PROFILE OF THE GERMAN WATER SECTOR

Arbeitsgemeinschaft Trinkwassertalsperren e.V.

bdew
Energie. Wasser. Leben.

DBVW
Deutscher Bund der verbandlichen Wasserwirtschaft e.V.

DVGW

DWA
Klare Konzepte. Saubere Umwelt.

VKU
VERBAND KOMMUNALER UNTERNEHMEN e.V.

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PROFILE OF THE GERMAN WATER SECTOR 2020

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FOREWORD

With the "Profile of the German Water Sector 2020", ATT, BDEW, DBVW, DVGW, DWA, and VKU, in collaboration with the Association of German Cities and the German Association of Towns and Municipalities, have once more produced an up-to-date overview of water supply and wastewater disposal in Germany. It enables the interested public and policy makers to learn all about the services the sector provides, the diversity of tasks it undertakes, and the current challenges it is facing. As with the four previous editions starting in 2005, the 2020 Water Sector Profile demonstrates that the modernisation strategy, pursued by politicians and the water sector alike, remains effective even under increasingly difficult conditions.

The Profile documents the high level of performance of the German water sector in comparison to other European countries and to the rest of the world. This high level which has been achieved so far, has to be maintained in the long term and – wherever possible and wherever necessary – improved.

The associations encourage the continuous improvement process of companies through benchmarking and have long recommended that their members take part in benchmarking projects (Associations' Joint Statement 2003 and 2005). Benchmarking means comparing and improving one's own performance by learning from other participants in a peer group.

Benchmarking, the transparent documentation of performance in the Water Sector Profile, and constant further development efforts are pillars of the sector's continuous improvement, which it undertakes at its own responsibility. This approach has long been recognised and supported by the German Federal Government in its 2006 report entitled "Modernisation strategy for the German water sector".

SUMMARY AND KEY MESSAGES

Performance

People in Germany have drinking water of exceptional quality available at all times, in sufficient quantities. In addition to the good resource situation in Germany, the first-class technical standards and a range of voluntary measures taken by the water sector contribute to the protection of natural resources. Wastewater treatment in Germany is also at a very high level. In contrast to many other EU countries, almost 100 per cent of wastewater is treated in accordance with the highest EU treatment standards. Through their work, drinking water suppliers and wastewater disposal companies thus make a considerable contribution to a sustainable and comprehensive protection of water.

The key performance areas of water supply and wastewater disposal in Germany are long-term reliability of supply and disposal, high drinking water quality, high wastewater disposal standards, high customer satisfaction, and careful management of water resources whilst maintaining economic efficiency.

These aspects are considered in the 5-pillar benchmarking concept. Using benchmarking in various projects throughout Germany, companies have markedly improved in all performance areas.

In order to remain fit for the future, the water sector needs to be efficient, cover its costs, and be transparent for customers. Benchmarking projects are a key instrument in this respect. The main requirements for the success of the benchmarking and performance indicator projects are that they are confidential and voluntary, however, consistency and compatibility of data collected are also essential. To this end, the sector continuously works to further develop its performance indicator systems.

First-class technical standards and compliance with the strict legal requirements result in the high quality and long-term reliability of German drinking water supply and wastewater disposal.

Organisation and economic efficiency

In Germany, water supply and wastewater disposal are core public services in the general interest provided within the competence of the municipalities or other public law corporations. Their democratically legitimised bodies make the strategic decisions regarding forms of organisation, shareholdings, and working collaborations. The companies involved in the supply of water and disposal of wastewater in Germany are diverse and include both public and private company forms.

The German water sector is one of the largest customers of the private sector, since planning and construction services are contracted out on a large scale to outside companies. Companies within the water sector have recognised that the factors which ensure their long-term viability are having employees with exactly the right qualifications as well as sector-specific knowledge and skills; for this reason, companies have, for many years, been continuously investing in training young people.

Charges, drinking water quality, environmental requirements, water abstraction rights and discharge rights are subject to strict governmental control. Increases in charges for drinking water and wastewater have largely been below the rate of inflation for many years. Reliability of supply and drinking water quality are of the utmost importance for customers. According to customer surveys, the charges which have to be paid in this respect are considered appropriate.

The specific regional and local framework conditions determine the rules governing supply and disposal at a local level. Water supply and wastewater disposal thus always require solutions adapted to the local situation. This, together with the existence of differing legal provisions on a *Länder* level, means that the cost and effort faced by the companies involved differs. Taking into account the respective water consumption and performance standards, customers in Germany pay less for their drinking water than customers in comparable EU countries.

In Germany, water supply and wastewater disposal are core public services in the general interest provided within the competence of the municipalities or other public law corporations. Their democratically legitimised bodies make the strategic decisions regarding forms of organisation, shareholdings, and working collaborations. Charges, quality, environmental requirements, water abstraction rights and discharge rights are subject to strict governmental control.

The fees and prices involved are largely determined by the specific regional and local framework conditions. For many years, increases have remained largely below the rate of inflation.

Tasks and challenges

Increasingly specific requirements are being placed on modern, sustainable water management. It is no longer simply about the provision of drinking water and treatment of wastewater. The application of a holistic approach, aimed at creating a sustainable, integrated water sector, is becoming increasingly important. As such, in addition to the supply of drinking water and disposal of wastewater, the responsibilities of a reliable water sector also include water maintenance and the protection of water bodies, as well as the landscape water regime and coastal and flood protection. In addition, changes in social priorities influence the work of the water sector. As such, a greater emphasis is being placed on energy consumption and efficiency, as well as resource protection. Increasing conflicts over the use of water within the sector must be solved through social consensus.

As a consequence of our modern industrial society and increasingly sophisticated analytical methods, the amounts of anthropogenic trace substances and other contaminants, such as microplastics, detected in the water are continuously rising. There is a considerable need for research into the resulting effects on humans and the environment. This challenge must be met through a cooperation between those causing the pollution, users, and the water sector. When dealing with trace substances, efforts must be focussed on preventing their input at source. If this is not possible, action taken needs to be based on the polluter–pays principle.

The water consumption of the population has been decreasing for decades, stabilising at a low level in recent years. Nevertheless, companies must still provide sufficient capacity to deal with peak demand and an infrastructure designed to cope accordingly, as shown, for example, by the dry year of 2018. In addition, there are regions in Germany where competing water demand, e.g. through irrigation, livestock farming etc., is constantly growing.

The priority of the public water supply is set down in law in the German Federal Water Act and constitutionally guaranteed. In light of the expected rising demands on securing the public water supply in the future, with increasingly frequent dry periods caused by climate change, it must be ensured that the legally enshrined priority of the public water supply over competing uses is effectively enforced.

Demographic change, increasing urbanisation, and climate change pose great challenges for the German water supply. For example, they entail markedly increased peak factors in drinking water, heavy rainfall events in wastewater, and flood discharge into bodies of water. This development is leading to a greater divergence between the basic and peak demand levels and thus, due to the measures required, to higher costs.

The German water sector is meeting these challenges by developing solutions tailored to the respective conditions. Through its extensive technical, economic, and scientific knowhow as well as its practice-oriented research, the sector has shown that it is able to cope with these challenges.

The current challenges facing the German water sector are demographic change, looming climate change, increasing and partly competing demand for water in society, sophisticated detection and minimisation of input of anthropogenic trace substances and other contaminants as well as conflicts of use with industry, agriculture, and energy policy objectives. Drinking water suppliers and wastewater disposal utilities are tackling these tasks and advocating flexible and individual solutions, tailored to the local conditions and based on social consensus.

1 WATER AND SOCIETY

1.1 Clean water as a sustainable development goal

"For life without poverty in a healthy environment and a developing economy, human beings need access to water, sanitation, wastewater management and sustainable water resources management." (Sustainable Development Goals – SDGs). In order to accomplish this, all Member States of the United Nations came to an agreement in September 2015 on a new common agenda: 17 sustainable development goals to be achieved by 2030. The SDGs were adopted. The topic of water was included as an independent goal:

"The SDGs make particular reference to the water sector in SDG 6 and its performance indicators by setting a goal for the international community to achieve universal and sustainable access to water and sanitation for all by 2030 (targets 6.1 and 6.2). By the same year it also intends to protect water resources against pollution and overuse (targets 6.3 to 6.6)."* The integrative approach of the SDGs means that without goal 6, "Clean water," the other goals cannot be achieved either.

To accomplish these key goals, underlying conditions in a variety of areas must be addressed. All Member States within the UN have to introduce the necessary measures and use performance indicators to regularly steer and monitor the achievement of these goals.

With the new version of the sustainability strategy, the German Federal Government has also committed itself to these goals as well as to championing sustainable development beyond its own borders.

The associations involved in producing the Water Sector Profile and their members also professed their commitment to these goals and take active responsibility for clean water, for a healthy environment and for the economic development of our country.

Water suppliers and wastewater disposal utilities are the cornerstones for achieving the UN's water goal (SDG 6) and are major drivers of the Water Action Decade (2018–2028) initiated by the UN, the guiding theme of which is "water for sustainable development". By acting sustainably, the water sector can furthermore also contribute to the achievement of other SDGs.

1.2 The significance of the drinking water supply and wastewater disposal for society

A sustainable water sector in the sense of the UN's water goal requires that water is available at all times in impeccable quality (preventive healthcare) and in adequate quantities (security of supply). In a more complex world, society must consider the interests of the public drinking water supply and wastewater disposal in all developments and take into account the respective priority. In public administration matters, the subject of water must be appropriately included in the technical assessment of interests in the planning and decision-making processes.

The availability of clean drinking water at all times and the high standard of German wastewater

* BMZ Water Strategy: A key contribution to implementing the 2030 Agenda and the Paris Agreement, published by the German Federal Ministry for Economic Cooperation and Development (BMZ), Berlin/Bonn 2017.

disposal are the essential basic elements of our modern society. They are key factors for the high level of life expectancy in Germany and important locational factors for the municipalities. Without drinking water supply and wastewater disposal, there would be, for example, no construction sites, no industrial estates, no growth. Moreover, the prosperity achieved could not be maintained without the preservation and expansion of the supply. Awareness must be raised once more in society at large of the immense value of a functioning water sector and of water as a regional product. All producers and consumers must accept responsibility for their own actions.

Drinking water as a resource must continue to be available to the whole population and to businesses at any time, in sufficient quantities and of good quality. The high standard of wastewater disposal must also be maintained. In this regard it is crucial that the municipalities bear responsibility for ensuring the drinking water supply and wastewater disposal – both of which are public services in the general interest as a key component of social development.

Our common goal should therefore be to support the supply of drinking water and disposal of wastewater as a social duty. Awareness must be focussed once more on the importance of the public drinking water supply and wastewater disposal for Germany's economic and social development.

However, it is not only the supply of drinking water and wastewater treatment themselves that are important for economic and social development. In addition, our sector, with its many jobs and diverse training opportunities, assumes an important social responsibility and provides career opportunities for all generations in urban and rural areas.

1.3 Maintain water resources and develop infrastructure systems collectively

Society is subject to constant change. And as society changes, the service providers for the drinking water supply and for wastewater disposal need to constantly adapt as well. This is due to the increasing need for renovation and renewal measures but there is also a need to adapt systems due to cumulative impacts from social change, the progressive consumption of resources, the globalisation of the economy, demographic change and social fragmentation, as well as climate change and natural hazards.

For example, in particular the summer of 2018 showed that whilst the water supply generally operates smoothly, in some places the need for change has become apparent, so that the drinking water supply can be guaranteed even during future heat waves. Moreover, the wastewater systems have to adapt to the changing climate conditions and increasing instances of heavy rainfall. In this regard, water management must be seen in a more integrative manner. Resilience strategies need to be developed through a collective learning and adjustment process by lawmakers, administrative authorities, and the general public, in order to better protect cities and regions against risks such as floods or droughts. For example, actors such as town planners must play a greater role and cooperate with wastewater disposal companies in the area of rainwater retention and environmental protection. This would allow new approaches in integrated rainwater management to be found.

In addition, the drinking water and wastewater infrastructure must remain affordable in regions with low population density while providing

appropriate supply and disposal systems in regions with population growth.

The adjustment of systems to take account of current developments and challenges requires not only financial effort but also improved staffing in the public and private sectors. Innovative implementation strategies must be developed in a collective effort. In addition to funding programmes for municipalities, there is a further need to develop framework conditions for the implementation of required changes.

Protection of resources has a high priority. The safety of drinking water resources for future generations must not be jeopardised. Preventive protection of natural resources and sustainable management of those resources are efficient approaches for the economy as a whole. In order to protect water resources from harmful impacts in the long term, the input of pollutants should be avoided in the first place. This represents a common social responsibility of all actors.

1.4 Water as a social responsibility

Water is not a commodity but a sensitive common good that must be treated accordingly. A reliable water supply is an essential component of the **public services in the general interest** and thus a core task of Germany's municipalities, which bear responsibility for safe drinking water supply and wastewater disposal – even if tasks are completely or partially delegated.

The principle of local self-government was also integrated into primary law in the Lisbon Treaty of 1 December 2009, as an element of the national identity of Member States. The development of municipalities is dependent to a great extent on the simultaneous development of the supply of drinking water and disposal of wastewater.

Germany has well-functioning systems with regard to both water supply and wastewater treatment. This means, however, that there is a danger that the great value of reliable public services in the general interest for Germany's social and economic development will no longer be actively recognised by everyone. The water sector's positions are generally heard, however, constraints are often imposed through compromises which are not in line with the UN's goals.

The associations involved in producing the Water Sector Profile thus jointly advocate for creating the necessary conditions to guarantee a supply of drinking water and disposal of wastewater which are sustainable and affordable. When decisions are made, it should be recognised that the public supply of drinking water and disposal of wastewater are the basis of Germany's social and economic development and must be regarded as a priority.

2 WATER SECTOR FRAMEWORK CONDITIONS

The resource situation in Germany is good. The protection of the valuable resource of water is an existential task of the public institutions. Water supply and wastewater treatment companies support the government considerably in its task of the long-term protection of bodies of water.

