

Water abstraction in public water supply 2

Data in percent



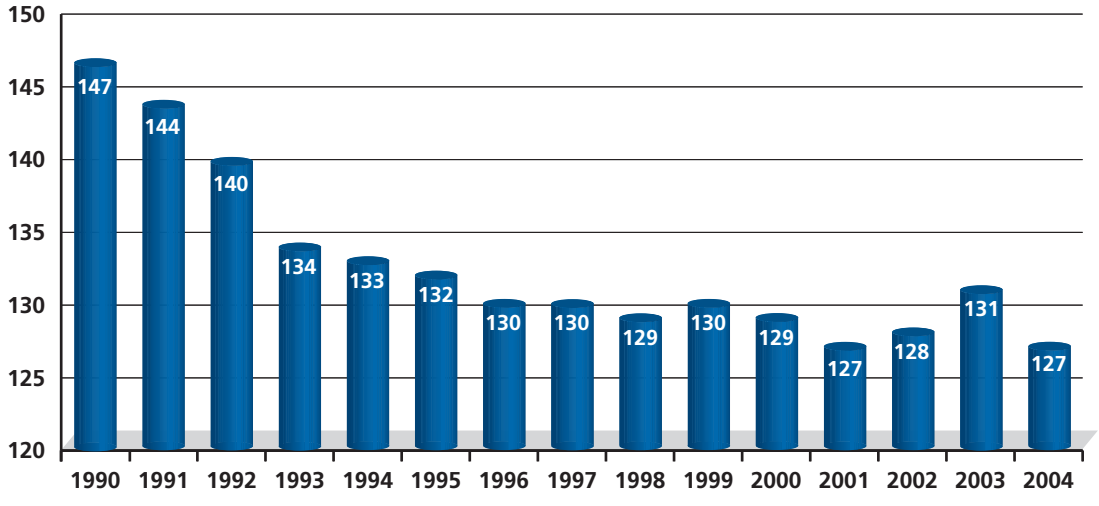
Source: Federal Statistical Office, Fachserie 19, Reihe 2.1, Heft 2001

2.2 Development of water consumption

The average water consumption in Germany has declined by approx. 14 percent since the early nineteen-nineties and currently amounts to 127 litres per inhabitant and day. Thus, Germany has the lowest value of all industrial nations along with Belgium. Water consumption has stabilised at a low level and from an operational point of view, there is little room for any further downward margins.

Development of the person-related water consumption in Germany 3

Data in litres per inhabitant and day, related to households/small trades



Source: BGW Water Statistics

From 1990 to 2004, the water delivery volume of the public water supply has declined from 5.99 to 4.72 billion cubic metres, i.e. by approx. 21 percent. Along with a significant reduction of the per-capita consumption contrary to the original forecasts, this has led to a noticeable under-utilisation of the facilities. A specific challenge in this context is the demographic change in some regions, especially in the federal states of eastern Germany.

To avoid hygienic problems under these circumstances, it is necessary to intensively flush the affected mains. Despite a declining water delivery volume to the consumers, this leads to constant output by the water utility. However, it is furthermore necessary to provide capacities for peak consumptions, if e.g. in drought years, such as the summer of 2003, house wells, rain water cisterns and the like do not yield water any more and such customers increasingly draw on the public water supply.

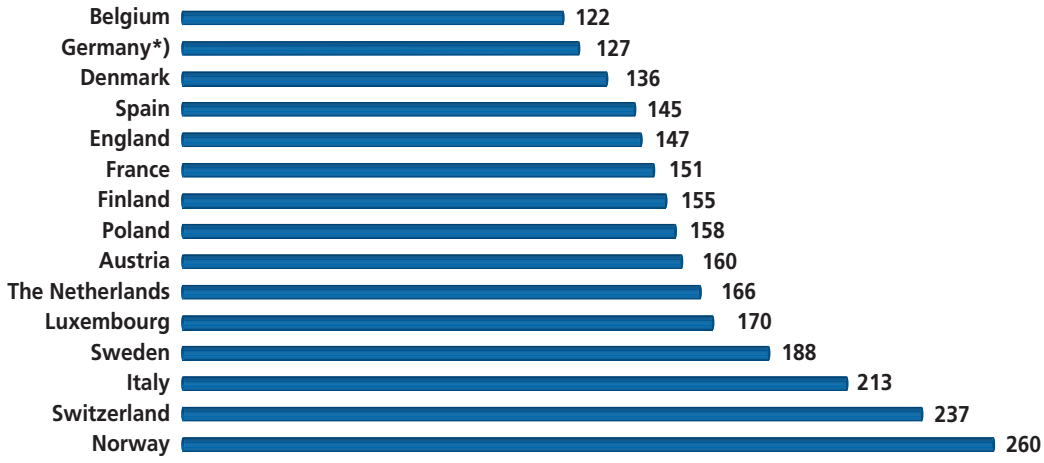
Maintaining the technical function at a lower degree of utilisation increases the volume-based prices, given constant fixed costs. Adaptation and deconstruction costs can additionally be incurred. The costs for a wastewater network reduction e.g. are assessed by the water industry to amount to € 500 to € 1,000 per distribution network metre. Moreover, the service life of existing facilities decreases. Therefore, investments have to be written off prematurely. All in all, this leads to an allocation of higher total costs for a decreasing population in the affected areas.

Against this background, a further reduction of water consumption supported by politics is not required, what is needed, however, is active assistance and also financial support of the demographically based restructuring and deconstruction process by the Federal Government and the federal states.

Household water consumption in a European comparison

4

Data in litres per inhabitant and day



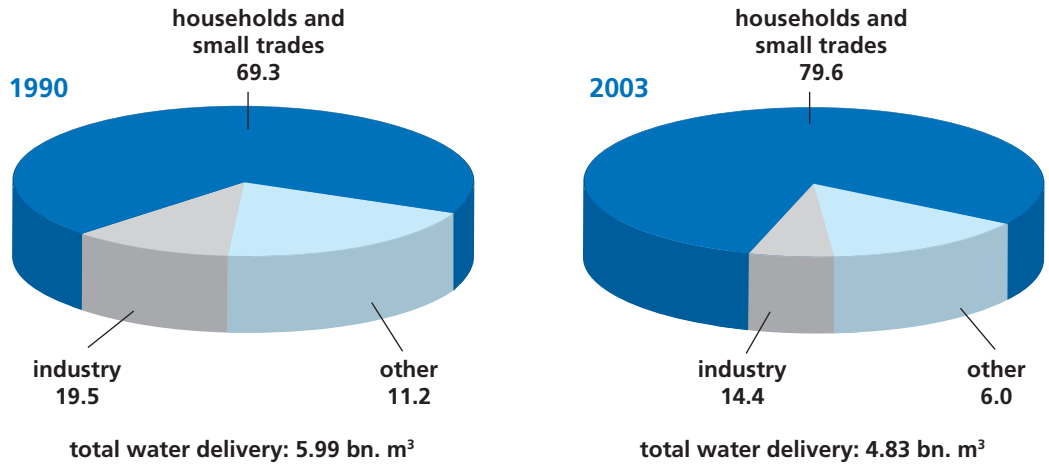
*) household water consumption incl. small trades; latest available data

Source: OECD 1999; IWSA 1999; BGW Water Statistics 2004

The share of industry supplied by public water supply has declined by approx. 40 percent since 1990. This is due to the introduction of resource-friendly production processes and an increasing degree of self-abstraction, but also the decline in water-intensive industries. This leads to an increasing demand on public supply utilities to act as corporate managers in the industrial water supply. Thus, the industry in Germany meets 96 percent of its water requirement by self-abstraction. Only 4 percent of the requirement is met by public water supply. With 30 percent in England and Wales, and 19 percent in France, the share of industry supplied by public water utilities is substantially higher than in Germany (preliminary data from a so far unpublished survey commissioned by BGW in 2005).

Public water supply in Germany **5**

Data in percent, water delivery according to customer groups in 1990 and 2003



Source: BGW Water Statistics

2.3 Forms of business organisation in the water industry

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

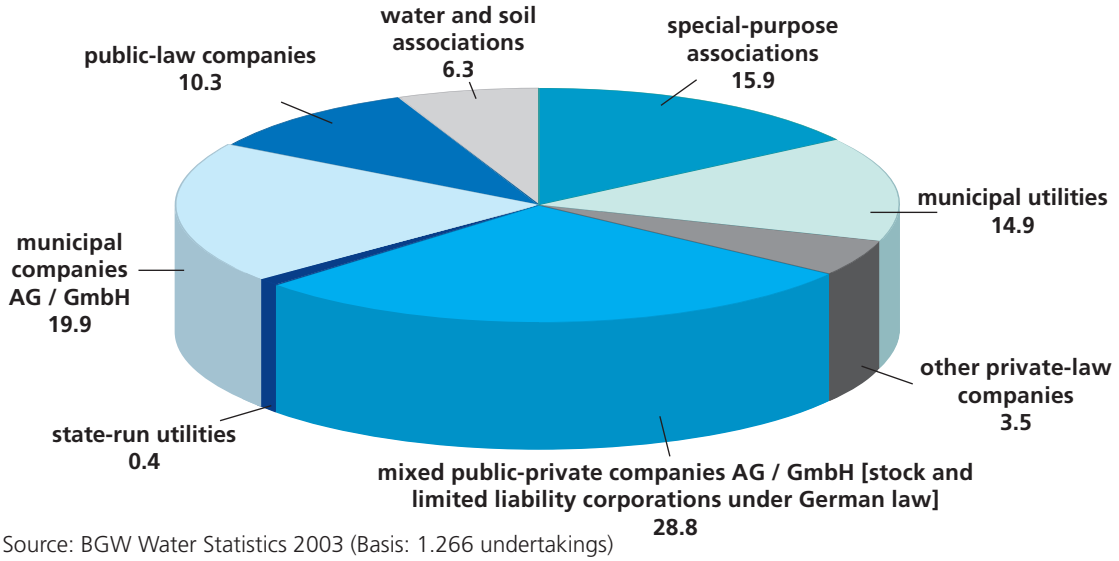
Thus, the share of municipal utilities has significantly decreased (from 63.3 % in 1986 to 14.9% in 2003) while the share of special-purpose associations has increased (from 10.2% in 1986 to 15.9% in 2003). Within this period, undertakings under private law have experienced a significant increase in the form of AGs and GmbHs [stock and limited liability corporations under German law]. Their share has increased from 12.7 percent in 1986 to 30.2 percent in 2003.

Also the increase of public-private undertakings is striking. Their share has increased from 3.3 percent in 1986 to 28.8 percent in 2003.

Forms of business organisation in public water supply in 2003

6

Total Germany/Data in percent related to the water yield



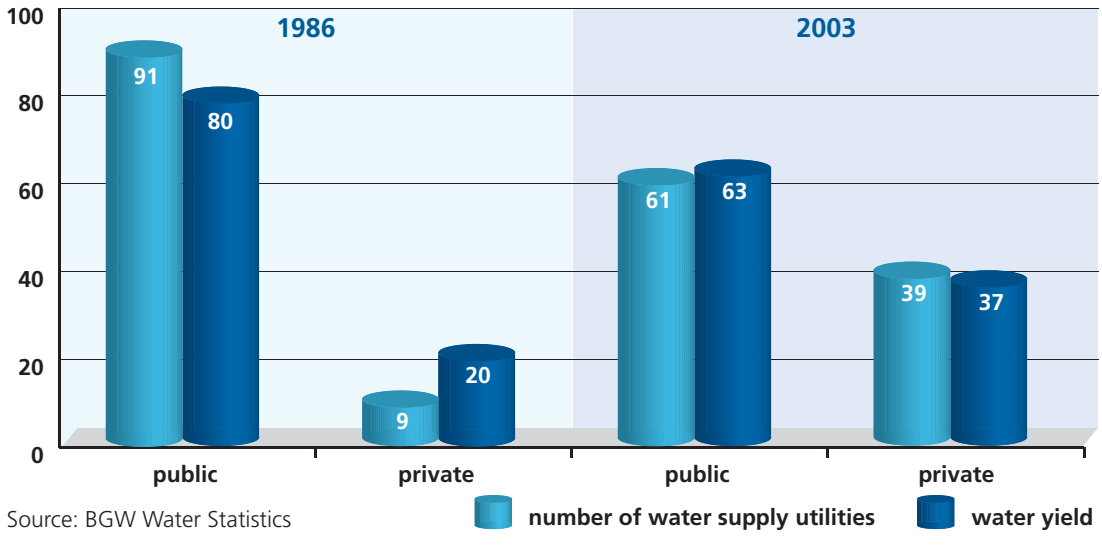
Source: BGW Water Statistics 2003 (Basis: 1.266 undertakings)

The percentage of purely private water supply utilities has slightly increased within this period, but it is still low (from 1 percent in 1986 to 3.5 percent in 2003). Also an increase of public-private partnerships can be observed. Private undertakings take over interests in undertakings whose shares were formerly exclusively held by public corporations.

Public and private forms of business organisation of public water supply in Germany in 1986 and 2003

7

Data in percent



Source: BGW Water Statistics

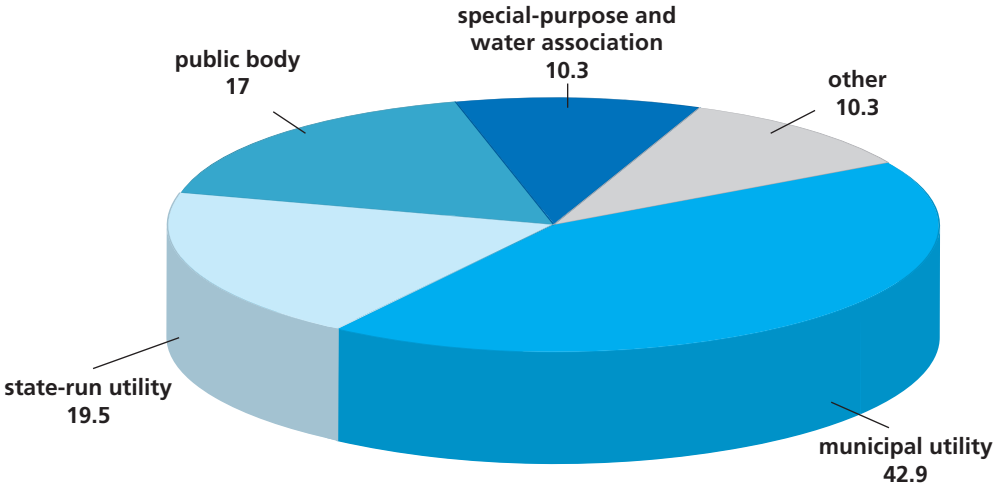
The above statements refer to the 1,266 undertakings in the BGW Water Statistics. In total, there are approx. 6,000 water supply utilities in Germany. The more than 4,000 undertakings which are not covered in the statistics are predominantly state-run and municipal utilities.

In contrast to drinking water supply, wastewater disposal in Germany is dominated by public enterprises. This is due to the classification of wastewater disposal as a sovereign obligation of the municipalities.

Forms of business organisation of bodies providing wastewater disposal in 2003

8

Data in percent, weighted according to the connected population



Source: BGW/DWA Survey 2003

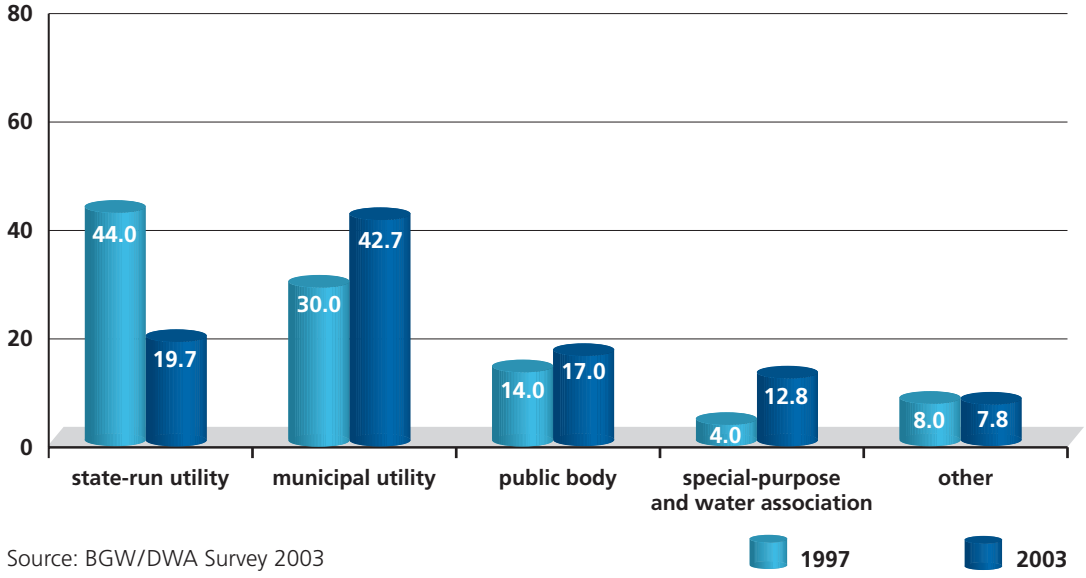
The chart is based on the data of slightly more than 900 wastewater disposal utilities. In total, however, there are more than 6,000 wastewater disposal utilities in Germany. The undertakings not covered here are predominantly operated by municipalities in the legal form of municipal utilities.

Nevertheless, the trend away from wastewater disposal as part of the municipal administrative structure, such as the state-run utility, and towards entrepreneurially autonomous public forms of organisation, such as public **bodies,** becomes evident also for the bodies of wastewater disposal.

