

# International Comparisons of Water Sector Performance

## Executive Summary

The purpose of this report is to compare the performance of the water sector in England and Wales since 1990 with that of key comparator countries, specifically France, Ireland, Italy, Spain and Germany.

Drawing comparisons between different water jurisdictions is notoriously difficult, which is the case for many state-run water services. However, the water sector in England & Wales is transparent and its performance is easy to monitor. Despite the difficulties, Global Water Intelligence (GWI) has trawled the available data to construct six points of meaningful comparison:

**Water quality** - how good is the water that comes out of the taps

**The quality of wastewater treatment** - for which we've used secondary treatment processes as a proxy

**Customer service**

**Non-revenue water** - the amount of water 'lost' in the system through leakage, faulty meters or unauthorised use

**The charge of water and wastewater to customers**

**The total cost to run the service per person**

The water sector in England & Wales has outperformed those in France, Ireland, Italy and Spain since 1990 in terms of the most important service indicators. In five out of the six measures, the water sector is either the top performer or the most improved. In the sixth measure - the quality of sewage treatment - England & Wales is the second best performer.

The water sector in Germany delivers a broadly similar quality service to that of England and Wales. It does so, however, at greater expense. On a like for like basis, prices in Germany are about 12 per cent higher than in England & Wales.

There is a strong case for stating that the England & Wales regulated system delivers the best value for money of all the utility sectors in this study. The model has driven up standards and increased efficiency.

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Water Quality		% change since 1990	Wastewater Treatment		% change since 1990
E&W	99.71%	+0.96%	Germany	91.3%	+16.3%
Germany	99.70%	+0.10%	E&W	88.6%	+31.9%
France	99.65%	+0.54%	Spain	80.9%	+51.1%
Italy	99.57%	+0.06%	France	79.3%	+2.0%
Spain	98.89%	+3.31%	Italy	57.8%	-3.0%
Ireland	96.50%	+5.57%	Ireland	45.3%	+43.6%
Customer Service			Non-revenue Water		% change since 1990
E&W	5.8		Germany	7.18%	-5.40%
Ireland	2.7		Spain	18.90%	-4.80%
Spain	2.7		France	21.25%	-4.30%
France	2.6		E&W	23.37%	-7.74%
Germany	2.5		Italy	34.71%	+10.40%
Italy	1.5		Ireland	44.41%	-2.40%
Charge to Customers		% change since 1990	Total Costs per Person		% change since 1990
Germany	€4.66	+15.03%	Italy	€156.39	+82.27%
E&W	€4.14	-21.80%	Spain	€249.72	+56.59%
France	€3.48	+38.09%	E&W	€272.70	-36.91%
Italy	€1.50	+15.14%	Ireland	€329.22	+147.23%
Spain	€1.32	+93.90%	Germany	€343.40	+5.73%
Ireland	€0.06	0.00%	France	€521.47	+33.81%

**Footnote:** the numbers displayed are in average and real terms

# International Comparisons of Water Sector Performance

## Introduction

Comparing value for money in water between utilities or countries is not straightforward for the following reasons:



**Geography:** There are natural variations in the cost of supplying water according to location.

**History:** Old networks are less efficient than new networks.



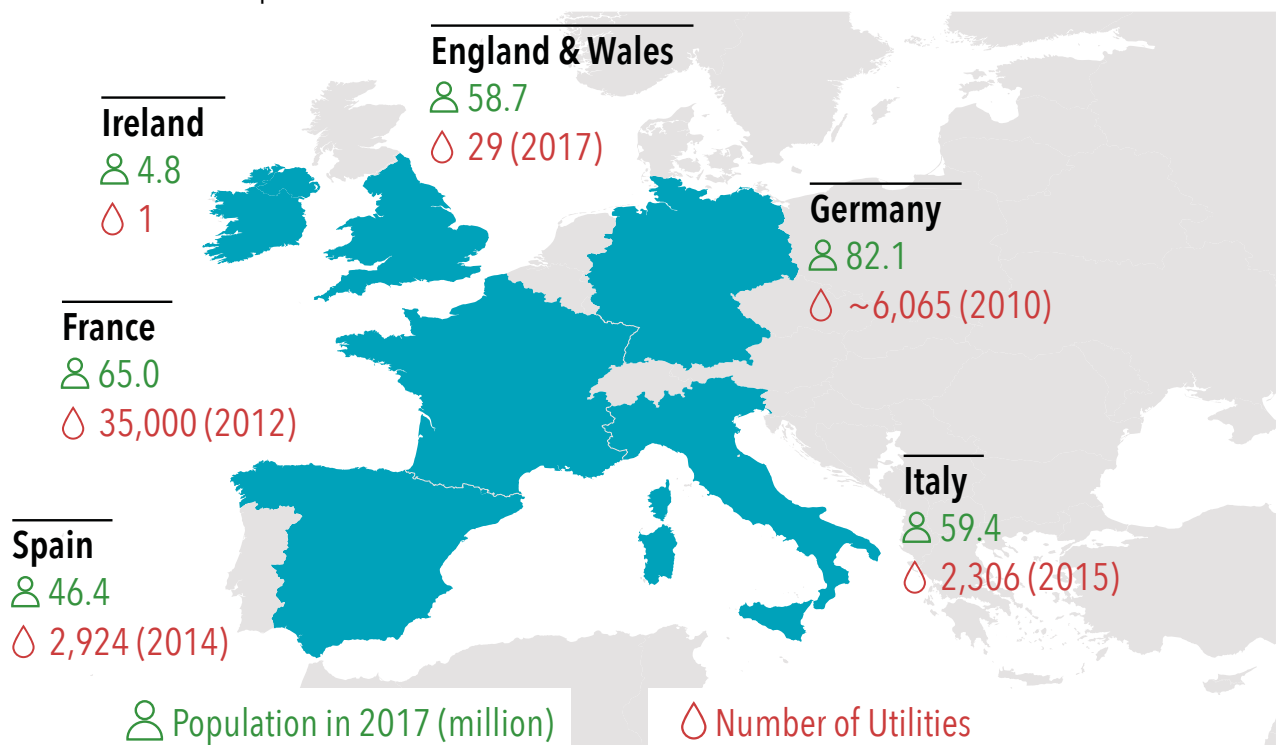
**Social values:** There are regional variations in what customers consider acceptable levels of service.

**Transparency:** Many utilities are very reluctant to publish data which might allow their performance to be compared with other utilities.



**Finance:** Customer tariffs rarely reflect the full capital cost of water services.

*International Comparisons of Water Sector Performance* compares the quality of water and wastewater utilities in six European countries (presented in the map) for the past 28 years, based on five key service performance indicators which are outlined below. Total expenditure (totex) per capita on services over the same period is then presented between the six target countries to give an indication of the totex required for overall service improvements.



Source: Istat, iAgua, BIPE-FP2E study, Irish Water, German Federal Statistical Office, DWI

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In this report, the following sections are presented and analysed:

1 Drinking water quality

2 Wastewater treatment

3 Customer service

4 System efficiency

5 Tariffs

6 Totex per Capita

For the report, more than 220 sources have been examined and several national agencies and statistics offices contacted directly, such as: the Drinking Water Inspectorate in the UK; the *Umweltbundesamt* in Germany; the Ministry of Health, Consumer Affairs and Social Welfare of Spain; the Environmental Protection Agency in Ireland; the Italian Regulatory Authority for Electricity Gas and Water; and the Ministry of Social Affairs and Health of France.

## 1. Drinking Water Quality

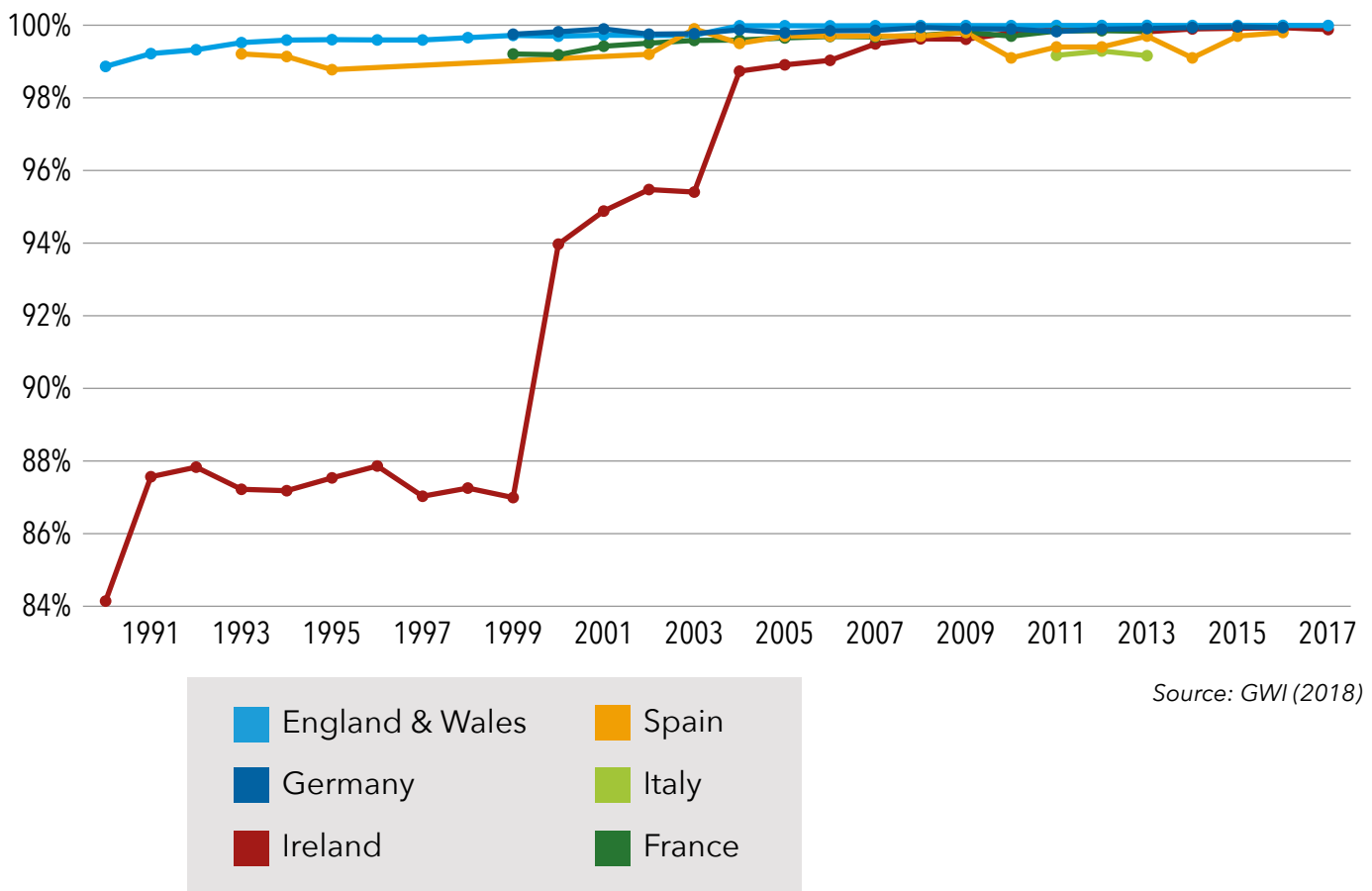
**Description:** Water suppliers and local authorities are required to take appropriate actions to safeguard public health by providing high-quality drinking water. There are both national and international legal frameworks that measure water quality. In terms of international legal frameworks, from 1990 to 2003 countries were guided by European Commission (EC) Drinking Water Directive 80/778/EEC. A new EC standard, Drinking Water Directive 98/83/EC, was published in 1998, which gradually replaced the old standard and came into complete force after 2003. Countries incorporated these standards into their own national standards. As per the Drinking Water Directive, each country must report the compliance rate of three subsets of parameters: microbiological, chemical and indicator (others).

This section begins with an analysis of **microbiological and chemical parameters**, as these two parameters are predominantly used in country's reports. Analysis of the **indicator parameters**, which shows the effectiveness of the purification treatment and the organoleptic characteristics of the water, can be found in Appendix 8.1. Finally, this section presents an assessment of the **overall compliance rate**, which is the number of compliant samples over the number of total samples taken.