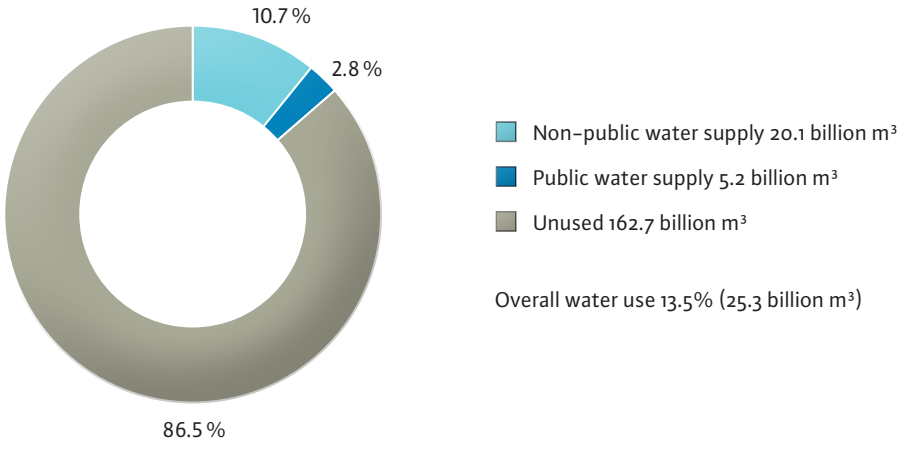
2.1 Supply in Germany

Annually, 188 billion m³ of fresh water is available to Germany's 83.2 million residents, which is regenerated through rainfall in our moderate, humid climate (source: German Environment Agency, "Water Resource Management in Germany"). In Germany, the overall use of the available water supply is 13.5 per cent, of which the public water supply accounts for 2.8 per cent. The European statistics authority "Eurostat" works on the assumption that the warning threshold of 20 per cent distinguishes a region without water related problems from a water scarce region. Severe scarcity is assumed where the water exploitation index exceeds 40 per cent. On that basis, Germany has a good resource situation.

Water usage in Germany 2016

1

Total available water resources 188 billion cubic metres

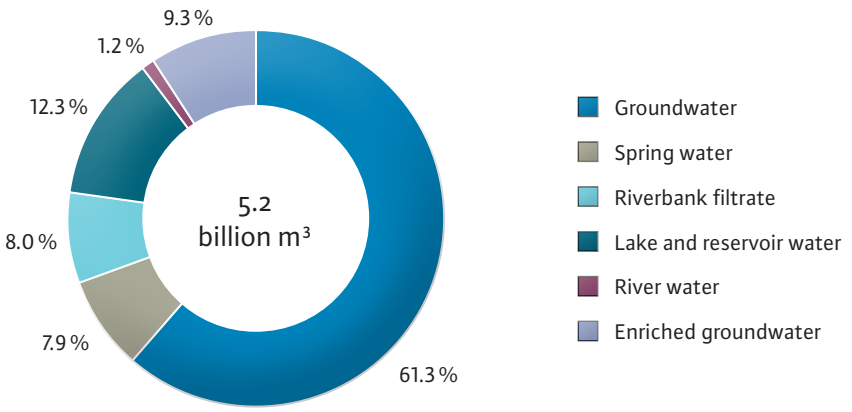


Source: German Federal Statistical Office, Subject-matter series 19 Series 2.1.1, published December 2018; German Federal Institute for Hydrology

Water abstraction by type of water

2

Proportions, 2016



Source: German Federal Statistical Office, Subject-matter series 19 Series 2.1.1, published December 2018; German Federal Institute for Hydrology

The median rainfall in Germany amounts to 789 mm per year, however, there are regional variations. For example, in 2017 the highest levels were recorded at the northern reaches of the Alps with local rainfall of over 2,500 mm.

The driest areas remained the northern Upper Rhine Valley and the foothills of the South-eastern Harz region, where less than 500 mm of rainfall fell in certain local areas for the entire year of 2017.

In addition, it generally rains more in the west than the east. In 2017, for example, Saarland was the Land with the most rainfall at almost 990 mm, while Saxony-Anhalt was the driest Land, at 630 mm (source: German Meteorological Service).

It is not only rainfall which has regional variations. There are also differences in the availability and quality of surface water and groundwater. Hydrological, geological and hydrochemical differences, as well as anthropogenic impacts are responsible for this.

In a highly industrialised, intensively farmed, and densely populated country like Germany, water resources are subject to diverse demands on usage as well as stresses and strains. It is the job of the government, supported by the companies in the water sector, to nevertheless ensure the best possible water quality.

2.2 Water management tasks

The demands on water use are constantly growing. It is no longer simply about providing water. Due to climate change, the probability of extreme weather events, such as increased heavy rainfall and flooding on the one hand and longer heat waves and drought periods on the other, is rising. Against the background of changed rainfall patterns and changed groundwater recharge, the holistic approach, aimed at producing a sustainable, integrated water sector, is becoming ever more important. Thus, in addition to the supply of drinking water and disposal of wastewater, a functioning water sector also includes, among other things, water maintenance, reservoir management, rainwater management, the protection of water bodies, the landscape water regime, measures to reduce the dangers of climate change and coastal and flood protection.

The comprehensive protection of water bodies is the responsibility of the government. European objectives set forth in the EU Water Framework Directive (EU-WFD; 2000/60/EC), require a "good status" of waters.

The areas used by the water sector and by agriculture partly overlap. For drinking water production, it is essential that groundwater and surface water is available in sufficient quantities, at a high level of quality, and that it is protected. Agricultural production leads to pollution of the groundwater and surface water, especially through nitrates and plant protection products.

In many areas, farmers and water supply companies therefore cooperate in the interests of the preventive protection of drinking water resources. This is of fundamental importance as there is no alternative to the existing drinking water catchment areas and the current drinking water supply.

It must be clear, however, that such cooperation does not primarily serve to ensure good professional practice in agriculture.

Instead, the good practice in agriculture has to be ensured through water protection legislation at a national level as well as the enforcement of fertiliser legislation. Consequently, the cooperation model is actually intended to ensure additional voluntary protection, specifically in drinking water catchment areas. This is where cooperation reaches its limits. As a basic principle, the party causing pollution of waters must be held to account to a greater extent. There is a need for action that goes considerably beyond the voluntary cooperation arrangements. In this respect, it is necessary for agricultural legislation to ensure that the requirements of water law are complied with. In addition, the authorisation process for plant protection products must be improved in relation to the concerns surrounding the protection of waters.

The 18,341 drinking water and medicinal spring protection areas in particular, which, at 55,000 km², cover 15.4 per cent of the Germany's land area (source: UBA: "Water Resource Management in Germany"), contribute to the preventive protection of drinking water resources. In these areas, stricter requirements, which exceed the usual, comprehensive protection of waters, apply to potentially harmful water use and the operation of connected facilities.

3 STRUCTURAL AND TECHNICAL FRAMEWORK CONDITIONS

The specific regional and local framework conditions determine the local supply and disposal conditions. The production, treatment and distribution of drinking water as well as the collection and treatment of wastewater are directly dependent on climatic, geological, hydrological, topographical, and settlement-geographic conditions, whereby the specifics of these conditions vary widely on a regional and local basis.

The cost of providing drinking water is dependent on the local availability of water resources (spring water, groundwater, surface water) and the raw water quality. These factors are influenced by, among other things, climate, vegetation, land use (agriculture, industry etc.) as well as natural, geologically determined substances in the water (e.g. often iron and manganese).

As far as wastewater disposal is concerned, the technical design of the sewer system is dependent on the local soil and slope conditions. Among other things, the altitude conditions also determine the number and type of facilities required (e.g. water towers, pumping stations, pressure reduction and boosting facilities) and their energy consumption, both in the water supply and in wastewater disposal.

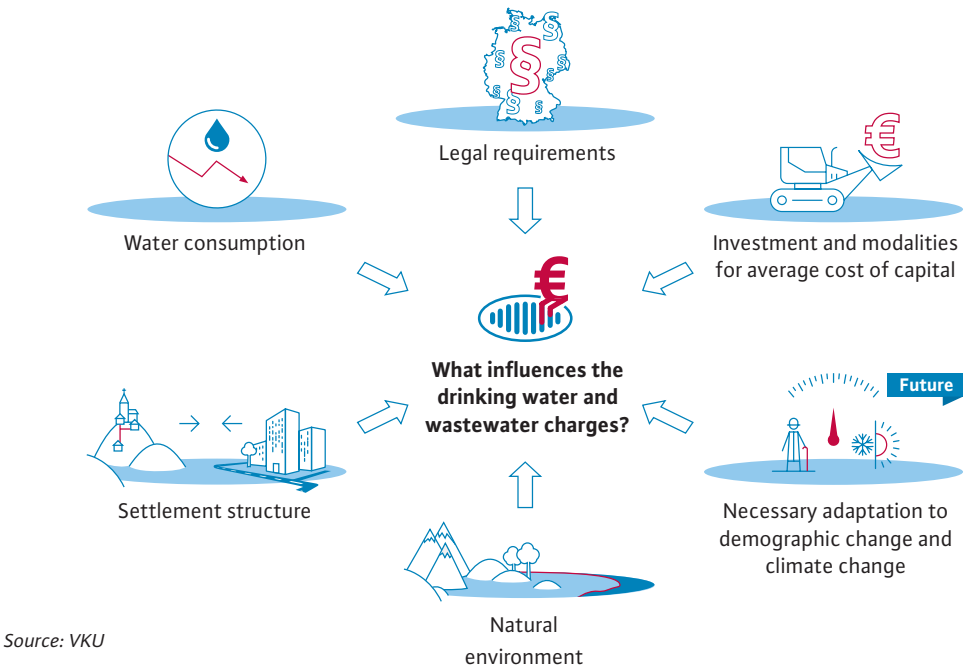
The expert opinions produced by Holländer et al. (2009, 2013) for the VKU demonstrate the impact of the general structural conditions on the supply of drinking water. External framework conditions such as urbanity, settlement density, topography or water availability influence the provision of drinking water. The framework conditions resulting from the physio-geographic conditions as well as, among other things, the settlement demographics and density, directly affect the four main processes for providing drinking water (production, processing, storage, distribution).

The investment activity and modalities for average cost of capital, together influence the water suppliers' costs.

The specific regional conditions exist on site and cannot be influenced by the supplier. However, such conditions have a significant bearing on the level of technical complexity and thus on the costs for providing drinking water. Hence, one cannot derive any reliable insight into the appropriateness of local drinking water or wastewater charges from comparisons of prices and fees that fail to take into account any structural differences which may exist.

Influence of structural and technical framework conditions on drinking water and wastewater charges

3



Source: VKU

Demand forecasts are crucial for planning long-lasting and complex infrastructures. Customer structures, population numbers (see section 7.1) and requirements from industry and business can fluctuate considerably over time. For example, water demand has been continuously decreasing since the 1980s due to, among other things, a change in customers' behaviour and an increasing use of water-saving devices and taps; in several regions, however, upticks in consumption are currently being seen due to a change in framework conditions (e.g. supply for livestock farming increasingly coming from the public network).

Water supply and wastewater disposal thus require locally tailored solutions. This, together with differing legal provisions, leads to varying levels of cost and effort.

4 LEGAL, ECONOMIC, POLITICAL FRAMEWORK CONDITIONS

In Germany, water supply and wastewater disposal are core duties of public services in the general interest and are the responsibility of the municipalities, or other public corporations. Their democratically legitimised bodies take the strategic decisions with regard to the forms of organisation, participations and cooperation.

4.1 Role of the municipalities

The German Basic Law (Article 28 Para. 2) and most constitutions of the *Länder* ensure the local self-government of municipalities. Self-government comprises all matters concerning the local community. Local self-government means autonomy in terms of by-laws, supreme power in terms of organisational, personnel, financing, regional and planning issues of cities, municipalities, associations of municipalities, and administrative districts in accomplishing the tasks assigned to them. Municipal codes and the water laws of the different *Länder* stipulate that drinking water supply is usually and wastewater disposal is always an obligation of the municipalities. On this basis, municipalities decide on the local implementation and organisation of water supply and wastewater disposal for the citizens' benefit. Based on the different constitutional provisions of the *Länder*, different forms of business organisation are possible for the implementation of water supply and wastewater disposal on the municipalities' own responsibility as part of their organisational sovereignty.

The forms of organisation are usually as follows:

- **Regiebetrieb:** Operation by municipality within the framework of the general municipal administration.
- **Eigenbetrieb:** Operation by municipality as special asset with independent accounting (economic autonomy).
- **Anstalt öffentlichen Rechts:** Economically and legally autonomous public utility.
- **Eigengesellschaft:** Private company with the municipality as shareholder (legal and economic autonomy).
- **Operations management model/operator model/cooperation model/public-private-partnership model:** Transfer of plant operation to a private operator while the performance of public tasks and sovereign obligations rest with the municipality.

With a view to effectively realising drinking water supply and wastewater disposal, municipalities may join forces, also in associations, for cooperation. Usually, this cooperation takes place on a voluntary basis, respecting the principle of municipal sovereignty, through inter-municipal cooperation in the form of:

- **Zweckverband** as public corporations,
- **Anstalt öffentlichen Rechts** as joint enterprises of several municipalities or
- **Wasser- und Bodenverbänden** within the meaning of the German Federal Act on *Wasser- und Bodenverbände*.

Some municipalities (such as in North Rhine-Westphalia) are members of **water management associations** subject to **special laws**.

Public law forms of business are *Zweckverbände, Anstalten öffentlichen Rechts, Wasser- und Bodenverbände,* associations under special law as well as *Regiebtriebe* and *Eigenbetriebe*. Private law forms of business organisation comprise *Eigengesellschaften* or cooperation models in the form of GmbH or AG (limited liability companies and stock corporations). Here, the majority of shares is usually held by the municipalities. The municipalities or their representatives in the association's bodies decide on the form of business organisation for supply and disposal utilities and on charges (prices or fees, see Chapter 4.6). In accordance with the responsibilities determined by by-laws, they continue to establish the utilisation requirements for all property owners in cities and municipalities.

In addition to these compulsory tasks, municipalities have to fulfil partial tasks regarding the implementation of environmental laws issued by the government and the *Länder*. In accordance with the regulation of competencies of the respective *Länder*, the lower water authorities or the water management offices implement the water rights within urban districts and cities not attached to districts as the lower instance of the water management administration.

Among other things, the lower water authorities approve wastewater systems, wastewater treatment plants, small sewage works, wastewater and rainwater discharges, use of water bodies, such as abstraction from groundwater and surface water and exceptional approvals for water and medicinal spring protection areas. Furthermore, as supervisory/executive authorities they are responsible, among other things, for sewage treatment plants, water supply facilities, registration of private wells, flooded areas, water and medicinal spring protection areas as well as for the Wastewater Levy Act and the wastewater register. The municipalities and *Zweckverbände, Anstalten öffentlichen Rechts, Wasser- und Bodenverbände* and water management associations subject to special laws are responsible for maintaining water bodies. Municipalities ensure the provision of water for fire-fighting.