Development of the forms of business organisation of bodies providing wastewater disposal

9

Data in percent, weighted according to the population connected to the sewage network



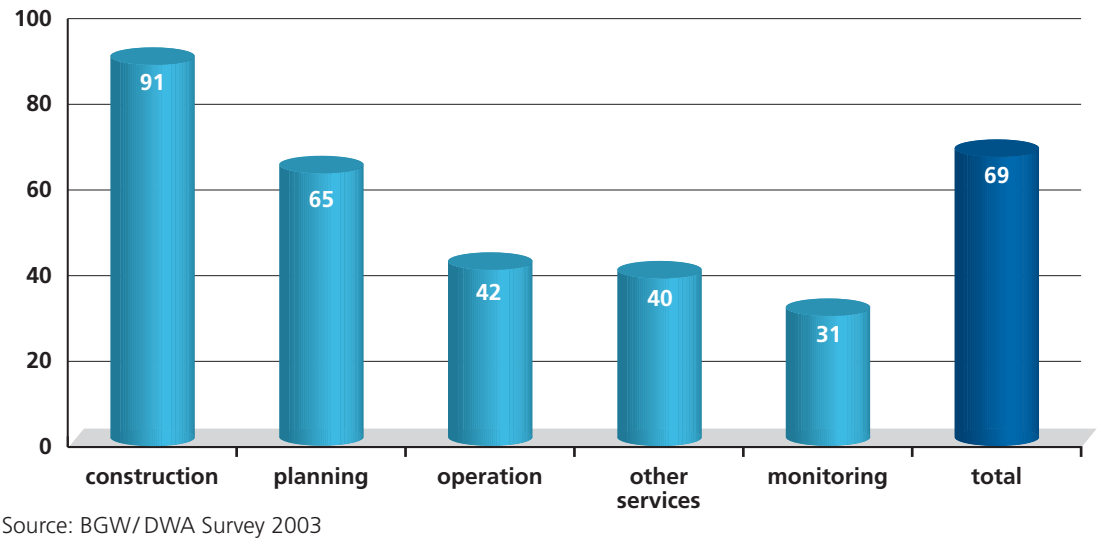
Source: BGW/DWA Survey 2003

Private wastewater disposal utilities are mainly active in the operative business by means of management or operator contracts. The share of private forms of business organisation in wastewater **discharge** is 10 percent and in wastewater **treatment** 12 percent (each related to the inhabitants covered, source: BGW / DWA survey 2003). in total, private undertakings or undertakings under private law are represented far less in the wastewater sector than in the sector of drinking water supply.

Share of external services in total expenses for wastewater

10

Data in percent



Source: BGW/ DWA Survey 2003

In the wastewater sector, the involvement of the private industry is widespread in the provision of partial services. Compared to the total expenses, approx. 70 percent of the services are provided within the fields of planning, construction and operation of private undertakings. This means that a substantial share of the investment volume of a supply utility is passed on to private service providers. The share of the private industry in the form of e.g. construction and planning services in the wastewater industry is thus significantly higher than the legal form of the disposal utilities would at first suggest. It is noticeable that approx. 90 percent of the construction services are provided by private undertakings.

37,105 **employees** alone work in the 1,099 water supply utilities covered (source: BGW Water Statistics 2003); 39,112 employees work in the wastewater utilities covered (source: Federal Statistical Office, Fachserie 19, series 2.1. 2001). It is estimated that far more than 100,000 persons are employed in the entire drinking water and wastewater sector in Germany.

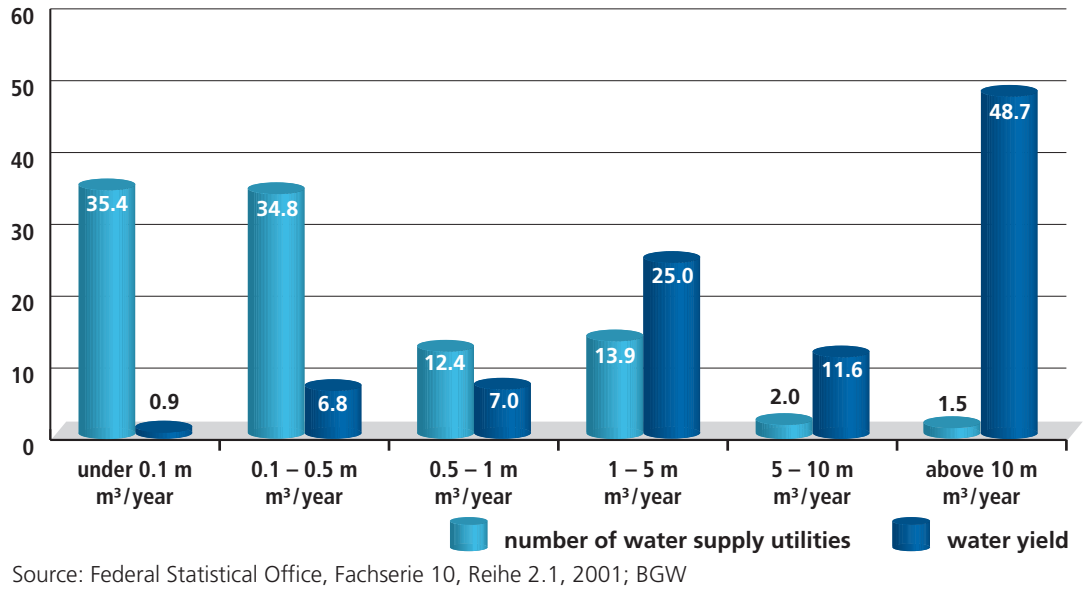
2.4 Size-distribution of the supply and disposal utilities

In rural areas, small undertakings supply a relatively small number of inhabitants. In contrast to this, in urban conurbations, a small number of undertakings supply a large number of inhabitants. Thus, only 1.5 percent of the undertakings supply almost 50 percent of the population.

A comparable size-distribution also results for the operators of wastewater facilities.

Size structure of water supply utilities in Germany **11**

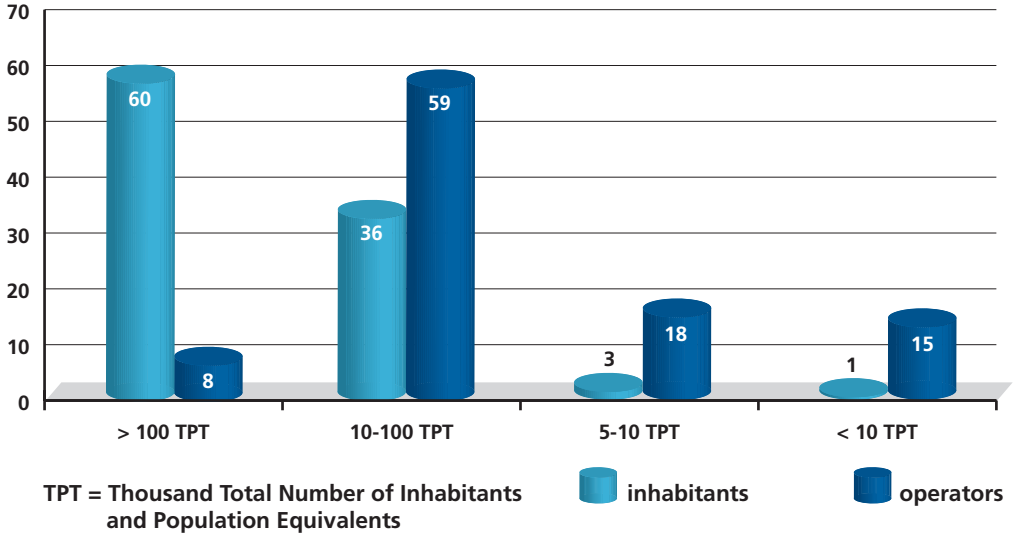
Data in percent



Source: Federal Statistical Office, Fachserie 10, Reihe 2.1, 2001; BGW

Size structure of wastewater plant operators 12

Data in percent



Source: BGW/DWA Survey 2003

2.5 Legal outline conditions of water supply and wastewater disposal in Germany

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 the local communities, they fall under the municipalities' right of self-government according to Art. 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 economically operating, mostly municipal undertakings. As public tasks of general interest, water supply and wastewater disposal services are notably committed also to the sustainability concept as well as to environmental protection (Art. 20a German Basic Law). The bodies performing these tasks therefore assume tasks, besides the actual supply resp. disposal activity, which are dedicated to the protection of water bodies including the protection of groundwater and finally to the vital water resource as a whole.

2.5.1 Fiscal outline conditions

The fiscal outline conditions for the water industry in Germany are complex. In the drinking water supply industry, a reduced turnover tax rate (currently 7 percent) uniformly applies to all forms of business organisation (exception: contributions and construction cost subsidies are taxed at currently 16 percent). Likewise, there is an obligation to pay corporate income tax and in principle also trade tax.

Pursuant to the currently applicable law, wastewater disposal is a sovereign undertaking in fiscal terms. The wastewater disposal activities of the municipalities, special-purpose associations or other public corporations are not subject to corporate income tax, trade tax and value added tax. However, if wastewater is disposed of by a private-law company, it is taxable according to the provisions applicable to it, amongst other things with a turnover tax rate of currently 16 percent. Companies limited by shares are subject to taxation by virtue of their legal form. Reference is made to EU legislation (amongst others, the 6th EC Value Added Tax Directive).

The review of the positive and negative consequences of a tax liability for wastewater disposal and thus at the same time of a fiscal equality of water and wastewater is part of the national modernisation strategy based on the resolution of the German Bundestag of 21 March 2002 (Printed Matter no. 14 /7177 of the German Bundestag).

2.5.2 Basis of pricing and charging

The fixing of water prices / water charges resp. wastewater charges is subject to strict statutory regulation. The public water supply and wastewater disposal utilities are subject to the Municipal Charges Acts of the federal states as well as to municipal supervision. As far as private supply utilities charge their services directly to the consumers, they are subject to the supervision of the antitrust agencies.

According to the Municipal Charges Acts, the supply and disposal utilities in Germany are legally bound to comply with the cost coverage principle, including the costs for substance preservation and refinancing of the facilities.

As far as the Municipal Charges Acts apply, the following principles have to be adhered to for the price and charge calculation:

- The principle of equivalence, i.e. the prices resp. charges must not – irrespective of the costs of the service – be substantially above the value of the service for the citizens (i.e. if the costs are high, the situation may arise that the prices resp. charges must be below the costs);
- The cost coverage principle, i.e. all costs incurred by water supply and wastewater disposal must be covered by the price / the charge (exception: violation of the principle of equivalence; for the rest, the necessity of the costs is reviewed by the courts);
- The prohibition of cost overrun.

The prices / charges therefore have to be calculated according to the following principles:

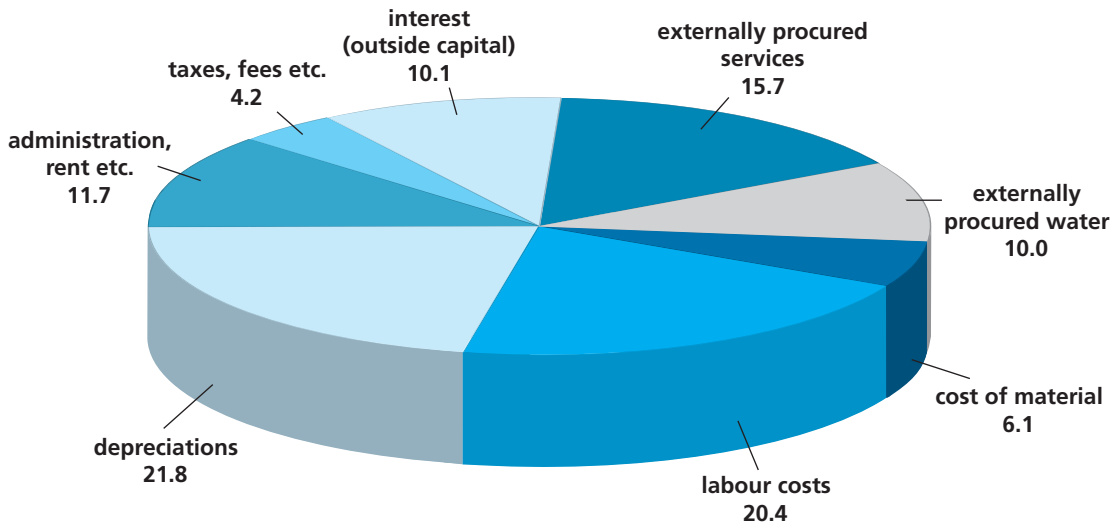
- Taking the principle of net substance preservation into account

- Breaking down the fees of the consumer groups according to the costs incurred by type-classified customer groups
- As regards the type definition, it is possible to charge fees for wastewater disposal according to the uniform standard of the consumed freshwater. Alternatively it is possible to levy a wastewater charge geared to the consumed freshwater volume, as well as an additional precipitation water charge which is based on the drained area (split wastewater charges standard). Numerous wastewater disposal utilities, approx. 60 percent related to the connected inhabitants, levy this charge according to the latter model.
- Taking account of the cost structure in fixing the base and volume price
- Adequate interest for equity capital

For water supply and wastewater disposal, manifold technical facilities are required for water abstraction, treatment, storage and distribution as well as for wastewater collection and purification. Supply and disposal are therefore characterised by a high plant intensity. This leads to high fixed, i.e. volume-independent costs. Furthermore, of the total expenditure of a water supply or disposal utility, a high share of cost for operation and maintenance of the facilities must be allocated to the fixed costs. Thus, e.g. maintenance and personnel costs only depend to a small extent on the operating performance. In contrast, volume-dependent costs only exist to a small extent. These clearly include the electricity costs for pumping and the operating resources for water treatment, water abstraction charges and the like. In principle, it must be assumed that fixed costs are incurred at a regular level of more than three quarters of the total costs.

Cost structure in water supply in 2002 13

Data in percent

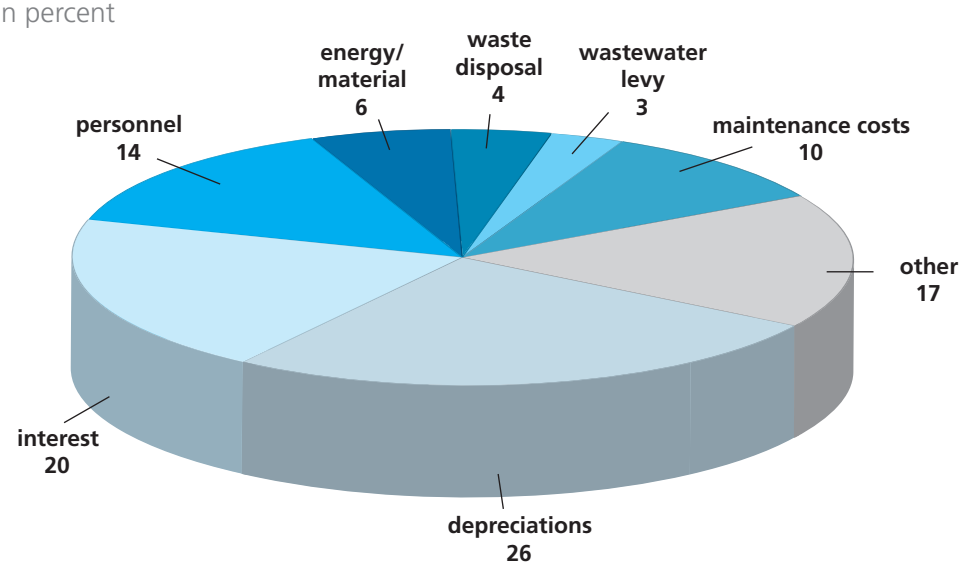


Source: Federal Statistical Office, Fachserie 4, Reihe 6.1, 2002 (published in April 2005)

Additionally, in many places the concession taxes as well as the business profit have to be earned by means of the water prices. Costs are also incurred by providing reliable fire protection which in general, however, is not borne by the consumers.

Cost structure in wastewater disposal in 2002 **14**

Data in percent



Source: BGW/ DWA-Survey 2003

Due to the high plant intensity, there is a high share of investments (new construction and renewal) in the total costs of supply and disposal utilities. In the field of wastewater, the costs for depreciation and financing of the technical facilities comprise 46 percent of the financial expenditure. These are represented in the form of capital costs (interest and depreciations).

Another factor for the long-term security of supply is the allowance for maintenance and renewal costs of technical facilities. A particular challenge is the long service life of the capital-intensive technical facilities. The distribution and sewage networks have an average service life of up to 100 years; other facilities, e.g. impounding reservoirs, have an even longer service life. It is important to emphasise this fact because in contrast to Germany, only very few countries include e.g. the maintenance costs of the distribution network in the water price (source: so far unpublished survey commissioned by BGW in 2005). It must also be taken into account that there are different regulations regarding depreciation among the federal states.

This explains the high share of calculatory costs in wastewater charges for example. Taking the security of supply and disposal into account, the approach of net substance preservation is one of the essential principles of calculation.

3 Performance of the Water Industry

Core Statements

- **Longer-lasting interruptions of supply are unknown in Germany. This is due to the high technical standards of treatment and distribution as well as the excellent condition of networks in comparison to the European situation. The German water supply utilities have by far the lowest network losses on a European scale.**
- **Drinking water of an excellent quality and in sufficient quantities is at all times available to the citizens. The statutory requirements of drinking water quality are complied with throughout the country.**
- **In Germany, wastewater is treated almost nationwide with the highest EU purification standard in contrast to many EU states.**
- **With total investments of approx. 8 billion p.a., the German water industry is one of the biggest customers of the private industry. Maintenance services are almost the same size. For wastewater, 70 percent of services are commissioned to external companies for construction, planning etc.**
- **Drinking water prices and wastewater charges have remained stable for approx. ten years. The increase rates are almost identical to the increase of other costs of living. If one takes the respective water consumption into account, German citizens have to pay less for their drinking water per year than French or English consumers.**

The performance features of the German water industry are long-term security of supply and disposal, high drinking water quality, a high wastewater disposal standard as well as high profitability, linked with sustainability and customer satisfaction (further to the last point see Part II).

3.1 Security of water supply and wastewater disposal

3.1.1 Interruptions of supply

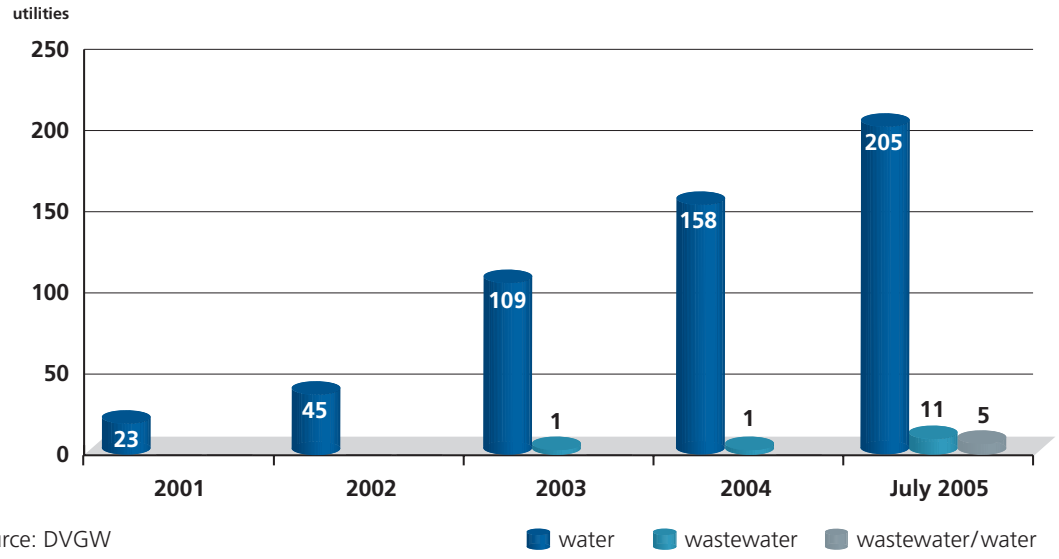
In Germany, data on interruptions of supply are not centrally recorded.

