

The United Kingdom

The European Commission and the OECD jointly review investment needs and financing capacities for water supply, sanitation and flood protection in each of the European Union's 28 member countries¹. A fact sheet was developed for each country. Each fact sheet: (i) highlights the main drivers of future expenditure and quantifies projected investment needs; and (ii) analyses past sources of financing as well as capacities to finance future needs.

The analysis reflected in the fact sheets aims to support cross-country comparisons. For some indicators, trade-offs had to be made between reporting the most up-to-date and accurate data for each individual country and using data available for all countries in order to support such cross-country comparisons. The fact sheets were reviewed by country authorities and have been revised to reflect comments as much as possible. Inaccuracies on selected items may remain, which reflect discrepancies between national and international data sources.

A full methodological document will be published to explain in detail the sources, categories and methods used to produce estimates. In a nutshell:

- Current levels of expenditure (baseline) on water supply and sanitation are based on a range of data sets from Eurostat, which combine water-related public and household expenditures.
- Projections on future expenditures for water supply and sanitation are driven by the growth in urban population. Additional scenarios for water supply and sanitation were developed to factor in such drivers such as compliance with Drinking Water Directive (DWD), Urban Wastewater Treatment Directive (UWWTD) and emerging EU water directives.
- The paucity of data on current levels of flood protection expenditures did not allow for monetisation of projected future investment needs. Projections of growth rates of future expenditures for flood protection combine estimates of exposure of population, assets and GDP to risks of coastal or river floods.
- The characterisation of past sources of financing in each country is derived from baseline data on current levels of public and household expenditures, debt finance and EU transfers.
- Countries' future financing capacities are approximated by analysing room for manoeuvre in 3 areas: i) the ability to raise the price of water services (taking into account affordability concerns); ii) the ability to increase public spending; and iii) the

¹ Further information and project outputs can be found on the websites of the European Commission and the OECD. The present publication presents time series which end before the United Kingdom's withdrawal from the European Union on 31 January 2020 at 23:00 GMT. The EU aggregate presented here therefore refers to the EU including the UK. In addition to being included in the EU aggregate, the UK also features in relevant tables and figures, when there is a breakdown of the data by country.

ability to tap into private finance. Affordability analysis is based on water-related household baseline expenditures, not on average tariffs (which are highly uncertain, inaccurate and not comparable across countries).

The future costs of diffuse pollution, compliance with the Water Framework Directive, adaptation to climate change, contaminants of emerging concern, urban floods from heavy rains, as well as the potential of innovation to minimise future financing needs are explored qualitatively and will be reflected separately. Costs related to water storage and bulk water supply are not considered.

Key Messages

- The UK performs well on water supply coverage and wastewater treatment compliance. Storm water overflows remain an ongoing challenge.
- Comparatively rapid growth in urban population will strain network capacities.
- The sector does not face any major issue in terms of financing capacity.
- Climate change will increase flooding and coastal change risks, as well as water supply shortages.

Context

The UK enjoys a relatively high level of per-capita GDP. However, future economic growth forecasts are below the EU member state average, despite strong forecast urban and total population growth. The UK performs well on water supply coverage and wastewater treatment compliance. The value of assets exposed to flood risks is forecast to grow significantly in coming decades.

The United Kingdom has a temperate climate, with plentiful rainfall all year round. Annual average rainfall across the country is expected to decrease slightly by the 2080s, but the seasonal distribution will change significantly, with much more rainfall expected in winter (OECD, 2013^[4]). This heavier rainfall will lead to more frequent flooding, including outside of recognised flood risk areas. Dry periods, when combined with higher temperatures, are likely to result in more severe and prolonged droughts. Projected sea level rise of 50-100 centimetres by 2100 will exacerbate flood risks and accelerate the process of coastal change for exposed communities (Committee on Climate Change, 2017^[5]).

Table 1 presents a number of key indicators characterising the country context and features relevant to future expenditures for WSS and flood protection. These indicators are further discussed in the next sections, including those that underpin the projections of future investment needs.