**Findings:** For microbiological parameters, Figure 1.1 shows that England & Wales and Germany have the highest compliance rates. France also performed well from 1999 to 2013. Spain's compliance rate varies, with some decreases during 1993, 2003, 2009 and 2013. By 2014, Spain was the worst performer, followed by Italy. Furthermore, Ireland's compliance rate used to be below 90% in the 1990s, because Ireland was measuring coliforms alone and the number of samples taken and the samples in compliance were low. However, Ireland has been making efforts to reduce *E. coli*. and *Enterococci*, and has caught up with the best performers in recent years. As displayed in Figure 1.2, England & Wales made great progress in enhancing their chemical

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Figure 1.1 Microbiological parameter compliance rate (%)

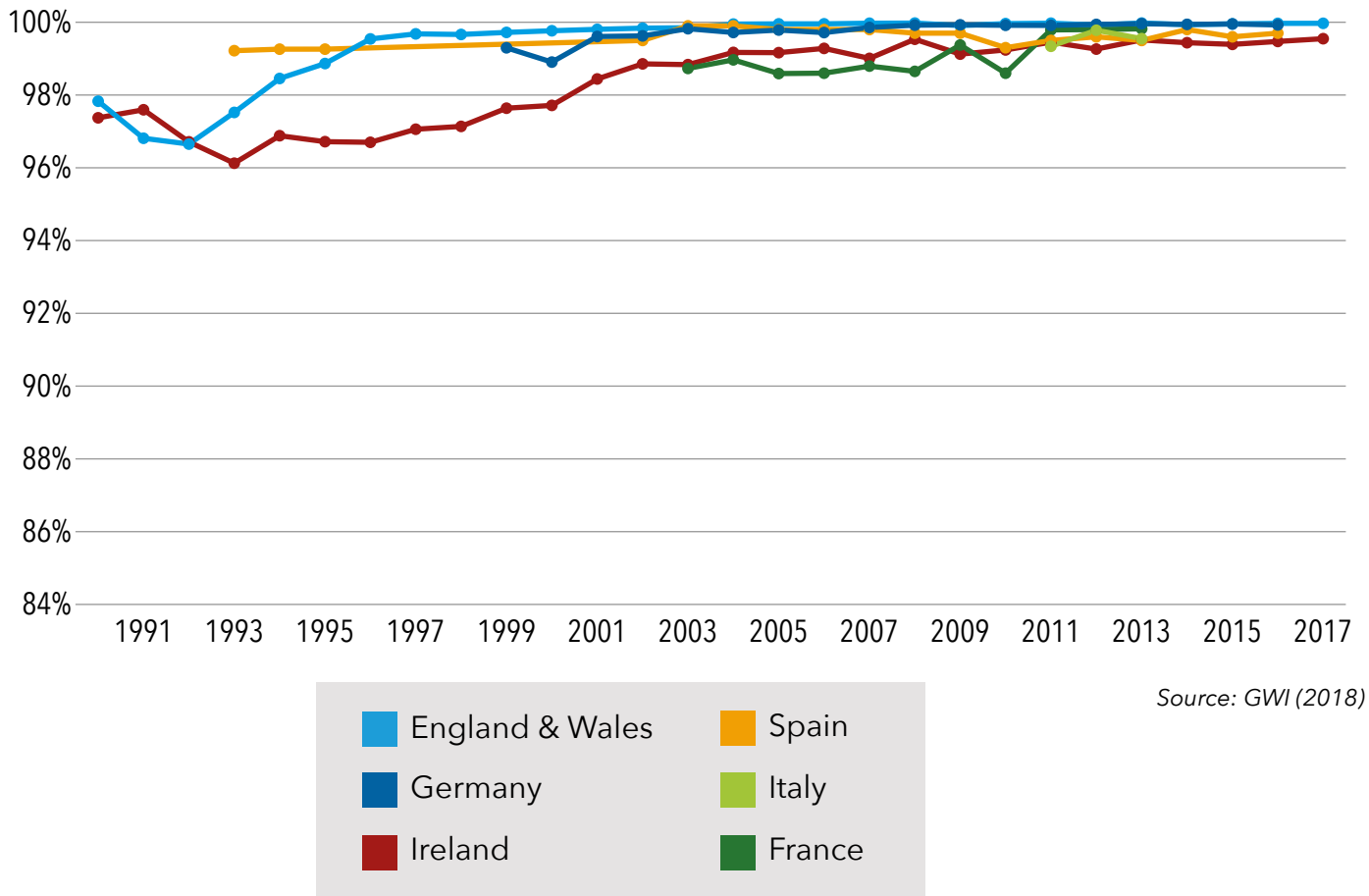


Source: GWI (2018)

parameter compliance rate during the 1990s. Spain also improved greatly during the 1990s, but suffered a steady decrease from early 2003 to 2010. Germany's performance is very similar to England & Wales after 2008, both having close to 100% compliance rates. Ireland started very behind but improved over the years. The Environmental Protection Agency (EPA) has reported that the level of monitoring for a number of chemical parameters in drinking water in 2004 was insufficient. Many local authorities did not carry out any monitoring for some of these chemical parameters. The main reason for this was the difficulty in sourcing laboratories capable of carrying out the required analysis. In addition, for some parameters there is no laboratory in Ireland capable of doing the analysis, thus requiring outsourcing to laboratories in the United Kingdom. Italy only presents information from 2011 to 2013, which is at an average of 99.56%. Please note that the information for France only regards pesticides, as this is the only substance they include in chemical parameter.

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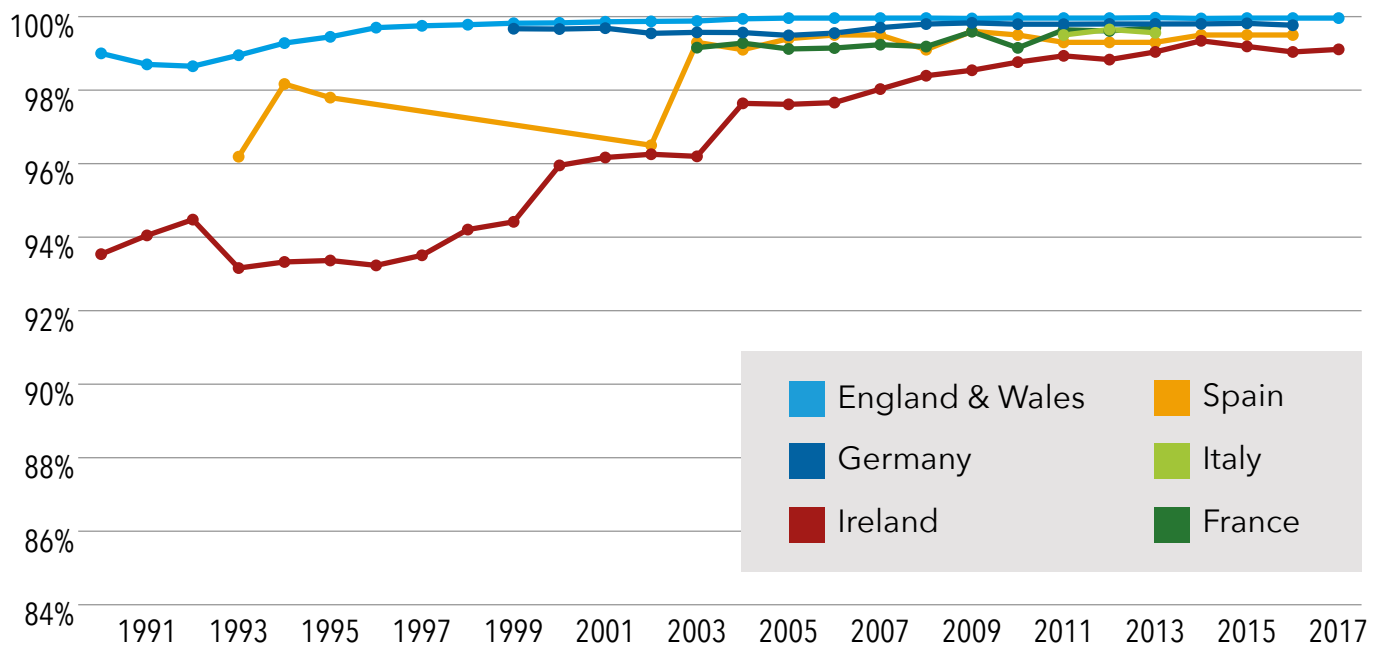
Figure 1.2 Chemical parameter compliance rate (%)



Source: GWI (2018)

During the late 1990s, drinking water standards became more stringent, so water utilities have invested a significant amount of resources in order to comply with the EC Drinking Water Directive, which has in general led to a rapid increase in overall compliance rates. England & Wales have the highest overall compliance rate since 1990, which has remained very stable over the past few years. Overall, France has a fairly stable compliance rate from 2003 onwards, and Germany has a high compliance rate that is only slightly below that of England & Wales. Spain did not perform well during the 1990s, but it has improved considerably since 2002 and by 2016 it was close to Germany's compliance rate. Italy only presents information from 2011 to 2013, and its compliance rate averages at 99.57%. Among the six countries, Ireland has the lowest average compliance rate of 96.50%. However, Irish Water has made efforts to comply with the standards set by the EPA in the past few years, so there has been a rapid increase in compliance since 1990.

**Figure 1.3 Overall compliance rate (%)**



Source: GWI (2018)

## 2. Wastewater treatment

**Description:** For this indicator, the trend for the percentage of the population connected to “above secondary” wastewater treatment is presented and analysed, which is calculated by adding connections to tertiary and secondary wastewater treatments (for more information, please see [Appendix 8.2](#)). Secondary treatment includes removal of biodegradable organic matter, suspended solids, and nutrients, while tertiary treatment involves further removal of suspended solids, which is typically achieved using filtration, membrane bioreactors (MBRs) and/or disinfection.

The result indicates to what degree utilities prioritise adding wastewater service connections, which is especially emphasised by basic service provision initiatives in the 1900s, and how they strive to upgrade current wastewater treatment to comply with more stringent standards.

**Findings:** As outlined in Figure 2.1, there has been a general rise in the percentage of the population connected to above secondary treatment in England & Wales, Germany, Spain and Ireland. In recent years, England & Wales have had the highest connection rate, followed closely by Germany and Spain. Between 1990 and 2015, Spain’s connection rate increased by 51.1%. In Ireland, meanwhile, the connection rate between 1990 and 2016 increased by 43.6%. France’s connection rate has remained at around 80% since the early 2000s. Italy experienced a decrease during the 1990s and early 2000s, but recovered slightly after 2005.

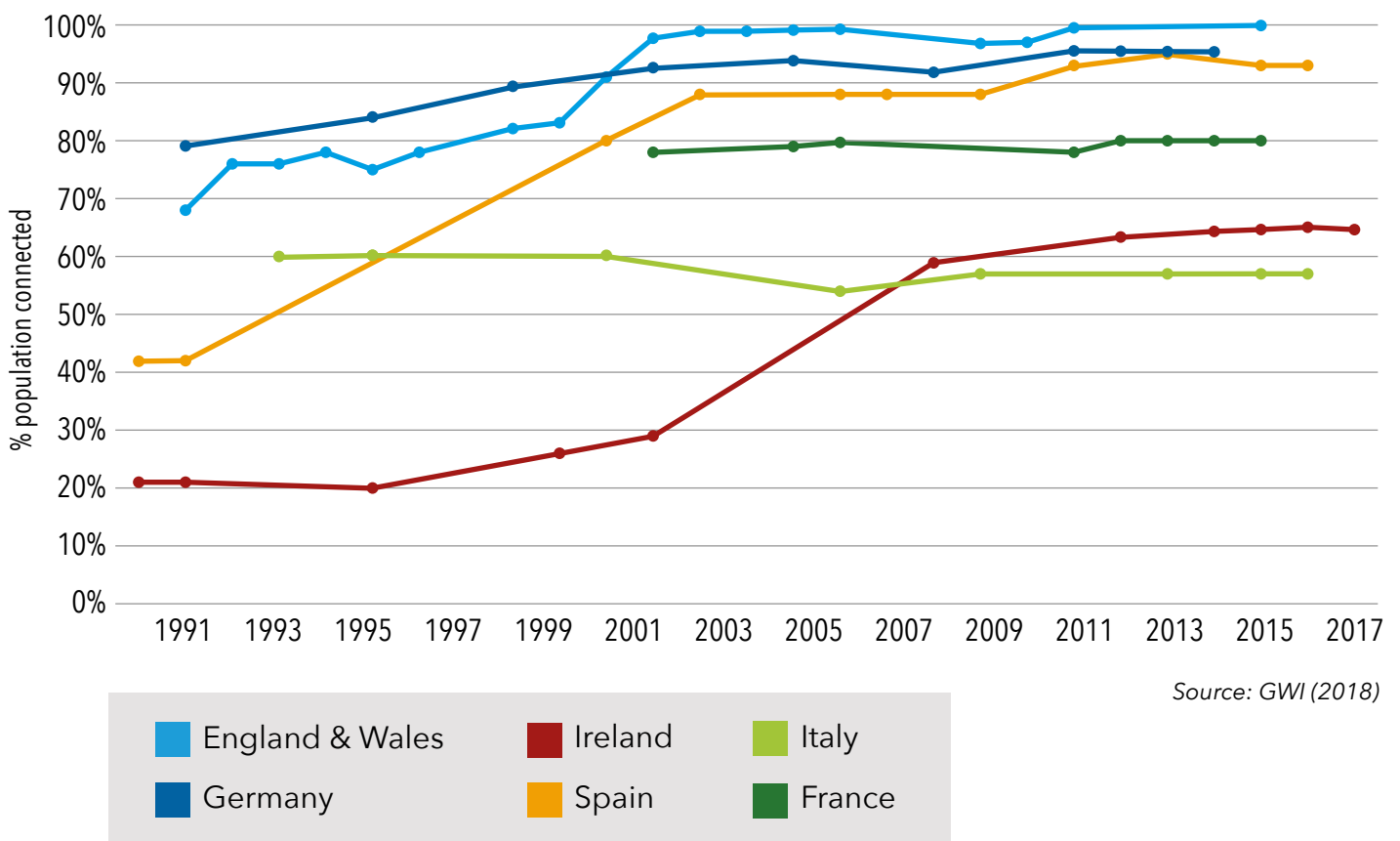
Over the period, there has been a general shift from connecting the population to secondary treatment to connecting the population to tertiary treatment, following the introduction of more

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stringent environmental standards Urban Waste Water Treatment Directive (UWWTD), introduced by European Commission. As a result, all the countries have an increasing percentage of the population connected to tertiary treatment, and a decreasing percentage of the population connected to secondary treatment in more recent years (except for Ireland). For more disaggregated information on the population connected to tertiary and secondary treatment respectively, please see [Appendix 8.2](#).