Cities not attached to districts, and urban districts as lower-tier public health authorities are furthermore involved in drinking water quality assurance. Within the scope of planning law, the cities and municipalities also contribute to the development of water management matters for their settlement area. In this way, they make an essential contribution to the local development and implementation of water management matters. This takes account of local and regional requirements. Through the election of municipal councillors and city leaders, citizens participate in these processes in a democratic manner.

4.2 Requirements for the protection, management and use of waters

"Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such..."

(Extract from the recitals of the European Water Framework Directive)

Since 2000, the European Water Framework Directive (EC WFD; 2000/60/EC) has formed the core regulatory framework for the protection, management and use of waters in Europe and identifies far-reaching objectives regarding the physicochemical, biological-ecological, and quantitative status of groundwater, surface water bodies and coastal waters. The goal is to avoid a deterioration of water bodies as well as to improve

their condition. The intention is the achievement of the objectives through a cross-sector, integrated management approach, designed to take into account, as best as possible, the interdependencies of the water cycle. In this context, the cost recovery and polluter-pays principles must also be adhered to. This includes taking environmental and resource costs into account in prices and fees, as well as the allocation of costs according to the polluter-pays principle.

According to the EC WFD, Member States are required to provide for the protection of drinking water resources. The EC WFD has been transposed into German law via the German Federal Water Act (FWA) and the *Länder* water laws, as well as additional implementing ordinances.

Sec. 47 (1) of the FWA transposes the prohibition of deterioration into national law and demands a prevention of deterioration of the quantitative and chemical status of waters; all significant and sustained upward trends in the concentration of any pollutant resulting from the impact of human activity must be reversed.

The FWA further governs the rights and obligations of the water supply and of wastewater disposal companies with regard to the use and protection of waters. The FWA stipulates that the public water supply is a task which falls within the public services in the general interest (FWA Sec. 50). Wastewater disposal – which has always been recognised as a part of the services in the general interest – is defined as a public service task. Therefore, both aspects involve exceptional social importance and responsibility.

Under certain conditions, the *Länder* may pass, in their individual water laws, rules which deviate from federal law.

4.3 Requirements for drinking water

While the EC WFD, FWA, and the water laws of the *Länder* regulate the role of water supply and wastewater disposal as part of the water cycle, the German Protection Against Infection Act and the EC Drinking Water Directive form the legal basis for securing and monitoring the supply of high-quality and hygienically safe drinking water. The basic requirements in respect of drinking water are set forth in detail in the German Drinking Water Ordinance.

In that ordinance, the requirements to minimise chemical substances and microbiological impurities in drinking water expand the European provisions in the interests of consumer protection.

As far as compliance with these requirements is concerned, the German Drinking Water Ordinance refers to the generally acknowledged rules of technology. Legal requirements and technical rules serve to make drinking water one of the most tested of all foodstuffs.

4.4 Requirements for the treatment of wastewater

The EC Urban Waste Water Directive (91/271/EEC) sets out uniform minimum standards for EU Member States for the treatment of municipal wastewater. The FWA, supplemented by the *Länder* water laws, transposes that Directive into national law.

The German Waste Water Ordinance (WWO) sets out the implementation of the EC Urban Waste Water Directive and the FWA in Germany with regard to uniform sampling methods, analyses and measurement processes and stipulates minimum requirements.

The WWO requires that state of the art processes be used for direct discharges, which results in an excellent technical standard of wastewater treatment in Germany.

The stipulation of uniform analysis methods ensures a uniform level of monitoring. If treated wastewater is discharged into waters, the nature of which demands even greater requirements to be placed on the wastewater being discharged, more strict rules – based on the FWA and *Länder* water laws – may be defined, in respect of the level of water treatment, in the regulatory instructions issued by the water authority. The *Länder* authorities monitor compliance with these requirements.

4.5 Technical self-governance

In the rapidly changing world of increasingly complex technology, lawmakers limit themselves to setting out basic requirements when drawing up legislation. Thereby, they provide the legal framework, adherence to which is monitored and enforced by the public authorities.

In the two technical and scientific associations, the German Technical and Scientific Association for Gas and Water and the German Association for Water, Wastewater and Waste, over 3,000 honorary experts from water supply and disposal companies, from industry, engineering firms, administrative authorities and science devise technical rules. The specialist public has extensive input into the process through transparent procedures. As such, the set of rules gains professional legitimacy and recognition as generally acknowledged rules of technology to which the acts and ordinances refer, by way of so-called technology clauses. There is also cooperation with other standards bodies such as DIN and VDI on a national level and CEN, CENELEC and ISO on a European and international level.

In this way, the public administration is relieved of tasks which the water sector develops and applies in the scope of technical self-governance with a high level of quality and innovation on the basis of a broad consensus. This cooperation principle is a cornerstone of German technology and environmental laws. The German Federal Government's "standardisation policy concept" expressly commits to technical self-governance and considers its reinforcement to be an important instrument for reducing bureaucracy.

4.6 Prices and fees

Cities and municipalities can arrange the supply of water in organisations under private or public law. The form of organisation determines the nature of the customer relationship. A public law customer relationship can only be chosen by water supply companies organised under public law. In return for the supply of drinking water, these companies collect, among other things, user fees and contributions for the construction and renewal of water supply facilities, their operation and maintenance. If a water supply company supplies customers on a private law basis, it can invoice its customers for the supply of drinking water, in particular via water prices, construction cost and house connection cost contributions. Supply relationships on a private law basis can be chosen irrespective of the form of organisation, i.e. a water supply company organised under public law can also collect payment on a private law basis.

Wastewater disposal is a sovereign obligation of local authorities. Up to now this has mainly been

carried out on the basis of public by-laws, enacted under the municipal constitutions of the *Länder*. The connection and use obligation as well as the collection of contributions and fees is regulated by the municipal levies acts of the *Länder*. In a few exceptional cases, wastewater disposal is carried out on a contractual basis with charges arranged on a private law basis.

In the following, the term "charges" is used as a generic term for all payments claimed and effected under public law and private law as consideration for the supply of goods and services.

The setting of fees in Germany is subject to specific legal provisions. The municipal levies acts and municipal codes of the *Länder* set out the framework for the calculation of fees. Accordingly, the principles of public financial conduct essentially apply, such as the principle of equivalence (proportionality), the cost-recovery principle, the prohibition of cost overruns, the principle of equal treatment and the implementation in accordance with economic principles.

There are generally no special legal provisions governing the calculation of water prices. Nonetheless, according to the case law of the German Federal Court of Justice, the principles covering the calculation of fees must also be applied accordingly to the calculation of prices. In individual cases, this is additionally governed by the municipal levies acts.

The collection of fees or prices requires that the costs be calculated in a comprehensible and consistent and therefore verifiable manner. The associations provide a number of supporting guidelines and calculation tools.

Charges are subject to comprehensive control by the competent authorities and the courts. Which control mechanisms apply depends on the respective contractual basis of the use (see Fig. 4).

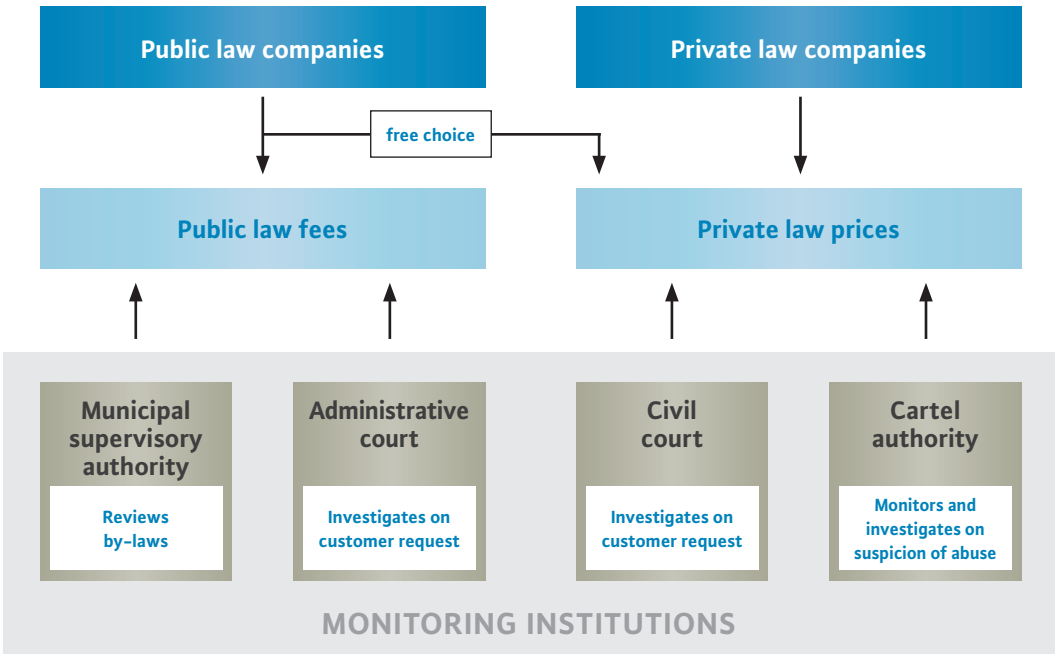
Fees and contributions may only be collected on the basis of a relevant by-law. The power to pass such by-laws rests with the elected municipal representatives. As such, citizens have a considerable say and thus the fees are democratically legitimised. All municipal codes afford municipal supervisory authorities a general right to receive information from the municipalities. Some municipal codes even grant a direct legal right to information to the citizens paying the fees. In light of this, there is no need for price-abuse control under anti-trust law. It was therefore clarified in the scope of the eighth amendment to the German Act Against Restraints of Competition that the provisions on price abuse control in anti-trust law do not apply to fees and contributions.

The decisions on water supply pricing in companies incorporated under private law are usually made by the supervisory board, on which, in the case of municipal companies, elected municipality representatives ensure that the public has a considerable say. The anti-trust law assessment of water pricing is the duty of the *Länder* anti-trust authorities or, in the case of activities across several *Länder*, by the German Federal Cartel Office.

Within the scope of the examination of pricing under anti-trust law, the anti-trust authorities must liaise with the competent supervisory authority.

Monitoring of prices and fees

4



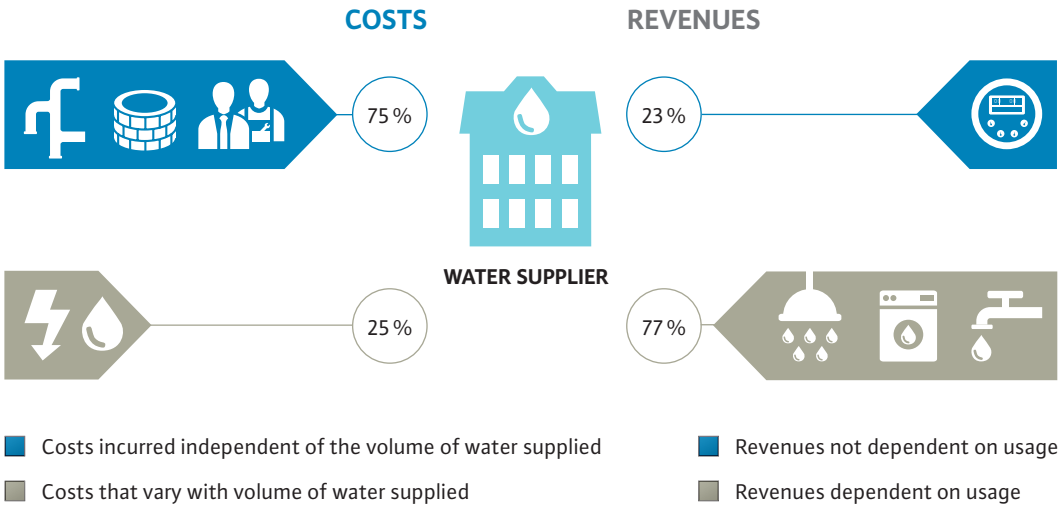
Source: VKU

This requirement under the German Act Against Restraints of Competition ensures that a one-sided consideration of costs is prevented and that the special conditions of the supply of drinking water are appropriately taken into account. To this end, the German Federal Environment Ministry and the German Federal Ministry of Health published their "Catalogue of precautionary services of water suppliers for the protection of waters and health" in the German Federal Gazette in August 2014.

In addition to anti-trust supervision, there is also the fairness test under Sec. 315 German Civil Code which can be asserted by consumers through the civil courts. The court then examines the appropriateness (fairness) of the agreed water price in relation to the service concerned, namely the supply of water. Here too, the assessment is made on the basis of the principles or rules of public financial conduct.

One of the main characteristics of the supply of water and disposal of wastewater is the complex infrastructure and the long-life duration of assets of up to eighty years. In the case of reservoirs this period is even longer. The great technical costs and efforts involved in the renewal and expansion of infrastructure as well as in the operation and maintenance is reflected in the cost structure.

Costs and revenue structure using example of drinking water supply 5



Source: VKU – Fact check: water prices and fees 2017

The operation and maintenance of facilities are cost items which are largely independent of the actual water and wastewater volumes involved. The fixed cost proportion thus amounts to an average of 70 to 85 per cent of supply and disposal. This cost structure is largely not reflected in the charge structure. Prices and fees usually comprise a component, which is independent of volume, and a variable component.

The volume-independent component is traditionally small. However, it is becoming increasingly important for the charges and prices to be reorganised with the objective of achieving a better approximation of the actual cost structure.

Average costs are not overly indicative because the actual costs at each value creation stage can vary significantly between the different companies.

As such, water suppliers with comparable total costs can have a completely different distribution of costs across the value creation stages. The level of costs depends on the local to regional supply conditions (e.g. topography, raw water quality, settlement density, demography, geology, climate, legal provisions) (see also section 3). As far as wastewater disposal is concerned, the respective charges must also always be seen in their local to regional contexts. Due to these differences, a simple comparison of prices or fees is unhelpful. Furthermore, a majority of the costs cannot be influenced by the respective supplier.

4.7 Special levies (water abstraction charges, compensation payments, wastewater levy)

In Germany, drinking water and wastewater charges are further increased by special state levies such as the water abstraction charge and the wastewater levy. These special levies are paid by the companies to the respective *Länder*. The abstraction charges amounted, on a national average level, to 4.4 per cent of consumer payments (source: VEWA study 2015).