Regional benchmarking projects and performance indicator comparisons provide more transparency and information (see Part III). The results of a benchmarking project with over 80 participants show that in the participating undertakings, there has been no planned or unannounced interruption of the water supply of more than 12 hours. In another business benchmarking, the participating supply utilities stated the annual interruption times in 2003 to amount to ≤ 7.2 hours.

The Technical Safety Management TSM increases the utilities' organisational safety and thus also the technical safety of operation especially in breakdowns and cases of emergency. The utilities are increasingly making use of the existing possibility of certification. Since recently, this has also become possible for wastewater disposal utilities.

Technical Safety Management (TSM) **15**

Development of the TSM confirmations (drinking water and wastewater)



Source: DVGW

3.1.2 Drinking water analyses

The data of the most up-to-date sectoral report of the Federal Republic to the EU Commission from 2001 on the compliance with the EU Drinking Water Directive shows that the number of minimum investigations required by the law has been exceeded.

The results of the benchmarking projects confirm this as well (see Part III). Accordingly, the analyses required pursuant to the EU Drinking Water Directive have been fulfilled in one project by 143 percent. The utilities exceed the legal requirements for precautionary reasons.

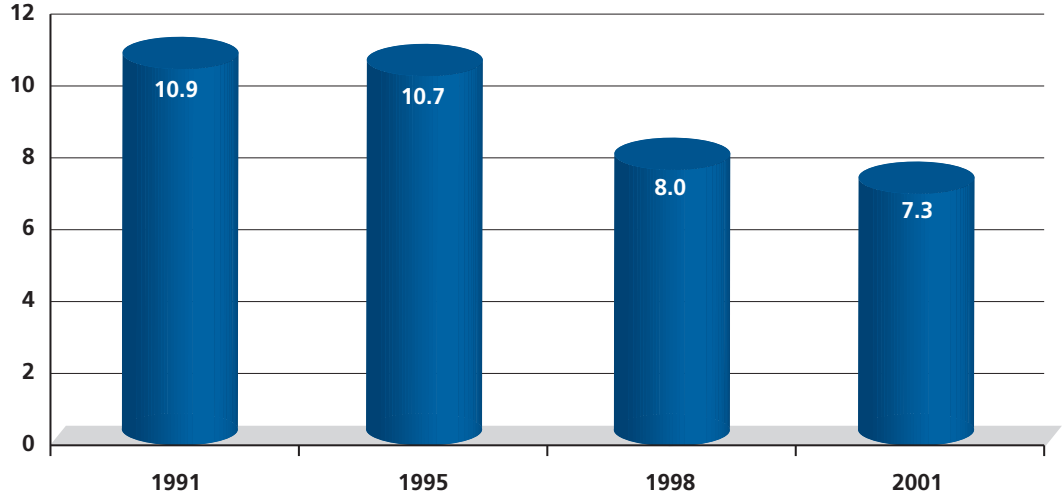
3.2 Quality of supply and disposal

3.2.1 Water losses

With an average of 7.3 percent, Germany has by far the lowest water loss rate in Europe. England and Wales with 19.2 percent, and France with 26.4 percent have significantly higher water losses. The water losses in France alone correspond to approx. 25 percent of the total delivery volume of drinking water in Germany (preliminary data from a so far unpublished survey commissioned by BGW in 2005).

Water losses in Germany 16

Data in percent



Source: Federal Statistical Office, Fachserie 19

3.2.2 Drinking water quality

It is the task of the public drinking water supply to ensure the high drinking water quality required by the law. The **compliance with the German Drinking Water Ordinance and the European Drinking Water Directive** ("Directive for Water for human Consumption") is authoritative. The drinking water quality is measured by means of parameters. The supply utilities continuously guarantee the compliance with the values prescribed by the law. The competent health authorities of the municipalities and administrative districts review their compliance.

In Germany, the requirements of the Drinking Water Ordinance are complied with nationwide. According to the Report of the Federal Republic of Germany to the EU Commission of 2001, 99.45 percent of the analyses for the supervision of the drinking water quality conducted by the authorities corresponded to national quality requirements. Exceeding values of more than 2 percent resulted

for the disinfection by-products parameter (THM). It must be taken into account that Germany has implemented the EU limit exceeding it by the factor of 10. It is noticeable that not a single excessive value has been measured in the delivered drinking water in Germany for the heavy metals cadmium, mercury, lead, chromium, antimony and nickel.

The report of 2001 by the competent French Ministry found only for the pesticides degradation product desethylatrazine a contamination level above the EU limit in approx. 11 percent of the samples. Furthermore, approx. 9 percent of the samples for selenium, and 2.3 percent of the samples for fluoride are above the limit.

For England and Wales, the British Health Authority reports for 2003 an excess of more than 3 percent for polycyclic aromatic hydrocarbons and 2.8 percent of the samples for nitrite. Related to the number of supply areas, the excesses amounted to approx. 8 resp. 6 percent for these parameters. The British regulatory body OFWAT has not published the results of tests for heavy metals.

Excesses of the parameter values are only tolerated pursuant to the EU Directive for a period of three years and provided that they are remedied. The German law provides a binding imperative to minimise chemical substances in water. This means that in many places, the use of disinfectants in water treatment can be dispensed with. The fact that no drinking water-borne diseases have been reported in Germany shows how high the German drinking water standard is here.

The quality of drinking water depends to a great extent on the quality of the abstracted raw water. This is ensured by more than 17,584 water protection areas (LAWA 1997). In water protection areas, requirements apply which exceed normal nationwide water body protection levels. Furthermore, there are also areas which are managed by the operators in a resource-friendly way. Especially the cooperations between agriculture and water supply utilities have proven worthwhile. The costs for the management of water protection and catchment areas and the cooperation with agriculture are included in the water price.

Further criteria for the quality of water supply are the compliance with the **minimum supply pressure** as well as the **plant surveillance** incl. the inspection of networks and hydrants. The determination of these data is the subject of benchmarking projects and performance indicator comparisons (see Part III).

The **degree of connections** to the public water supply in Germany is 99 percent. The utilities surveyed in the BGW water statistics had a total **length of networks** of 371,000 kilometres (in 2003). Apart from this, there is no exact data available; the German water industry estimates a length of approx. 500,000 km (without house connections).

3.2.3 Wastewater purification standards

The quality of public wastewater disposal can be measured by the wastewater purification standard, the number of wastewater purification plants and by the degree of connections to the distribution networks and wastewater treatment plants.

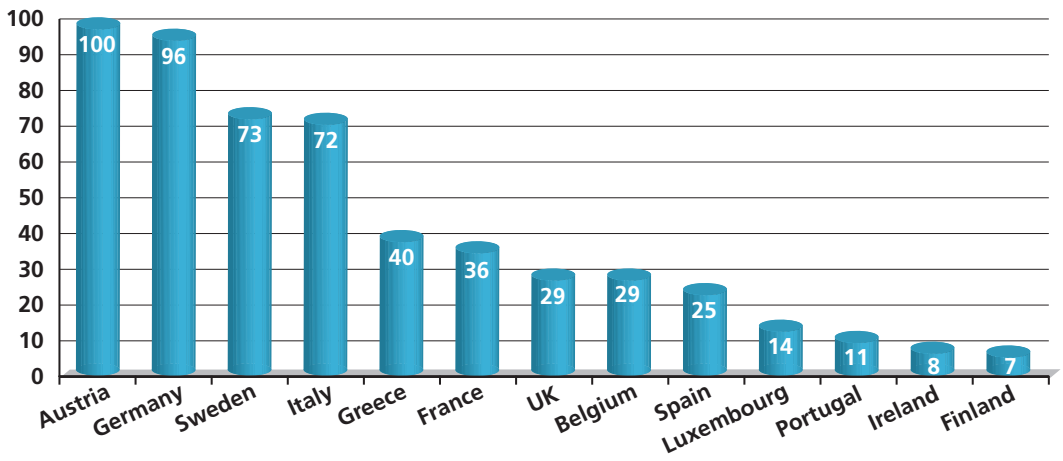
Wastewater purification proceeds through several steps – one mechanic, one biologic (so-called "secondary purification step") and a so-called "tertiary purification step", a biologic purification with nutrient elimination. In Germany, 94 percent of the wastewater volume is treated with the highest EU standard (biologic treatment with nutrient elimination i.e. with the tertiary purification step pursuant to the EC Directive on "Urban Wastewater Treatment"). For specific local requirements resp. official standards, it is possible to add further elements. Thus, in England and Wales the share of the respectively treated wastewater volume amounts to approx. 38.6 percent, and in France to 36.3 percent (preliminary data from a so far unpublished survey commissioned by BGW in 2005).

In Germany, the DWA performance comparison of municipal sewage treatment plants in 2004 has determined degradation degrees of 77 percent for nitrogen, and 90 percent for phosphorus for sewage plants with over 10,000 connected inhabitants. The report of the EU Commission of 2004 about the implementation of the EC Urban Wastewater Treatment Directive states that Greece, Spain, Italy and Portugal provide nutrient elimination for less than 10 percent of the wastewater pollution.

The bar chart shows the current treatment level of the secondary and tertiary purification levels in the EU Member States.

Treatment level for organic pollution pursuant to the EU Directive on "Urban Wastewater Treatment" in sensitive areas 17

Data in percent (situation of 1 January 2002)

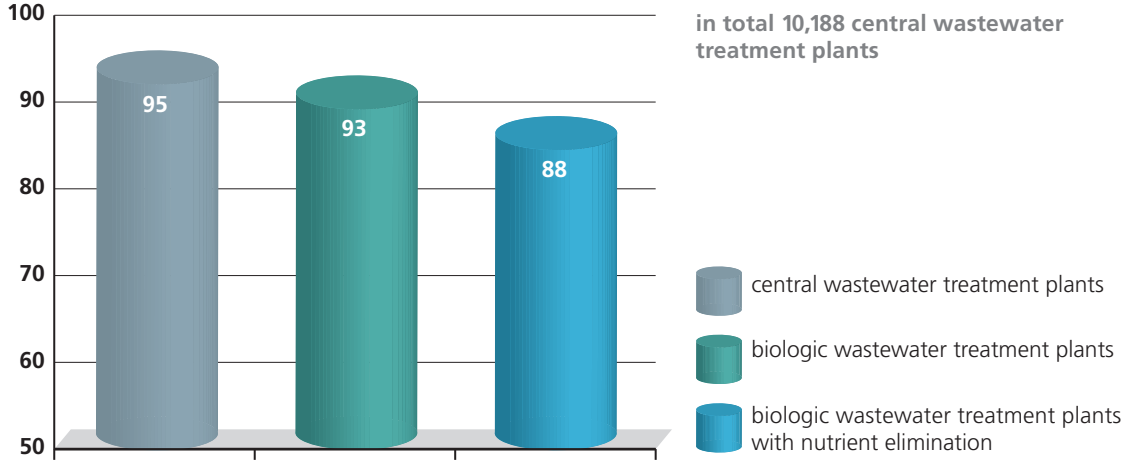


Source: Report of the EU Commission COM (2004) 248 final

Characteristic of the high standard is also the number and the equipment of the 10,188 wastewater treatment plants. The following bar chart shows the situation in Germany.

Degree of connections of the population to wastewater treatment plants in 2001 **18**

Data in percent



Source: Federal Statistical Office, Fachserie 19, Reihe 2.1, 2001

It should be added that the wastewater of households which are not connected to central wastewater systems is disposed of decentrally, so that one can actually speak of an almost 100 percent connection to wastewater treatment plants.

3.2.4 Distribution network length

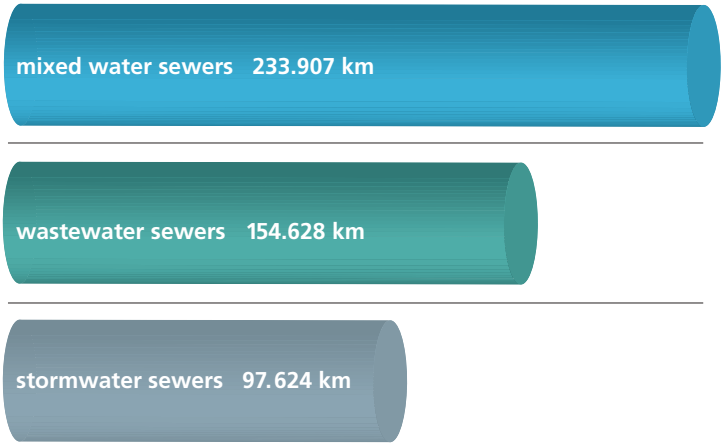
The disposal quality furthermore depends on the volume of connections to distribution networks. In 2001, German distribution networks had a total length of 486,159 km plus 37,000 storm water drainage systems. Since 1998, the distribution network length has increased by approx. 40,000 km (approx. 10 percent).

In **2004**, 97.6 percent of the population in Germany were directly connected to the public sewage network. The non-connected part of the population mostly lives in geographically remote areas. There, disposal is provided by decentralised plants or by sewage removal services. Taking this population group into account, the degree of connection to wastewater treatment (centralised or decentralised) totals 98.1 percent.

In 2003, the costs for the rehabilitation of one metre of sewer amounted to an average of € 1,000. Repair and rehabilitation add up to € 138 resp. € 360 per metre of sewer. In big cities higher costs can be incurred which is shown by a benchmarking project investigating sewer construction in large cities.

Length of the sewage network of public wastewater disposal

19



In total 486.159 km, i.e. more than twelve times the circumference of the earth.

Source: Federal Statistical Office, Fachserie 19, Reihe 2.1, 2001

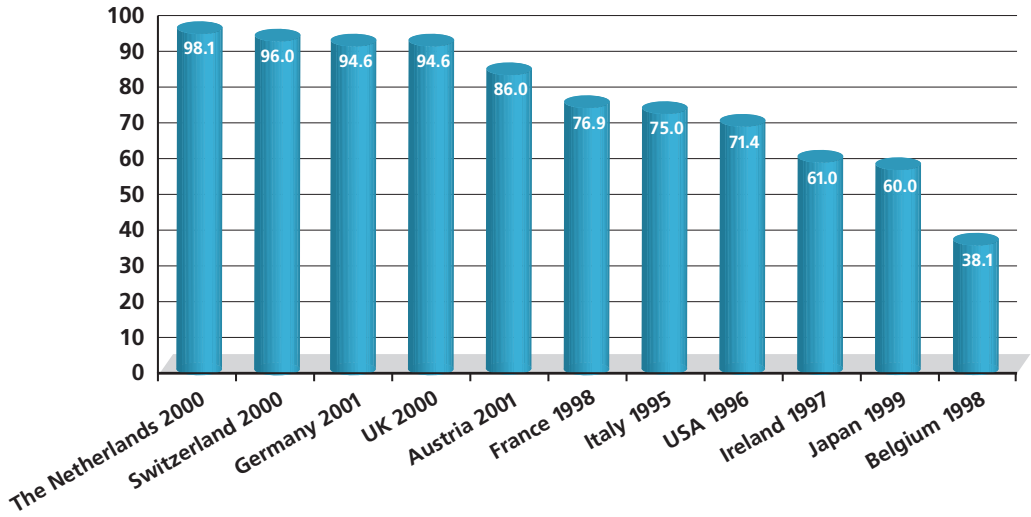
Rehabilitation projects amount to an average of € 1,500 – 2,000 per metre of rehabilitated sewer, and renewal projects total approx. € 500 per renewed metre of sewer (base: 400 surveyed sewer construction projects).

An OECD comparison from 2003 shows that the degree of wastewater connections in Germany is far above the average of other industrialised countries.

Degree of connections to wastewater in an international comparison

20

Data in percent



Source: OECD (Water: Performance and Challenges in OECD Countries)

3.3 Sustainability

3.3.1 Water protection areas / water catchment areas

In order to secure the drinking water supply, Germany has registered 17,584 water protection areas (LAWA 1997). These comprise 11.7 percent of the total area of the Federal Republic of Germany. The water supply utilities are in charge of management. These costs are also a constituent of the water price.

3.3.2 Compensation payments (cooperations with agriculture)

Furthermore, a multitude of cooperation contracts exist almost nationwide between undertakings of the water supply industry and farmers aimed at promoting a water body-friendly land use. Compensation is paid to agriculture on the basis of federal state regulations. There is no data available for the Federal Republic of Germany. Here, additional information is provided by the results of benchmarking projects and performance indicator comparisons. An example: In 2003, 70 participants of a benchmarking project (2005) paid a total of approx. € 1.4 million as compensation.

3.3.3 Network renewal rate

The drinking water and wastewater networks have a service life of up to 100 years. This means that continuous network maintenance and renewal is a permanent task.

The results of individual benchmarking projects show for example an average network renewal rate (supply) of approx. 0.91 percent. It must be taken into account that 85 percent of the networks of utilities surveyed were built after 1951.

3.3.4 Cost coverage degree

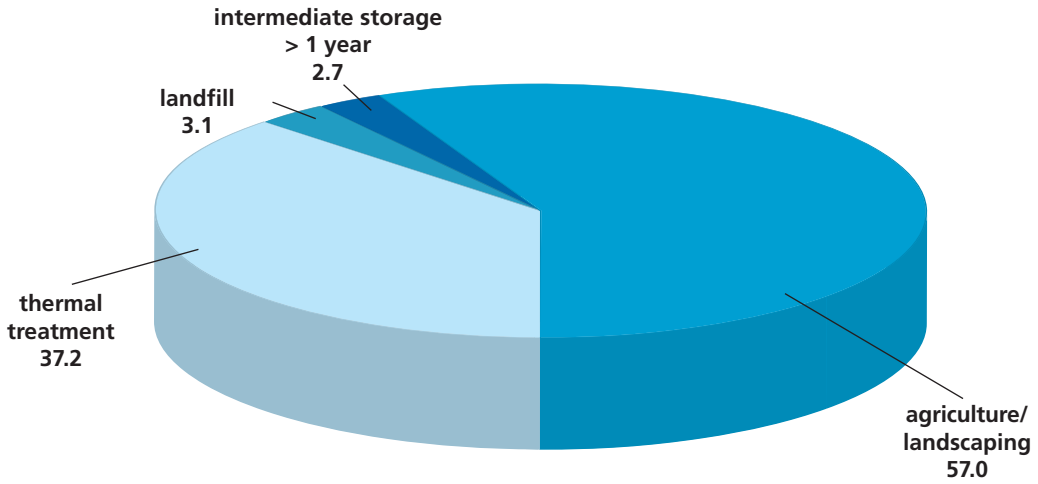
The cost coverage principle has been set out in Chapter 2.5.2. in detail. If the cost coverage principle is complied with, it can be assumed that the economic fundamentals for a long-term supply and disposal operation are ensured, with the existing standards being maintained. This is an essential prerequisite for sustainable water supply and wastewater disposal. The average cost coverage degree amounts to 100 percent.