Table 1. Key features relevant to future expenditures for WSS and flood protection

	Indicator	Value (rank if applicable)	Data Source	Year
Economy and Demographics	GDP per capita	EUR 36 500 (10/28)	Eurostat	2016
	Projected GDP growth	1.7% (22/28)	IMF	2016-2022
	Projected urban population variation by 2050	1.26x (5/28)	UN	2017-2050
Water Supply and Sanitation	Estimated annual average expenditure per capita	EUR 243	Authors based on EUROSTAT	2011-2015
	Population not connected	0%	EC	2015
	Annual domestic sector consumption per capita	55.6 m3	EUROSTAT	
	Leakage rate for public water supply	14%	EC	2017
	Non-revenue water	c23%	EurEau	2017
	Compliance with UWWTD Art.3, 4 and 5 (Index)	97% (11/28)	EC	2014
Flood Protection	Estimated annual average expenditure per capita	EUR 1 (25/27)	EC survey	2013-15
	Pop. potentially affected in flood risk areas	n.a.	EC report	2015
	Value of assets at risk (rise 2015-30):	2.64x (24/28)	WRI	2015-2030

Note: A rank of 1 implies best in class.

Main drivers and projections of future investment needs

Water supply and sanitation

Access to drinking water is universal in the UK, and quality is generally high (European Commission, 2017_[1]). The UK also has high compliance with the UWWTD, however storm water overflows remain an ongoing challenge (European Commission, 2017_[1]). Storm water overflows are being progressively addressed by innovative solutions such as sustainable urban drainage systems (European Commission, 2017_[1]). Over EUR 45 billion has been invested over the last 25 years to maintain and improve the UK sewage system, and there are plans to continue to invest higher amounts to improve the network even more (EurEau, 2017_[2]).

The WSS sector in the UK is characterized by a high rate of privatisation in the EU (EurEau, 2017_[2]). The sector is regulated by a range of institutions, and differs between England and Wales, Scotland, and Northern Ireland. In England and Wales, the Water Services Regulation Authority (Ofwat) is responsible for economic regulation; the Environment Agency is responsible for environmental regulation; and the Drinking Water Inspectorate for regulating drinking water quality. In Scotland, the economic water industry regulator is the Water Industry Commission and the environmental regulator is the Scottish Environment Protection Agency (Ofwat,(n.d.)_[3])

Table 2 projects future investment needs in water supply and sanitation for a business as usual and a compliance scenario. The compliance scenario consists of two dimensions (1) investments needed to comply with the revised DWD, extend access to vulnerable populations and improve network efficiency (reduce leakage); and (2) investments needed to comply with the UWWTD.

Table 2. Projected investment needs – Water supply and sanitation to 2050 (m. EUR)

UNITED KINGDOM		Baseline 2015	2020	2030	Total by 2030	2040	2050
BAU water supply and sanitation	CAPEX	10193	10535	11195		11668	11930
	TOTEX	15542	16294	17741	-	18957	19883
Scenario Compliance + for water supply and sanitation	ADD. CAPEX	-	1882	1922	21080	-	-
	ADD. TOTEX	-	3070	3200	34155	-	-
Compliance with DWD, access and efficiency (water supply)	ADD. CAPEX	-	109	109	1086	-	-
	ADD. TOTEX	-	327	327	3267	-	-
Compliance with UWWTD (sanitation)	ADD. CAPEX	-	1774	1813	19994	-	-
	ADD. TOTEX	-	2743	2873	30888	-	-

Note: BAU projections on future expenditures for water supply and sanitation are estimated based on the growth in urban population. Additional scenarios for water supply and sanitation are based on drivers relating to compliance the DWD and UWWTD as well as (for water supply) the cost of connecting vulnerable groups and of reduced leakage. The projections do not take into account the age and pace of renewal of water supply and sanitation assets due to the lack of comprehensive and comparable data across EU member countries.

Source: OECD analysis based on Eurostat (water-related public and household expenditure data) for the baseline; United Nations and Eurostat (total and urban population statistics and projections); European Commission (estimates of costs of compliance with revised DWD and of connecting vulnerable groups, leakage rates, and distance to compliance with UWWTD).

Flood risk management

England has regularly experienced flooding incidents with significant economic costs over the last decade. Between 2002 and 2013, the total direct costs of flooding amounted to EUR 23 billion. Currently, approximately 1 in 6 properties in England are at risk of flooding from rivers or the sea (European Commission, 2017^[1]). The 2017 Climate Change Risk Assessment identified large increases in flood risk and shortages in water as some of the greatest direct climate change-related threats for the UK. The UK has a complex system of managing flood and coastal erosion risk, which is further elaborated in the next section.

