

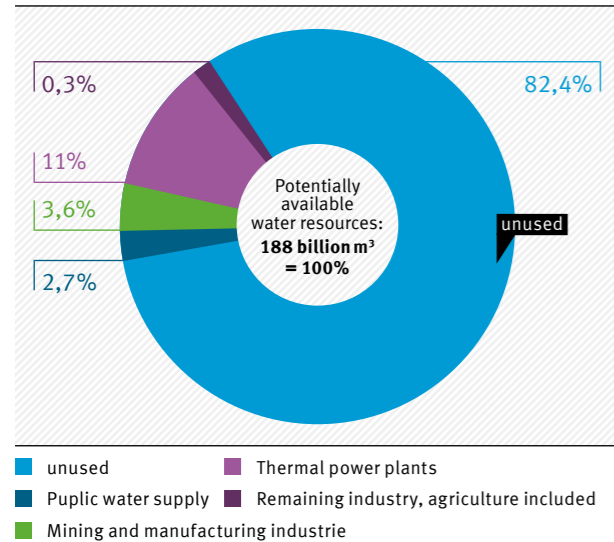
## Public water supply

### Available water supply and water use

With an available water supply of 188 billion m<sup>3</sup> Germany is a country rich in water resources. In 2010 around 33.1 billion m<sup>3</sup> of water was abstracted from groundwater and surface waters by industry and for supplying private households. This is less than 20% of the available water supply, i.e. over 80% of the water available currently remains unused. Applied to the abstracted water volumes this means that the public water supply abstracted around 5.1 billion m<sup>3</sup> of water to supply the population with drinking water. Groundwater reserves are the most important source of drinking water. As the second biggest user of water, the mining sector and the manufacturing industry abstracted around 6.8 billion m<sup>3</sup> for industrial purposes. Thermal power plants have the largest water demand – approx. 20.7 billion m<sup>3</sup> of water as cooling water for energy production. Water used for agriculture only plays a minor role in Germany.

fig. 1



### Available water supply and water use 2010



Source: Federal Statistical Office (Destatis), 2013

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Umweltbundesamt  
Federal Environment Agency  
Section II 2.1  
Postfach 14 06  
06844 Dessau-Roßlau  
Phone: +49 340-2103-0  
E-Mail: [info@umweltbundesamt.de](mailto:info@umweltbundesamt.de)  
Internet: [www.umweltbundesamt.de](http://www.umweltbundesamt.de)  
Author: Bernd Kirschbaum, Simone Richter

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## Water Management in Germany Water Supply – Waste Water Disposal

### Figures

#### Public water supply in figures (2010)

- ▶ water utilities > 6,000
- ▶ water volume: ~ 5.1 billion m<sup>3</sup>
- ▶ length of supply network: ~ 530,000 km
- ▶ average annual expenditure for a two-person-household: 206 €
- ▶ investments: € 2.2 billion
- ▶ employees: ~ 60,000

#### Public waste water disposal in figures (2010)

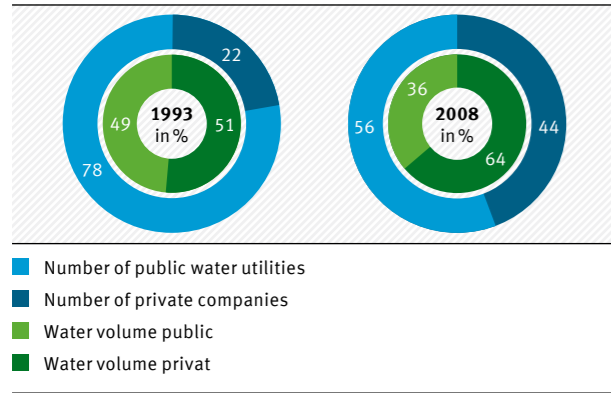
- ▶ waste water treatment plants: almost 10,000
- ▶ treated waste water volume: 10.1 billion m<sup>3</sup> (5.2 billion m<sup>3</sup> waste water and 4.9 billion m<sup>3</sup> storm water and sewer infiltration water)
- ▶ length of public sewage network: ~ 540,000 km, ~ 66,000 storm water discharge systems
- ▶ average annual expenditure for a two-person-household: 243 €
- ▶ investments: € 4.4 billion
- ▶ employees: ~ 40,000