3.3.5 Sewage sludge

In Germany, approx. 2.2 million tonnes of sewage sludge are currently accumulating ("Stand der Abwasserbeseitigung in der Bundesrepublik Deutschland" [state of wastewater disposal in the Federal Republic of Germany], Federal Ministry of the Environment, as of 31 December 2002). A substantial increase of sewage accumulation is not expected due to the very high degree of connection to the public distribution network and thus to the sewage treatment plants. The following chart 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.

Methods of sewage sludge disposal in 2003 **21**

Data in percent



Source: DWA sewage sludge survey 2003

Over the past few years, thermal procedures have gained greater importance, amongst other things at the expense of landfills as well as material recycling (agriculture, landscaping). This can be ascribed, amongst other things, to the political discussion in view of the introduction of higher requirements to sewage sludge for recycling in agriculture and landscaping.

The most recent DWA survey of 2003 shows that the contents of pollutants in municipal sewage sludge in Germany is far below the limits of the applicable German Sewage Sludge Ordinance as well as of the applicable EC Directive, and the positive development of the sewage sludge quality in general continues. A comparison with the nationwide data on the quality of agriculturally recycled sewage sludge published by the Federal Environmental Agency (FEA) in 1997 shows that the quality of sludge for the ecotoxicologically most relevant heavy metals, i.e. cadmium, lead and mercury, has further improved, with the reductions amounting to 14 to 18 percent. This, however, is in contrast to increasing contents of the elements copper and nickel in a similar extent (15 % Cu, 20 % Ni).

Another positive trend is the development of organic substances. In contrast to the FEA data of 1996, significantly reduced contents of pollutants have been registered for all parameters provided pursuant to the Sewage Sludge Ordinance. The reductions of dioxins and furans amount to 44 percent, those of adsorbable organically bound halogens (AOX) to 12 percent, and polychlorinated biphenyls (PCB) to 55 percent. As expected, the collected data also shows that the sewage sludge recycled in agriculture and landscaping have significantly lower contents of pollutants than the sludge subjected to thermal treatment. Sewage sludge of higher quality is used for soil-based recycling. Furthermore in order to allow for a precautionary soil and groundwater protection, it is recommended that a quality system ensures optimal sewage sludge quality and recycling.

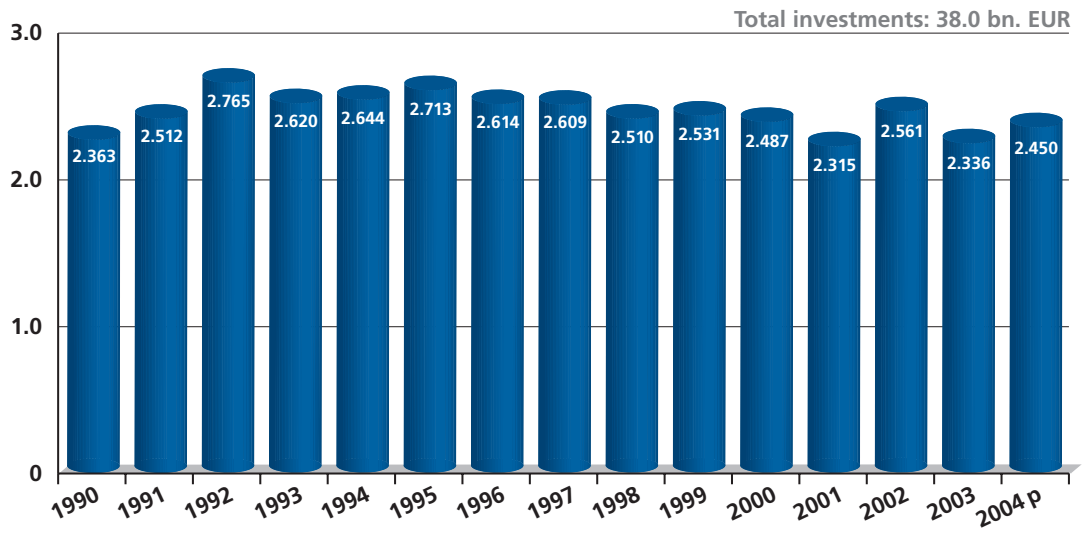
3.4 Profitability

3.4.1 Investments

Continuous investments into infrastructure, maintenance and renewal 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. These also lead to a blending in view of the age of the supply and disposal facilities. The following charts show the continuously high investments which are constantly made both by water supply and wastewater disposal utilities in Germany.

Development of investments from 1990 to 2004 in public water supply 22

Data in bn. EUR



Source: BGW Water Statistics
(p = preliminary)

According to the estimate of the operators, approx. 20 percent of the public sewer network needs rehabilitation on a short resp. medium-term basis. This corresponds to a volume of approx. € 50 to 55 billion for the next 15 years. Further 21.5 percent of the network must be rehabilitated on a long-term basis due to minor damages. The annual total expenses currently amount to € 1.6 billion. It is pointed out that in 2004, an inspection degree of 77 percent was reached. To put it in other words: In total, three quarters of the sewer network were inspected for damages. In 2003, the costs for the renewal of one metre of sewer amounted to an average of € 1,000. Repair and rehabilitation add up to € 138 resp. € 360 per metre of sewer. There is no backlog in investments.

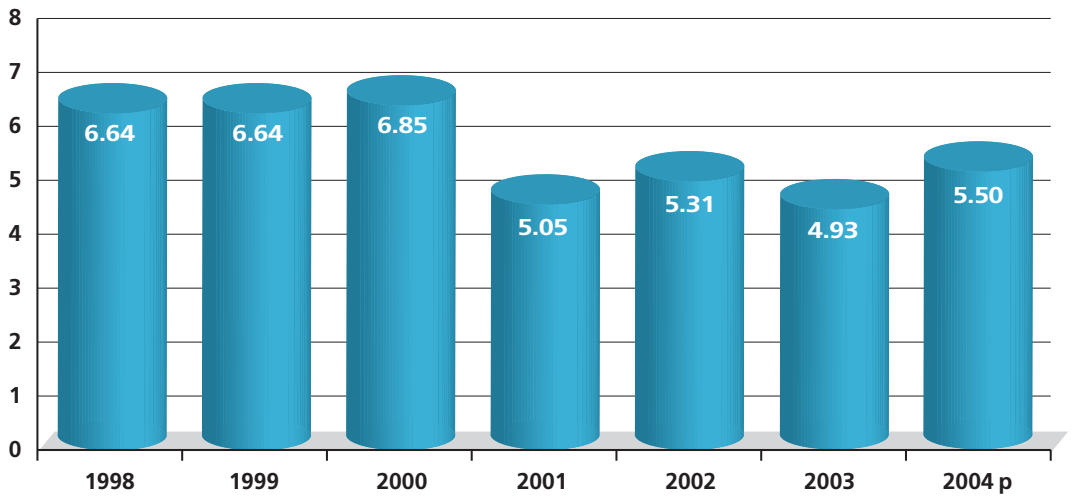
The drinking water industry in Germany has invested € 2.5 billion p.a. at a constant level for over 15 years. From this amount, an average of approx. 65 percent flows into the distribution networks, and approx. 10 percent each into abstraction and treatment.

With approx. € 5.5 billion, also the wastewater sector has invested at a high level for many years. The decline compared to the years before 2000 is due to the phasing-out of investments within the implementation of the EU Directive on Communal Wastewater. The investments into the rehabilitation and maintenance of networks in both sectors have been almost constant for many years.

The drinking water supply and wastewater disposal sectors together invest approx. € 8 billion p. a. and are therefore among the industries with the highest investments of all. It has to be taken into account that the costs for the construction and renewal of networks in Germany are fully included in the prices and charges. In other countries, investments are financed by the municipalities themselves by means of municipal taxes and levies and are therefore not part of the prices and charges.

Development of investments from 1998 to 2004 in public wastewater disposal **23**

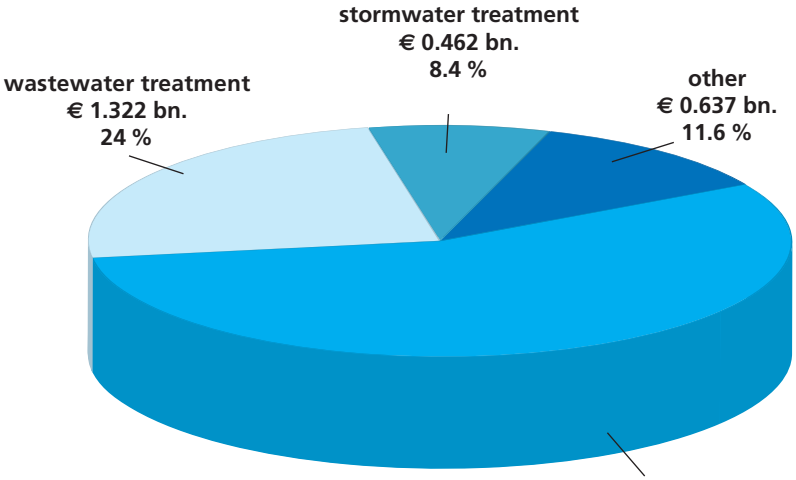
Data in bn. EUR



Source: BGW/DWA Wastewater Surveys
(p = preliminary)

Investments of wastewater utilities in Germany in 2004*

24



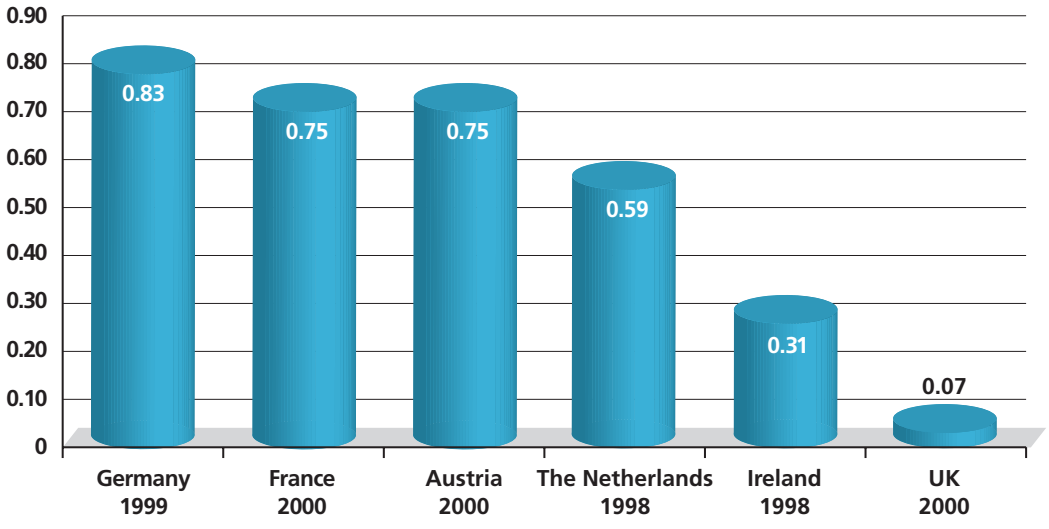
Source: BGW/DWA Survey
* = forecast

An OECD survey reflects Germany's top position regarding the investments in wastewater disposal (Environmental Performance Reviews – Water, OECD 2003). In 1999, these amounted to 0.83 percent of the Gross National Product (GNP) in Germany. In the United Kingdom (UK) in contrast, these expenses only amounted to 0.07 percent of the GNP in 2000. Most recently, investments have been substantially increased in England and Wales. In Germany, average investments per cubic metre of drinking water amounted to € 0.55 in 2003, in England and Wales to € 0.47, and in France to € 0.37 (preliminary data from a so far unpublished survey commissioned by BGW in 2005). The Ger-

Investments in wastewater in a European comparison

25

Data in percent of the Gross National Product of the corresponding country



Source: OECD Environmental Data Compendium

man water industry ensures a consistently high level of investments to maintain the infrastructure in order to safeguard security and quality of supply on a long-term basis.

3.4.2 Development of water prices and wastewater charges

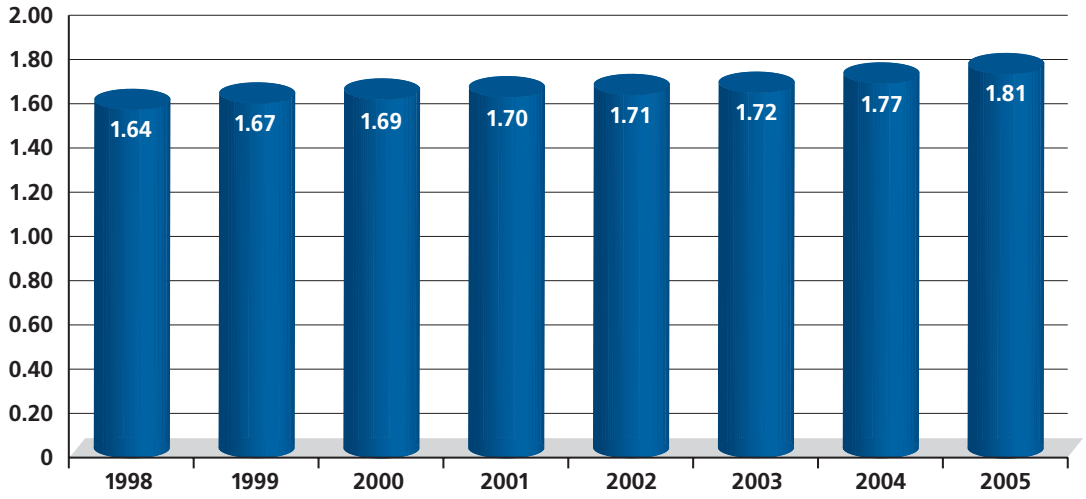
Consumers have to pay an average of € 1.81 per 1,000 litres (= 1 cubic metre) of drinking water (2005).

In Germany, drinking water prices have increased by an average of 2.3 percent in 2005. The increase was for the second time above the average price increase rate of 1.6 percent.

For the basics of pricing and charging see Section 2.5.2.

Development of drinking water prices from 1998 to 2005 **26**

Average prices for households in Germany in EUR per cubic metre



Source: BGW Water Tariff Statistics of 1 January of the respective year, incl. base price and VAT

Consumer prices have increased by an average of 1.7 percent since 1995.

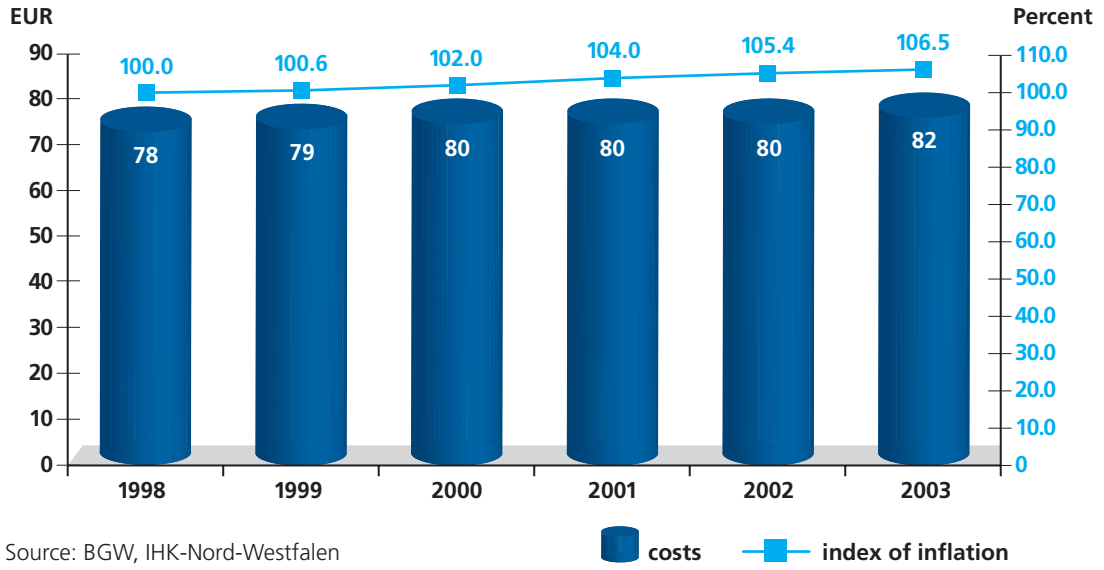
Since 1998, the general price index in Germany has increased by 6.2 percent. In the same period, the citizens' per-capita burden for drinking water prices only increased by 5.5 percent (from € 78 to € 82), so that one could even speak of a declining burden.

In comparison with the **drinking water costs** per head and year – taking account of the higher consumption in other countries – Germany is with € 82 even behind England and Wales with € 100 and France with € 85 (preliminary data from a so far unpublished survey commissioned by BGW in 2005). The target of the World Bank regarding the share of income for water services amounts to 4

percent. In Germany and France, this value has significantly fallen below at 0.38 percent. This comparison does not take account of the different standards regarding compliance with the drinking water quality, the condition of networks, interruptions of supply, water losses and subsidies.

Drinking water costs from 1998 to 2003 and index of inflation **27**

Data in EUR per inhabitant and year



Source: BGW, IHK-Nord-Westfalen

In 2003, **wastewater charges** in Germany increased by 1.4 percent compared to the previous year. The increase is only slightly above the inflation rate of 1.1 percent. The discharge and treatment of 1,000 litres of wastewater costs the citizens an average of € 2.14. Since 2000, wastewater charges in Germany have remained almost stable. The per-capita burden per citizen and day for wastewater disposal amounts to € 0.34 including connection costs.

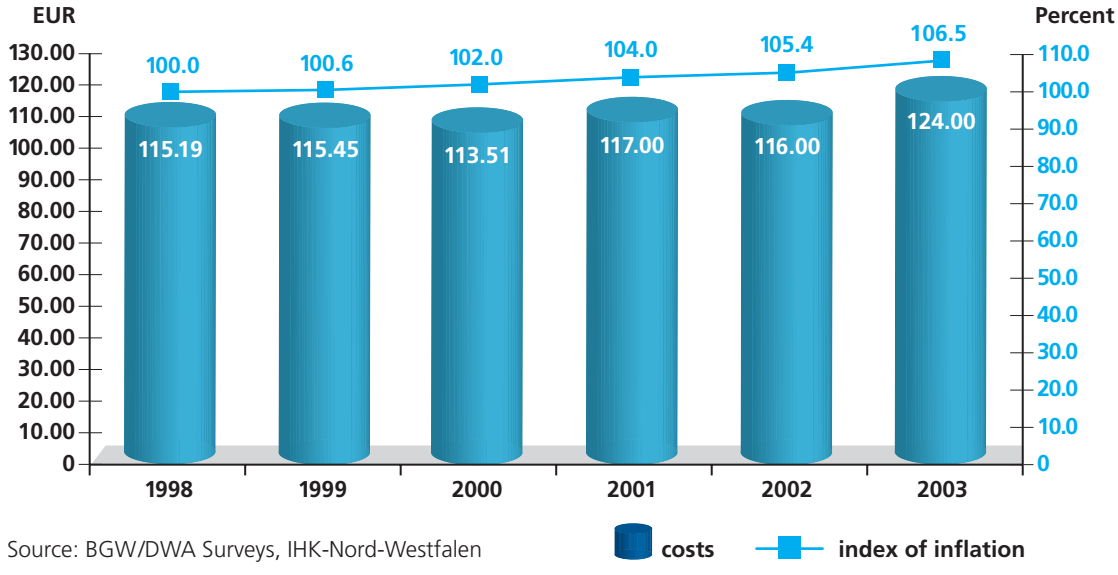
Wastewater charges can be levied by:

- a uniform charge according to the freshwater standard which is based on the volume of the consumed freshwater 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.
- a wastewater charge geared to the consumed freshwater as well as an additional precipitation water charge based on the drained area (split wastewater charges).