It is important to mention that the European Union's top court recently fined Italy €25 million for years of failure to treat urban sewage. By 2017, the Commission reported that Italy has not fulfilled its requirements for more than 10 years, and its persistent failure is shown in two other cases where the Court ruled against the country in 2012 and 2014. The other poorly performing country, Ireland, has also demonstrated low compliance rates with the UWWTD.

**Figure 2.1 Population connected to above secondary treatment (%)**





## 3. Customer Service

**Description:** There is an increasing necessity within the water industry to engage with customers and develop new and innovative approaches to better understand their needs. Like businesses in other competitive retail markets, which have successfully harnessed customer insight data to offer better services tailored to meet customers' needs, water utilities must strive to improve customer satisfaction. The main challenge lies in the fact that each country measures customer service in a different way. Therefore, six indicators have been chosen to make a comparable and comprehensive assessment of the customer service quality of each country:

### 1 Number of complaints

Measures the number of customers that express any dissatisfaction related to either the quality of the water or the level of service provided.

### 2 Type of complaint

Indicates whether the complaint is related to the water itself or to the service provided by the utility (i.e. billing errors, poor customer service).

### 3 Complaint resolution

Demonstrates the capacity of the utilities to react and solve the complaints related to the service provided by the utility.

### 4 Specific department or organisation dealing with customer service

Assesses the commitment of each country to solve the complaints.

### 5 Improving customer service over time

Serves as a reference for the commitment of each utility or organisation in charge of the complaints to maintain satisfaction levels or develop innovative approaches to improve this satisfaction (for example, through better technology).

### 6 Financial information available for customers

Shows how transparent target countries are in disclosing information about tariffs and totex to their customers.

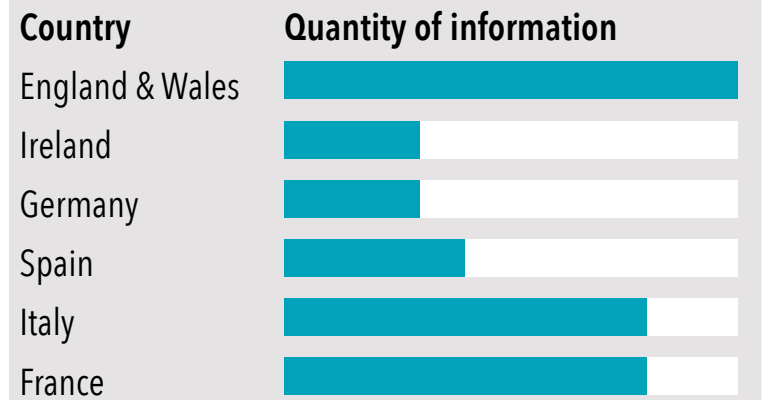
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In our analysis, we have rated all the indicators between 0 to 1; 1 being the country with the best performance in relative terms, i.e. in comparison to other countries. Finally, to do an overall comparison, the sum of all indicator ratings per country are compared to yield a final ranking.

## Findings:

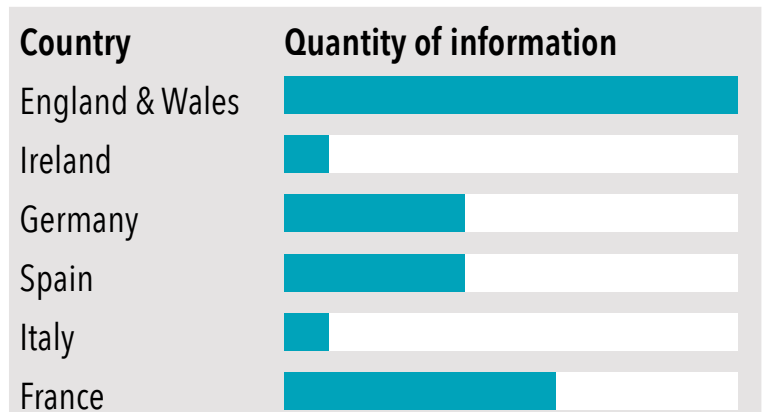
### 1 Number of complaints

Due to the information gathered by the Drinking Water Inspectorate (DWI), England & Wales have the most comprehensive records for the number of water quality complaints between 1990 and 2017 reported through direct customer contact. DWI also has information for the complaints filed to individual companies for several years. Although France and Italy do not indicate the number of complaints per se, both countries provide comprehensive information on water quality satisfaction levels and irregularities of water provision, respectively. Conversely, Spain and Ireland have only four years of complaint information available, while Germany does not provide public information on the number of complaints.



### 2 Type of complaint

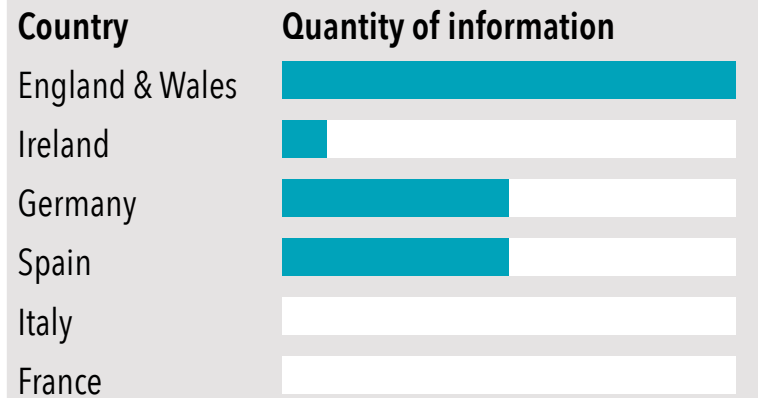
Regarding information about the type of complaint, England & Wales are again the most comprehensive as DWI has a breakdown of water quality complaints since 2000 and the Water Services Regulation Authority (Ofwat) has tariff complaints since 2004. Comparatively, none of the other countries are performing that well. France has a thorough breakdown of nine categories of complaint, but the information is only available for five consecutive years (from 2008 to 2012). Spain's breakdown is more limited, with information only available for 2008, 2012, 2014 and 2017 respectively. For Germany, data on type of complaint is not directly available, although there are certain surveys on customers' concerns. The poorest performers are Italy and Ireland, as neither have specific explanations for complaints.



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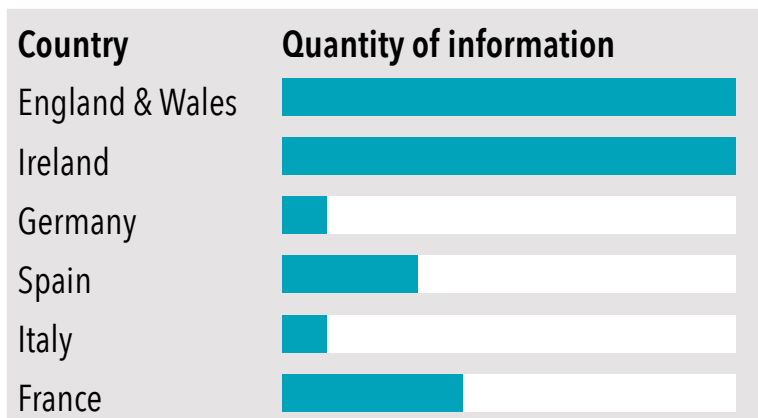
## 3 Complaint resolution

England & Wales again score the highest for resolution of complaints. DWI provides details about the complaints it has investigated for each year, while Ofwat and the Consumer Council for Water (CCWater) list parameters, which measure the response efficiency from 1990 to 2008 and since 2010, respectively. Spain provides the percentage of complaints that have been resolved in favour of the customer, but the information is only available for 2008, 2012, 2014 and 2017 respectively. Germany, on the other hand, provides information on several years. However, the information is not exactly about how each complaint is solved, but customer satisfaction with suppliers' response to complaints. Irish Water published the numbers for work orders issued and closed regarding operational matters for 2014. Italy and France do not provide any type of information regarding this matter.



## 4 Specific department or organization dealing with customer service

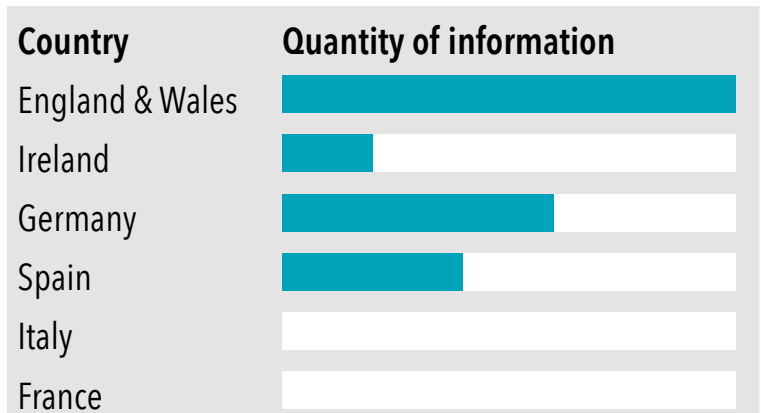
With regards to this parameter, Ireland is on a par with England & Wales, with both having three organisations dealing with customer complaints. In France, the General Directorate for Competition Policy, Consumer Affairs and Fraud Control (DGCCRF) is in charge of registering complaints about the water sector, but the information is only available from 2008 to 2012. Spain is a special case, as the Spanish Association of Water Supply and Sanitation (AEAS), a non-profit that works for the promotion and development of urban water supply and sanitation services, carries out a survey with this information. Germany and Italy have very limited information about where and to whom to file a complaint related to water issues. News in Germany indicates that people usually submit complaints to the local water suppliers or to the municipalities.



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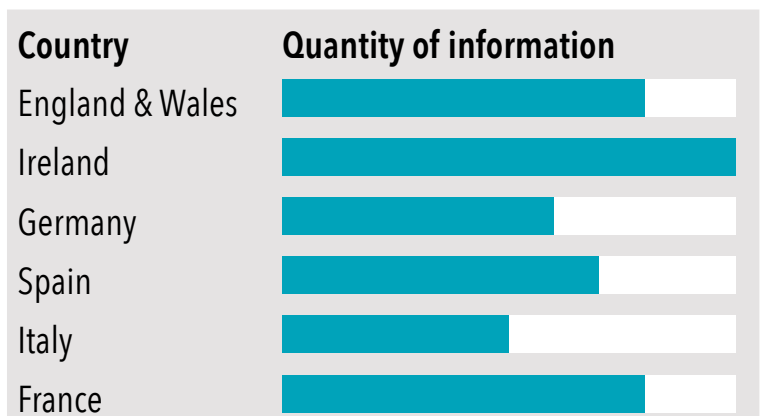
## 5 Improving customer service over time

According to industry customer service performance, England & Wales score highest. In both cases, there is a general decreasing trend in the percentage of inefficiencies related to complaint responses. Additionally, a more recent parameter called "Service Incentive Mechanism (SIM)", introduced by Ofwat, measures the performance of individual companies each year on a scale of 100, and the scores for each company have been increasing over time. By comparison, the other countries lag behind. Germany appears to be the closest, but the information is still very limited as reports of the German Association of Energy and Water Industries (BDEW) compare only satisfaction with customer service and do not specify the types of improvement. The Spanish AEAS survey, meanwhile, highlights better access to an interactive web page, but the time-frame is very narrow (from 2008 to 2012). Likewise, Ireland shows a detailed explanation of the improvement from 2015 to 2016, while nothing is available for other years. Italy and France do not provide any information for this indicator.



## 6 Financial information available for customers

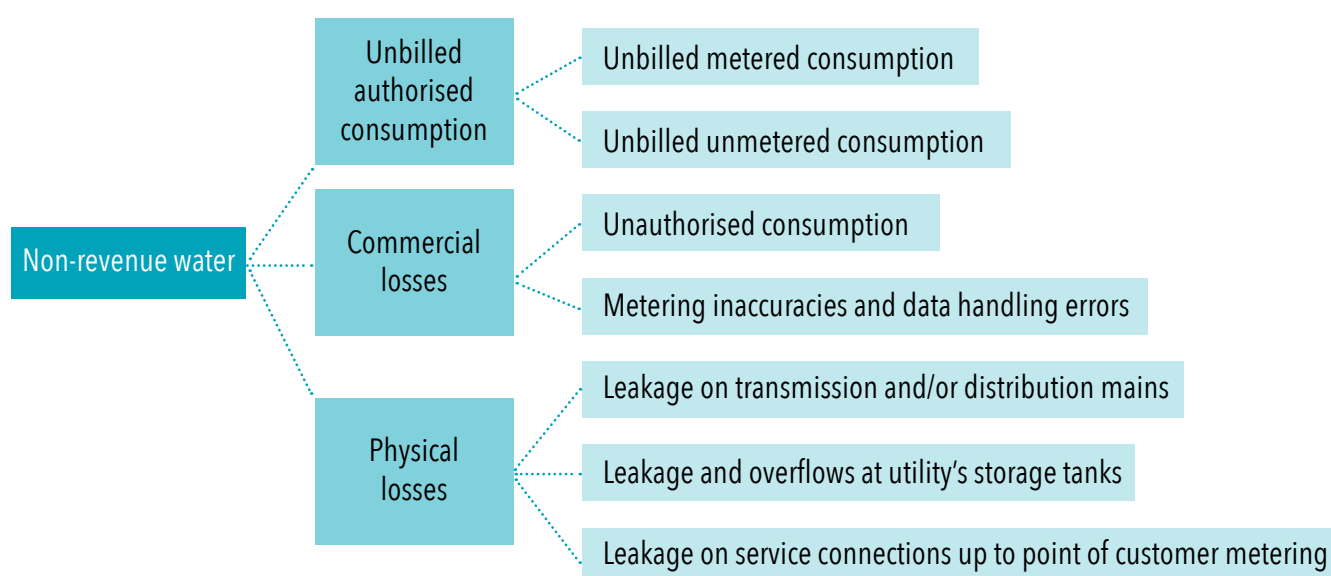
Ireland ranks the highest, as tariff information is easily accessible. Additionally, both the Central Statistics Office and Irish Water provide detailed information about totex. England & Wales rank second, since customers can get information about their water bills from their water companies, but totex information from different resources has been incomplete for some years. The French FP2E provides information on tariffs since 1994, and totex information is available from 1990 to 2013, published by the Observation and Statistics Agency. In Spain, the Official Statistics Agency (INE) and some other sources provide information on tariffs since 1996. Totex information is available from 1995 to 2016 in the National Accounts published by the General Comptroller of the State Administration. In Germany, both the *Statistisches Bundesamt* and BDEW provide water and wastewater tariff information, and BDEW provides capex information since 1990. However, opex is not easily accessible. Italy has limited information on tariffs since 1996, but the Italian National Institute of Statistics (Istat) provides information on totex from 1997 to 2010.