## Types of companies for public water supply

In Germany, ensuring water supply is a mandatory duty of the state. Responsibility lies with the municipalities, which can use a range of organisational and legal forms to comply with this duty. They can supply water themselves, can establish water and special-purpose associations within the framework of municipal cooperation or can commission a third party with the task while retaining municipal supervision. This means that public and private types of companies are working side by side. However, the number of privately organized companies has increased in recent years, and they now comprise more than 40% of water companies. They supply over 60% of the water volume.

fig. 2

## Companies for public water supply



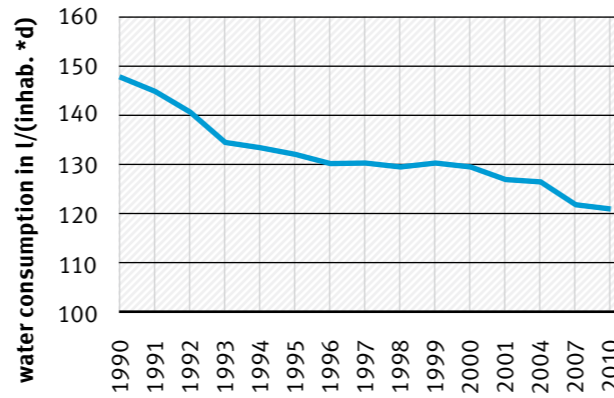
Source: Profile of the German Water Sector, 2011

## Individual water consumption

In Germany, almost all households and public establishments such as schools and hospitals are connected to the public water supply, i.e. every citizen has access to clean drinking water. Over the past 20 years drinking water consumption decreased by 18% to 121 litres per person per day in 2010. This drop was primarily due to the use of water saving household appliances and fittings, better consumer awareness, and a water price generally linked to consumption.

fig. 3

## Individual water consumption



Source: Federal Statistical Office, 2013

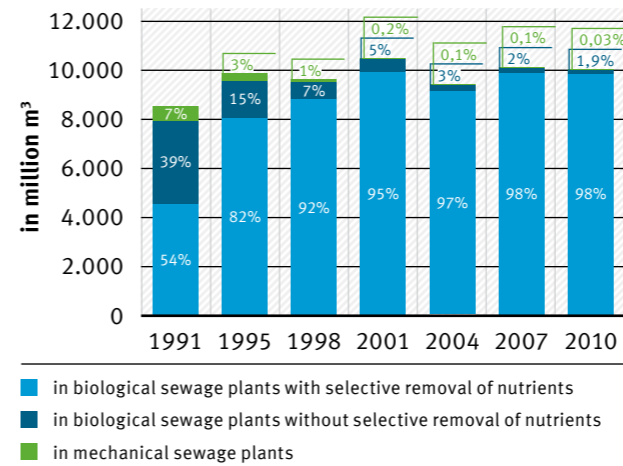
## Public waste water disposal

### Waste water treated in public sewage plants

A total of 10 billion m<sup>3</sup> of waste water was treated in public sewage plants in 2010, almost exclusively through biological waste water treatment. The volume of waste water is composed of sewage water, rainwater and infiltration water in almost equal parts. The expansion of waste water treatment plants carried out in recent years, the high level of connection to the sewerage system and to municipal mechanical-biological plants and plants with selective nitrogen and phosphate removal (implementation of Annex 1 of the Waste Water Ordinance and Directive 91/271/EEC) have brought about a significant improvement in the biological water quality. In 2005 municipal waste water treatment plants achieved a reduction in nutrient loads of 90% for phosphorous and 81% for nitrogen. The EU Urban Waste Water Treatment Directive requires a reduction of 75% for both substances.