Wastewater costs from 1998 to 2002 and index of inflation

28

Data in EUR per inhabitant and year



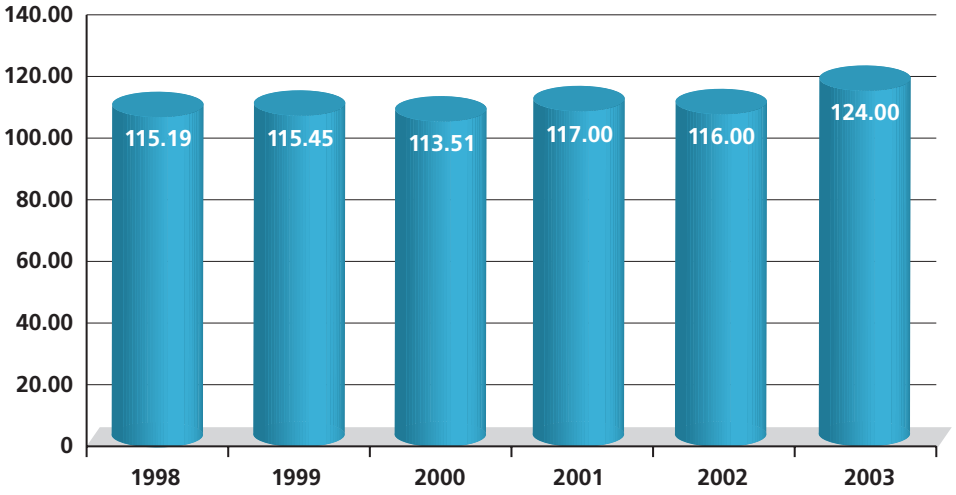
Source: BGW/DWA Surveys, IHK-Nord-Westfalen

Additionally it is possible to levy a basic charge. This basic charge provides for a more homogeneous distribution of the high fixed costs among all inhabitants connected to wastewater disposal facilities. At the same time, it contributes, as a stabilising element, to cushioning the increase in charges. As a general rule, a basic charge is levied as a fixed annual sum.

Population-specific annual wastewater burden

29

Data in EUR per inhabitant and year (incl. connection fees)

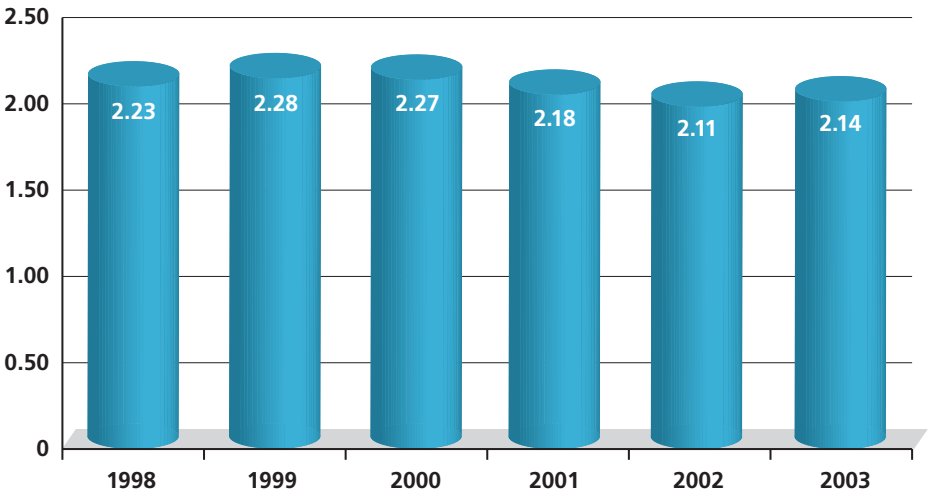


Source: BGW/DWA Surveys

Wastewater charges according to the freshwater standard

30

Data in EUR per cubic metre

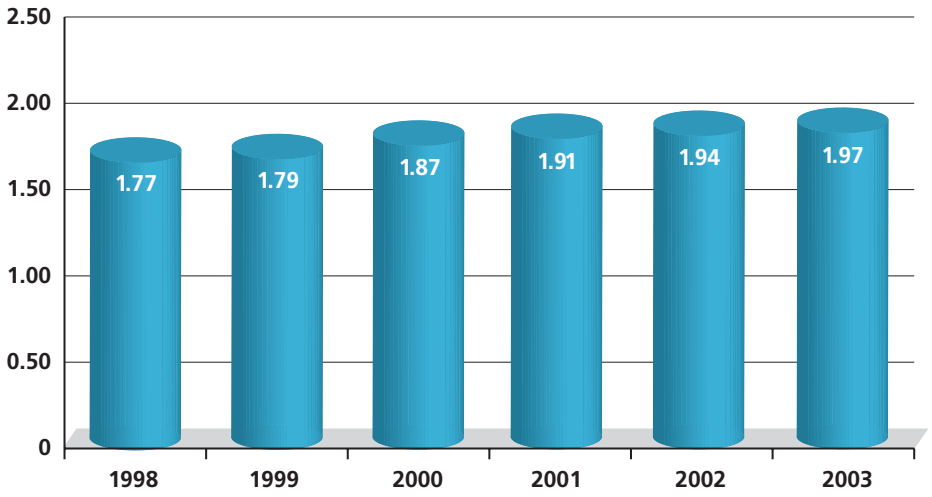


Source: BGW/DWA Surveys

Wastewater charges according to the split wastewater charges standard

31

Data in EUR per cubic metre

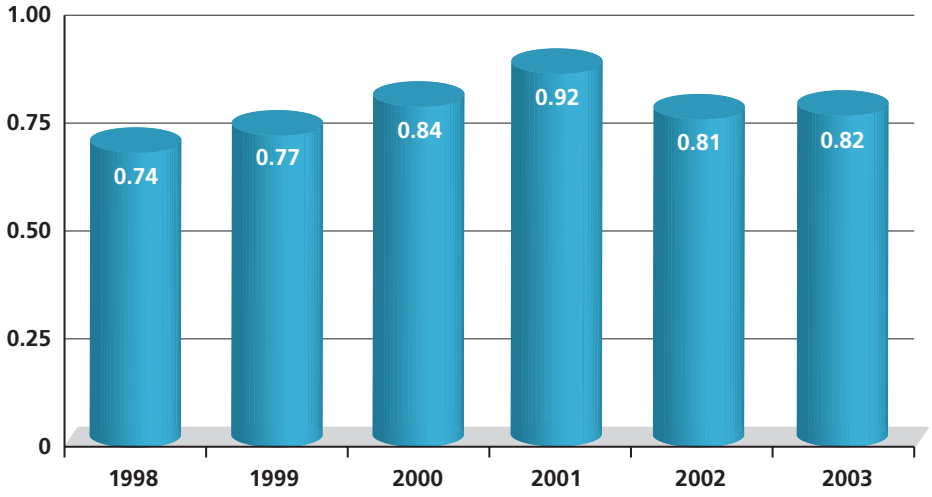


Source: BGW/DWA Surveys

Precipitation charges according to the split wastewater charges standard

32

Data in EUR per square metre of seated area



Source: BGW/DWA Surveys

The data of the four charts above are only comparable to a limited extent due to the differing interviewed population.

In view of the quality differences regarding the purification performance of the sewage treatment plants which are particularly eminent in wastewater disposal, the differences in the annual per-capita burden for wastewater disposal in Europe are relatively low. In Germany, these amount to € 102 related to the freshwater standard, with basic and volume charges, however without one-off payments, in France these amount to € 90, and in England and Wales to € 98 (preliminary data from a so far unpublished study commissioned by BGW in 2005). Most particularly state grants are not taken into account.

The OECD has issued a conclusive survey on the different measures taken in the individual countries to keep water prices stable. It also compares water prices in various European and non-European cities. In many places, the water price is a political price. It is evident that the cost coverage principle required in the EU Water Framework Directive is often only partly adhered to. In Belgium, for example, the water price actually paid is reduced by a multitude of social benefits for low-income parts of the population. Other countries, e.g. the United Kingdom, do not calculate the price to be paid on the basis of actual consumption, but independently of consumption on a lump-sum basis.

In Italy and Switzerland, for example, the general price is reduced by substantial subsidies (according to the OECD definition by more than 30 percent of the operating costs). In return, these subsidies have to be financed in the affected states collectively by the taxpayers. The comparison of the strict cubic metre prices as an indicator for the efficiency and performance of the supply utilities is thus not relevant.

3.4.3 Special charges: Water abstraction levies, compensation payments, wastewater tax

In Germany, water prices are additionally increased by special state charges such as the water abstraction levy. In some federal states, these 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 prices in Germany.

Water abstraction levies

33

Water cent per m³ of yielded drinking water volume
in the Federal Republic of Germany according to federal states
(in Eurocent)

federal state	amount of water cent	notes
Baden-Württemberg	**5.1**	since 1988 ("SchALVo")
Bavaria	**-**	
Berlin	**31**	
Brandenburg	**12.3**	with two increases since 1994
Bremen	**5**	since 1993
Hamburg	**6 / 7**	for approx. 10 years
Hesse	**-**	abolished in January 2003
Mecklenburg-Western Pomerania	**1.8**	continuation of the water abstraction levy of the former GDR
Lower Saxony	**5.1**	
North Rhine Westphalia	**4.5**	since 1 February 2004
Rhineland Palatinate	**-**	
Schleswig-Holstein	**5 resp. 11** [1)]	since 1 February 2004
Saarland	**-**	
Saxony	**1.5**	
Saxony Anhalt	**-**	
Thuringia	**-**	

1) 5 cent: for Industrial undertakings as final consumers, provided that more than 1,500 m³ of water are purchased in the assessment period, 11 cent: by other final consumers

Source: BGW, State: July 2005

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 for more investments which, however, is politically highly disputed due to the outlined high wastewater purification standards in Germany. The wastewater tax accounts for approx. 3 percent of the total wastewater disposal costs and thus of the wastewater charges (BGW / DWA Market Data 2003). In 2001, this accounted for a volume of € 365 million.

Part II Results of the Customer Survey on Water 2005

Core statement

For the customers of the German water industry, security of supply and quality are of the utmost importance.

1. Introduction

For the utilities of the water industry, the relation to their customers is essential. Therefore, BGW regularly has customers interviewed on their opinions about the drinking water supply. An independent opinion research institute conducts this nationwide survey of private households. The customers were interviewed in December 2004 / January 2005 for the first time about wastewater disposal.

The so-called customer barometer gives the utilities clues as to where potentials for optimisation exist for their respective relation to the customers.

The survey investigates the following aspects:

- the user behaviour of the customers in view of drinking water,
- the public image of the water and wastewater utilities,
- the level of satisfaction with the service as well as with the technical and ecological standards,
- the awareness of drinking water prices and
- the contact between consumers and utilities.

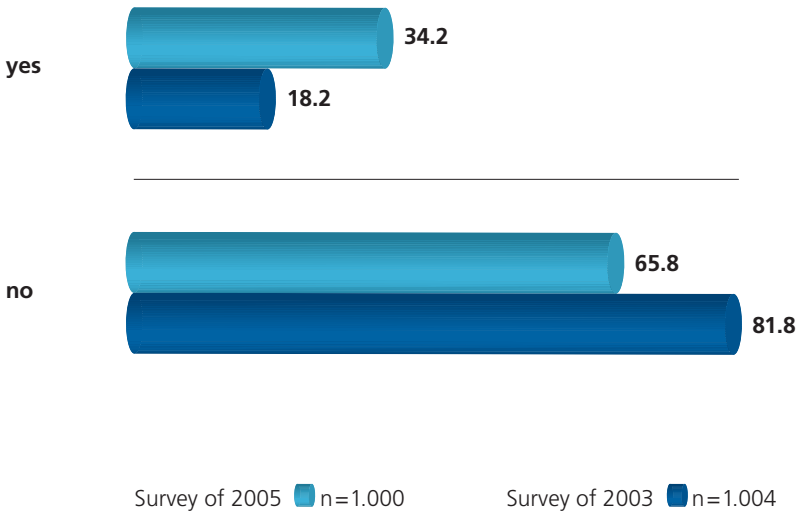
In detail it investigated the global customer satisfaction level, the satisfaction level with the individual technical and commercial performance factors as well as the importance level of single factors from the consumer's point of view. The survey on the contact behaviour dealt with the user behaviour of the customers as well as the way customers are addressed by the utility, including complaint management. This chapter of the Water Industry Profile compiles and assesses some integral results of the customer satisfaction survey.

2. Compilation of Results of the Drinking Water Survey

A substantial change is the strongly increased number of consumers who claim to be aware of their water consumption volume and their annual expenses for drinking water. Regarding the price awareness, their share has almost doubled from 18 to 34 percent.

Are the water customers aware of the amount of their annual expenses for drinking water? **34**

Data in percent

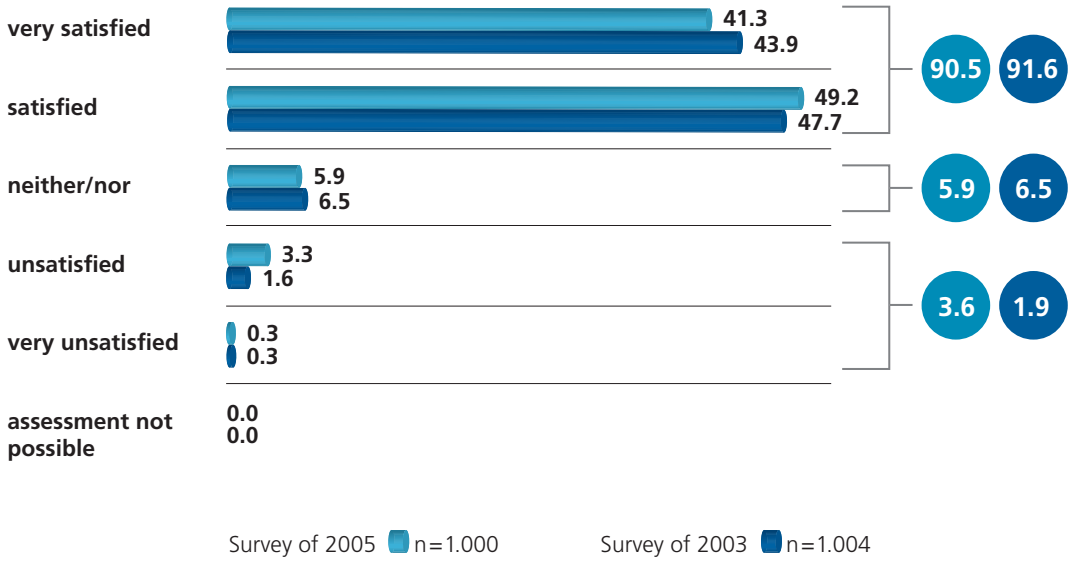


With values of 1.7 and 2.0 [on a scale graded from 1 down to 5] compared to 2003, the assessment of the drinking water and service quality is unchanged at a high level (further to the service see Section 2.2).

How satisfied are the customers with the water quality in general?

35

Data in percent

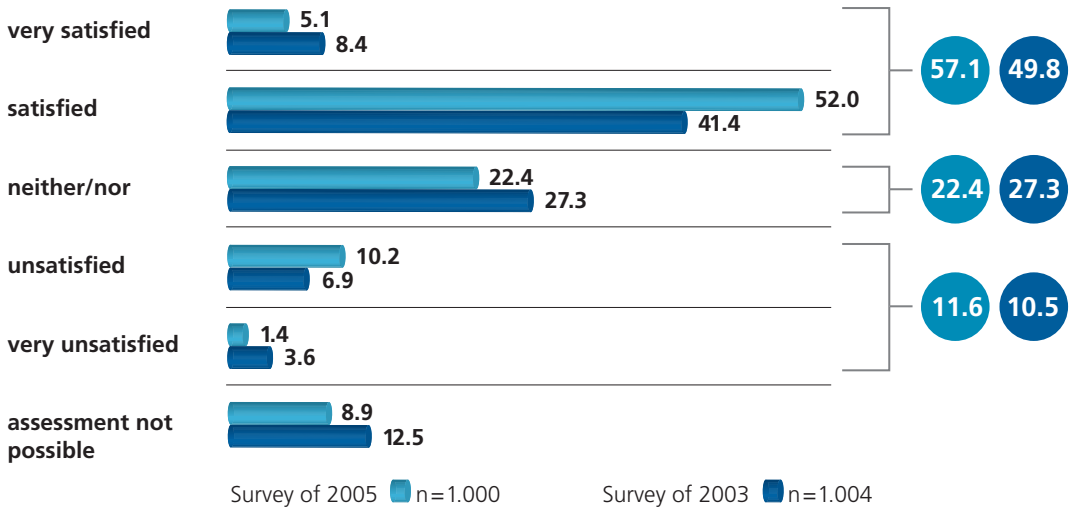


The price/performance ratio tended to be assessed better than still in 2003. Although the average assessment was unchanged at 2.5, the percentage of consumers, however, who were satisfied or even very satisfied with the ratio increased from 50 to 57 percent.

How satisfied are the customers with the price/performance ratio of their water provider in general?