## 4. System efficiency

**Description:** One of the main challenges faced by water utilities worldwide is the discrepancy between the amount of water put into the distribution system and the amount of water billed to consumers. This difference is recognised as non-revenue water (NRW) and represents the lack of technical, financial and managerial efficiency of the water utility. It comprises three components, which are presented below:

**Figure 4.1 International water balance**



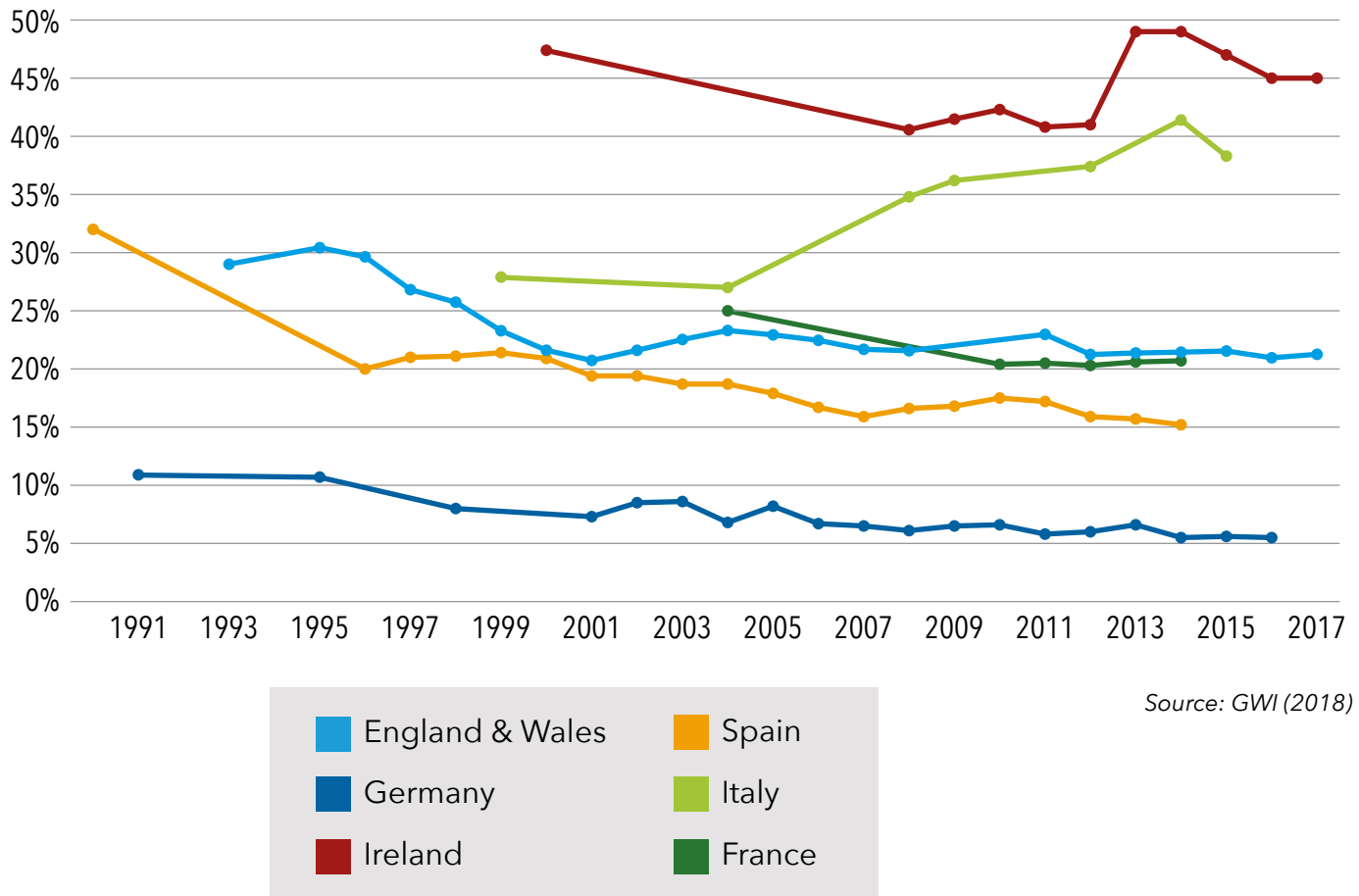
Source: IWA and World Bank Institute (2006)

NRW is used as the indicator for the system efficiency of the utilities, as it provides a holistic view of how well the utilities deal with water losses and sheds light on existing inefficiencies. For England & Wales, NRW is not generally used, but it is essentially the same as total leakage, which is the sum of distribution loss and underground supply pipe leakage. Therefore, NRW for England & Wales is calculated by using the total leakage divided by total water supplied, which are both measured in Ml/d. The situation for Ireland is more complex, since the only year that they charged households was 2016. To comply with the official reports which exclude unbilled authorised consumption, only commercial and physical losses are included in NRW. In addition, Irish official reports use unaccounted-for water (UFW), water loss and leakage interchangeably, which can lead to minor discrepancies. In Spain, "real losses" were used for the period between 1996 and 2009, and NRW was used afterwards. Both France and Italy's average distribution system efficiency were measured by leakage rate.

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## Findings:

**Figure 4.2 Non-revenue water (%)**



Ireland has the highest rate of NRW, with an average of 44.4%. Traditionally, since Ireland charged nothing for drinking water, there was only limited funding for reducing physical and commercial losses. However, since the establishment of Irish Water in 2014, some progress was made in dealing with these challenges and Ireland has reduced NRW from 49% to 45%. The big leap between 2012 and 2013 was mainly due to the discrepancies from using different resources. Following Ireland, Italy's high NRW figures illustrate how little investment has been made in the last 10 years. Apart from the drop in investment that contributed to increasing obsolescence of infrastructure, the approach to leakage control that the majority of water utilities have taken also plays a role in the shocking level of water losses in Italy. Namely, utilities usually only repair 'reported' leaks, and do not practice any regular form of active leakage control, except as an emergency action response during droughts.

NRW for England & Wales decreased during the 1990s and reached a relatively stable point from 2001, fluctuating between 20% and 25%. The decrease in NRW was mainly due to a reduction in both the total water supplied and leakage, with the leakage rate decreasing more rapidly. This is due to Ofwat providing financial incentives for meeting the leakage targets, encouraging companies to actively engage in repairing and replacing supply pipes, and consumers using water more efficiently. Afterwards, the fluctuation in NRW was mainly due to specific companies exceeding the leakage targets. France presents a similar trend. Its NRW rates have decreased over time, but it reached a stable point in 2010 at 20%. Spain improved the most over the peri-

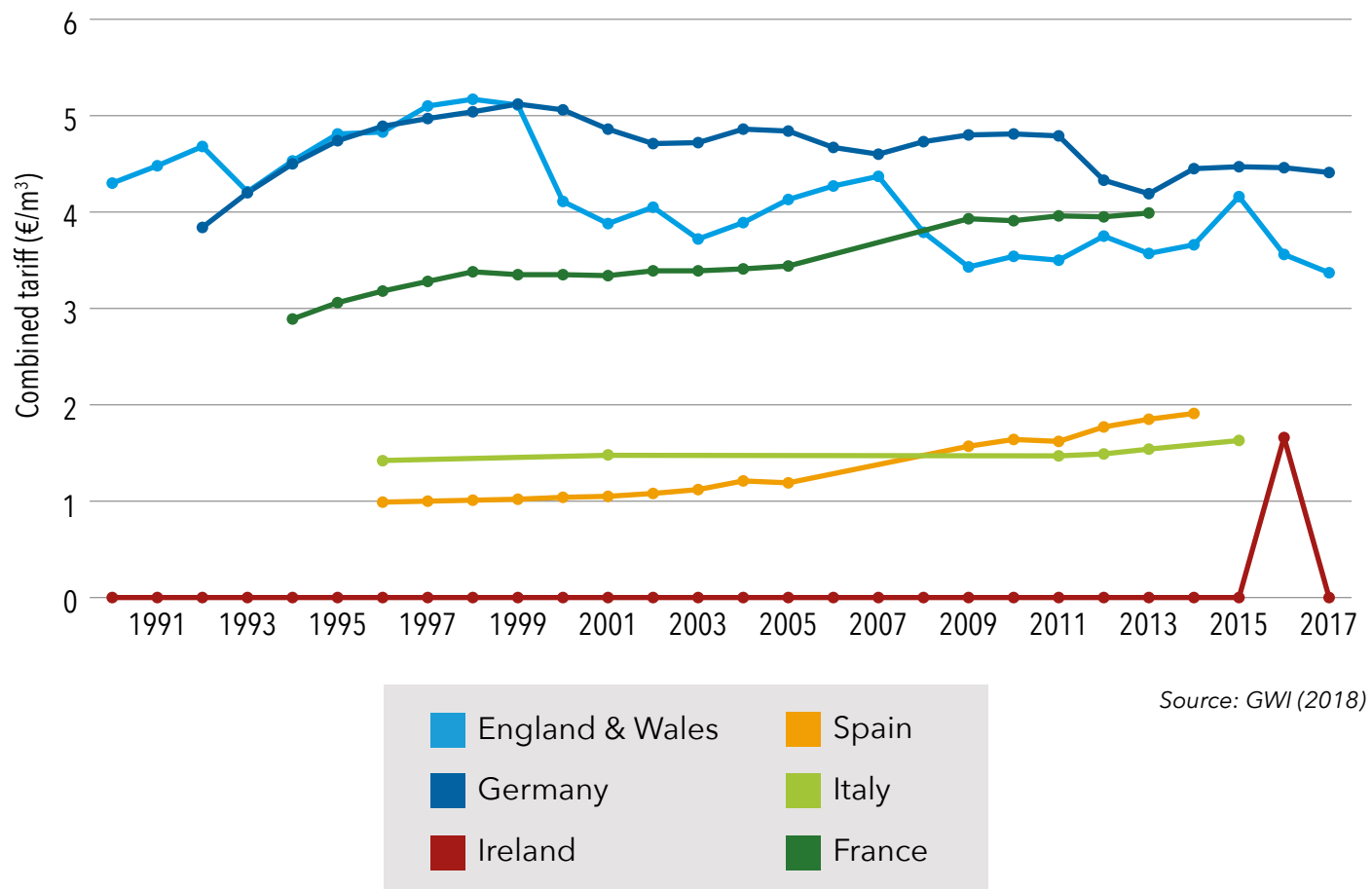
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od analysed, as it has more than halved its NRW. There was a significant decrease at the start of the 1990s and since then, the decrease has been less pronounced. Leakages represent around 40% of the NRW in Spain, but metering errors play an important role too. Germany has consistently outperformed all the other countries, with the lowest NRW rate at an average of around 7.2%. According to the European Environmental Agency, its low NRW is due to “a combination of favourable soil conditions, treatment to reduce the aggressiveness of the water supplied, easy access to repair mains and a high level of mains replacement”.