fig. 4

## Waste water volumes treated in public sewage plants



Source: Federal Statistical Office, 2013

### Sewage system capacities

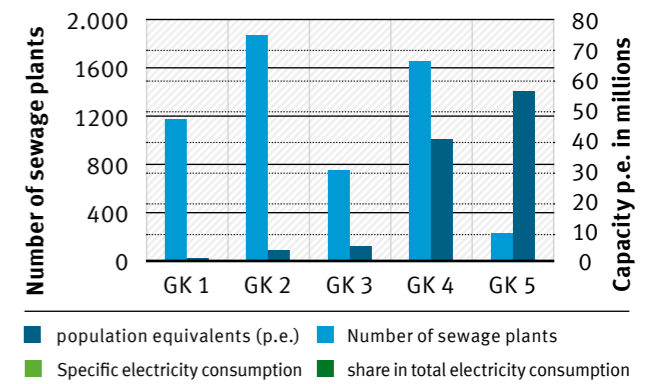
With more than 6,900 municipal waste water disposal companies and a total of 10,000 waste water treatment plants, the German waste water sector is tightly. Currently around 78 million inhabitants are connected to centralized municipal sewage plants. Additionally, around 30 million population equivalents from industry, commerce and agriculture are also treated at the municipal sewage plants. From 2002 to 2011, nitrogen removal increased from 74% to 82%. In 2011, the nationwide average of phosphorus removal was 91% and the phosphorous concentration in the sewage plants effluent was an average of 0.74 mg/l. All in all, on a nationwide average the requirements of the European Urban Waste Water Treatment Directive have been complied with or clearly exceeded.

### Electricity consumption of public sewage plants

Waste water plants are one of the biggest consumers of electricity. The almost 10,000 municipal sewage plants in Germany consume around 3,200 gigawatt-hours (GWh) of electricity per year. This is equivalent to the capacity of a typical modern coal-fired power plant. The specific electricity consumption greatly depends on the capacity of a

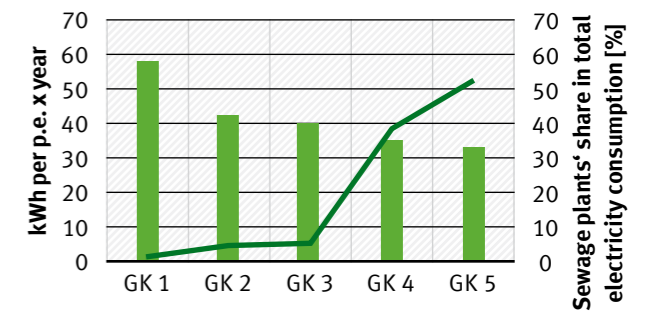
fig. 5

## Sewage plant capacities



■ population equivalents (p.e.) ■ Number of sewage plants  
■ Specific electricity consumption ■ share in total electricity consumption

## Electricity consumption of public sewage plants



GK 1 < 1,000 population equivalents  
GK 2 > 1,000 - 5,000 population equivalents  
GK 3 > 5,000 - 10,000 population equivalents  
GK 4 > 10,000 - 100,000 population equivalents  
GK 5 > 100,000 population equivalents

Source: German Association for Water, Wastewater and Waste, 2011

sewage plant. The categories 4 and 5 have significantly lower specific electricity consumption than smaller plants (cf. fig. 5 – left). There are only around 2,200 category 4 and 5 sewage plants, but they treat over 92% of population equivalents and account for 90% of total electricity consumption (cf. fig 5 – green line and right). The current electricity consumption of municipal sewage plants is responsible for around 2.2 million tonnes of CO<sub>2</sub> emissions. Increasing energy efficiency in waste water treatment processes can make a significant contribution to CO<sub>2</sub> reduction.