36

Data in percent



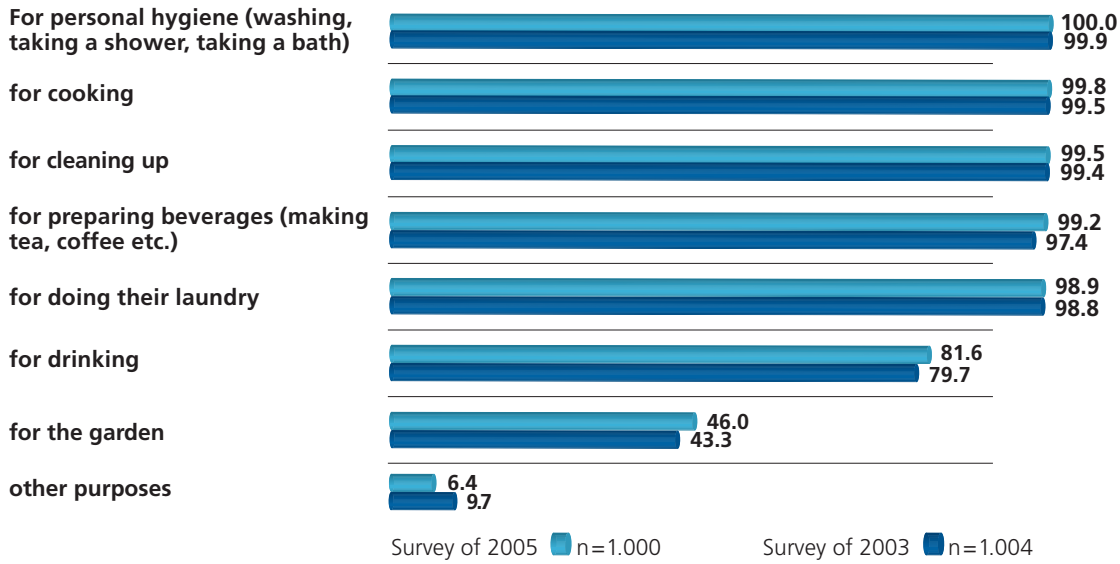
Also for 2005, the public image of the water utilities remains as positive as ever. Within this assessment, reliability was assessed as the best at 1.6; the bureaucracy image was assessed as the lowest at 2.6.

2.1 User behaviour and drinking water quality

Regarding the user behaviour in drinking water consumption, it has to be stated that 97 percent of the interviewed persons use drinking water to make coffee or tea, but only 80 percent drink water straight from the tap. Obviously, the potential of drinking water consumption as a refreshment is not yet fully utilised.

What do customers privately use drinking water for? **37**

Data in percent



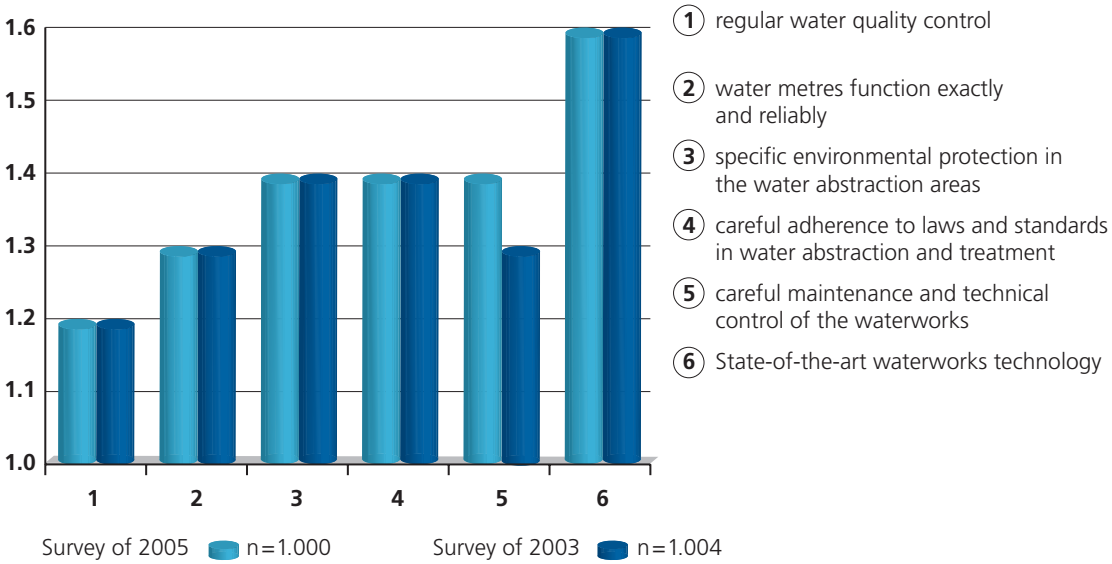
The assessment of the drinking water quality for individual usages diverges. With approx. 55 percent, the number of consumers who consider drinking water as suitable to prepare baby food is at a constant level. Here, there is obviously further need for information. The percentage of consumers who also like uncarbonated drinking water has increased from 30 to 36 percent.

2.2 Customer satisfaction level with the service of the water provider

The most important criteria for the interviewed persons regarding the water quality and the quality of supply are the regular testing of drinking water and the exact function of water metres.

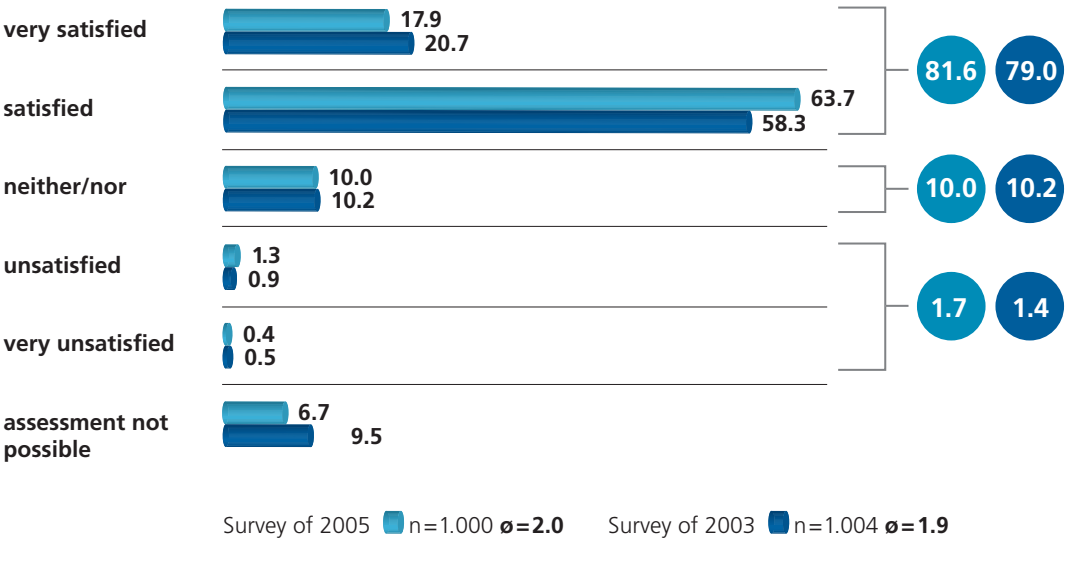
Customer satisfaction with the technical services of the water providers 38

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



Customer satisfaction with the service of their water provider 39

Data in percent



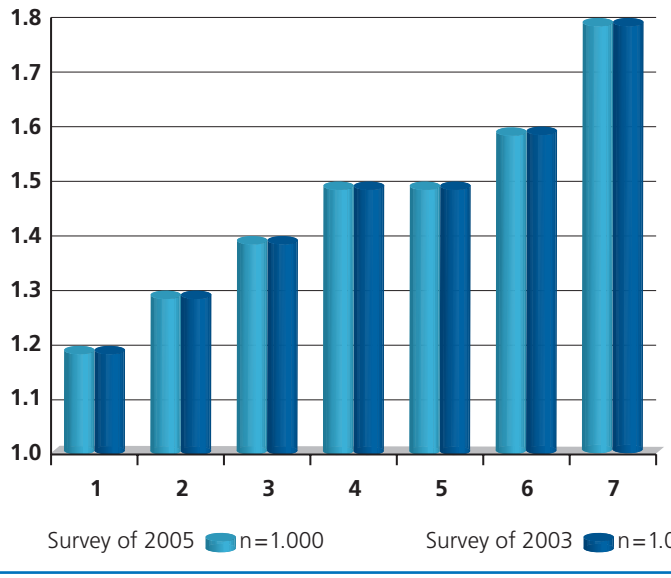
74 percent of the interviewed persons were able to name their water provider, i.e. 26 percent of the interviewed persons did not know their water provider by name. This is a decrease from 30 to 26 percent, but nevertheless, there is further potential for optimisation here, above all for the utilities' public relations.

Most customers have every confidence in the performance of the German water utilities and the drinking water quality. In this year, the overall satisfaction increased in the fields of quality, satisfaction with the price/performance and service. Approx. 82 percent of the consumers were very satisfied up to satisfied with the service of their water utility.

By far the most important criterion for customer satisfaction is the reliability of water supply, far above the speedy removal of interruptions. The comprehensibility and composition of the price had the lowest relevance.

Customer satisfaction with the service quality of the water providers **40**

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



1. reliability of the water providers
2. speedy removal of interruptions
3. careful and reliable execution of house connection works
4. clarity of the water bill
5. careful and reliable exchange resp. reading of the water metre
6. comprehensability of the price composition
7. unproblematic appointment for metre reading or a new house connection

As service criteria, the competence of the contact partners, the availability on the telephone and the adherence to agreements made headed the scale of relevance. These are the customers' most important criteria for satisfaction, along with the friendliness of the staff. The least important factor of customer satisfaction, despite a strong increase, was the availability on the Internet as well as the availability of general information.

2.3 Awareness of water consumption and drinking water prices

The percentage of consumers who claimed to be aware of their actual water consumption has increased since 2003 from 19 percent to approx. 32 percent. This shows an increasing interest by the consumers.

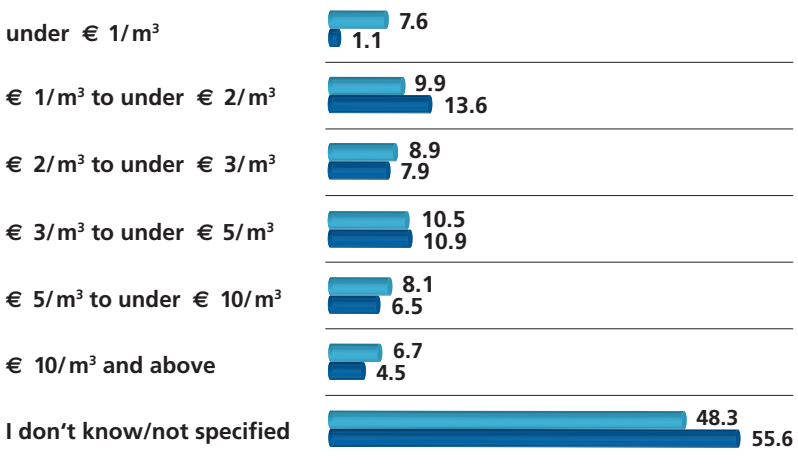
Nevertheless, two thirds of the interviewed persons could not state how much they spent on their drinking water per year. However, this reflects that the costs for drinking water play an increasing role in the minds of the consumers. If asked for the amount of the annual expenses for drinking water, the number of answers has almost doubled from 18 to 34 percent compared to 2003.

In this context, approx. 75 percent of the interviewed persons stated to economize water consumption. This is to an increasing extent (from 64 to 70 percent) to save money, with the environmental concern only ranking second, just like in 2003.

With an average of approx. € 5, the price for a cubic metre of drinking water was assessed far too high by the interviewed persons; the actual average price amounted to € 1.81 (2005) and was thus more than 60 percent lower. Approx. 48 percent of the interviewed persons were not aware of their water price; in 2003, these had even been 56 percent. There is obviously a dearth of information in this matter to which the utilities could respond with increased public relations.

How do the customers estimate the price for one cubic metre (= 1,000 litres) of drinking water? **41**

Data in percent



Actual price:
2005 = € 1.81/m³
2003 = € 1.72/m³

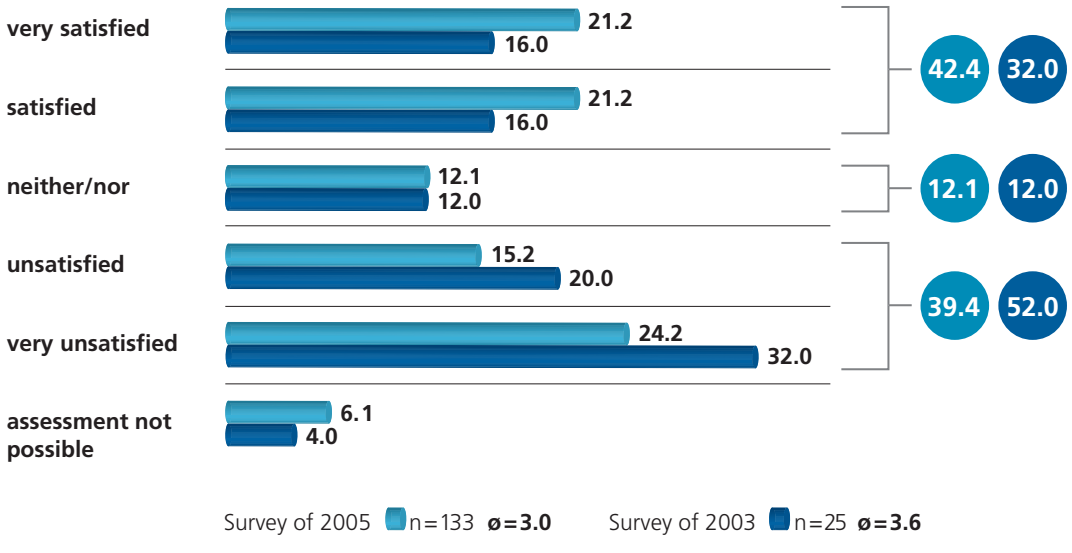
Survey of 2005 n=1.000 **ø= € 5.03** Survey of 2003 n=1.004 **ø= € 4.32**

2.4 Complaint rate

With approx. 4 percent, the complaint rate has been extraordinarily low for many years. However, the dissatisfaction of the interviewed persons with the response of the water providers to their complaints is relatively high at approx. 40 percent. This, however, is clearly below the value of 52 percent in 2003 and has thus decreased significantly.

Customer satisfaction with the water provider in case of complaints **42**

Data in percent

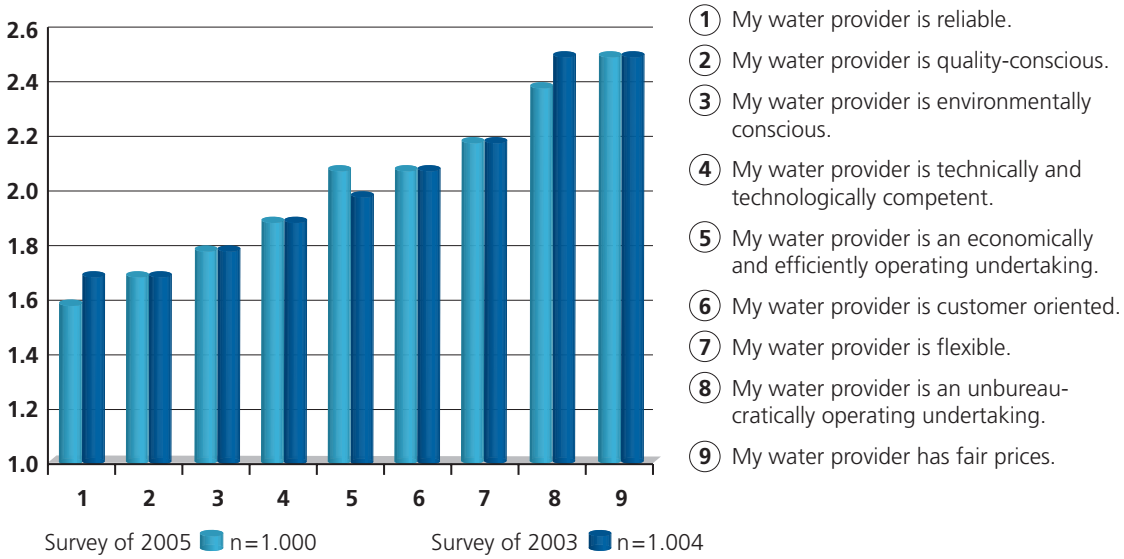


2.5 Public image of the water provider

The public image of the German water providers can be characterised as thoroughly positive. The quality awareness and the reliability of the water provider reach the highest values. The aspects of "fair water prices" (2.5) and "unbureaucratically operating utility" (2.4) were assessed as less good, but still positive.

Statements of the customers on the public image of their water provider **43**

Assessment index: 1 (absolutely true) to 5 (absolutely not true)



3. Compilation of Results of the Waste Water Survey

In 2005, the issue of wastewater disposal was taken into account for the first time, therefore comparative data on the previous year are not available.

3.1 Customer satisfaction with the service of the wastewater utility

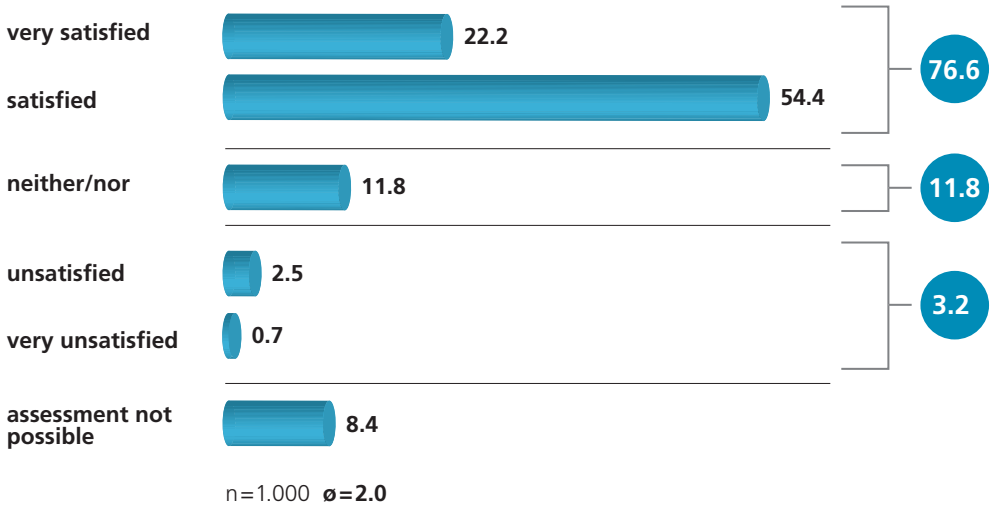
77 percent of all interviewed persons are satisfied with the technical standards of wastewater disposal, only 3 percent expressed their dissatisfaction.

The overall satisfaction with the wastewater disposal utility is extremely high. 79 percent are very satisfied or satisfied; only 1.3 percent is dissatisfied.