## 5. Tariffs

**Description:** Different countries have different means by which water tariffs are charged. For example, some countries do not charge for water tariffs directly, but include the tariff in the tax, while other countries have both metered and unmetered customers. To compare different countries, combined tariff data has been collected, which is the sum of drinking water and wastewater tariffs, measured in €/m<sup>3</sup>. Since the nominal tariff includes the inflation rates of each country, the real tariff at the 2017 price has been used (the most recent year in our report), to remove this effect and focus on the change in the real tariff. In addition to the cross-country comparison for tariffs that is presented below, a separate graph for England & Wales, denominated in GBP,

**Figure 5.1 Combined tariff (€/m<sup>3</sup>) 2017 price**



Source: GWI (2018)

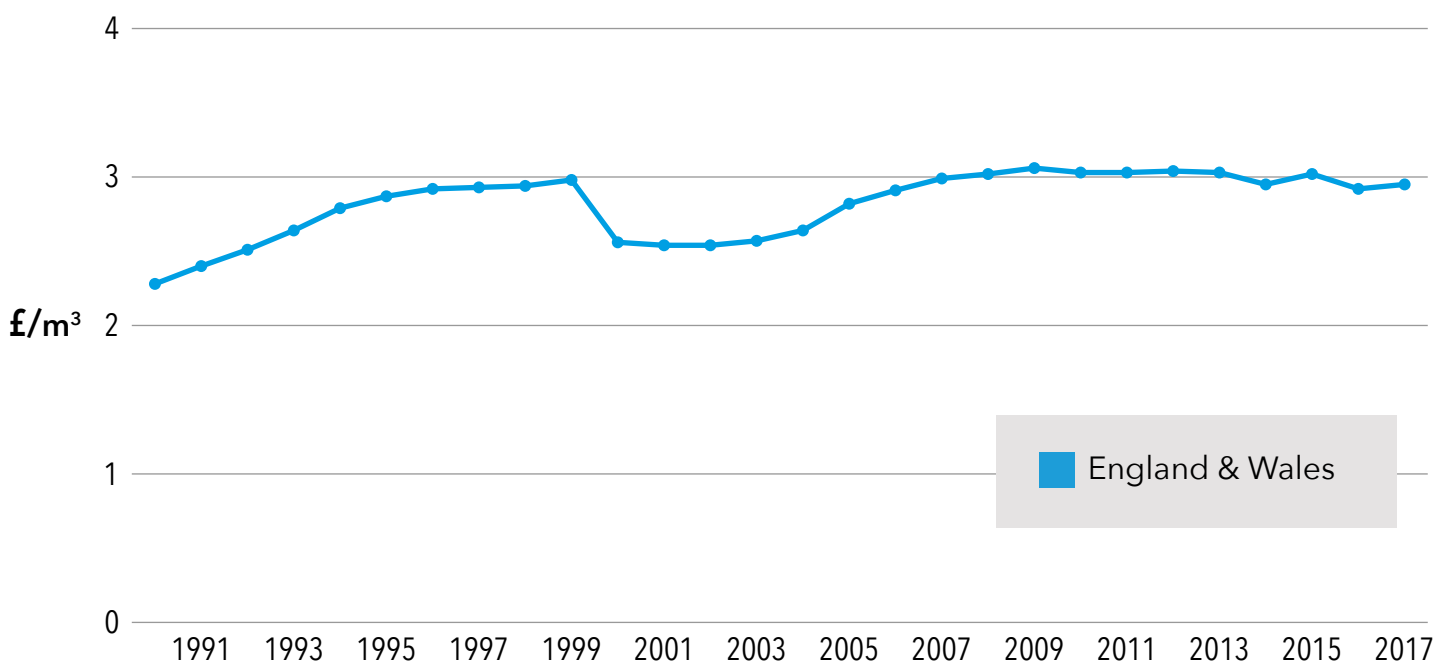
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has been provided to present the real trend without the exchange rate effect.

Germany has the highest average combined tariff of all the countries at €4.66/m<sup>3</sup>, because by regulation, Germany's full cost recovery scheme requires the combined tariff to cover both water and wastewater costs. Germany's tariff increased during the 1990s and peaked in 1999, with an increase of 33%. Afterwards, the tariff continued to drop, resulting in a 14% drop in 2017 compared with the peak year. France has the third highest water tariff, which increased 38% from 1994 to 2013. Its water supply and sanitation services are local public services, where the local authority sets the tariff. France's tariff has been increasing since 1994, but the increase became more prominent after 2005 due to an increase in investments driven by regulations.

Italy and Spain's average combined tariffs, at €1.50/m<sup>3</sup> and €1.32/m<sup>3</sup>, respectively, are lower than Germany and France. In Italy, the tariffs have remained almost unchanged from 1996 to 2015, with an increase of only 15%. This can be attributed to the fact that, until 2011, Italy did not have a strong national regulator and tariffs were set by Optimal Territorial Areas (ATOs) with no regard to funding needs. The initial rates were generally set at levels that just covered operating costs and did not yield sufficient revenues for the maintenance and renewal of networks. In November 2011, the regulatory responsibilities for water supply and sanitation were transferred to the Italian Regulatory Authority for Electricity and Gas (AEEG). Since then, the tariffs have been increasing at a higher rate. Spain's average combined tariff has seen an increase of around 94% from 1996 to 2014. Nonetheless, Spain's tariffs are still the lowest of the countries analysed. According to the latest Environmental Performance Review (2015), the tariffs are too low, and they should be established in a more transparent manner, especially in the context of declining available EU funding.

**Figure 5.2 Combined tariff (GBP/m<sup>3</sup>) 2017 price**



Source: GWI (2018)



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Ireland has the lowest average combined tariff of the six countries. In Ireland, households paid a flat fee for supplied water as part of local property taxes until 1997, and since then, water supply and wastewater services have been provided free of charge to households. Irish water briefly charged public water and wastewater bills, but this was repealed because of public opposition. Therefore, the explicit water charge has remained at 0, except for a short period in 2016.

During the 1990s, England & Wales had the second highest average combined tariff (denominated in euros). However, since 2008 their combined tariff has decreased, bringing them to third position after Germany and France. The figure on the previous page, which is denominated in GBP, shows that the combined tariff increased most rapidly in the early 1990s and peaked in 1999, followed by a sharp drop in 2000. Since then, the combined tariff has continued to increase and peaked in 2009. Since privatisation, Ofwat has been responsible for setting price limits for the companies, to control antitrust behaviour. As of 2017, there has been an increase in price of around 30% since 1990, and a decrease in price of around 4% since 2009. Ofwat expects a 5% decrease in the real tariff between 2015 and 2020, and it is fair to say that, so far, England & Wales are on track to achieve this goal.

**E&W:** According to UK Briefing Paper Number CBP06596 published in 2016, “water companies in England and Wales are not legally allowed to disconnect or restrict a household customer’s water supply if a bill is unpaid”. To help cover the unpaid bills, the UK government provides payment support through various social tariff schemes. The most prominent scheme is WaterSure, introduced in 1999, which caps the bill at the average charge of the region and is available to metered households receiving certain social benefits and with more than three children under 19. In 2014/15, around 94,000 people were registered under this scheme. It allocates the unpaid bill to the rest of the paying customers, which cost these customers around 35 pence a year to fund it in 2011. WaterSure is just one example of social tariffs available to qualified customers, and there are other schemes such as Water Direct and the win-win tariff, provided by either water companies themselves or third parties.

**Spain** has a wide variation of water tariffs across the country, as there are no national standards and tariffs are approved by the municipalities. This variation also applies to social tariffs, and although the levels of commitment vary, most municipalities are committed to ensuring that households have access to a minimum vital supply. In Madrid, the water utility Canal de Isabel II offers some bonuses for families with proof of the unaffordability of their water bill payments. With this help, these families pay only 50% - they can consume 417 litres of water for free. The social water tariff also provides bonuses for large families, for large houses (more than 5 people) and for families that save water. Other municipalities, like the municipality in Huelva, are committed to not cutting the water supply to a non-payer if the household faces social exclusion and grant a deferral for the debt.

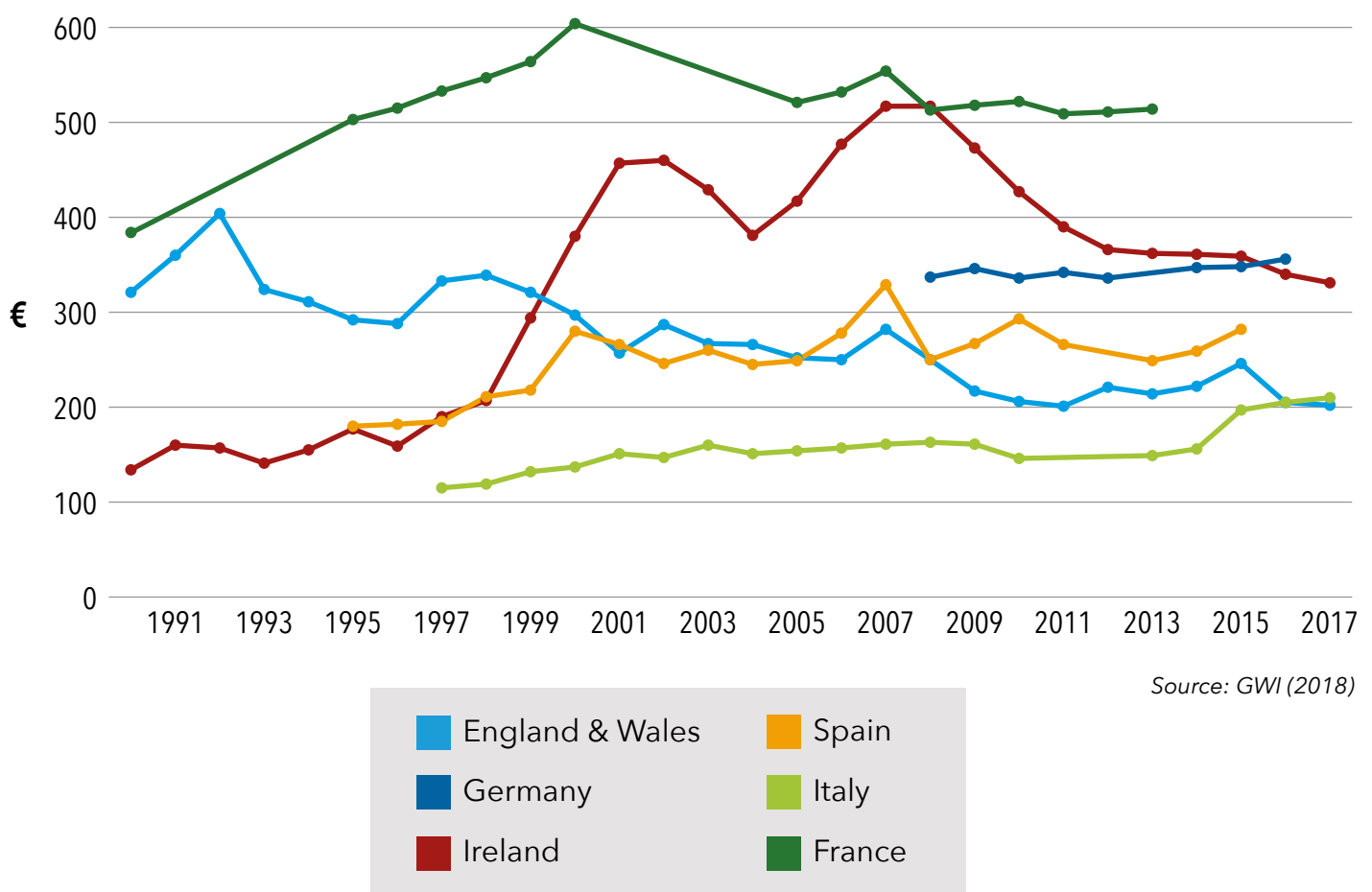
## 6. TOTEX per Capita

**Description:** In the water and wastewater industry, utility capital expenditure (capex) refers to the money that water companies spend on major development, such as the acquisition of tangible fixed assets, maintenance and enhancement of infrastructure, installation of meters, and compliance with drinking water and environmental quality and standards. Utility operating expenditure (opex) refers to the money spent on day-to-day operational business, including the treatment and distribution of water and wastewater, business activities and services. Utility total expenditure (totex) is the sum of utility capex and opex.

To compare the level of spending per capita between countries over the period of 1990 to 2017, a country's totex was divided by its population for each year. Like the combined tariff, expenditure was measured in real terms using the 2017 Euro price level to maintain consistency. A separate graph for England & Wales that is denominated in GBP is provided to present the real trend without an exchange rate effect.

### Findings:

**Figure 6.1: TOTEX per capita for all countries, 1990-2017**



Source: GWI (2018)

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Among the six countries, Germany and Italy have relatively stable totex patterns, while France, Ireland, Spain, and England & Wales experience higher volatility.

Of these countries, France spent the most – on average €521 per person per year. The totex per capita increased consistently until 2000, when it experienced a turning point and started to decrease. Since 2005, France's totex per capita has been relatively stable. For the period of analysis, capex per capita has been stable at around €160, while opex per capita has almost doubled since the 1990s ([for more information, see Appendix 8.4](#)).

Ireland's totex peaked in 2008 and has been gradually decreasing since then due to a decrease in both capex and opex. Before the establishment of Irish Water in 2013, each local authority was in charge of planning and providing information on expenditure to the Department of Housing, Planning and Local Government, so Ireland's expenditures were not optimised. Irish Water is now responsible for national level development, so the allocation of funding has improved.

Germany's totex per capita has been stable in recent years, remaining at around €343. Germany's capex per capita in the 1990s was high, due to reunification efforts to rebuild infrastructure. Since 2008, the country's capex and opex has remained stable because of timely replacements and the repair of mains.