For the discharge of wastewater into waters, the state imposes a special statutory levy (wastewater levy), which is ultimately borne by the fee-payer. According to Sec. 13 German Wastewater Levies Act, the revenue collected from the wastewater levy must be earmarked for measures to preserve or improve water quality (e.g. construction of wastewater treatment facilities). The *Länder* collect on average 300 million euro annually in revenues from the wastewater levy (source: UBA Texts 55/2014). The level of the wastewater levy is set according to the load of the permissible wastewater substances discharged.

Depending on the *Land*, the revenues from the water abstraction charges (around 400 million euro) and the wastewater levy are used to support various measures (protection and restoration of water bodies, compensation payments to farmers, investment in flood protection).

5 COMPANY TYPES AND SIZES

Germany has a diverse range of supply and disposal companies with public and private forms of company.

In 2016, there was a total of 5,845 companies in Germany involved in the supply of water (source: German Federal Statistical Office, 2019). For the most part, these are small, municipal *Regiebetriebe* and *Eigenbetriebe*, as the basis for the water supply in Germany is local self-government, usually with short distance water supply.

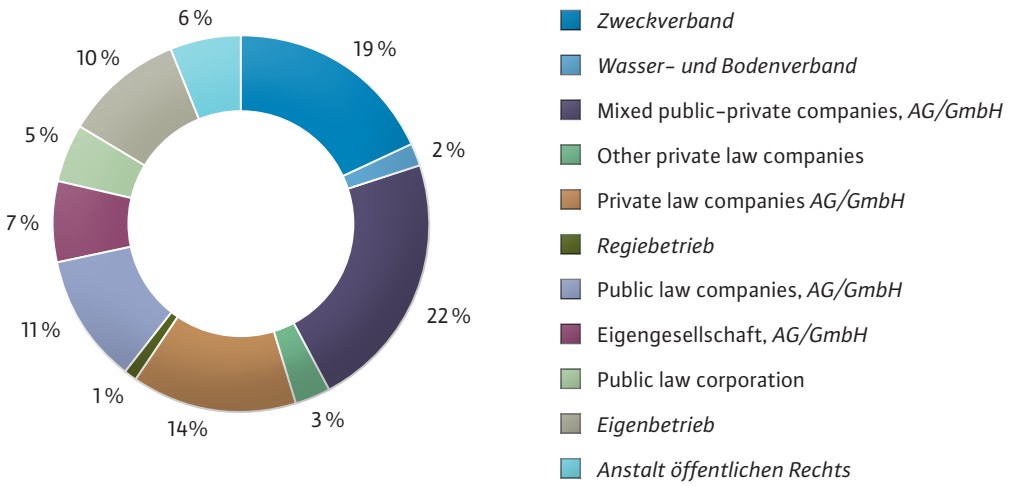
There are thus many small companies accounting for a relatively small proportion of total water output and a small number of large companies responsible for a larger proportion of the total water supplied.

The following information concerning the water supply is based on 1,579 companies in the 2018 BDEW Water Statistics Report, which represent 80 per cent of the water produced in Germany. Public and private law companies have existed alongside one another for decades in the water supply sector.

Based on the number of companies concerned, in 2018, publicly owned companies constituted 67 per cent of all companies, while private companies accounted for the remaining 33 per cent. Based on the volume of water supplied, publicly owned companies accounted for 43 per cent of the total, with private companies supplying 57 per cent (2017; see section 4.1 for information on types of companies).

Types of company in the public water supply 2018 — 6

Proportions based on water output

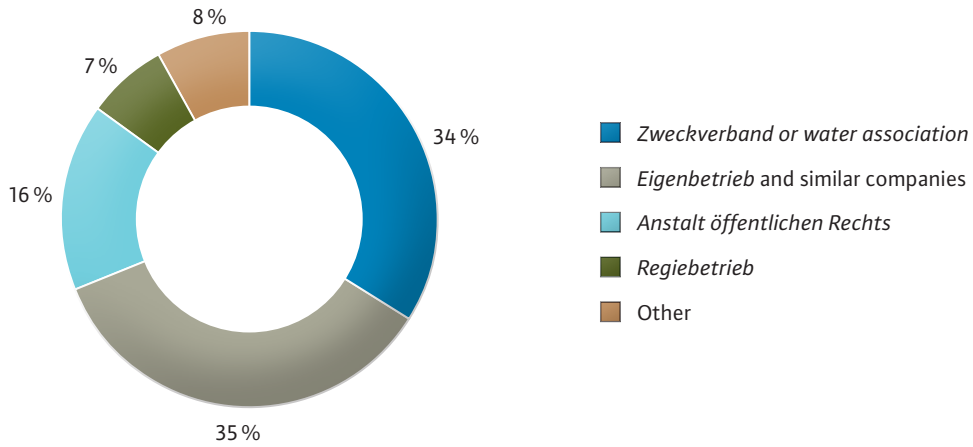


Source: 2018 BDEW Water Statistics Report (base: 1,579 companies)

Types of company in wastewater disposal

7

Weighted by number of residents



Source: DWA Economic Data 2014

Among the public law forms of enterprise, *Zweckverbände* predominate while *Regiebetriebe* account for one per cent. The proportion of *Eigenbetriebe* was 29 per cent in 1993, a figure which was ten per cent in 2017 (see figure 6). Among the private law forms of enterprise, mixed public-private companies predominate, in the form of *AG/GmbH* companies (22 per cent), i.e. companies with some private sector participation.

In total, there were more than 6,590 wastewater disposal utilities in Germany in 2016 (source: German Federal Statistical Office, 2018). The data on wastewater disposal was collected in the scope of the DWA economic data survey, in which 506 wastewater disposal companies took part. These utilities represented over 50 per cent of people living in Germany. The utilities not included were predominantly operated by the municipalities as *Regiebetriebe* and *Eigenbetriebe*.

There is also a large number of smaller companies engaged in wastewater disposal based on the principle of local self-government which is firmly established in Germany. The major proportion of connected population equivalents is, however, serviced by a few large wastewater operators.

Private wastewater disposal companies are involved in the operative business mainly through management or operator contracts. Based on the number of residents, private law companies account for five per cent of wastewater collection and transport and six per cent of wastewater treatment.

6 WATER MANAGEMENT FROM THE CUSTOMERS' PERSPECTIVE

The German water sector's commitment is to provide a high level of reliability and quality of supply and disposal at reasonable prices. In fulfilling these self-imposed standards, the water sector meets the high expectations of consumers, as regularly demonstrated by the findings of relevant surveys.

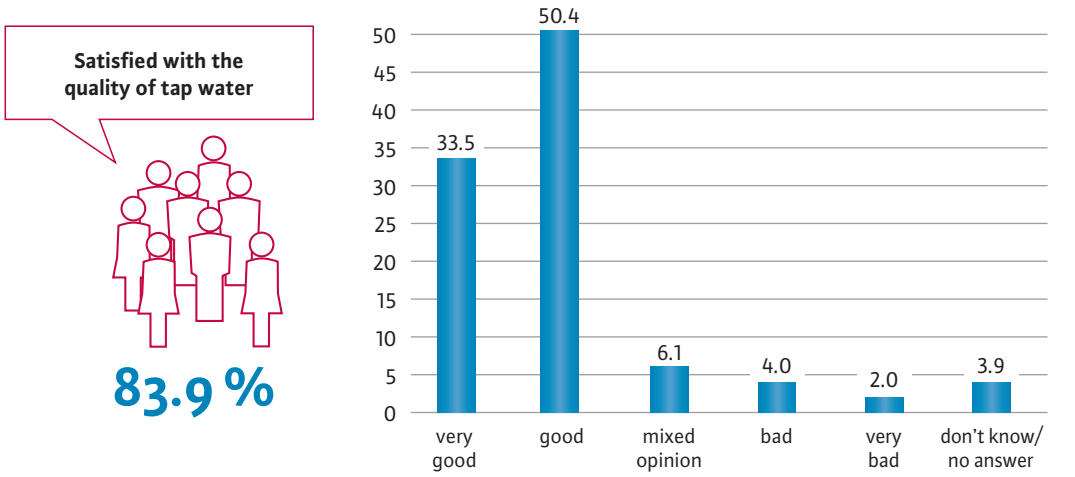
Customers in Germany have an extremely high level of trust in the level of performance and service provided by their drinking water suppliers. 84 per cent rate the quality as "very good" or "good" and over 90 per cent of all consumers surveyed rate their tap water as "clean and pure".

The service and service quality of water suppliers also receive positive evaluations. Around 75 per cent, i.e. three out of every four people asked, gave ratings of "very good" or "good". And 87 per cent are at least satisfied. This confirms once again the high approval ratings that have been expressed by customers for many years.

Population's level of satisfaction with the water quality

8

in percentage of respondents



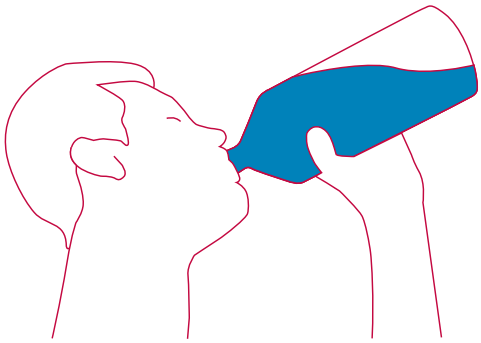
Source: Study: The quality and image of drinking water in Germany (TWIS), data report 2018/19, I.E.S.K./VKU

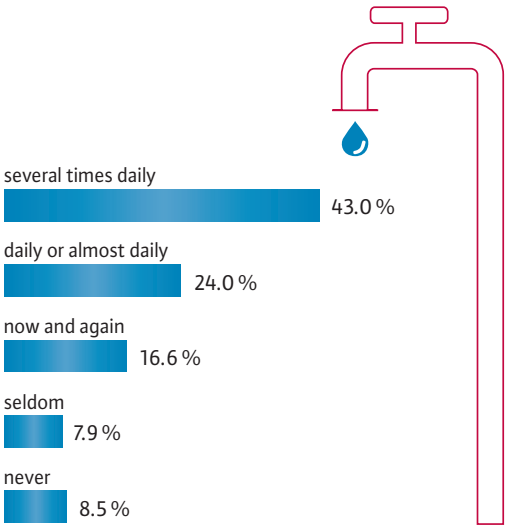
Drinking water is the number one foodstuff. Around nine out of every ten people in Germany use tap water directly as drinking water, with over two thirds even several times a day, every day or nearly every day. As a result, the German population is increasingly not only using less water but simultaneously saving money by using tap water.

Specifically, citizens can drink around 2,495 litres of tap water for five euro, which is enough to satisfy the water intake for around 5.3 years (source: study: The quality and image of drinking water in Germany (TWIS), data report 2017/18, I.E.S.K./VKU). What is more, delivery is free.

Use of tap water as drinking water

9





Source: Study: The quality and image of drinking water in Germany (TWIS), data report 2018/19, I.E.S.K./VKU

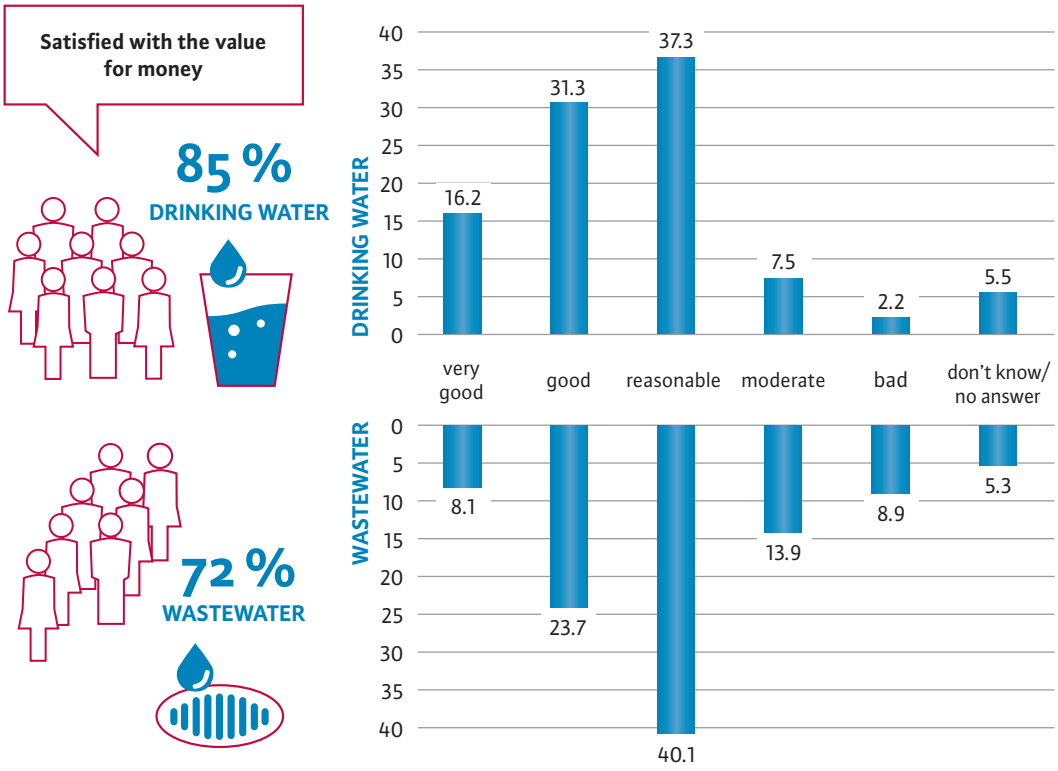
This also corresponds to the population's perception of the price in Germany. 85 per cent of all consumers consider the costs for the supply of drinking water to be reasonable; almost half of those surveyed even rated the value for money as "very good" to "good".

For wastewater disposal, 72 per cent of respondents are satisfied with the level of value for money. In addition to the positive value for money rating, the committed efforts of wastewater disposal utilities have led to water environments, in particular rivers, becoming once again increasingly attractive and valuable to German citizens for leisure and recreation.

Value for money in water supply and wastewater disposal

10

in percentage of respondents



Source: Study: The quality and image of drinking water in Germany (TWIS), data report 2018/19, I.E.S.K./VKU

To pay for their daily drinking water needs, any person earning an average level of net income has to work for around one and a half minutes. The population also enjoys excellent value for money in wastewater disposal in Germany. The disposal of wastewater costs them on average 37 cents per day, or not even two minutes of their working time.