Customer satisfaction with the technical standards of their wastewater disposal

44

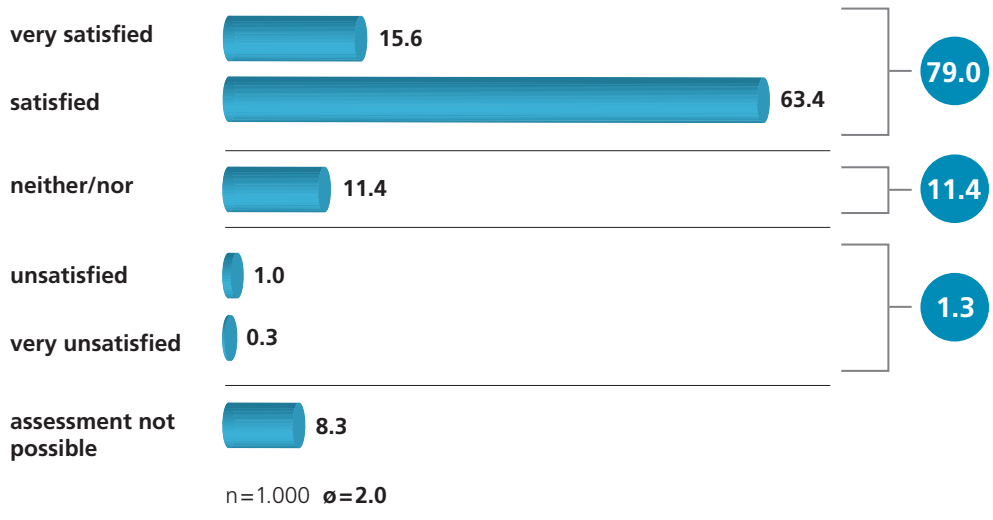
Data in percent



Overall customer satisfaction with the services of their wastewater disposal utility

45

Data in percent



Most of the few interviewed persons who were dissatisfied with the service of their wastewater disposal utility (13 out of 1,000 interviewed persons) complained about high costs. Other factors mentioned were outdated technical facilities and poor service.

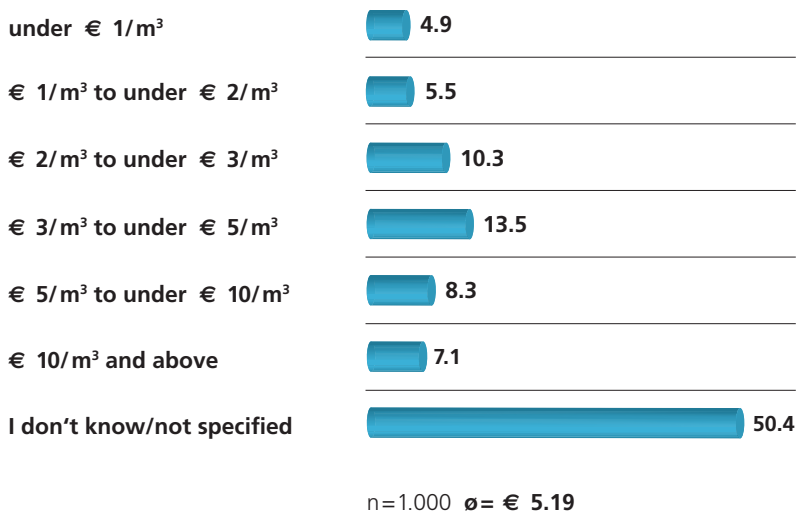
3.2 Awareness of the wastewater disposal utility and the level of wastewater charges

Only approx. 47 percent of the interviewed persons are aware of their wastewater disposal utility. The awareness of the drinking water utility is approx. 75 percent.

Approx. one in two interviewed persons deem themselves able to estimate prices; on average, a price of € 5.19 was stated for the disposal of one cubic metre of wastewater. The actual figure is by approx. 50 percent lower at € 2.14 (2003) per cubic metre.

How do the customers estimate the price for one cubic metre (= 1,000 litres) of wastewater? **46**

Data in percent



Actual price:
2003 = € 2.14/m³

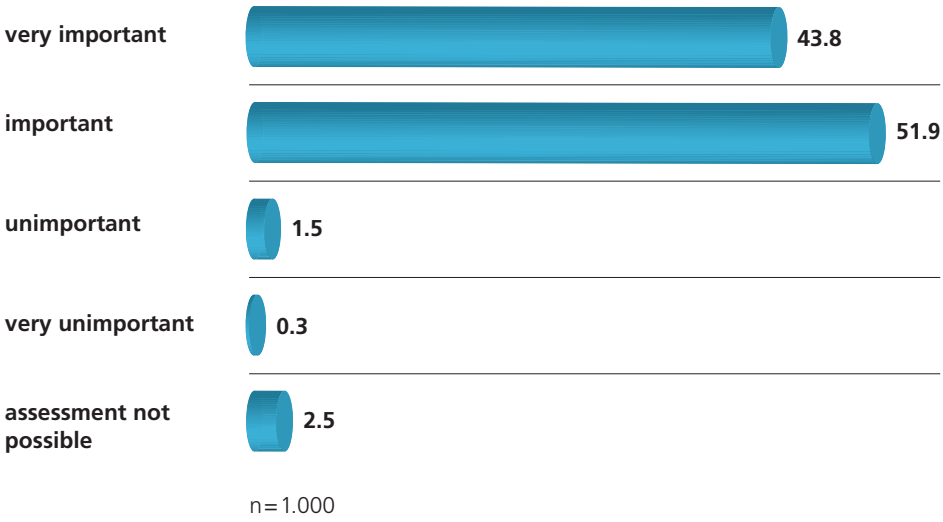
It is noticeable that especially in East Germany, the wastewater charges were overestimated (by 2 to 3 times the actual amounts). Here, there is obviously a considerable need for information on the part of the wastewater disposal utilities to their customers. This is confirmed by the statement that almost one in five interviewed persons (19 percent) does not understand his or her wastewater bill.

3.3 Contribution of wastewater disposal utilities to environmental protection

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

How do the customers assess the contribution of wastewater disposal to environmental protection? 47

Data in percent



n = 1.000

Part III Information on Benchmarking Projects in Water Supply and Wastewater Disposal

Core statement

Voluntary benchmarking in the German water industry is a success story. The undertakings recognise and use potentials for improvement from which finally all citizens benefit.

1. History of Benchmarking

The character of the benchmarking instrument is currently undergoing a sustained change in the water and wastewater sectors. In the past, benchmarking was almost exclusively a microeconomic instrument which was aimed at a systematic and continuous optimisation of operational processes and thus finally a continuous improvement of the undertakings' performance. Undertakings have compared each other for over 50 years above all in terms of microeconomic indicators. This view is about to change.

The benchmarking term has found its way into national and European politics. The benchmarking issue is also an essential building block of the current German discussion about water modernisation which has been led since 2002 on the basis of the resolution of the German Bundestag of 21 March 2002 on a "Sustainable Water Industry in Germany" (Printed Matter no. 14 / 7177 of the German Bundestag). Furthermore, a parallel development in the European discussion about water modernisation is beginning to emerge marked by the resolutions of the European Parliament of 14 January and 10 March 2004 as well as of 12 April 2005.

The German Associations of the Water and Wastewater Industry, ATT, BGW, DBVW, DVGW, DWA and VKU, have signed the extended "Statement of the Associations of the Water Industry on Benchmarking in the Water Sector" on 30 June 2005 and have thus defined for themselves the support of benchmarking to be an integral task of their self-administration. The main targets of the Statement are supported by the German Association of Cities (DST) and the German Association of Towns and Municipalities (DStGB). The signing associations are prepared to jointly draw up and develop further the required conceptual framework for benchmarking in the water industry. The outline concept which is about to be realised will guarantee that the present flexibility and diversity of benchmarking systems of the water industry are preserved.

In its content, the Statement ties up the five optimisation objectives of security of supply and disposal, quality, customer service, sustainability and profitability. These objectives are based on the economic approach of the so-called IWA system. Since 1995, a project group of the International Water Association (IWA) has developed a comprehensive performance indicator system for water

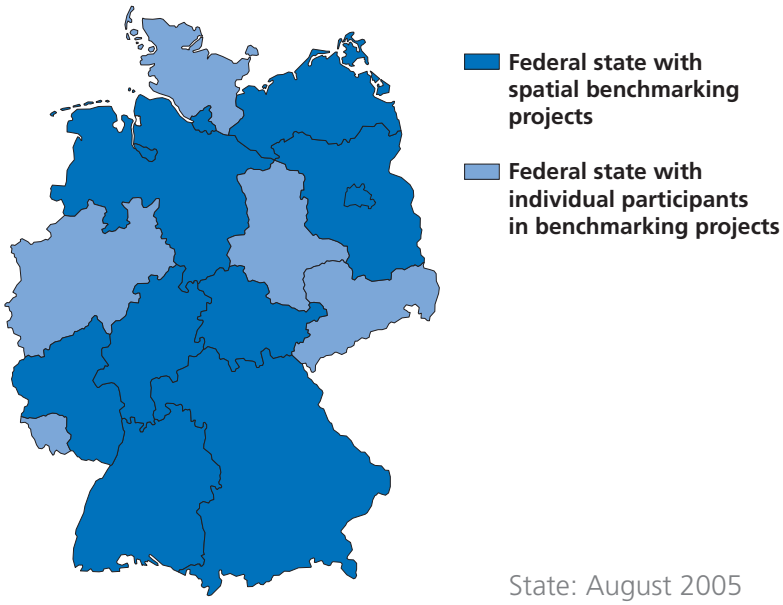
supply in order to obtain well-founded, reliable and generally valid figures for a significant benchmarking in water supply. This so-called IWA performance indicator system links efficiency and quality criteria, and intends as far as possible to take account of all integral aspects of the water industry. An area-wide establishment of this system, as far as possible, opens up the opportunity to make different benchmarking systems comparable.

2. Projects in Drinking Water Supply

In the field of water supply, benchmarking has already been implemented since 1950. Most recently, a clearly increased interest by the undertakings could be registered. Related to the annual delivery volume of the undertakings, the rate of participation presently amounts to approx. 50 percent. This trend is increasing significantly.

The approx. 35 projects so far in water supply range from indicator comparisons to the examination of entire undertakings / undertaking sectors (business benchmarking) up to individual process optimisations (process benchmarking). The numbers of participants range from 2 to 220 participants per project. Undertakings from all federal states participate in these projects. Many of them have already such a high rate of participation that a nationwide dissemination of the benchmarking instrument has taken place in this sector.

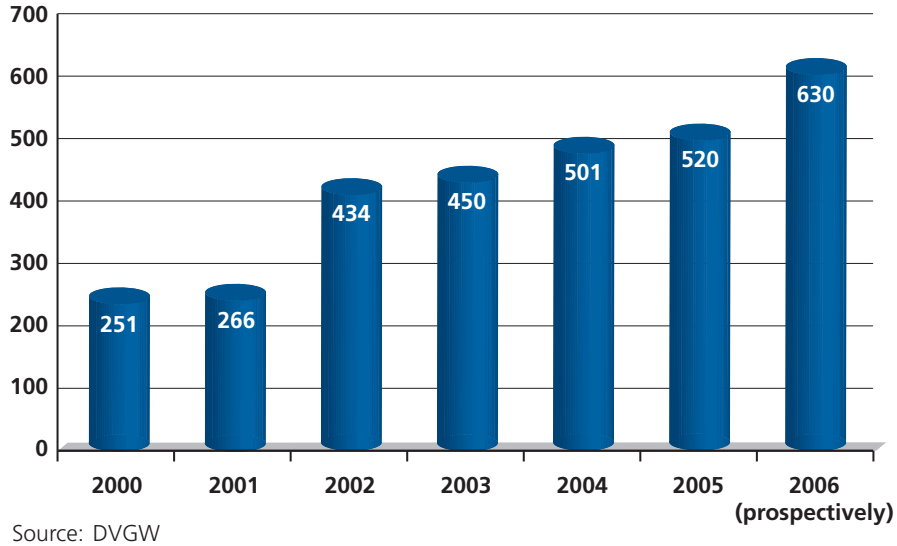
Benchmarking projects in drinking water supply **48**



Source: DVGW

State: August 2005

Number (cumulative) of water supply utilities which have already participated in benchmarking projects 49



Source: DVGW

2.1 Results and Experience

Benchmarking projects in water supply are implemented with different purposes and motivations of the participants. In this context, internal performance assessment and follow-up as well as the definition of positions are in the foreground.

Where indicators and benchmarking in water supply have initially mostly been used for the (holistic) definition of positions for the undertakings, these are now furthermore the basis for detailed considerations and optimisations of individual processes.

It has been seen in all projects that the assessment of the undertakings' performance has to assume a holistic approach (see Part I). Further project results have proven that for the definition of positions the security of supply is guaranteed to a high extent and high quality standards are complied with. Sustainability of supply is not limited to ecologic aspects alone but also comprises technical, economic and social criteria.

In the projects, concrete optimisation measures are always derived for the undertakings beside the initial methodical developments. These range from the improvement of details e.g. to enhance the comprehensibility of billing, the increase of the number of further training days for employees up to methodical optimisations, e.g. the adaptation of cost centres, optimisation of distribution network rehabilitation and the improvement of cooperations.

The focal points of optimisation at the process level have so far included the following areas, amongst others:

- operation of the distribution network
- new construction of supply lines
- setting-up of house connections
- assumption of tasks and outsourcing
- billing of consumption / charges
- customer service and public relations

2.2 Brief Descriptions of Project Approaches

Operational cost comparison (OCC) / Benchmarking of VKU (01)

The OCC / Benchmarking (operational cost comparison / benchmarking) has been implemented on a nationwide level for more than 50 years at the initiative of VKU. Currently more than 200 VKU members (approx. 187 in water supply) participate in the OCC / Benchmarking. Besides the water supply sector, the annual comparisons also comprise the areas of electricity, gas, distant heating, general and joint operational departments, wastewater, public baths as well as the corporate comparison. In the field of water supply, the comparison originally laid out predominantly for the performance feature of profitability in 2004 was extended by the comparative fields of security of supply, quality, sustainability and customer service, and was adapted to the requirements of the IWA system. The surveys are assisted and evaluated by an external service provider and supported by annual accompanying meetings. (See also Projects in Waste Water Disposal)

- www.vku.de

BKWasser in Hesse (02)

BKWasser in Hesse (operational performance indicator comparison for public water supply and municipal wastewater disposal) especially addresses small and medium-sized utilities. It is supported by the Ministry for the Environment, Rural Areas and Consumer Protection of the Federal State of Hesse. The project (performance indicator comparison) is based on annually collected data from a self-developed performance indicator system. Besides the collection of general structural and cost data, the comparison concentrates on the essential input and output (e.g. administration resp. water delivery). The main point of consideration is the cost accrual split up into cost centres. (See also Projects in Waste Water Disposal)

- www.hmulv.hessen.de/umwelt/wasser/grundwasser_versorgung/benchmark/index.php; state: 4 November, 2005.

BGW Federal State Group North (03)

The BGW Federal State Group North has implemented a performance indicator comparison at a corporate level in 12 utilities of northern Germany. This comparison which is intentionally based on few indicators of security, quality, customer service, sustainability and profitability showed that in principle, no differences are discernible in the indicators between the utilities and the associations of the region.

⋮⋮⋮ www.bgw-nord.de

BMBF Research Project (04)

Within the framework of the BMBF Research Project on "Indicators for Water Supply", the English IWA performance indicator system was translated from 2000 to 2004, adapted to the German characteristics and applied in a project with 15 water supply utilities. The results of this project formed the basis for many further projects in Germany. Important methodical developments have been pushed forward here, also in cooperation with further projects (see also project 05).

⋮⋮⋮ Hirner, W.; Merkel, W. (2005): Kennzahlen für Benchmarking in der Wasserversorgung [Indicators for Benchmarking in Water Supply]; wvgw Wirtschafts- und Verlagsgesellschaft Gas und Wasser mbH, www.wvgw.de

EffWB in Bavaria (05)

The project of "Effizienz- und Qualitätsuntersuchung der kommunalen Wasserversorgung in Bayern (EffWB)" [Efficiency and quality survey of municipal water supply in Bavaria] completed its second cycle in the autumn of 2005. It is a business benchmarking based on a detailed process investigation. The initiators were both the Bavarian Water Management Agency and the Association of the Bavarian Gas and Water Utilities (VBGW), whereby an essential political component is included in the project which is notably reflected in public project reports. However, no confidential data is transmitted to the public or politicians. The indicators are based on the "5-pillar-model" and comprise all aspects of supply, thus providing a holistic approach.

⋮⋮⋮ www.effwb.de; state: 4 November 2005

KOWAS Project in Lower Saxony (06)

In northern Lower Saxony, ten associations have joined to form the Kooperation Wasser (KOWAS) [KOWAS Water Cooperation]. An intensified cooperation has been initiated by the signing of the cooperation contract. From 2002 to 2004, KOWAS implemented annual surveys within a research project based on a performance indicator system developed on the IWA basis. Both a definition of positions and first optimisation measures have been derived from the performance indicator comparison. The KOWAS utilities continue the surveys and evaluations on their own initiative and use the results both to optimise operation and to intensify their cooperation.

⋮⋮⋮ www.tu-harburg.de/www/projekte/versorgung.html; state: 4 November 2005

Mecklenburg-Western Pomerania (07)

In Mecklenburg-Western Pomerania, the BGW / DVGW Federal State Group North has initiated a performance indicator project. It applies the WABE system. 20 drinking water und wastewater utilities compare their fields of activity in order to enhance the corporate processes. It is aimed particularly at making the situation of the utilities in Mecklenburg-Western Pomerania transparent (significantly declining population) by means of indicators and deriving strategies for action.

⋮⋮⋮ www.bgw-nord.de, www.dvgw-nord.de

Corporate and process benchmarking for WVU (08 / 09 / 13)

Based on the IWA performance indicator system, various partners jointly coordinate projects where, based on business benchmarking, optimisation-relevant processes are determined and are optionally enhanced in a subsequent process benchmarking. The participants' expert fields are composed at a supra-regional level. In 2004, 14 utilities participated and in 2005, a similar number of participants was achieved. 7 operators participated in the subsequent process benchmarking in 2005.

Process benchmarking for water management, water abstraction, water treatment (10)

In the research project funded by BMBF, research institutes jointly with 12 water supply utilities have developed process indicators for the water management, water abstraction and water treatment since June 2005. The following is a detailed outline of the IWA performance indicator system in these areas aimed at facilitating optimisations.

Performance indicator comparison in Thuringia (11)

The project in Thuringia is based on the Bavarian concept (EffWB). 16 utilities participate in this project. The Thuringian Ministry for Agriculture, Nature Conservation and the Environment has initiated the project in coordination with the Thuringian Ministry for the Interior and a university. The processes and organisation of the bodies in charge of water supply were analysed and compared. The project was completed and presented to the public in the autumn of 2005.