Table 3 highlights growth factors in future investment needs for protection against (riverine and coastal) flood risks. Urban floods from heavy rains will be discussed separately (not in the country fact sheet). The increase in the value of assets at risk from river flood events is lower than in other countries, although this remains an important source of future risk.

Table 3. Protection against coastal and river flood risks: Projected growth rates of investment needs to 2030

	Expenditures to protect against river flood risk			Expenditures to protect against coastal flood risk
	Total growth factors, by 2030			Categories (1-4), by 2030
	Expected urban damage	Expected affected population	Expected affected GDP	
United Kingdom	2,39	2,93	3,72	4

Note: It was not possible to establish a robust baseline of current expenditures for flood protection due to the absence of comprehensive and comparable data across EU member countries. As a result, this table presents projected growth factors in future expenditures. A growth factor is defined as the factor by which current flood risk expenditures should be multiplied in order to maintain current flood risk protection standards in the future (by 2030). For coastal flood, countries were classified in one of four categories of projected coastal flood risk investment needs, in which 1 indicates very low growth of projected investment needs and 4 very high growth of projected investment needs by 2030.

Source: OECD analysis based on the Aqueduct Global Flood Analyzer of the World Resources Institute (river flood impacts by urban damage, affected GDP, and affected population), the global database of FLOOD PROTECTION STANDARDS (Scussolini et al., 2016) (for countries river flood-related protection level), the European Commission Joint Research Centre (change of build-up in areas vulnerable for coastal flooding), a 2010 study by Hinkel et al. (number of people exposed to coastal flooding, and damage costs in the case of a coastal flood event).

Other pressures affecting water quality compliance with the WFD

The ecological status of UK water bodies has significantly improved in the past 30 years due to stronger environmental regulations (Environment Agency, 2018_[6]). About 41% of natural water bodies and 27% of modified/artificial water bodies meet the standard of “good ecological status” or better required by the EU Water Framework Directive (European Commission, 2017_[11]). Diffuse source pollution affects 68% of water bodies but there are large regional differences. For example, 90% of water bodies in the Anglian river basin district but only 16% in the Scotland river basin district are affected by diffuse sources (European Commission, 2017_[11]). Agriculture, rural land management, and urban and transport pressures remain key causes of poor water quality (Environment Agency, 2018_[6]).

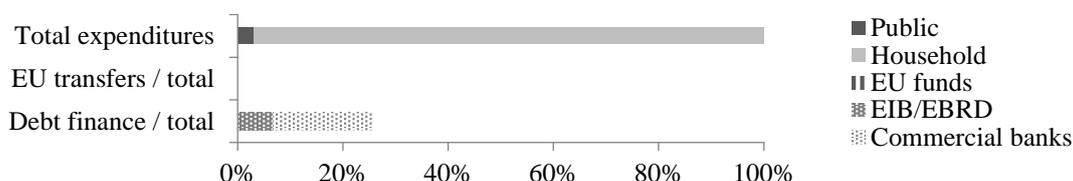
Past financing strategies and room for manoeuvre to finance future needs

Water supply and sanitation

There has been a 40% rise in household water bills since WSS privatisation in 1989. Following a 2014 review of water prices, companies announced that water and sewerage bills would fall after April 2015, and that more affordability measures would be put in place for low-income consumers (Water UK, 2018_[7]). Water tariffs are relatively high compared to EU averages (EurEau, 2017_[8]).

Water companies finance their investments through a mix of debt finance and equity finance. The water sector has a higher proportion of debt finance than other sectors in the UK due to the predictable regulatory regime (Water UK, 2018_[7]).

As depicted in Figure 3, the United Kingdom relies almost exclusively on household expenditures to finance WSS-related expenditures. A robust business model has made it possible to recourse to significant levels of commercial and public multilateral debt to finance upfront capital investments. On that basis, the country has not benefited from - nor would have been in need of - EU transfers.

Figure 3. Share of annual average expenditure on WSS, by source (2011-15, %)

Source: EUROSTAT (for public and household expenditures), European Commission (for EU transfers), European Bank for Reconstruction and Development, European Investment Bank, IJ Global, Thomson Reuters, Dealogic (for debt finance).

Table 4 indicates that the United Kingdom should be in a position to continue to mainly rely on tariffs, as affordability does not appear to be a critical concern, which in turn makes it possible to tap into commercial debt finance. Relatively high current levels of consolidated public debt would, however, constrain a significant increase in public spending, should it be needed.