Daily working time to cover drinking water needs

11

Drinking water supply:

1 minute

31 seconds of

of working time

Daily drinking water needs per person:

127 litres

127 litres of drinking water costs on average only **€ 0.33***

* average drinking water charges based on an average household in Germany

Source: German Federal Statistical Office, information based on average net wages and working time in Germany in 2018 / VKU

Daily working time for the disposal of household wastewater

12

Wastewater disposal:

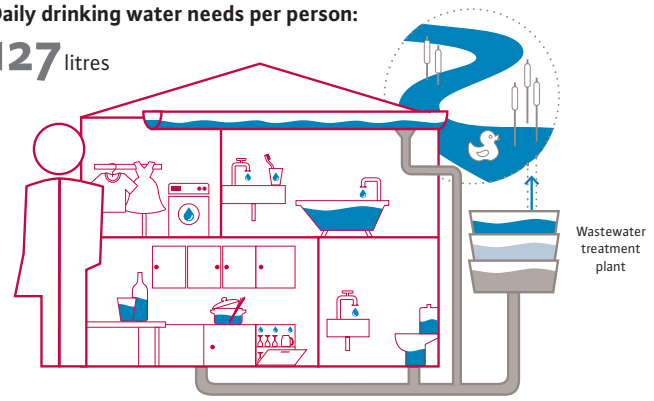
1 minute

44 seconds of

working time

Daily drinking water needs per person:

127 litres



The disposal of household wastewater costs on average per day **€ 0.37***

* Costs for an average household in Germany, with 80m² of sealed surface

Source: German Federal Statistical Office, information based on average net wages and working time in Germany in 2018 / VKU

7 CURRENT DEVELOPMENTS AND CHALLENGES

Water use has fallen considerably since 1990, settling at a stable low level in recent years. However, companies still have to provide sufficient capacity to deal with peak demand. Political demands for further reductions in water consumption are not reasonable.

Demographic change and climate change present major challenges for the German water sector. Whilst Germany has sufficient water resources, changes to the climate mean that longer periods of drought and more frequent local heavy rainfall events are to be expected in the future. While in some regions population decline is accompanied by a fall in the demand for water and production of wastewater, an increase in water demand has been recorded especially in the growing urban areas. There are no one-size-fits-all solutions due to the varying levels of impact experienced at a regional and local level.

When dealing with trace substances and other inputs of pollutants into the water cycle, the priority must be on prevention at the direct source; where the input cannot be avoided, the polluter-pays principle must be duly taken into account.

7.1 Maintaining the supply and disposal infrastructure

Water supply and wastewater disposal in Germany is characterised by a high level of reliability and quality of supply and disposal. For the population, clean drinking water and sustainable wastewater treatment is a given.

Longer periods of supply interruptions are unheard of in Germany. This is thanks to the high technical standards in the distribution of drinking water and collection and transport of wastewater and the good condition of the networks and facilities.

The basis is a functioning infrastructure which has to be maintained and renewed with intensive investment and on a cross-generational basis. This infrastructure under our streets remains invisible to most of the population. As long as everything works, people will rarely think about the services provided. However, just like the ever-visible roads, bridges and railway lines, drinking water and sewage networks must be kept in good condition and renewed once their operating life is over. Water supply and wastewater disposal infrastructure thus represent a significant asset for a municipality's population – a "treasure under the streets".

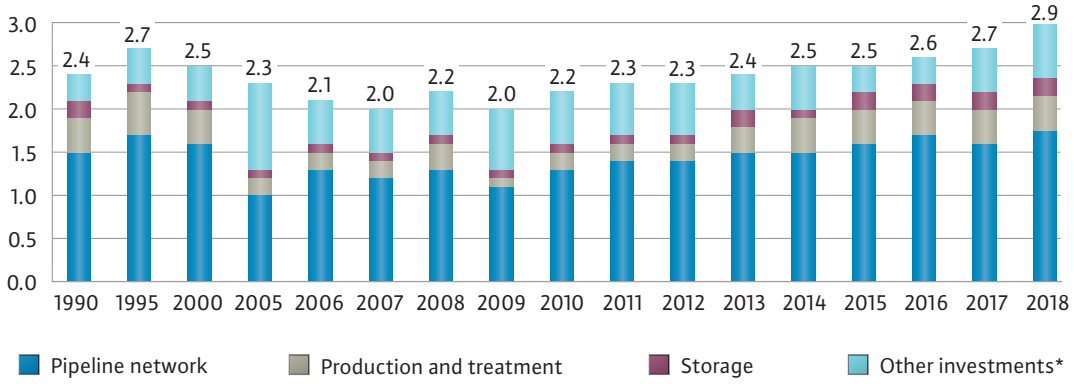
In order to ensure that the networks of today continue to function reliably tomorrow, enormous sums have to be invested year after year. The German drinking water network has a total length of around 540,000 kilometres. The total length of the public sewage pipelines amounts to approximately 590,000 kilometres. Around eight billion euro has been invested annually in both infrastructure areas in recent years.

It is thus the aspiration of the German water sector to be able to stay on top of maintaining this infrastructure without excessively burdening the population through increasing charges. It is precisely for this reason that it is important that society is aware of the necessity of infrastructure maintenance and that the political and legal frameworks are responsive to these demands.

Investment in the public water supply, 1990 to 2018

13

by type of facility, in billion euro



* Other investments = meters/measuring devices and IT; also investments for which there is no breakdown by type of facility.

Source: BDEW Water Statistics Report

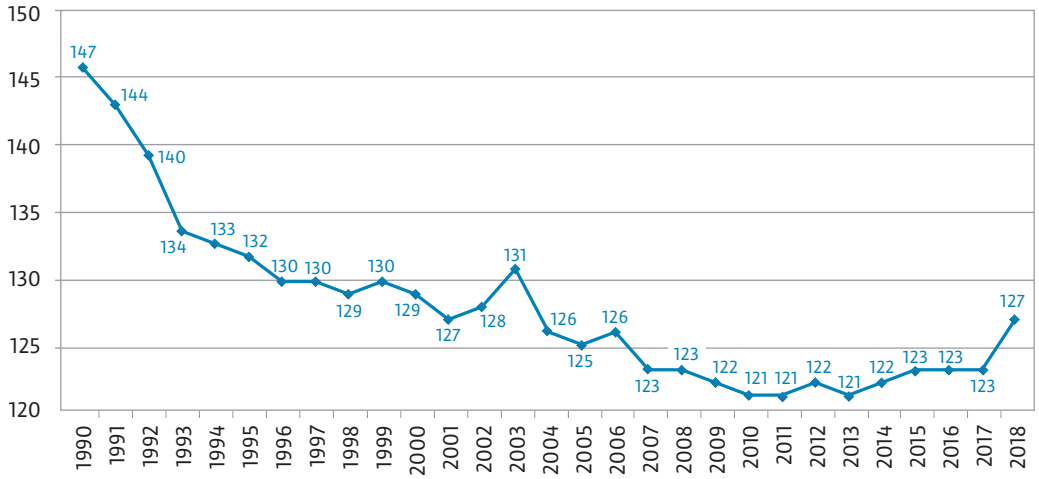
The maintenance and development of the existing pipeline and sewage networks will be a crucial challenge for supply and disposal companies in the coming years. Although the majority of companies assumes that the funds currently spent on maintaining physical assets are sufficient for current needs, at the same time the majority is concerned that the infrastructure expenditure will have to increase significantly in many regions in the coming years (VKU 2017). This concern is predominant despite the huge sums that are already being invested by the municipal water and wastewater sector today. In addition, increasing legal and technical requirements as well as changing framework conditions, such as rising civil engineering and pipeline construction costs, also have an impact on how available funds are used. The consequences of climate change and demographic developments demand regionally tailored responses.

Even though average drinking water consumption has significantly fallen over the past thirty years, the companies will in the future still have to hold sufficient capacity to account for peak demand. Just recently, the long period of drought in the summer of 2018 revealed the challenges associated with ensuring the availability of high-quality drinking water at all times. That period acted as a very real stress test for the networks, a test which the water suppliers, with just a few local exceptions with special framework conditions, passed very well. Due to the effects of climate change, it must be assumed that in the future such longer-lasting drought periods, and also local heavy rainfall events (see section 7.4), will occur with greater frequency and that peak demand will thus increase in terms of extent and duration. Consequently, water supply companies must keep the necessary infrastructure – such as pipelines, water towers, pumping stations and similar facilities – available, despite the reduced water consumption.

Personal water use

14

in litres per resident per day, Germany



Source: BDEW Water Statistics Report, based on households and small businesses; base: resident data on the basis of 2011 census

In places where increasing numbers of people are moving away and the remaining inhabitants are paying for the infrastructure, drinking water suppliers and wastewater disposal utilities are facing particular challenges: the burden of funding the infrastructure has to be shouldered by ever fewer people. In the future, this will not be possible in some areas without subsidies for future-proof infrastructure, in order to ensure the affordability of this basic public service in the general interest in the long term. The costs for the service in the general interest cannot be allowed to become a negative location factor for certain regions.

This leads one to conclude: the maintenance and renewal of the existing infrastructure is of primary importance for the German water sector. With regard to the appropriateness and political viability of drinking water and wastewater charges, despite the requirement of cost recovery as set down in municipal laws on levies, funds for increasing expansion of the scope of services are finite.

Consequently, new requirements must not be made at the expense of measures and tasks which are necessary to maintain the quality and reliability levels achieved to date. Legislative initiatives which would result in additional investment requirements must therefore leave room for decision-making at a local level and may not lead to blanket requirements for all water supply and wastewater disposal utilities. The competent bodies are best placed to estimate, on the basis of local conditions, which measures are necessary and what the priorities for implementation of the various measures are.

7.2 Water 4.0 / Digitalisation

The topic of digitalisation is rapidly gaining in significance in the water sector, as is the case in many other sectors. Already today, it is relevant in a variety of application fields across the different operational areas.

Hence, people are talking about Water 4.0, taken from the term Industry 4.0. The ever-advancing progress of digitalisation sees companies often facing the question as to how current structures and processes will change. In this respect, the focus is not only on potential efficiency gains but also on how existing data can be intelligently linked together to generate information for utilities' own internal processes, to improve services and, in conjunction with other local stakeholders, derive added value for customers, municipalities and the region. The equipping of system components such as pumps, water storage vessels or the pipeline network with sensors and the resulting possibilities for collecting and processing data in real time, lead to completely new application possibilities for improving system understanding, control, and monitoring of the different processes in the water sector. Examples worth mentioning in this context are water loss management, as an important criterion maintenance and capital expenditure planning in the water distribution system by means of pressure and flow sensors, or the prompt detection of changes to water quality with the help of event detection systems. Communication with customers can, with the help of digitalisation, also take place on an entirely new basis. Moreover, the management of water consumption can be made more effective and transparent for customers through the use of digital water meters.

In order to support companies in the water sector in the process of digital transformation, a standardised maturity model was developed in the scope of the DVGW research project "Water supply 4.0 maturity model", which enables the digital development trajectory to be systematically analysed. In this way, it is possible to determine where a company stands in relation to digitalisation (status quo) and create the basis for addressing the topic of digitalisation in a structured manner while identifying meaningful potential benefits of digitalisation.

The increased dependency on data flows and information technologies associated with digitalisation presents the water sector as well as industry with the challenge of protecting the systems concerned against failures of the IT infrastructure. This applies both in relation to the growing number of cyber attacks and in relation to physical threats (e.g. from floods). In the regard, the water sector is of particular importance, as it is part of Germany's so-called critical infrastructure and is crucial for sustaining the nation's society and economy. Its failure or degradation would result in significant disruption of public safety and security).

In light of this, the DVGW and DWA have, as the bodies that issue technical standards for the sector, developed the Sector-Specific IT Security Standard Water Supply/Waste Water Utilities. By implementing the controls specified in that standard, water supply and wastewater disposal companies are able to ensure a level of protection for their IT infrastructure in line with the best available technology. In June 2017, the German Federal Office for Information Security recognised the Sector-Specific IT Security Standard Water Supply/Waste Water Utilities as the first IT security standard for one of the critical infrastructure sectors within the meaning of Sec. 8a German Act on the Federal Office for Information Security.

By implementing the Sector-Specific IT Security Standard Water Supply/Waste Water Utilities, drinking water suppliers and wastewater disposal utilities, which are legally mandated to protect the IT infrastructure (BSIG; Ordinance on the Identification of Critical Infrastructures according to the BSIG), meet the legal requirements.

7.3 Personnel development

With the many jobs and training opportunities it provides, the sector has an important social and macroeconomic responsibility. Qualified employees with extensive knowledge and skills are what keeps companies sustainable in the long term (see figure 15). Companies within the water sector have come to recognise this and have continuously invested in the training of young people for many years. At the same time, many companies have difficulties in finding suitable young talent.

The general intensification of competition for talented young employees in the future will also be felt by companies in the water sector and their service providers. Demographic change is leading to an ever-decreasing supply of high school graduates. By 2025, the number of people graduating from general education will have stabilised at a low level in some regions. In addition, ever fewer school graduates are aspiring to in-company training, with young people instead streaming to universities. Additionally, it must be noted, however, that the number of graduates in subjects with a relevance for water management is also falling.

Jobs in the water sector 15

Source: dysign/D. Wübbeling (DBVW)

Companies within the water sector are among the largest contracting companies in Germany. The skills shortage also has a diminishing effect on the contractors' service capacities, resulting in the subject of supplier availability coming into greater focus.

The various companies in the sector are therefore increasingly keen to raise awareness, at an early stage in young people's lives, of careers in the water sector at career fairs and informational events. These efforts will have to be intensified in the future, as there is already intense competition for young people with other sectors which have significantly greater financial resources. The companies in the water sector will have to react to this development with new initiatives for attracting staff at an early stage and committing them to apprenticeships and also academic professions. A further complicating factor for companies in the sector is that not enough young people have a basic knowledge of our water systems.

Adding this topic into school curricula can be beneficial, even at this early stage, for later career choices, as well as for the development of conscious consumption.

7.4 Climate change

The most recent findings of the ReKliEs-De project (Regional Climate Projections Ensemble for Germany) lend support to existing forecasts on the effects of climate change in Germany, which also appeared in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). In the course of the 21st century, it will become warmer and drier on an average annual basis, hot spells during the summer will become more common with cold periods decreasing. Due to the warmer winters, rainfall at that time of year will increase. The regional variations are considerable.

For the water sector, this means an intensification and increase in frequency of already existing and known phenomena and problems: More instances of heavy rainfall, longer heat waves and dry periods, more frequent flooding events, new rainfall patterns, changing groundwater recharge. For instance, the volume of water which is usable for the water supply in lakes and dams could decrease. The availability of water could decline on a seasonal basis or lead to flooding as a result of heavy rainfall, which can also raise the concentration of nutrients and pollutants in waters as a result. Increasing temperatures have different effects on the quality of surface water. In reservoirs and lakes, the thermal stratification patterns of the water bodies change. The lower the nutrient content (the trophic status) of the waters, the lower the resulting quality impairments such as oxygen depletion or the development of cyanobacteria ("blue-green algae").