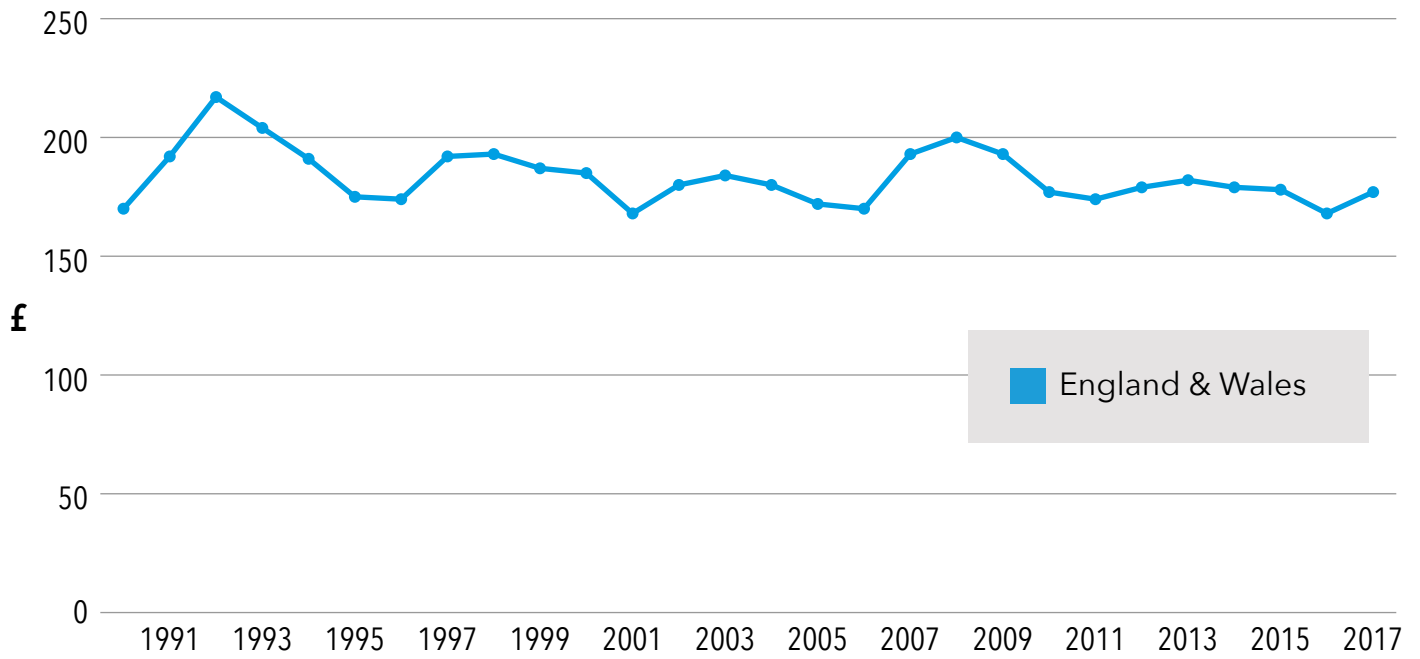
Italy has the lowest totex per capita among the countries analysed, due to a decrease in public funds allocated for the development of water infrastructure and insufficient revenues to guarantee necessary investments. This drop in investment has contributed to an increasing obsolescence of infrastructure, a rise in network leakages and a decline in service levels. As presented in Section 4, Italy has the second highest rate of non-revenue water. Italy's capex per capita has remained fairly stable from 1997 to 2017, while its opex per capita has increased steadily over 20 years: in 2017, it was almost double that of 1997.

The country with the second lowest totex per capita is Spain. It has received significant funding from the EU in the last few decades, but this funding source has diminished significantly in recent years. Also, investments in large infrastructure projects are funded by the central government, and since the economic recession of 2008/9, there has been a significant decrease in capex per capita. Meanwhile, Spain's opex per capita has been increasing slightly, resulting in a relatively stable totex per capita.

The totex for England & Wales has decreased when compared with the 1990s, with an average totex per capita of €273, which is higher than €156 of Italy and €250 of Spain. The following figure (denominated in GBP) shows that the totex has been fluctuating. Since privatisation, the water industry in England & Wales has incurred significant capital investment. The relatively low levels of capex per capita in 1995, 1996, 2001, and 2006 are in the years immediately following price reviews. Companies have attributed this dip to the need to review and plan their capital investment programmes after price limits have been set, resulting in a peak later in the five-year period. Compared to capex, opex per capita has been relatively stable, as shown in [Figure 8.7](#).

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Figure 6.2 TOTEX per capita for England & Wales, 1990-2017



Source: GWI (2018)

Commissioned by Water UK



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## 8. Appendix

### Drinking Water Quality

**Raw Data and Method for Calculation:** Each country has an independent agency in charge of taking a specified standard number of samples and carrying out tests to determine how many samples are not in compliance with water quality standards. The relevant agencies are listed below:

- England and Wales: Drinking Water Inspectorate (DWI)
- Germany: *Umweltbundesamt* (UBA)
- Ireland: Environmental Protection Agency (EPA)
- Spain: The Ministry of Health, Consumption and Social Welfare
- Italy: The Ministry of Health and the Italian Regulatory Authority for Electricity Gas and Water (ARERA)
- France: Ministry of Social Affairs and Health

When available, compliance rates have been used directly. However, if this data is not available, the rates have been calculated based on the relevant annual water quality reports. While calculating the compliance rates, three caveats have been taken into account:

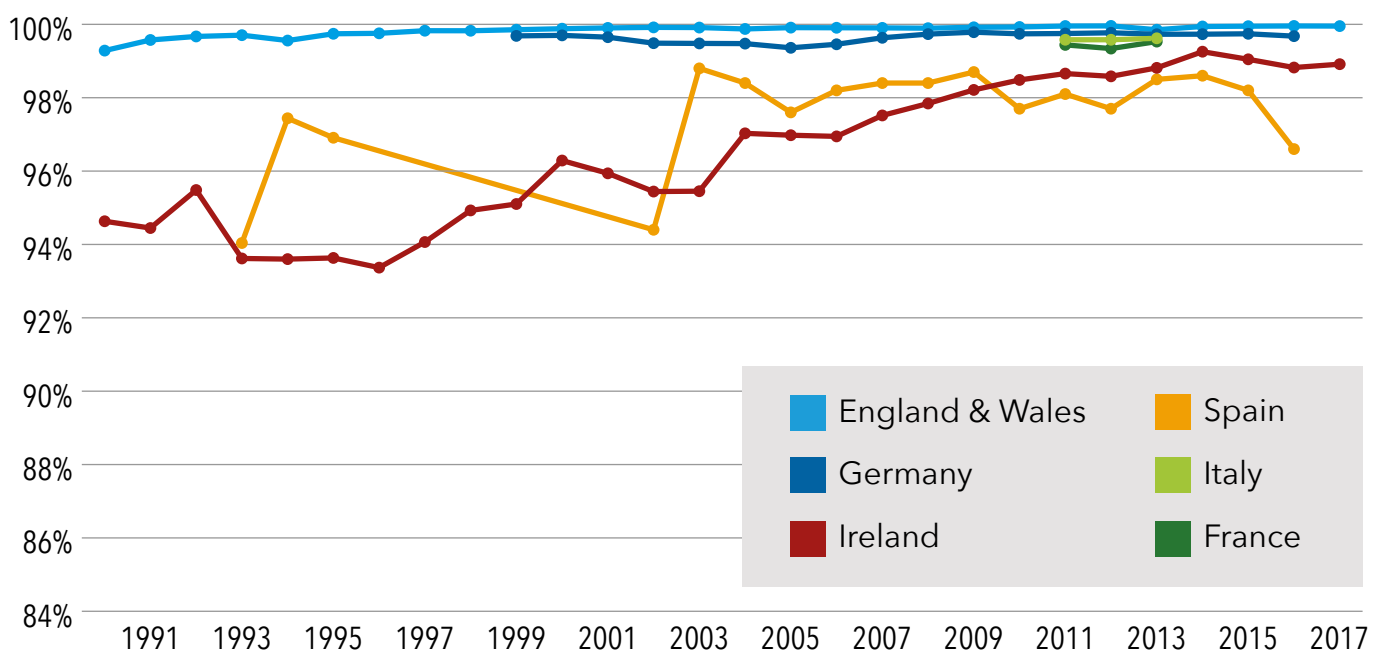
- The target countries changed some parameters after the change in the EU 1998 Drinking Water Directive. Therefore, the parameters for calculation under each parameter are slightly different for some years.
- Different countries use slightly different parameters as a basis for their compliance calculations.
- For the same parameter, the standard becomes more stringent in more recent years (e.g, the compliance standard for lead went from 25 to 10 µg/l in 2014).

# International Comparisons of Water Sector Performance

Nevertheless, efforts have been made to make the parameters as comparable as possible, so that trends for individual countries can be analysed and cross-country analysis can be conducted.

**Comments for Indicator/Other Parameter:** Indicator parameters are used less frequently in country reports, but they are still useful in assessing compliance performance. Although the indicator parameters that each country measures are not completely uniform (for example, some countries measure infrequently used indicators such as colony count at 22° Celsius and total organic carbon), all the countries measure aluminium, chloride, colour, odour and turbidity, etc., which allows comparability.

**Figure 8.1 Indicator / other parameter compliance rate**



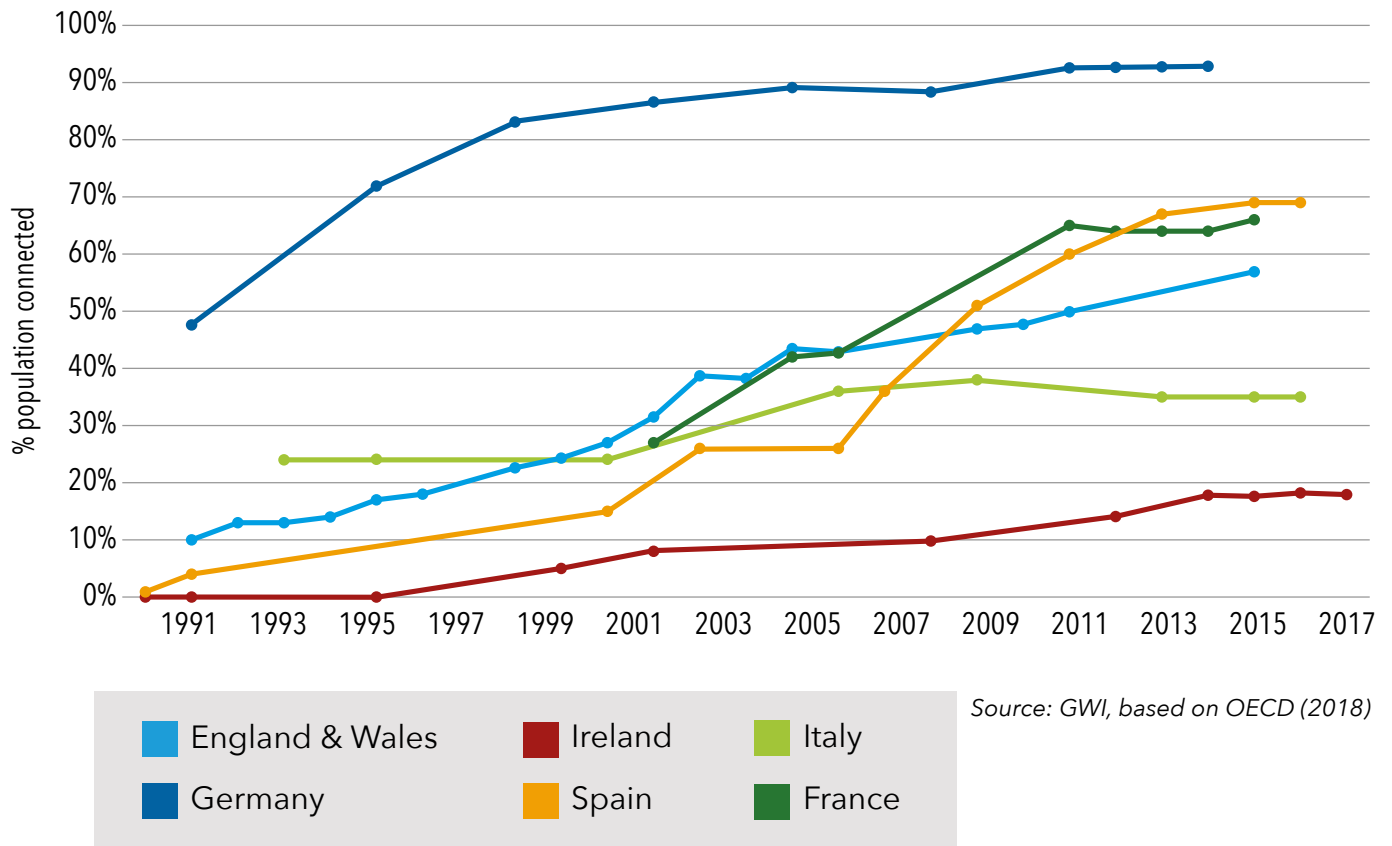
Source: GWI (2018)