⋮⋮⋮ www.fh-schmalkalden.de/Benchmarking.html; state: 4 November 2005

Inter-utility performance comparison (12)

The ÜBV (inter-utility performance comparison of metropolitan supply utilities) is a pool of metropolitan supply utilities from Germany and Austria and since 1949 has offered its 26 members the opportunity to participate in annual benchmarkings. These cover the sectors of electricity, gas, water and distant heating as well as sales accounting and central comparison. In 2004, the existing benchmarking of the water sector was adapted to the IWA performance indicator system. In 2004, the entire value chain of water supply was furthermore investigated within a process-benchmarking project in which 10 large supply utilities took part.

⋮⋮⋮ www.uebv.de; state: 4 November 2005

Water and wastewater benchmarking to increase the efficiency in drinking water supply utilities (14)

So far, approx. 18 projects have been implemented on the basis of this concept. They include a performance indicator comparison and a business benchmarking. The applied indicator system is aligned with the IWA system and is therefore a holistic approach ("5-pillar-model"). A process benchmarking of selected processes is furthermore offered. This compares the processes and regulations of the utilities right down to the level of individual activities.

Wasserverbandstag Niedersachsen e. V. (15)

The performance indicator comparison of the Wasserverbandstag [Associations' Water Day] with more than 20 participants took place in Lower Saxony for the first time in 2002. Here, the focus was laid on the entire utilities. Numerous projects in process benchmarking as well as annual performance indicator comparisons were followed up and continue until to-date. Also many ideas for further projects were adopted in Northern Germany.

⋮⋮⋮ www.wasserverbandstag.de

Benchmarking on impounding reservoirs (16)

In 2002, a research institute implemented a benchmarking project with two utilities dealing with water supply utilities with impounding drinking water reservoirs. The indicators were collected on the basis of a self-developed model based on partial processes. The results of this project were used for the further development of the projects in Germany.

⋮⋮⋮ http://swa.bauv.unibw-muenchen.de/-forschungsvorhaben/aktuelle%20forschungsvorhaben/Rapp/Projektskizze.pdf; state: 4 November 2005, Contact: University of the Federal Armed Forces Munich, Secretary of Civil Engineering and Surveying Institute of Hydroscience, Sanitary Engineering and Waste Management, phone: +49 (0)89 6004-3547, -2156, -3484

Baden-Wuerttemberg (17)

Under the auspices of the Associations of VKU, DVGW, BGW (VGW) of Baden-Wuerttemberg as well as the Städtetag und Gemeindetag [Association of Cities / Municipalities] of Baden-Wuerttemberg, a voluntary benchmarking will be offered for water supply utilities at a nationwide level as of 2006 based on the associations' self-administration. As early as in the first half of 2006, the first evaluations of the indicators will be submitted, based on the data of 2005. The comparison comprises a limited number of common core indicators. Based on this, further-reaching and more comprehensive benchmarking procedures can be used if required.

⋮⋮⋮ www.bgw.de, www.vku.de, www.dvgw.de, www.gemeindetag-bw.de

Hesse (18)

34 utilities participated in the project on "Benchmarking for Water Supply in Hesse". It is based on the EffWB concept (see project 05). The Hessian Ministry for the Environment and the Hessian Ministry for Economic Affairs welcome the implementation of this project. The project takes place in co-operation with the Hessian Association of Cities as well as the Hessian Städte- und Gemeindebund [Association of Towns and Municipalities].

⋮⋮⋮ www.dvgw-hessen.de, www.dvgw-nord.de (Themen); state: 4 November 2005

Rhineland-Palatinate (19)

In Rhineland-Palatinate, the associations of the water industry (DWA, DVGW, LGW and VKU) as well as the leading municipal organisations Städtetag [Association of Cities] and Gemeinde- und Städtebund [Association of Towns and Municipalities] of Rhineland-Palatinate have joined forces with the Ministry for the Environment and Forestry of Rhineland-Palatinate in order to initiate and conduct a benchmarking process for municipal utilities of water supply and wastewater disposal. This nationwide project is also based on the principles of voluntary participation and confidentiality. According to current information, the launch is envisaged for the end of 2005 (see also Projects of Wastewater disposal).

⋮⋮⋮ www.wasserbenchmarking-rp.de; state: 4 November 2005

Table 1: Benchmarking Projects in Drinking Water Supply

(State: May 2005, source: DVGW)

Ser. no.	Project	Description	Period	Partici-pants	Inhabitants (million l)	Annual wastewa-ter volume (million m³)
01	operating cost comparison/ benchmarking of VKU (like table 2/26)	• performance indicator comparison • business benchmarking		approx. 220		795
02	operational performance indicator comparison on water (Hesse) (like table 2 / 27)	• performance indicator comparison		approx. 25		25
03	BGW Federal State Group North	• performance indicator comparison		12		52
04	BMBF project	• performance indicator comparison • business benchmarking	from 2001 to 2004	15		675
05	municipal water supply in Bavaria I + II	• business benchmarking • process benchmarking	since 2002	95 85		350 350
06	Kooperation Wasser (KOWAS)	• performance indicator comparison • business benchmarking	from 2002 to 2004	8		30
07	Mecklenburg-Western Pomerania (2/15)	• performance indicator comparison		21		60
08	process benchmarking on water supply - online	• process benchmarking	since 2005	7	4.5	
09	process benchmarking on water supply – pilot project	• process benchmarking	from 2002 to 2004	2	1.4	
10	process benchmarking on water Industry, abstraction, treatment benchmarking for WVU	• business benchmarking • process benchmarking	since 2005	12		280
11	Thuringia	• performance indicator comparison • business benchmarking	since 2003	16		64

Ser. no.	Project	Description	Period	Partici-pants	Inhabitants (million I)	Annual wastewa-ter volume (million m³)
12	inter-utility benchmarking of metropolitan supply utilities	• performance indicator comparison • business benchmarking		26		1.300
13	business benchmarking of water supply	• business benchmarking	since 2004	approx. 18	16.3	
14	water and wastewater benchmarking for efficiency increase	• various projects (17)	since 2002	43		282
15	Wasserverbandstag Niedersachsen e.V.	• business benchmarking • process benchmarking	2002	23		200
16	water supply with impounding reservoirs	• process benchmarking	2002	2		50
17	Baden-Wuerttemberg		as of 2006			
18	Hesse	• business benchmarking • process benchmarking	end of 2005	34		223
19	Rhineland-Palatinate (like table 2/14)	• performance indicator comparison • process benchmarking	as of 2006			

3. Projects in Wastewater Disposal

In wastewater disposal, benchmarking has been applied since 1996 amongst a growing number of participants. In the field of wastewater disposal, the initiative has been taken by individual undertakings which joined to form project groups. Meanwhile, the operators of sewage plants from all federal states participate in benchmarking projects. Up to 2005, more than 154 operators of wastewater plants have benchmarked themselves. These represent more than 34 million inhabitants (I) and a capacity extendible to more than 52 million Total Number of Inhabitants and Population Equivalents (PT) which additionally take the associated trade into account. Thus, participation already today corresponds to approx. 35 to 40 percent of the sewage plant capacity in the Federal Republic of Germany. (For comparison: The Federal Republic has approx. 82 million inhabitants and a sewage plant capacity of approx. 149 million population equivalents.)

The results of benchmarking projects are the potentials for improvement and the corresponding action plans, and as an «interim result» provide the participating undertakings with a definition of their current position. The following are examples for both aspects:

The following brief descriptions of the respective coordinators and the final table provide an overview of the respective procedure and project groups. For lines 26 and 27 in table 2, the statements about the projects in drinking water supply in section 1 apply. (The list order **does not involve any valuation**.)

3.1 Results and Experience

The following generally applies: Benchmarking is worthwhile. In benchmarking projects, feasible savings potentials ranging from 5 up to 15 percent have resulted for operating costs.

For benchmarking purposes, the task of wastewater disposal is subdivided into processes to assess the performance of wastewater utilities. Thus, it must be distinguished between the "collection and discharge of wastewater" in the sewage network, and the "wastewater treatment" in sewage plants. A further subdivision into more detailed partial processes is necessary to determine concrete potentials for improvement. Furthermore, capital costs and operating costs with their respective components are differentiated.

As a rule, the implementation of numerous individual measures is necessary for its realisation. A process benchmarking of 12 sewage plants with capacities extendible between 10,000 and 1 million PT e.g. has yielded an attainable total potential of 10 percent of operating costs. The required 50 to 60 individual measures were developed in facilitated workshops.

In a project with 11 participants (sewage plant size: 9,000 to 240,000 PT), the total costs of wastewater disposal were determined in relation to the annual fresh water consumption (frw). The value

corresponds approx. to average wastewater charges in Germany which are indicated in Part I of this Water Industry Profile.

The relation to the connected load in the form of the number of inhabitants plus the corresponding values for industry and trade (PT) is generally better suited for process comparisons. Related to this, another project (15 operators) provided average total costs which were slightly above the wastewater costs per inhabitant in Germany indicated in Part I of this Water Industry Profile. In such cases, there is good reason to conduct further analyses and measures.

To assess the efficiency of staff deployment, the actual number of employees is e.g. compared to a standard taken from the set of rules and standards[1]. In a project with 8 operators and 15 sewage plants, the standard on average clearly fell below this value.

The participants indicate further benefit aspects beyond concrete savings and improvements, e.g.

- the indicators are suitable for year-on-year comparisons resp. time series,
- benchmarking increases internal transparency,
- benchmarking increases the "sensitivity" towards indicators.

3.2 Brief Descriptions of Project Approaches

Corporate and process benchmarking for wastewater disposal (Table 2, lines 1 to 14)

Since July 2003, the leading utilities of the water and wastewater industry have focussed their more than 8 years of benchmarking experience in a joint association. It offers various tailor-made benchmarking solutions for the entire sector. So far, a total of 65 wastewater disposal utilities have participated in projects of the association. The methodology has been continuously developed from different previous associations since 1996. With the undertaking's establishment has been founded, it has become possible to continuously book and combine the different benchmarking products. The data entry and data analysis are offered as the Internet-based solution "Benchmarking Online".

The "Business Benchmarking on Wastewater" has its origins in the pilot project on "Steering Indicators for Entire Utilities" implemented in 2002. Business benchmarking is aimed at continuously highlighting whether utilities are in essential indicators within the usual sector range or whether individual strong and weak points are discernible. It is geared towards the internationally developed IWA performance indicator system and can be combined with the association's more process-oriented products of "sewer construction", "sewer operation", "sewage treatment plants" and "materials management".

1 Merkblatt ATV-M 271 "Personalbedarf für den Betrieb kommunaler Kläranlagen"

Business benchmarking encompasses the following work steps:

- data collection (training, collecting data)
- quality assurance (corrections by the utilities)
- expert workshop I (joint review of results, cause analysis)
- internal evaluation (profitability report, internal cause analysis)
- expert workshop II (internal analyses, measures)
- implementation of measures
- data collection in the following year

aquabench GmbH, www.aquabench.de

Water and wastewater benchmarking to increase efficiency (Table 2, lines 15 to 23)

So far, 56 wastewater disposal utilities have participated in this benchmarking concept (performance indicator comparisons, business benchmarking, process benchmarking) for water and wastewater utilities beginning in 2000 in 16 projects from 8 federal states (Saxony, Saxony-Anhalt, Lower Saxony, Brandenburg, Thuringia, Mecklenburg-Western Pomerania, North Rhine Westphalia, Schleswig-Holstein). Furthermore, three international projects have so far been implemented with the participation of 24 wastewater disposal utilities from Switzerland.

Beside the performance indicator comparisons based on the IWA system, focus is placed upon process-benchmarking projects with selected processes:

- itemizing consumption accounting
- providing a house connection
- operating a sewer network
- operating sewage treatment plants
- investing into the sewer network

The "benchmarking on sewage treatment plants" encompasses the following work steps:

- Kick-off workshop on "concretisation" with a joint selection of focal points to be considered:
- joint drawing-up of questions
- compiling questionnaires
- data collection and individual on-site work sessions with the coordinator
- evaluation and quality assurance
- Workshop on "evaluations" with discussions of results
- Workshop on "procedures" with an open, structured exchange of experience among the project participants, e.g. about influencing factors (e.g. variations of the burden), strategies (e.g. event-oriented maintenance); presentation of "best" practice (e.g. application of online-analytics) etc.

Confideon Unternehmensberatung GmbH, www.confideon.de

Minimisation of wastewater costs on the basis of indicators (Table 2, lines 24 and 25)

Within this Lower Saxony project, both wastewater discharge (sewer network) and wastewater treatment (sewage treatment plant) have been investigated since 1999 (1st cycle). In 2000, 85 wastewater disposal utilities with sewer networks and sewage treatment plants participated in this project. The survey includes both commercial and technical data which can be entered and saved by the participating undertakings online. Furthermore, one project each was conducted dealing with pumping stations and sewage sludge disposal.

The system is an offer to wastewater utilities which

- document an economical wastewater operation and
- want long-term stabilisation of low charges through internal cost control.

The objective and set-up of the project was developed in 1997/98, involving representatives of the municipalities, and was tested in 1998/2000 in a first project cycle. It was intended that, wherever possible, each wastewater utility, especially those in small municipalities, was to be able to participate.

After adaptation to the first-cycle findings, three further projects have been implemented. The work steps of the procedure correspond to the activities of the Work Report on "benchmarking" of the German Association for Water, Wastewater and Waste (ATV-DVWK; now DWA). However, there is one particular feature: Wastewater utilities which do not have all data available in the required differentiation are also invited to participate. They are offered the opportunity to "merge into it"; they participate in the discussions about the backgrounds of deviations in the indicators, and on the other hand they are free to contribute from their own working experience.

- Kommunale Umwelt-AktioN U.A.N., www.uan.de

Table 2: Benchmarking projects in wastewater disposal

(Source: DWA)

Ser. no.	Project	Description	Period	Participants	Inhabitants (million I)	Annual wastewater volume (million m³)
01	benchmarking in the wastewater industry phase 1 (phase 2)	• development of methodologies • benchmarking of partial processes	from 1997 to 1999	14 (21)	(incl. 0.3 (1.8) million from CH resp. A)	
02	benchmarking "operate a sewer network"	• process benchmarking	from 2000 to 2001	18	16.4 (incl. 0.3 million from CH)	
03	benchmarking on wastewater	• development of an online tool • process benchmarking	from 2001 to 2003	14	11.6 (incl. 0.3 million from CH)	
04	benchmarking "sewerage system", pilot projects	• process benchmarking • (further development of BMBF project on wastewater discharge)	from 2000 to 2002	3	4.3	
05a	benchmarking on sewage treatment plants, pilot projects	• development of methodologies • process benchmarking	from 1996 to 1998	4	0.12	11
05b	benchmarking in wastewater disposal on the basis of technical/economic performance indicator systems	• research project funded by the Federal Ministry for Education and Research • process benchmarking	from 1999 to 2001	2 (100 plants)	4.3	311
05c	benchmarking on sewage treatment plants	• process benchmarking • approx. 35 different operators investigation of 50 sewage treatment plants	from 1999 to 2003 seven cycles	66 (incl. repetitions)	22	1.500
06	benchmarking on wastewater - online	• business benchmarking	since 2003 three cycles	23	9.4	800
07	benchmarking on sewer construction - online	• process benchmarking • cf. ser. no. 6	since 2003 three cycles	12	10.6	
08	benchmarking on sewer operation - online	• process benchmarking • cf. ser. no. 6	since 2003 three cycles	22	12.5	
09	benchmarking on sewage treatment plants - online	• process benchmarking • cf. ser. no. 6	since 2004 two cycles	10	11.7	800

Ser. no.	Project	Description	Period	Participants	Inhabitants (million I)	Annual wastewater volume (million m³)
10	benchmarking on sewage treatment plants - ("classical")	• process benchmarking	since 2003 two cycles	8	3.9	126 million (without participants of 2005/2006)
11	benchmarking on materials management - online	• process benchmarking • cf. ser. no. 6	since 2003 three cycles	8	9.3	
12	benchmarking on civil engineering offices, pilot projects	• development of methods • business benchmarking • process benchmarking	from 2005 to 2006	7	3.4	
13	benchmarking on analytics and surveillance of indirect discharge - online pilot project	• development of methodologies • process benchmarking	as of 2005	15	14	
14	benchmarking initiative of the water industry of Rhineland-Palatinate (Ministry for the Environment and Forestry of Rhineland-Palatinate, coordinator) (like table 1 / 19)	• development and implementation of a nationwide benchmarking of water supply and wastewater disposal • basic benchmarking for standard definition of positions • on this basis, participation in further process benchmarking is suggested	IV. quarter of 2005 to I. quarter of 2006	up to 400 (expected)	up to 4,085 (expected)	up to 246,1 (expected)
15	Mecklenburg-Western Pomerania (BGW, coordinator) (like table 1/07)	• performance indicator comparison • corporate level	2004	17	1.7	48
16	Wasserverbandstag Niedersachsen e. V. (coordinator) (like table 1/15)	• business benchmarking • process benchmarking	2002	12	0.7	41
17	benchmarking on "consumption accounting (AW)"	• process benchmarking	since 2001 three cycles	24	2.5	73
18	benchmarking "provide house connection"	• process benchmarking	since 2001 two cycles	18	2.1	58
19	benchmarking "operate sewer network"	• process benchmarking	since 2002 two cycles	20	2.6	83
20	benchmarking "conduct investments in the sewage network"	• process benchmarking	2003	9	1.1	34

Ser. no.	Project	Description	Period	Participants	Inhabitants (million I)	Annual wastewater volume (million m³)
21	"operate sewage treatment plants"	• performance indicator comparison at the main process level	2003	55	2.4 P	72
22	"operate sewage treatment plants"	• process benchmarking	2005	15	1.2 PT	43
23	water and wastewater benchmarking to increase efficiency	• performance indicator comparison corporate level based on IWA System various federal states	since 2001 three cycles	23	2.7	78
24	minimisation of wastewater costs on the basis of indicators, first cycle	• development of methodologies • performance indicator comparison	from 1997 to 2000	85	1.7 PT 3.5 P	124
25	wastewater cost minimisation on the basis of indicators, 2nd to 4th cycle	• benchmarking at the level of main processes with focus on individual processes in partial processes	from 2000 to 2004	up to 35	up to 0.4 P 0.67PT	up to 45
26	operating cost comparison/benchmarking of VKU (like table 1/01)	• performance indicator comparison • business benchmarking	since 1997	12	0.9 P 1.4 PT	
27	operational performance indicator comparison (Hesse) (like table 1/02)	• performance indicator comparison	since 2000	36	0.9 P 1.2 PT	

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Annex

Statement of the Associations of the Water Industry on Benchmarking in the Water Sector[1)]

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	BGW Vice President	DBVW President	DVGW President	DWA President	VKU President
Gummersbach, 30.06.2005	Berlin, 30.06.2005	Hannover, 30.06.2005	Bonn, 30.06.2005	Hennef, 30.06.2005	Köln, 30.06.2005

[1)] Translation of the German original version

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