Additionally, competition for water resources with other users is growing. More frequent and longer lasting dry periods and heat waves can lead to a higher peak demand. Local heavy rainfall events and flooding can negatively impact the supply and disposal infrastructure and could even lead to its failure in some cases. A rise in temperatures and in heavy rainfall events in urban areas require improved local water management.

In response to these and other challenges, the water sector is developing collective solutions for water management and water legislation across the *Länder*, e.g. through the LAWA (the German Working Group on Water Issues of the Federal States and the Federal Government) ("Effects of climate change on the water sector", 2017). The

need for change and possibilities for action always result from the respective physio-geographic conditions, the technical structure of a water supply and wastewater disposal infrastructure, the interdependence with other factors such as population and economic development, as well as industrial and agricultural water use.

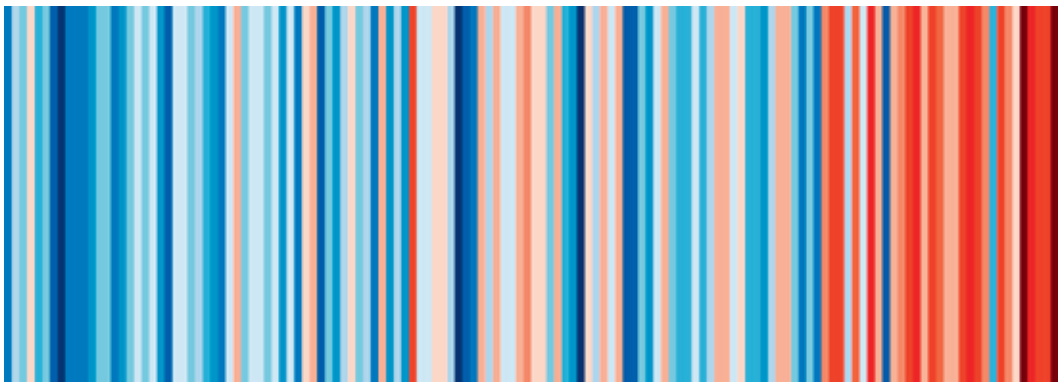
When dealing with extremes of weather such as drought, heavy rainfall and flooding (e.g. the dry year of 1976, extreme summers of 2003 and 2018, the Elbe flooding in 2002 and 2013, heavy rainfall events in 2017), drinking water suppliers and wastewater disposal utilities have demonstrated that they are able to avoid long-lasting and large scale failures.

In the extreme summer of 2018, a number of suppliers nevertheless encouraged customers to save water. In particular, the unusually long-lasting drought period was a real stress test for the supply systems, which the companies passed without major failures. For example, if during heat waves and prolonged dry periods large numbers of people draw unusually large amounts of water, the pressure in the transport system can drop. This happens primarily when water use suddenly jumps up, for example in the evening, when many gardens or lawns are watered at the same time. In individual cases, therefore, suppliers have issued orders to prohibit e.g. lawn sprinklers, or water pressure has been slightly reduced to mitigate peak demand. And yet: the water supply was able to be maintained without any great disturbances. However, 2018 did show that strategies for adapting the water management infrastructure are needed.

Annual temperatures in Germany, 1881 to 2018

16

The colour scale ranges from 6.6°C (dark blue) to 10.3°C (dark red)



Source: https://showyourstripes.info/; Graphics and lead scientist: Ed Hawkins, National Centre for Atmospheric Science, University of Reading.
Data: Berkeley Earth, NOAA, UK Met Office, MeteoSwiss, DWD.

The sector must also address this challenge in order to protect and maintain the resource of water. The possibilities for change are extremely diverse due to the different effects of climate change on production, processing and distribution in the individual regions of Germany.

Companies are paying greater attention to the regional effects of climate change when producing trend analyses and long-term water availability and demand forecasts. Increasing numbers of water supply and wastewater treatment companies are establishing safety, risk and crisis management instruments in their operational organisation and are thereby systematically assessing their need to adapt to the effects of climate change.

As tasks which fall within public services in the general interest, water supply and wastewater disposal must be afforded priority in sovereign decisions on the use of water resources or the protection of critical infrastructure.

7.5 Anthropogenic influences on the water cycle

In a highly industrialised, intensively farmed, and densely populated country like Germany, water resources (surface waters, groundwater) are subject to a variety of influences. As a result of human activities, anthropogenic trace substances (e.g. ingredients from medicines, industrial chemicals, household chemicals, personal care products, cleaning agents, detergents and disinfectants, hormones, biocides, pesticides), among other things, end up in the environment, possibly also leading to cumulative effects. However, rainwater, industrial discharges, road and tyre wear, shipping, railway lines, certain agricultural activities, and various diffuse sources must also be considered as input routes. Awareness of anthropogenic trace substances and their effects on waters has been steadily rising in recent years. In addition, the occurrence of multidrug-resistant germs (pathogens that are resistant to antibiotics in human and veterinary medicine) from hospitals and agriculture, as well as plastic particles or microplastics (e.g. in cosmetics) in the aquatic environment represent an increasing challenge for the water sector. The provision of hygienically safe drinking water and the removal of these substances from wastewater place an additional strain on the sector. Assessing the preventability and non-preventability of these pollutants and the respective funding required is a socio-political task. In these cases, the polluter-pays principle should be the guiding standard.

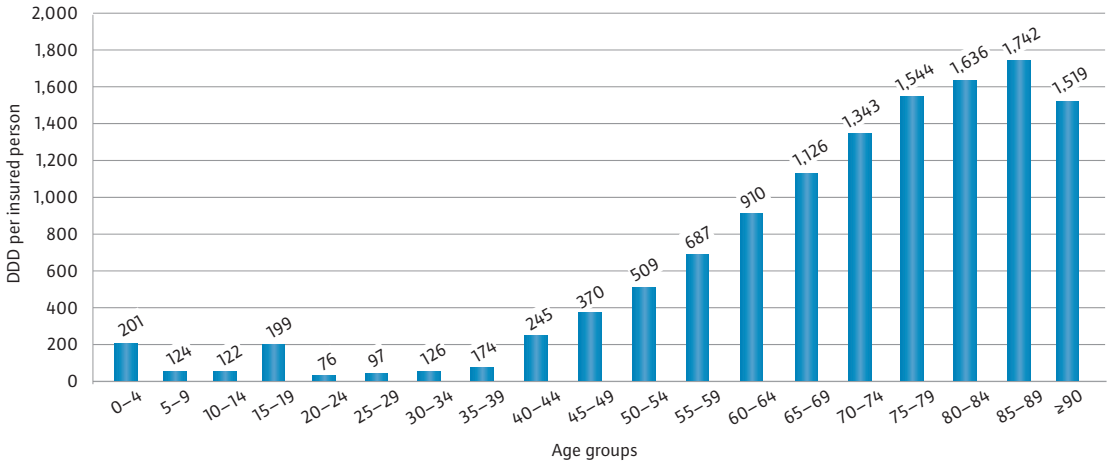
It is both from specific points and via diffuse routes that anthropogenic substances find their way into waters, where they can be detected in ever smaller concentrations due to the continued advancement of analysis methods. Anthropogenic trace substances are not generally harmful. The decisive factors for assessing possible harmfulness are the concentration, time of exposure, degradability, and the actual harmful effect. For newly emerging substances, a comprehensive hazard analysis and risk assessment are often not possible, due to insufficient knowledge of the causal relationships and incomplete data. The concept of health-related indicator values for new substances and those not yet allocated limit values (GOW), which was developed by the UBA, takes this into account and needs to be stringently implemented in all *Länder*.

GOW sets values at a sufficiently low level that even lifelong ingestion of the substance in question would cause no health concerns.

Medicine consumption per insured person in the SHI scheme 2018

17

DDD = prescriptions in defined daily doses



Source: SHI Pharmaceuticals Index in WIdO 2019

To achieve preventive protection of water and to have measures based on the polluter-pays principle, coordinated efforts of all parties involved in the substance cycle, including manufacturing, authorisation, and disposal, are required. In this context, it is necessary to strike a balance between the benefit associated with a substance according to its intended purpose and the harm caused by the presence of that substance in the aquatic environment and in the human body. The precautionary principle is taken into account by the legal principle that raw water used for producing drinking water should have a quality that permits drinking water to be produced using near-natural treatment processes. Substances which are non-natural and which are not easily bio-degradable must therefore be kept away from waters and the environment as a precautionary step.

The polluter-pays principle requires that measures to minimise the inputs at source are prioritised, e.g. through the separate treatment of hospital wastewater and takeback systems for pharmaceuticals but also by taking into account the interests of the protection of waters when using plant protection products in agriculture. The extent to which additional measures in wastewater disposal (e.g. construction of a further treatment stage) or the supply of water (technical processing) are effective, reasonable, and necessary must be carefully considered on a case by case basis. It is important to note that not all substances can be eliminated by, for example, a further treatment stage. As such, from the perspective of the water sector, prevention must always take priority over cost-intensive treatment stages, which are only suitable to a limited extent, and can, in some cases, lead to undesired reaction products or increased energy consumption.

It should be noted that currently both the statutory regulations and the enforcement of existing provisions are not sufficient to sustainably protect waters from undesired pollution. In fact, the protected resources (water resources for the supply of drinking water, aquatic ecosystems, fisheries, sport and recreational spaces, foodstuffs and, above all, public health) require all parties involved to work together closely. That means that manufacturing firms, users, consumers, policy-makers, administrative authorities, suppliers, and disposal utilities must find collective solutions to minimise or completely prevent the pollution of the protected resources. The stakeholder dialogue "Federal Government trace substance strategy", set in motion by the German Federal Government at the end of 2016 and the discussion on the pharmaceuticals strategy initiated at a European level are aimed at just such a prevention strategy and are welcomed and supported by the water sector. The precautionary principle and polluter-pays principle, together with the minimisation requirement, must be enshrined as binding maxims for all companies at each stage of the supply chain. End-of-pipe solutions do not lead to the desired reduction of inputs but to a significant increase in drinking water and wastewater charges. Therefore, the burden should, in the interests of cost fairness, not fall on the general public. Instead, a substantial economic incentive should be created for polluters to prevent or minimise hazards to water bodies and the environment, increasingly taking the polluter-pays principle into account.

In addition, where further measures are required in the purification of drinking water and treatment of wastewater there is often a lack of scientific findings on which investment decisions are based.

A lack of legal certainty also complicates the process of recouping the associated costs via prices and fees.

7.6 Conflicts of use

In the scope of the current discussions surrounding the *Energiewende*, the use of regenerative, and thus climate-friendly, energy sources is rightly supported by the European Union, but also at federal and *Länder* level, in order to ensure a sustainable energy supply, taking into account ecological, economic and socio-political aspects. However, this can lead to conflicts of use. As such, the *Energiewende* must take into account all protected resources so that it can live up to the idea of integral sustainability.

In light of this, the demands on possible types of use for surface and subterranean environments in drinking water catchment areas are multiplying. At the same time, possible risks to groundwater are frequently not taken into account. When using the land and subsoil, drinking water production should be afforded priority over other interests because the associated protection of waters and of drinking water resources is of fundamental importance to humans.

Above-ground renewable energy sources, such as wind turbines, solar thermal energy or the use of biomass, have established themselves and their importance will continue to grow. In addition, processes are being discussed that are mainly underground, such as geothermal energy, fracking (to extract unconventional gas deposits from deeper rock layers) or CCS (carbon capture and storage). With underground activities in particular, it should be noted that the forms of use associated with the aim of renewable energy production in the catchment areas of drinking water production facilities may constitute a risk to the drinking water resources and must therefore be rejected. Questions regarding long-term safety and how possible cases of damage should be dealt with from

a technical and liability-related perspective require expert clarification. The principles of the German Federal Water Act, according to which waters must be protected from adverse impacts, apply. In addition, it must be taken into account that drinking water as a foodstuff has no substitute.

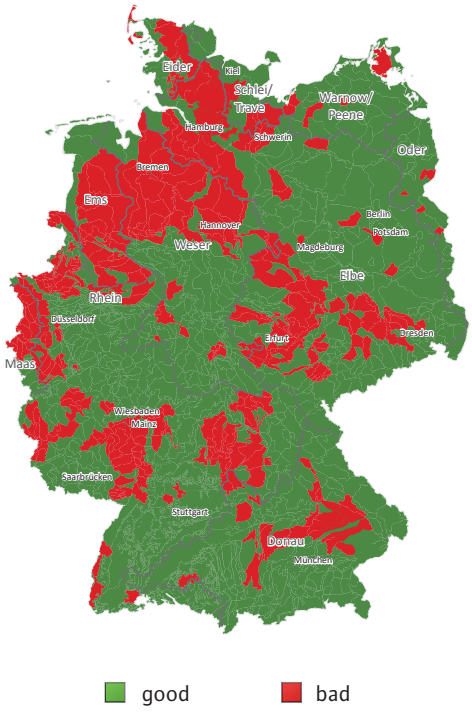
In light of the growing use of renewable energy sources and driven by the agricultural policy framework conditions, the intensity of land use is continually increasing. The cultivation of energy crops and intensive livestock farming leads in some regions to high releases of nitrogen and thus to marked conflicts with the objectives of water protection, even within drinking water protection areas. An upward trend in nitrate concentration in groundwater continues to be observed on a regional basis. Moreover, diffuse phosphorus inputs from agricultural land use and findings of plant protection products as well as their degradation and transformation products represent a problem for the protection of waters. Prescribed EU targets for achieving higher quality standards will not be reached in many areas of Germany by 2021 or 2027 even with the second and third generation management plans and programmes of measures under the EC WFD.

In addition, due to the intensification and expansion of the irrigation of agricultural land, water resources are being used that are ecologically important or that secure the supply of drinking water elsewhere. Climate change will cause this conflict to further intensify in the future.

The regionally varying demand for land to develop new residential and commercial areas and the advancing expansion of the transport infrastructure also holds further potential for conflict in the realm of water protection. There is also a need to closely interlink water management with urban development plans and concepts for developing rural areas.