## Wastewater treatment

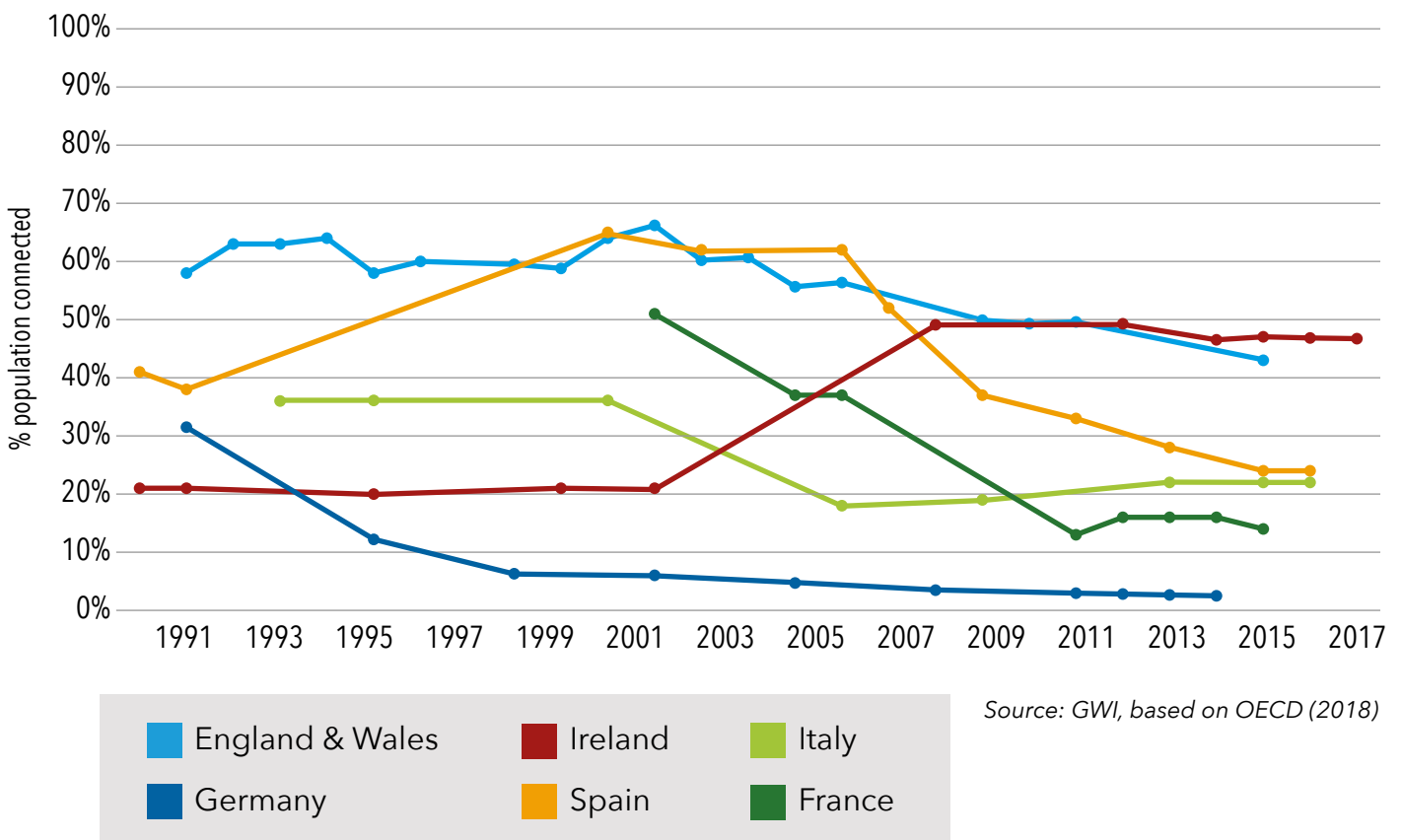
**Comments for Tertiary Treatment:** There is a general increasing trend for all countries in connecting to tertiary treatment. Germany leads, with over 90% of the population connected to tertiary treatment. Over 60% of the population in France and Spain is connected, while in England & Wales over 50% of the population is connected. Ireland has the lowest percentage of the population connected to tertiary treatment, at only 18%. Spain's connection rate increased the most rapidly, rising by 68% between 1990 and 2015, followed by Germany with an increase of 45% between 1991 and 2013. During the first decade of the 2000s, France's connection rate of tertiary treatment increased from 27% to 65%, but from 2010 to 2014 it only increased by 1%. Italy showed a slow increase of only 11% between 1993 and 2015.

# International Comparisons of Water Sector Performance

**Figure 8.2 Population connected to tertiary treatment (%)**



**Figure 8.3 Population connected to secondary treatment (%)**



**Comments for Secondary Treatment:** The performance of the target countries varies concerning connection to secondary treatment. Germany, France, and England & Wales have focused on improving wastewater treatment technology, so that more treatments are classified as tertiary rather than secondary. Consequently, the percentage of the population connected to secondary treatment in these countries has been decreasing. For Ireland and Spain, the percentage has increased and then decreased, because these countries focused on connecting more people to secondary treatment in the first stage, and then shifted their focus to having more treatment classified as tertiary. The secondary connection rates for Italy have been stable at around 20% since 2005.

## Country Ranking by Customer Service Indicator

### 1 Number of complaints

#### **E&W: 1**

Normally, customers complain to individual water companies first, and contact DWI for unsolvable cases. DWI has records of the number of complaints related to water quality from 1990 to 2017 for customers contacting DWI directly, as well as information on the complaints filed to individual companies for some years. Ofwat can provide numbers for customer complaints about tariffs since 2005, and how much of a rebate it has helped customers claim. CCWater can provide the number of complaints handled by individual companies.

#### **Ireland: 0.3**

There are only four years of complaint information available. Irish Water has information for 2014 and 2017, and the Commission for Regulation of Utilities (CRU) has information for 2015 and 2016.

#### **Germany: 0.3**

No information about the number of complaints is available. The 2011 BDEW document states, "for many years, the rate of complaints has been extraordinarily low at 4%". However, some customer satisfaction surveys can be used to assess the dissatisfaction of the customers indirectly, such as: using BDEW graphs on how satisfied customers are with water quality in general; customer satisfaction with the service of their water supplier; and overall satisfaction of customers with the services of their wastewater disposal utility. The information is available from the BDEW biennial benchmarking project from 2003 to 2013.

#### **Spain: 0.4**

There is only four years of information about the percentage of customer complaints (the timeframe covers nine years, from 2008 to 2017). These results for the year 2008 are available in the Survey of Drinking Water Supply and Sanitation in Spain that is published on the webpage of the AEAS and the results of the rest of the years are available through different news sources.

#### **Italy: 0.8**

No information about the number of complaints is available. However, the Statistics Agency of the country publishes information on irregularities of water provision in the Aspects of Daily Life survey from 1995 to 2017. Irregularities in water can be seen as complaints about drinking water quality and the timeframe allows us to make a good comparison in reference to the best

performer.

## France: 0.8

Information about the number of complaints per se is available for five years. However, there is information on water quality satisfaction levels from 1996 to 2011. The timeframe allows us to make a good comparison in reference to the best performer.

## 2 Type of complaint

### E&W: 1

DWI has a breakdown of water quality complaints since 2000, while Ofwat has tariff complaints since 2004.

### Ireland: 0.1

Neither Irish Water nor CRU provide specifics regarding the reasons for complaints. However, CRU scanned the original copies of tariff complaints, which can be found here: [https://www.cru.ie/document\\_group/water-tariff-responses-received/](https://www.cru.ie/document_group/water-tariff-responses-received/)

### Germany: 0.4

Type of complaint data is not directly available. However, there are some surveys about customers' concerns, which could indicate the kinds of complaints received, if the water suppliers scored low on those parameters. For example, BDEW measures the assessment of the water providers' services with individual scores from 1 (highest) to 5 (lowest) on parameters such as: **careful and reliable exchange and reading of the water meter; transparency of the price composition; clarity of the water bill; speedy removal of interruptions; reliability of water supply; careful and reliable execution of house connection works; and unproblematic appointment for meter reading or a new house connection.** Another parameter is **how satisfied are the customers with the service?** This measures the **friendliness of staff; adherence to agreements; expert advice on water issues; availability on the telephone; availability in the customer service centre; availability on the internet; and competence of contact persons.** The information is available from the BDEW biennial Benchmarking project from 2003 to 2013.

### Spain: 0.4

Type of complaint data is available, but only for the four years mentioned in the previous indicator.

### France: 0.6

Information about the type of complaint is available for five years (from 2008 to 2012). The information is divided into nine categories. Similarly, there are some scattered comments on tariff information and bill payments from the 1990s.

### Italy: 0.1

Type of complaint data is not directly available. Nonetheless, as the irregularities in water can be seen as complaints about drinking water quality, the type of complaint usually centres on quality.

## 3 Complaint resolution

### E&W: 1

DWI provides details about the complaints it has investigated for each year. Ofwat has parameters such as billing contracts not responded to within five working days and written complaints not responded to within 10 working days from 1990 to 2008; performance standards for disputes and complaints and consumers' views since 2006; and how many rebates have been claimed since 2004 for tariff complaints. CCWater has similar information since 2010, including complaints acknowledged within five working days; complaints resolved in 20 days; complaints resolved in 40 days; and customers satisfied with the quality of service.

## **Ireland: 0.1**

In 2014, Irish Water published the numbers for work orders issued and closed regarding operational matters. However, no other information is available for other years.

## **Germany: 0.5**

There is no direct response about how each complaint is solved, but BDEW provides a rating on customer satisfaction with suppliers' response to complaints, on a scale from unsatisfied to extremely satisfied. The information is available from the BDEW biennial Benchmarking project from 2003 to 2013.

## **Spain: 0.5**

There is information on the percentage rate of complaints that have been resolved in favour of the customer. The information provided is only available for the four years mentioned in the previous indicators.

## **Italy: 0**

No information provided

## **France: 0**

No information provided

## **4 Specific department or organisation dealing with customer complaint**

### **E&W: 1**

DWI was formed in 1990 to provide independent reassurance that water supplies in England & Wales are safe and drinking water quality is acceptable to consumers. It solves the complaints for water quality that the water companies cannot resolve. Ofwat mainly deals with water tariff complaints. CCWater is a non-departmental public body that represents water and sewerage consumers in England & Wales, which deals with all sorts of complaints.

### **Ireland: 1**

Customers complain directly to Irish Water regarding any issue. They can also report to the EPA quoting the complaint reference assigned by Irish Water or complain to the CRU about tariff issues.

### **Germany: 0.1**

There is very limited information about how to file a complaint. Some news sources indicate that people usually submit complaints to the local water suppliers or to the municipalities.

## **Spain: 0.3**

In Spain, there is no national regulatory agency. The Spanish regulatory framework is therefore less developed than in other countries, although by law, municipalities are responsible for providing drinking water and wastewater services. As mentioned above, the Spanish AEAS is a non-profit professional association that works for the promotion and development of scientific, technical, administrative and legal aspects of urban water supply and sanitation services. Hence, it published a survey with information on customer complaints and which organisations resolved those complaints, but the information is only available for one year.

## **Italy: 0.1**

The Italian ARERA is the independent body which regulates, controls and monitors the electricity and gas markets and water services in Italy. It is responsible for protecting consumer and customer rights. However, it is mainly focused on energy and not water.

## **France: 0.4**

The DGCCRF is in charge of registering water sector complaints. It published a report on this information over five years (from 2008 to 2012 inclusive). Complaints are received by government officers working in regional DGCCRF agencies or by telephone on the "Info Consommateurs" helpdesk (3939).

## **5 Improving customer service over time**

### **E&W: 1**

According to industry customer service performance, there has been a general decreasing trend in the percentage of "billing contacts not responded to (within five working days)" and "written complaints not responded to (within 10 working days)" since the 1990s. A more recent Ofwat parameter, SIM (Service Incentive Mechanism), measures the performance of individual companies each year on a scale of 100, and the score for each company increases over time. CCWater has measured "complaints responded to within 5 days/20 days/40 days" and "customers satisfied with the quality of our service/ outcome/speed/ courtesy" since 2006, and there has been a general increasing trend.

### **Ireland: 0.2**

A CRU customer satisfaction survey shows that customer satisfaction for customer service somewhat improved between 2015 and 2016 with many detailed explanations. However, nothing is available for other years.

### **Germany: 0.6**

BDEW reports compare customer satisfaction from different years. From 2003 to 2013/14, customer satisfaction almost stayed the same, with some specific areas increasing slightly.

### **Spain: 0.4**

Survey results from 2008 and 2012 show that there has been an improvement in customer service over time. Better access to an interactive web page from 2008 to 2012 has been mentioned specifically.

### **Italy: 0**

No information provided



## France: 0

No information provided

## 6 Financial information available for customers

### E&W: 0.8

Customers can obtain information about their water bills from the companies, and Water UK provides the average tariff for England & Wales each year. Ofwat provided detailed totex information until 2009. Afterwards, customers can check totex in different companies' reports.

### Ireland: 1

The water tariff has remained free since the 1990s, with 2016 being the only exception. The Central Statistics Office provides totex information from 2000 to 2013, and Irish Water provides totex information afterwards.

### Germany: 0.6

Statistisches Bundesamt and BDEW both provide water and wastewater tariff information for all the federal states as well as the whole country. BDEW provides capex information since the 1990s. Statistisches Bundesamt provides opex information, but they are hardly accessible and incomplete.

### Spain: 0.7

The Spanish Statistical Office (INE) and some other sources have provided information on tariffs since 1996. Information on totex is available from 1995 and 2016 in the National Accounts published by the General Comptroller of the State Administration.

### Italy: 0.5

The research Institute CRS-PROAQUA has provided information on water tariffs since 1996 (but for limited years). The OECD published information on capex from 2000 to 2008 and the Italian National Institute of Statistics (Istat) published a report on expenditure for the management of waste, wastewater and water resources in Italy from 1997 until 2010.

