

Czech Republic

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 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).

¹ Further information and project outputs can be found on the websites of the European Commission and the OECD.

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

- A water stressed country, in international river basins
- Recent infrastructure investments result in high levels of compliance with DWD and UWWTD and strong sector efficiency. More stringent treatment will be required
- Notable combination of grey and nature-based solutions to address flood risks
- Of note: distinctively rapid land use change, driven by agriculture and urbanisation

Context

The Czech Republic is a medium-sized, land-locked country, with three international river basins all drain into neighbouring countries (Danube Water Program, 2015). The rivers account for 26% of annual drinking water availability, with net precipitation accounting for the bulk of renewable water sources. It is a “water stressed” country with per-capita annual renewable water resources of 1 234 m³ well below the EU average of over 10 000m³ (Danube Water Program, 2015). The country relies on a mix of groundwater from deep aquifers and surface water for drinking water supplies (OECD, 2005; EurEau, 2017).

The land area of the Czech Republic is about 49% dedicated to agricultural production, with forests (35%) and residential (5%) areas the next largest land-use types (Eurostat, 2017). This allocation of land has changed significantly over the previous decade, with agricultural conversions representing the major driver (EEA, 2017a). Urban sprawl, notably of commercial and industrial sites, has also increased.

The Czech Republic has a level of per-capita economic output around the EU median, with future real economic growth expected to be slightly above the EU average. 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 16 700 (18/28)	Eurostat	2016
	Projected GDP growth	2.3% (12/28)	IMF	2016-2022
	Projected urban population variation by 2050	1.08x (18/28)	UN	2017-2050
Water Supply and Sanitation	Estimated annual average expenditure per capita	EUR 194	Authors based on Eurostat	2011-2015
	Population not connected	6.7%	EC	2015
	Annual domestic sector consumption per capita	43 m3	Eurostat	
	Leakage rate for public water supply	23%	EC	2017
	Non-revenue water	c.18%	EurEau	2017
	Compliance with UWWTD Art.3, 4 and 5 (Index)	91% (19/28)	EC	2014
Flood Protection	Estimated annual average expenditure per capita	EUR 4 (15/27)	EC survey	2013-15
	Pop. potentially affected in flood risk areas	28%	EC report	2015
	Value of assets at risk (rise 2015-30):	1.1x (5/28)	WRI	2015-2030

Note: Rank 1 implies best in class among the EU member countries for which data is available for each indicator. The Czech Statistical Office records 5.6% of the population are not connected to water supply and sanitation and only 4.6% of the population living in flood risk areas.

Main drivers and projections of future investment needs

Water supply and sanitation

The Czech Republic is forecast to undergo slight positive population growth until about 2030, with a fall forecast thereafter (UN, 2017). At the same time, the rate of urbanisation is projected to increase slightly (UN, 2017).

Approximately 100% of the population is connected to drinking water supply, with over 93% connected to Large Water Supply Zones and the rest relying on self-provision, typically via wells (Eureau, 2017; Danube Water Program, 2015). There us a large number of providers, which range from private concessions, municipal companies, mixed/owner-operator utilities, and municipal administrations. Despite numbering into the thousands of providers, the top 50 utilities together account for 90% of the population (Danube Water Program, 2015).

The Czech Republic exhibits very high compliance with the EC's Drinking Water Directive (EC, 2017). Non-revenue water accounts for around 20% of water supplied. This is a superior performance to the average of most other countries (EurEau. 2017). The asset renewal rate for water supply and sanitation infrastructure is significantly higher than in most other EU member states (Danube Water Program, 2015).

The Czech Republic is compliant with the EC's Urban Wastewater Treatment Directive, although only about 87% of wastewater collected is subject to secondary treatment at the

national level. Just 54% is subject to additional treatment. This reflects the major investments made, with the assistance of EU funds over the last fifteen years (see Figure 1 further down).

Table 2 projects future investment needs in WSS 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. Water supply and sanitation: projected investment needs to 2050 (million EUR)

CZECH REPUBLIC		Baseline 2015	2020	2030	Total by 2030	2040	2050
BAU water supply and sanitation	CAPEX	752	841	994		1153	1325
	TOTEX	2044	2069	2111	-	2154	2208
Scenario Compliance + for water supply and sanitation	ADD. CAPEX		218	236	2437		
	ADD. TOTEX	-	542	517	5742	-	-
Compliance with DWD, access and efficiency (water supply)	ADD. CAPEX	-	31	31	310	-	-
	ADD. TOTEX		82	82	824		
Compliance with UWWTD (sanitation)	ADD. CAPEX		187	205	2126		
	ADD. TOTEX		459	435	4919		

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

The Czech Republic is at risk of river and pluvial flooding across many of its river basins, with these risks likely to increase due to both demographic and climate changes. Flood events in recent years (for example, in 2010 and 2013) caused significant displacement and economic damage. Nonetheless, the Czech Republic faces a relatively low increase in the value of assets at risk to possible future riverine flooding compared to other member states (WRI, 2015). Table 3 highlights growth factors in future investment needs for protection against (riverine and coastal) flood risks.