Securing water resources permanently for future generations is crucial to the water sector. A sustainable water sector, in the sense of public drinking water supply, requires that water is available at all times in impeccable quality (preventive healthcare) and in adequate quantities (security of supply). The preventive protection of waters and the priority of the water sector services

Chemical status of groundwater bodies in Germany **18**



Source: UBA – "Water Resource Management in Germany". Based on data from the WasserBLIcK/BfG portal, status 03/2016

in the general interest must therefore, as a socio-political responsibility, be recognised as the primary objective in all economic activities and decisions.

7.7 Sewage sludge

The new rules in waste and fertiliser legislation adopted in 2017 have fundamentally changed framework conditions for the disposal of sewage sludge with long-term effects. For example, from 2029 and 2032 onwards, the new German Sewage Sludge Ordinance prohibits the application of sewage sludge for wastewater treatment plants sized over 100,000 or 50,000 population equivalents (p.e.) respectively. Starting in 2029, all operators are obliged to implement measures for extensive phosphorus recycling and only wastewater treatment plants of up to 100,000 p.e. may continue to carry out soil-based use of sewage sludge, to the extent the sewage sludge meets the requirements under fertiliser and waste legislation. From 2032 onwards, this option will only remain available to wastewater treatment plants of up to 50,000 p.e. Starting in 2029, all municipal wastewater treatment plants whose sludge has a phosphorus content of over 20g/kg will be obligated to carry out phosphorus recovery.

Exceptions to this are possible for sludge from facilities of up to 100,000 p.e. or 50,000, if such sludge may be applied to land within the scope of the aforementioned rule or fed into other waste disposal routes with the authorisation of the competent authority. Phosphorus recovery measures can also be carried out outside the facility itself, by contracted third parties.

In light of this, the wastewater sector and also the waste management sector in Germany will face huge challenges in the coming years:

- As a result of the new rules, in particular the German Fertiliser Ordinance and German Sewage Sludge Ordinance, a significant reduction in land application was already being observed in 2017. Regionally, there are considerable bottlenecks in disposal systems which also lead to substantial increases in disposal costs. Operators are required to find suitable solutions for this situation, e.g. interim storage of sewage sludge. Changing the disposal strategy requires, in many treatment plants, investment in modified process technology for the treatment of sludge.

- New incineration capacities for sewage sludge must be systematically constructed in order to compensate for the decline in volumes previously applied to land. In addition, due to the *Energiewende* and the requirements of phosphorus recovery, a significant reduction in the co-incineration of sewage sludge must be expected in the medium term, in particular in coal-fired power stations. When constructing new mono-incineration plants, capacity, location, and the technology in the facility must be determined with a long-term perspective, which currently entails significant challenges. In many cases, inter-municipal cooperation models are already being implemented in this context.

- To meet the obligations on recirculation of phosphorus from sewage sludge, it will be necessary to establish new technology for phosphorus recovery. Currently, numerous processes are being developed in research and pilot projects and tested for their viability in practice. The remaining limit of around twelve years is very much required in order to be able to make reliable investment decisions based on the research findings and to realise the development of the corresponding facilities and logistics.

Both the construction of new incineration capacity for sewage sludge and the implementation of recirculation for phosphorus from wastewater, sewage sludge or sewage sludge ash are high cost endeavours.

The operators of municipal wastewater treatment plants are making every effort to tackle these challenges, while always seeking economic and sustainable solutions in order to minimise appreciable burdens on the budget available from fees collected.

7.8 Conclusion on challenges

The previous sections show how the supply of drinking water and disposal of wastewater in Germany are undergoing diverse changes: questions of quality, demographics, maintaining the infrastructure, changing water consumption, as well as climate change, changing legal frameworks, and the skills shortage are challenges which drinking water supply and wastewater disposal companies must consider when developing their strategies.

The associated need for investment places growing pressure on the funding of drinking water and wastewater. This will also have consequences for the charges to be paid by consumers. On the one hand, an information strategy is needed to ensure the public understands the situation; on the other, however, a political debate is required as to how and with which priorities sustainable financing based on the polluter-pays principle can be achieved.

The drinking water supply and wastewater disposal in Germany also have to continue to function reliably and be developed with today's challenges in mind. The financial resources for maintaining the public service in the general interest cannot be exhausted due to ever more requirements being placed on the water supply and wastewater disposal. An integrated approach including all political initiatives is required, taking into account the resulting costs for the population. In this respect, a responsible use of the revenue from fees and prices must always be at the forefront of the considerations.

The collective goal of policymakers and the municipal water sector must therefore be to ensure that the challenges associated with maintaining the infrastructure are increasingly brought into the public consciousness. A functioning, high-quality municipal water sector forms the basis of social and economic development in Germany.

8 BENCHMARKING

The performance areas of the German water sector are:

- long-term reliability of supply and disposal,
- high quality/standards for drinking water quality and wastewater disposal,
- customer satisfaction,
- sustainability, e.g. sustainable use of water resources,
- economic efficiency (viability).

Voluntary performance assessments (benchmarking) are a key instrument used within the water sector by companies to improve their internal structures and processes. They have been an established tool for over fifteen years.

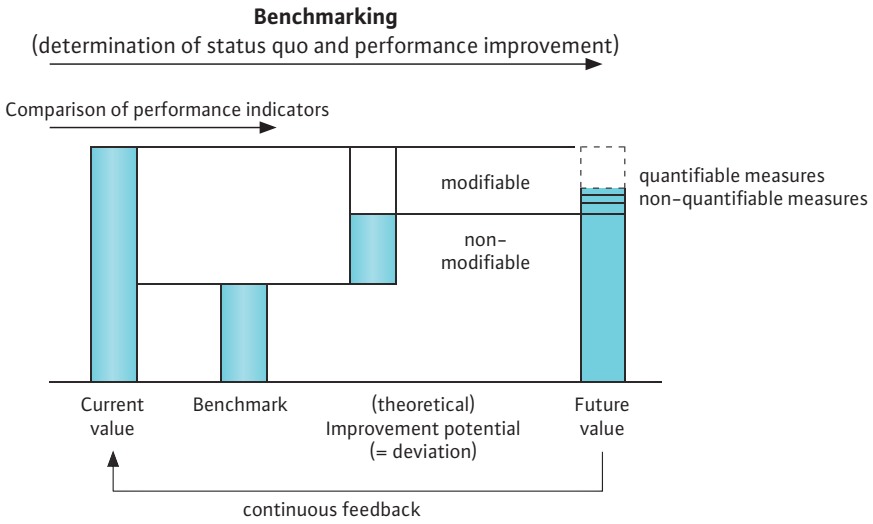
Benchmarking makes a significant contribution to securing and improving the quality, efficiency and reputation of municipal services in the general interest.

8.1 Key instrument for performance

Comparing one's own company with other companies and making improvements by learning from the best in a peer group – that is how the German water sector defines benchmarking. It is therefore more than just comparing performance indicators. Indeed, benchmarking is a systematic and continuous process for identifying, learning about and adopting successful instruments, methods and processes from benchmarking partners. The current rules are also described in greater detail in the standard DIN ISO 24523.

Benchmarking elements

19



Source: DIN ISO 24523:2017

By participating in benchmarking projects, the companies involved regularly identify potential for improving efficiency. They can use this as a basis for developing and implementing specific measures to "elevate" these efficiencies, so that an increase in performance can be achieved for the sector as a whole.

There are often several "bests" in one project. This is because for any given situation that can be illustrated with performance indicators, there will be one participating company that is ahead – the benchmark. In this regard, individual performance indicators are seldom of informative value but must always be seen within the overall context. No-one is leading in all aspects. Participants primarily learn from, and together with, other participants. The focus is on exchange.

The presentation of performance in benchmarking projects are divided into the five performance areas (5-pillar model):

- **Reliability:** Longer and more frequent periods of supply interruptions are unheard of in Germany. This is due to high technical standards and the exceptionally good condition of facilities and distribution systems as compared to the rest of Europe. The German water supply companies experience very small losses of water compared to the rest of Europe. Capacity utilisation of wastewater treatment facilities is generally good with sufficient reserves available.
- **Quality:** Legal requirements for the quality of drinking water are complied with across the board. People have drinking water of an exceptional quality available at all times and in sufficient quantities. Moreover, wastewater is treated to a high standard. Companies are responding to the new challenges, e.g. trace substances, microplastics and multidrug-resistant germs, and are looking, together with participating agencies, for appropriate solutions for each of them.
- **Customer satisfaction and customer service:** Whether the water suppliers or wastewater disposal utilities are meeting their high aspirations towards their customers is assessed by the companies on a local basis by way of regular opinion surveys. The findings demonstrate that the water sector does meet the high expectations of all consumers.
- **Sustainability:** The careful management of water resources to preserve their stability and natural ability to regenerate is essential to the German water sector.
- **Efficiency:** The German water sector's goal is to provide a high level of reliability and quality of supply and disposal at reasonable prices while taking into account the aspect of sustainability.

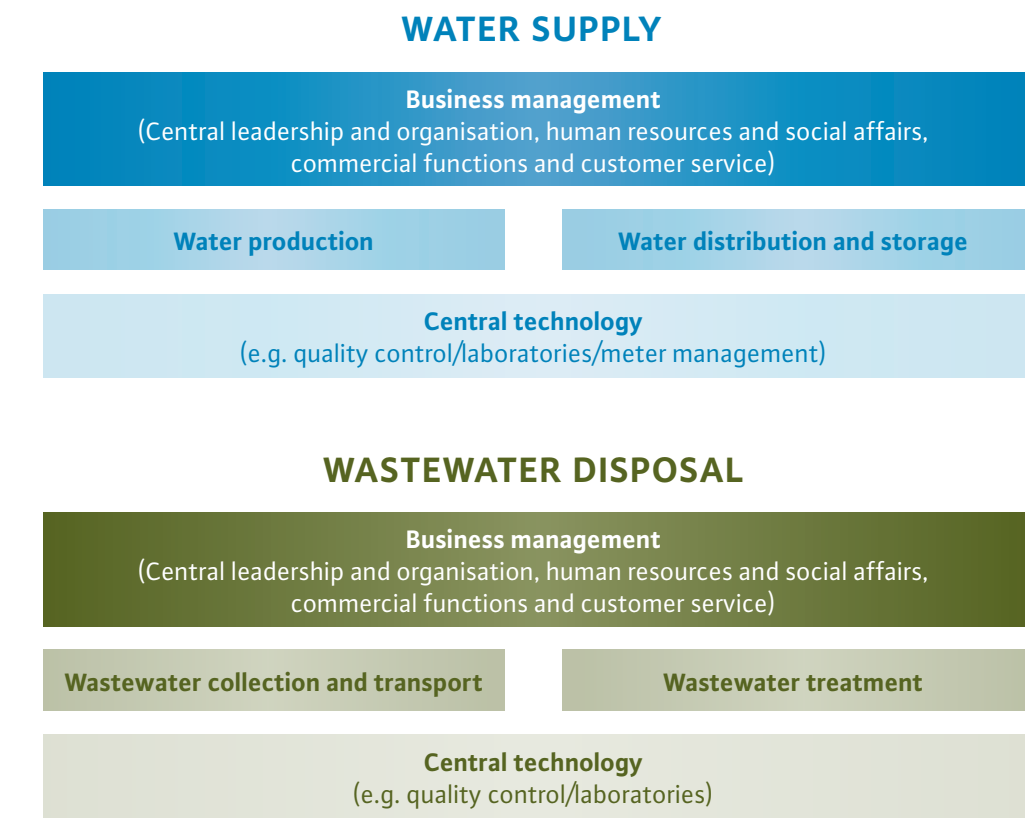
8.2 Success factors for benchmarking

A range of factors are crucial to successfully establishing and implementing benchmarking projects and performance indicator assessments. The key requirement for successful assessments is that the participating companies can voluntarily and confidentially make comparisons with others.

A good and broad basis for comparison is also important. This requires the highest possible level of participation in benchmarking projects.

An exchange in this way leads to useful results for the participating companies, if it takes place within a protected discussion space with the largest possible group of suitable assessment partners.

Example outline of the tasks involved in the drinking water supply and wastewater disposal 20



Source: DIN ISO 24523:2017

Benchmarking requires a plausible and reliable base of data in order to eliminate, as far as possible, ambiguity in definitions, collection, and delineation differences. A common understanding of the process as shown in Fig. 20 is helpful here. Data plausibility is supported by practicable definitions, explanations and indicator values and checked by external project coordinators.

A comprehensible definition of the performance indicators is particularly important for determining the status quo. Special framework conditions which are of relevance to companies or to the other participants must be taken into account as far as possible. It must be possible for each participant to identify the causes for its ranking in a group and to distinguish modifiable from non-modifiable causes.

Benchmarking does not end with the comparison of performance indicators. The learning and improvement process only starts after the assessment. Many companies that have been taking part in benchmarking for years, rate the mutual exchange between participants in the project as the most important success factor. While the assessment of performance indicators mainly provides indications of possible potential for improvement, specific improvement measures are also identified through the mutual exchange.

The resulting contacts are used beyond the projects themselves and enable an unconvoluted mutual transfer of knowledge and solutions to problems.

8.3 Benchmarking as a generator of catalysts for improvement

Benchmarking often leads to the reconsidering of the company's goals. One example: a company learns that its own energy consumption is high compared to others. On the basis of such knowledge, the company´s own long-term goals are adjusted and starting points are identified that could contribute to achieving them. Only then does the search for appropriate optimisation measures begin. This is assisted by the following questions: Which measures have other companies taken in a particular context? Will these measures also work for the own company, and what interdependencies need to be considered? Comparative figures then work as a trigger to question long-established processes, initiate changes, and assess their effects over time.

Optimisation steps which result from benchmarking can be found both on a technical and organisational level. There is strong evidence that companies have improved in all five performance areas after introducing benchmarking in their companies. Frequently mentioned examples include the examination of performance indicators on energy use, in particular comparisons of the specific energy use of individual process steps or facilities (e.g. wastewater treatment plants, pumping stations). Comparing performance indicators can influence strategic decisions within companies. Examples of this are long-term rehabilitation planning, optimisation of storage tank volumes, the procurement of electricity, the collection of meter data, the premature replacement of plant components and much more. Further significant findings can also act as triggers for improvements to further education and training opportunities for employees or for the reduction of workplace accidents.

Looking at the performance indicator results and the knowledge gained from the exchange of experiences also often leads to a recurring analysis of internal processes. Decisions regarding particular measures and projects are thus influenced and repeatedly reviewed.