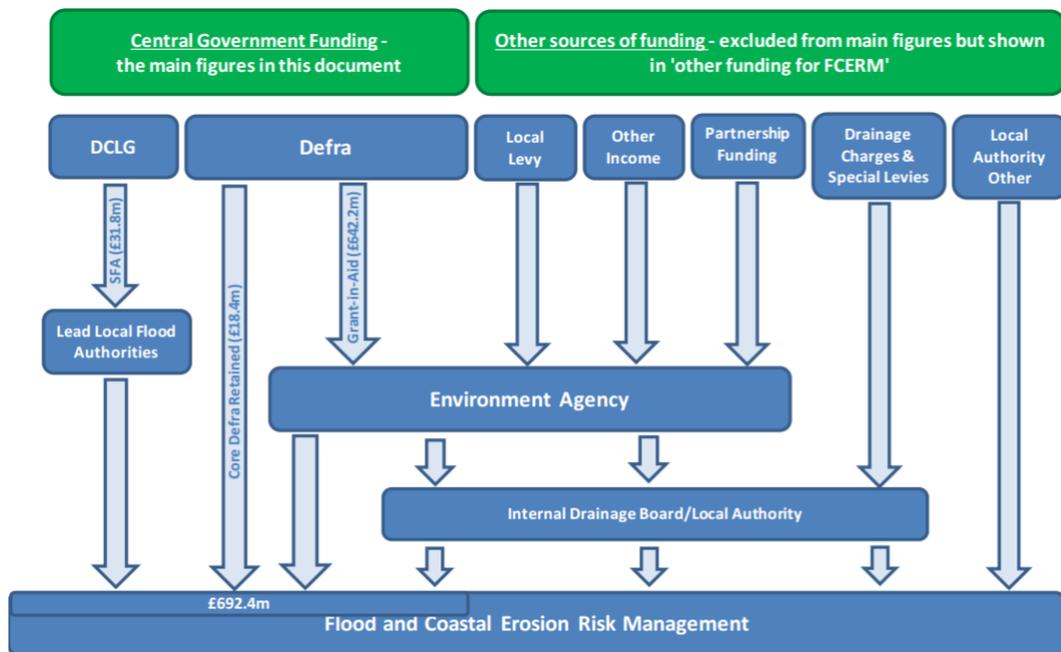
Table 4. Indicators of future financing capacities

	Indicator	Value (rank)	Year	Data Source	Assessment
Ability to price water	Country-level average price for water supply and sanitation / m3 (PPP)	2.7 EUR (5/27)	2009	EC Joint Research Centre (forthcoming)	High
	Water expenditures in lowest household income decile	2.39% (21/26)	2011-15	Authors based on EUROSTAT	
	Full cost recovery equivalent in lowest household income decile	2.46% (9/28)	2011-15	Authors based on EUROSTAT	
	At-risk-of-poverty rate	15.9% (11/28)	2016	EUROSTAT	
Ability to raise public spending	Tax revenue / GDP	35.1% (13/28)	2016	EUROSTAT	Medium
	Government consolidated debt / GDP	88.3% (21/28)	2016	EUROSTAT	
	Sovereign rating	AA	2017	Standard & Poor's	
Ability to attract private finance	Domestic credit to private sector / GDP	134% (3/28)	2015	World Bank	High

Flood risk management

Funding for flood and coastal erosion risk management in the UK is split between central funds and other measures. Multiple departments play a role in distributing central funds (see Figure 2).

Figure 2. Flood and Coastal Erosion Risk Management Funding Structure – 2017/18



Source: (Defra, 2017^[9])

The primary funding for flood and coastal erosion risk management comes from the central government in the UK, through Defra (Department for Environment, Food & Rural Affairs). Other sources of funding are:

- A levy on local authorities raised by the Environment Agency.
- Drainage charges and special levies raised by the Internal Drainage Boards.
- The partnership funding mechanism. This mechanism promotes sharing of costs between local and central government. The cost-sharing agreement is designed to favour more high-risk, low-income communities. The mechanism includes a provision that properties built after January 2012 will not influence the funding of projects, to avoid encouraging inappropriate development in areas at risk (DEFRA, 2011^[10]).
- Other income raised by the Environment Agency, such as drainage charges and sales of assets.
- Local governments/communities have the authority to use their own funds for flood protection works, outside of the model in Figure 2.

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