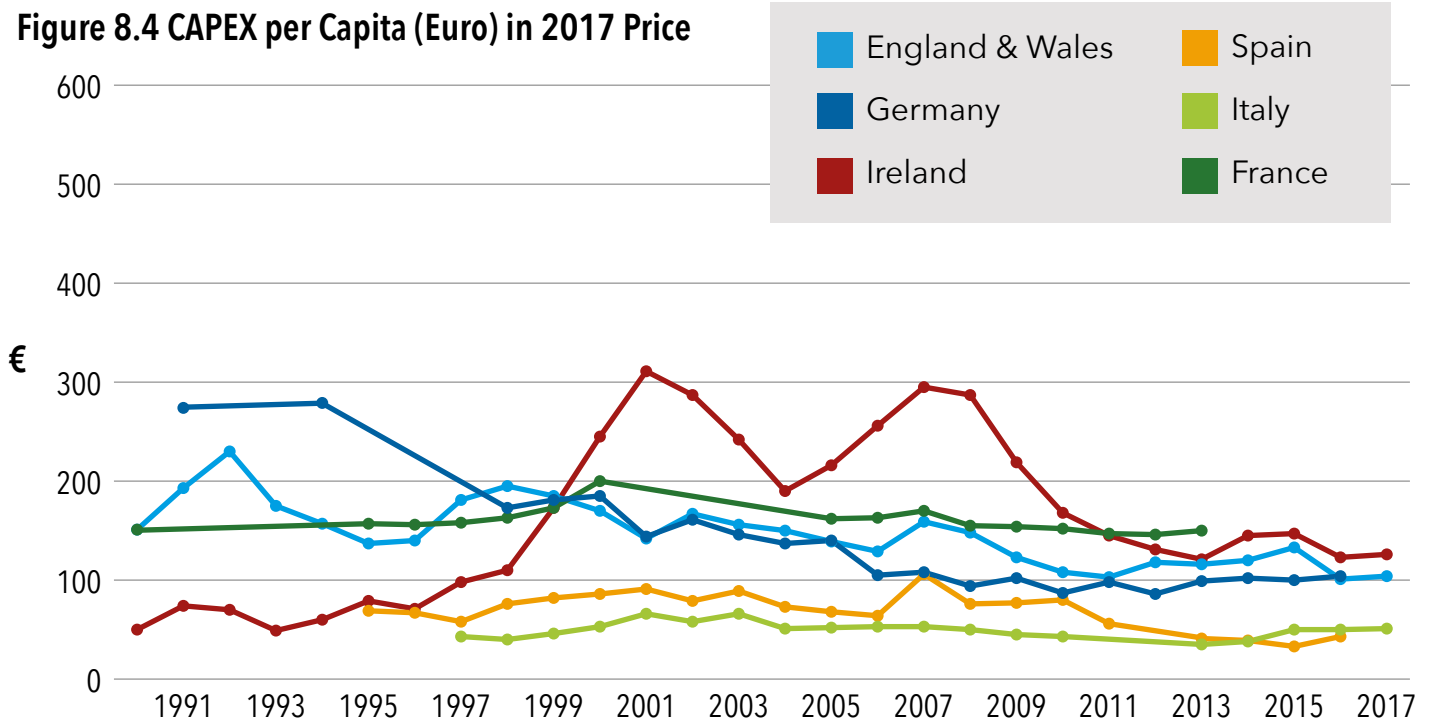
### France: 0.8

The French FP2E provides information on tariffs, which has been available since 1994. The Observation and Statistics Agency has published totex information from 1990 to 2013.

# International Comparisons of Water Sector Performance

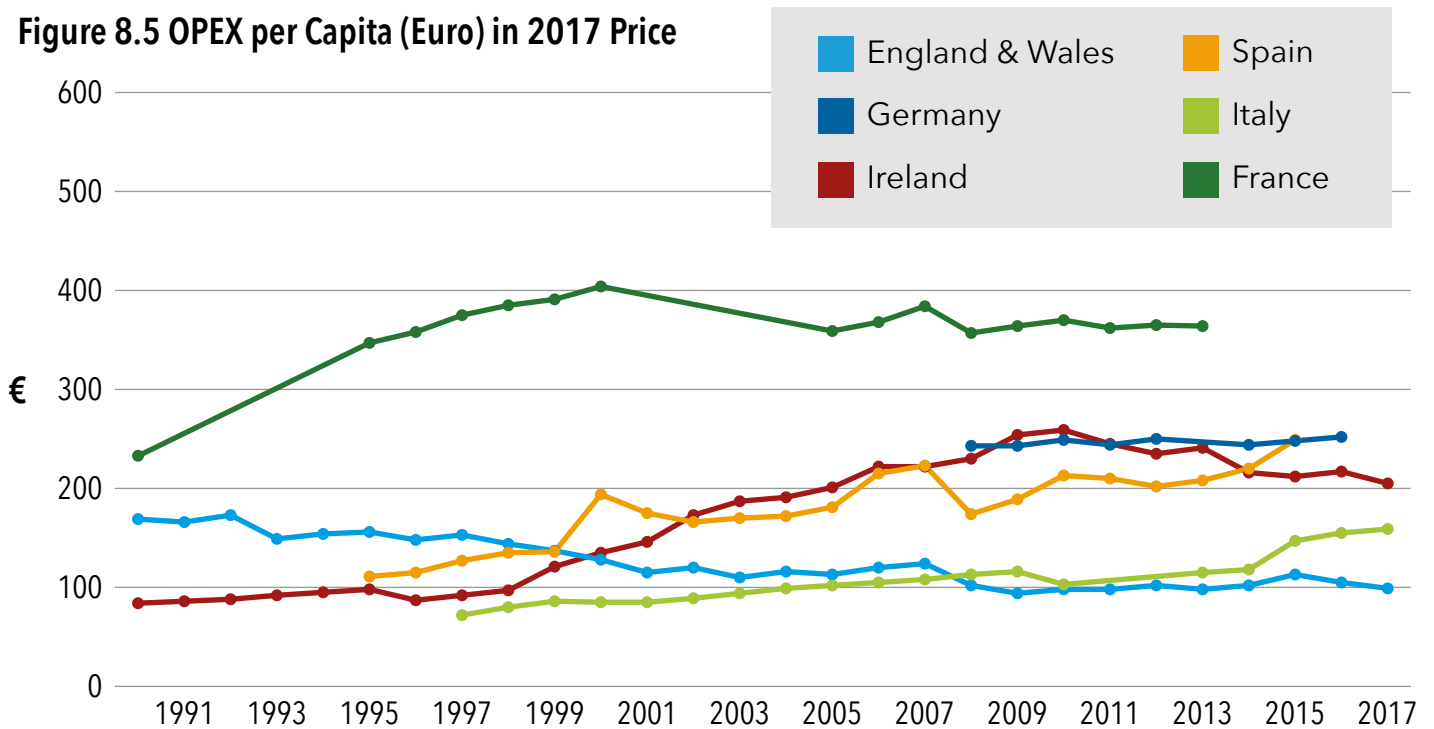
## Totex Breakdown: Capex and Opex per Capita

Figure 8.4 CAPEX per Capita (Euro) in 2017 Price



Source: GWI (2018)

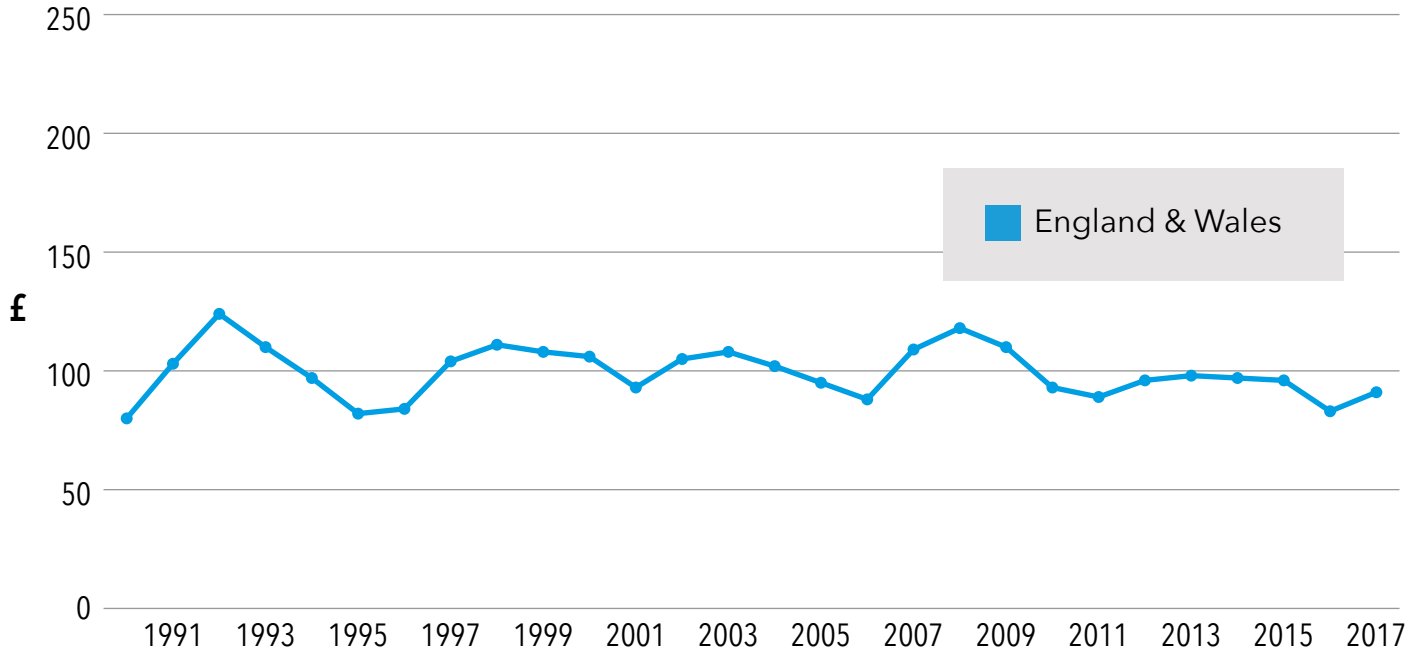
Figure 8.5 OPEX per Capita (Euro) in 2017 Price



Source: GWI (2018)

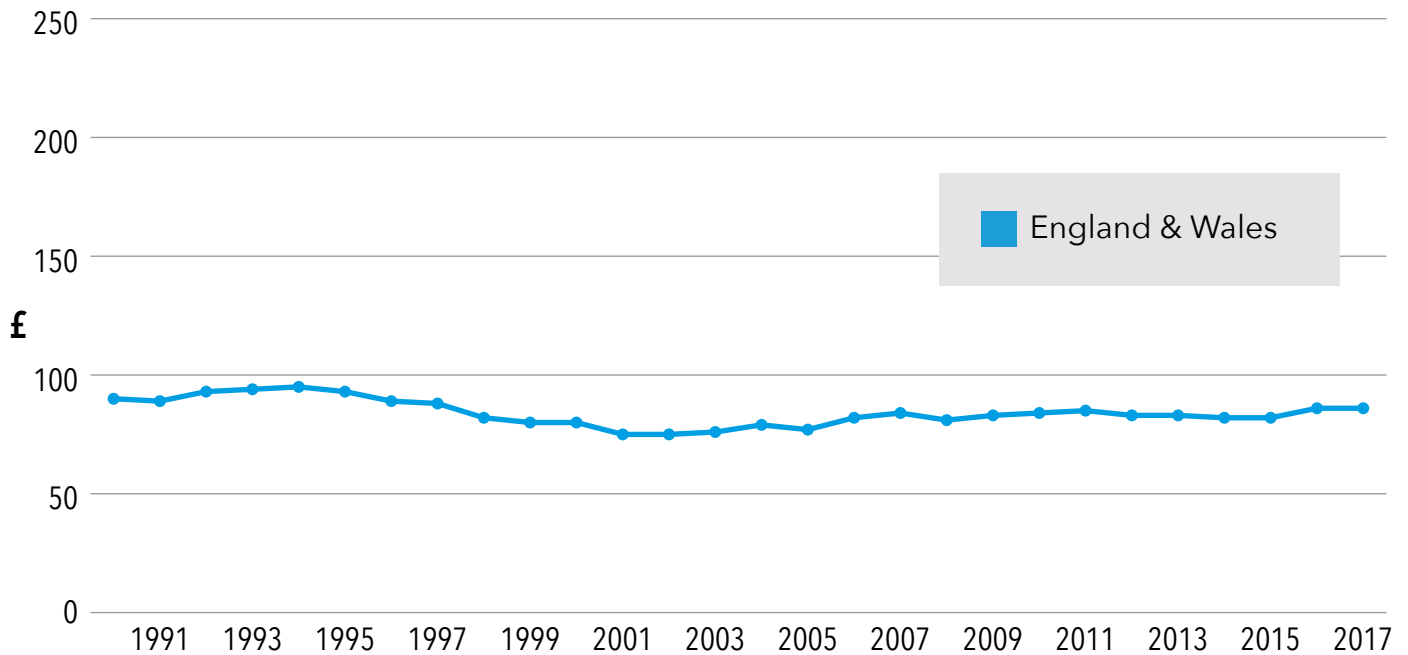
# International Comparisons of Water Sector Performance

**Figure 8.6 CAPEX per Capita (GBP) in 2017 Price**



Source: GWI (2018)

**Figure 8.7 OPEX per Capita (GBP) in 2017 Price**



Source: GWI (2018)