8.4 Benchmarking has proven itself over time

Meanwhile, numerous projects and peer groups have been established and have proven themselves. Figure 21 shows an extract of examples in the areas of drinking water and wastewater:

Variety of benchmarking projects in the areas of drinking water and wastewater 21

Examples

DRINKING WATER

- *Länder* benchmarking projects
- International projects, e.g. European Benchmarking Co-operation
- Long-distance water supplier benchmarking
- Major water supplier benchmarking
- Process benchmarking, e.g. waterworks, procurement, pipeline construction, personnel
- Exchange of experience within drinking water distribution systems
  - Large urban water suppliers
  - Local small and medium-sized water suppliers

WASTEWATER

- *Länder* benchmarking projects
- International projects, e.g. European Benchmarking Co-operation
- Major city benchmarking
- Benchmarking of water associations with special legal status
- Process benchmarking, e.g. wastewater treatment plants, sewer network, analytics, IT, personnel ...

Source: Confideon, Aquabench, Rödl & Partner, IWW

In addition to the *Länder* benchmarking projects, there are numerous nationwide projects for which, for example due to their use of similar comparative figures, there is great potential from the exchange of experiences. Examples for this are: the comparison of major water suppliers (which account for approximately 13 million citizens), the major-city comparison of wastewater disposal utilities or the comparison of long-distance water suppliers.

In addition, water suppliers and wastewater disposal utilities use process benchmarking, in which the comparison is defined more precisely and differentiated at a process level, for the specific optimisation of many key processes within companies.

Examples of process benchmarking projects in the area of drinking water are waterworks, procurement, pipeline construction, IT, personnel etc. In the area of wastewater, there is process benchmarking for the processes in wastewater treatment plants sewer network, analytics, personnel, IT etc.

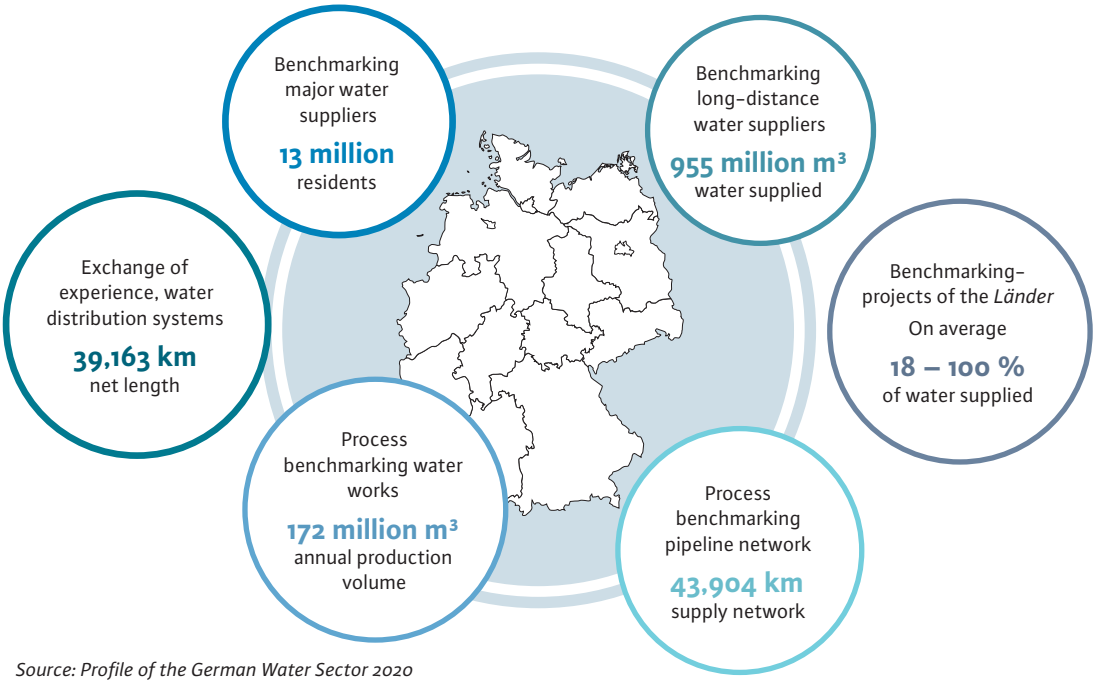
Furthermore, there are international projects such as the European Benchmarking Cooperation.

Examples of participation in the various projects are presented in Fig. 22 and Fig. 23. Many companies take part in several projects, since new insight can be obtained from each project through the diverse approaches and peer groups. In addition, internal benchmarking is used (e.g. several operating sites within a company are compared), or even self-organised local comparison circles (e.g. in Bavaria or Schleswig-Holstein), which are not taken into account in the figures in Fig. 22 and Fig 23. Thus, the frequently published figures on water supplied or degree of the *Länder*-wide projects do not reflect the actual prevalence of benchmarking. In fact, the prevalence is significantly higher through – partly simultaneous – participation in other national and international benchmarking projects.

These examples make it clear that the water suppliers and wastewater disposal utilities are convinced of the benefit of the instrument of benchmarking and derive improvement potential for their companies from it.

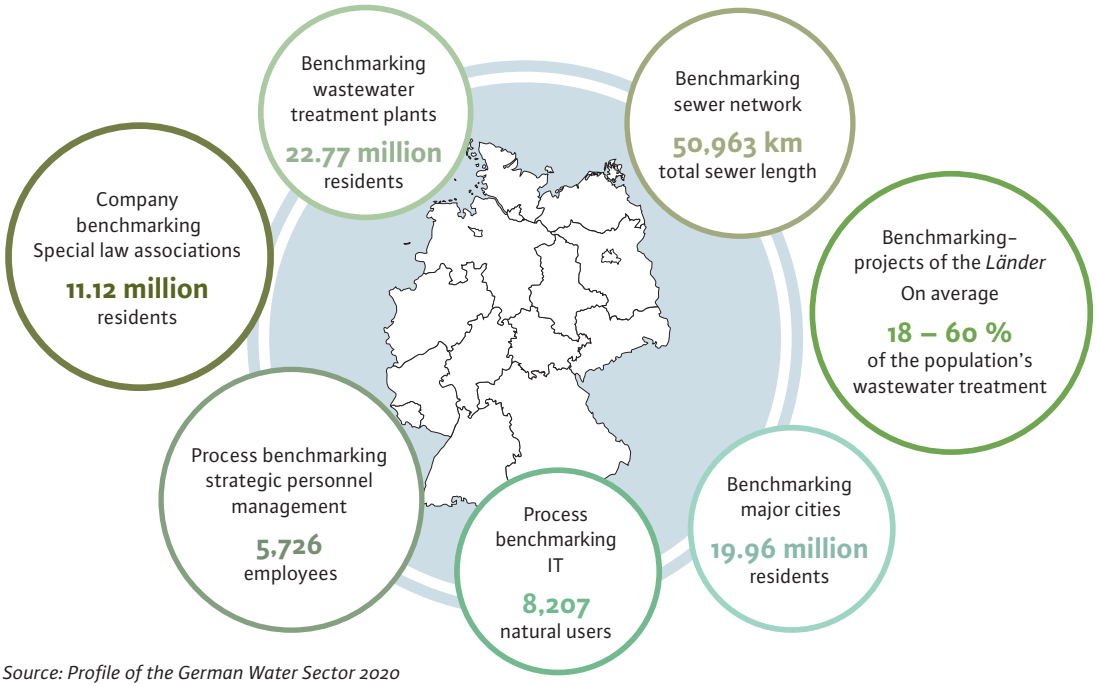
The associations of the water sector have supported the many various benchmarking projects for around twenty years now; the projects are funded and carried out by the economic affairs, interior and environment ministries of the *Länder* or by the companies themselves. The key results, for example from the *Länder* benchmarking projects, are available to the public through comprehensive project reports. More detailed information on benchmarking and the *Länder*-wide projects is available from the associations that produced this profile.

Examples of participation in benchmarking projects Drinking water 22



Source: Profile of the German Water Sector 2020

Examples of participation in benchmarking projects Wastewater 23



Source: Profile of the German Water Sector 2020

8.5 Further development

Benchmarking projects have been further developed successfully in recent years. This means that, in addition to the continuous development processes in the *Länder* projects, there are offers that support an easy entry for new companies.

For a long time, the IWA Performance Indicator System was used in Germany as a starting point for the performance indicators used in the benchmarking projects in the drinking water supply sector. A corresponding IWA system for wastewater disposal was published in 2003. Due to the specific framework conditions of individual benchmarking projects, the performance indicators within the projects have been further developed over time with the result that findings from the benchmarking projects were only able to be compared to each other to a very limited extent.

Definitions for selected performance indicators have been developed by the associations (DVGW 2016, DWA 2008) thus making it possible for uniformly defined performance indicators to be used in the various benchmarking projects. These performance indicator systems with uniformly defined indicators ensure that the existing benchmarking systems can be further developed compatibly. To this end, the existing systems are tested on the ground and – where necessary – modified. The respective project partners independently select – as has been the case to date – their performance indicator set. This approach secures the progress achieved to date while also pursuing a consistent course of continuous further development.

It is important to the sector that water supply and wastewater disposal companies that participate in benchmarking projects reflect the highest possible proportion of the population, i.e. that participation rates continue to increase. In this regard, the LAWA considers it an ambitious target that 80 per cent of the water supply or residents connected to public wastewater treatment system is covered by companies which take part in benchmarking. In addition to the *Länder* benchmarking projects, the numerous cross-national benchmarking projects and process benchmarking projects also contribute to this. In order to achieve the goal in all *Länder*, it is necessary to convince more water supply and wastewater disposal companies of the benefits of participating.

In addition, the LAWA stresses that efficiency and transparency in the water sector is not only a matter for water and wastewater companies alone but also a duty of the *Länder* and municipalities with their regulatory and supervising bodies, municipal decision-makers and associations (e.g. municipal umbrella associations, business and professional associations).

The associations will continue to make benchmarking a subject of discussion in their association work and public relations activities (publications, events, direct communications to member companies, etc.). In this respect it is important to expand on positive examples from the *Länder* benchmarking projects.

The water sector associations continue to promote regular participation in benchmarking projects among water supply and wastewater disposal utilities. They also call for their members to further expand local dialogue with citizens as well as local politicians and the public, and advocate achieving a higher degree of transparency for the sector as a whole at the federal level.

SELECTED WATER SUPPLY AND WASTEWATER DISPOSAL BENCHMARKING PROJECTS

Baden-Wuerttemberg	www.abwasserbenchmarking-bw.de www.roedl.de/benchmarking/bw
Bavaria	www.abwasserbenchmarking-bayern.de www.roedl.de/benchmarking/by
Brandenburg	www.kennzahlen-bb.de
Hesse	www.bkwasser.de www.roedl.de/benchmarking/he
Mecklenburg-Western Pomerania	www.kennzahlen-mv.de
Lower Saxony	www.kennzahlen-h2o.de www.abwasserbenchmarking-nord.de
North Rhine-Westphalia	www.abwasserbenchmarking-nrw.de www.roedl.de/benchmarking/nrw
Rhineland-Palatinate	www.wasserbenchmarking-rp.de
Saarland	www.wasserbenchmarking-saarland.de
Saxony	www.abwasserbenchmarking-sachsen.de www.kennzahlen-sn.de/start.html
Saxony-Anhalt	www.kennzahlen-lsa.de
Schleswig-Holstein	www.abwasserbenchmarking-nord.de
Thuringia	www.roedl.de/benchmarking/th
Major water suppliers	www.roedl.de/benchmarking/grow
Long-distance water suppliers	www.aquabench.de/aktuelles/news-fernwasser.html

THE ASSOCIATIONS

This Profile was produced by:

Arbeitsgemeinschaft Trinkwassertalsperren e. V. (ATT)
[Association of Drinking Water from Reservoirs]
ATT is a non-profit association consisting of around 40 water supply companies, water associations, reservoir operation and administration bodies, as well as university, testing and research institutes in Germany and Luxembourg, concerned with the production, treatment and distribution of drinking water from reservoirs.

Bundesverband der Energie- und Wasserwirtschaft e. V. (BDEW)
[German Association of Energy and Water Industries]
BDEW and its regional organisations represent over 1,900 companies, 1,200 of which are active in the water sector. Its members are local and municipal, regional and national companies, which represent around 90 per cent of all electricity sales, over 60 per cent of local and district heat supply, 90 per cent of natural gas sales as well as 80 per cent of drinking water abstraction and around a third of wastewater disposal in Germany.

Deutscher Bund der verbandlichen Wasserwirtschaft e. V. (DBVW)
[German Alliance of Water Management Associations]
DBVW is a union of nine Länder associations. It represents the interests of water sector associations responsible for the maintenance of water bodies, coastal protection and flood control, drinking water supply, wastewater disposal etc. Around 2,000 water sector associations (public-law corporations with self-administration) are represented by the DBVW. The DBVW unites all areas of the water sector and thus has extensive experience in terms of integrative water management.

Deutscher Verein des Gas- und Wasserfaches e. V. –
Technisch-wissenschaftlicher Verein (DVGW)
[German Technical and Scientific Association for Gas and Water]
DVGW promotes the gas and water supply sector, taking particular account of technical and hygienic safety as well as environmental protection. With its around 14,000 members, the DVGW elaborates generally accepted technical rules for gas and water. Its tasks include the control and certification of products, persons and companies, the initiation and promotion of research projects and training for the whole spectrum of topics relating to the gas and water sector. The non-profit organisation is economically and politically independent and neutral.

Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e. V. (DWA)
[German Association for Water, Wastewater and Waste]
DWA intensively supports the development of secure and sustainable management of water resources. As a politically and economically independent organisation, the DWA works in the fields of water management, wastewater, waste and soil protection. With around 14,000 members, it is one of the largest associations in Europe in this field and possesses special professional competence in terms of rule-setting, education and informing the public.

Verband kommunaler Unternehmen e. V. (VKU)
[German Association of Local Utilities]
VKU represents around 1,500 municipal utilities and local companies in the fields of energy, water/wastewater, waste management and telecommunications. The municipal water sector has its own independent representation within the VKU, which advocates the prioritisation of responsibility for municipalities in the supply of drinking water and disposal of wastewater. The VKU represents its members' interests with regard to regulatory, environmental, and economic issues at the *Länder*, national and European level.

Statement of the Associations of the Water Industry on Benchmarking in the Water Sector

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 Water Management Associations
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-Vorsitzender	BGW-Vizepräsident	DBWW-Präsident	DVGW-Präsident	DWA-Präsident	VKU-Präsident
Gummersbach, 30.06.2005	Berlin, 30.06.2005	Hannover, 30.06.2005	Bonn, 30.06.2005	Hennef, 30.06.2005	Köln, 30.06.2005

LIST OF FIGURES

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