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	
Czech Republic	2,38	1,78	2,91	na

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 rates in future expenditures.

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 (for countries river flood-related protection level), the European Commission Joint Research Centre (change of build-up in areas vulnerable for coastal flooding), a study 2010 by Hinkel et al, (number of people exposed to coastal flooding, and damage costs in the case of a coastal flood event).

Ongoing efforts to use nature-based solutions and restore more natural hydromorphology in the two-thirds of surface water bodies affected by artificial flow regulation should help to mitigate flood risks over time (EC, 2017). The Czech Republic is developing Flood risk management plans in accordance with the requirements of the EC's Floods Directive.

Other pressures affecting compliance with WFD

Only about 20% of natural water bodies meet the standard of “good ecological status” or better required by the EU Water Framework Directive and just 7% of modified/artificial water bodies meet the standard of “good ecological potential” (EC, 2017). Diffuse source pollution is a major source of non-compliance with water quality standards, affecting about half of water bodies, while point sources of pollution affect 44% of surface waters (EC, 2017). Water quality is broadly similar across all the country's river basins.

Past financing strategies and room for manoeuvre to finance future needs

Water supply and sanitation

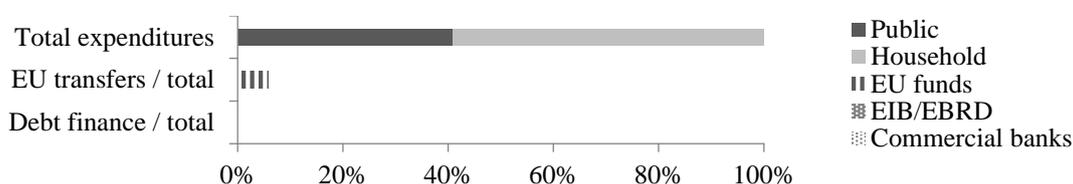
Water supply and sanitation policy is managed at the national level, with responsibilities divided across four main government bodies: agriculture, environment, finance and public health (Danube Water Program, 2015). Each of the Czech Republic's 14 regions is divided into municipalities, the smallest administrative unit, which typically own the water infrastructure and are responsible for providing public services. While some do so directly, others allow private provision (Danube Water Program, 2015).

Households and businesses connected to water supply and sanitation infrastructure pay user charges, according to national regulation, with cross-subsidisation prohibited. Each utility is entitled to charge a tariff that covers full economic cost, including operating and maintenance expenses, as well as a return on capital (Danube Water Program, 2015). Tariffs vary by region. Some smaller municipalities supplement user charges with general taxation revenue, typically in the order of 5-10% of operating expenses. There is no general subsidy or levy provided by central government.

As depicted in Figure 1, the Czech Republic has been relying slightly more on household than public expenditures to finance WSS-related capital and operational expenses. Only a

limited part of total expenditures have been dependent on EU transfers. Debt finance does not appear to have played a role.

Figure 1. Share of annual average expenditure on WSS, by source (2011-15, %)



Sources: Eurostat (for public and household expenditures), European Commission (for EU transfers), European Investment Bank, IJ Global, Thomson Reuters, Dealogic (for debt finance).

Table 4 indicates that the Czech Republic faces some financing challenges, though likely manageable. Current price levels are relatively higher than in other new member states, but affordability may become a concern if prices would further increase. The country has leeway to increase public spending thanks in particular to a healthy fiscal condition.

Table 4. Indicators of future financing capacities

	Indicator	Value (rank)	Year	Data Source	Assessment
Ability to price water	Water expenditures in lowest household income decile	2.48% (23/26)	2011-15	Authors based on Eurostat	Medium
	Full cost recovery equivalent in lowest household income decile	4.2% (24/28)	2011-15	Authors based on Eurostat	
	At-risk-of-poverty rate	9.7% (1/28)	2016	Eurostat	
Ability to raise public spending	Tax revenue / GDP	34.8% (20/28)	2016	Eurostat	High to Medium
	Government consolidated debt / GDP	36.8% (4/28)	2016	Eurostat	
	Sovereign rating	AA-	2017	Standard & Poor's	
Ability to use debt finance	Domestic credit to private sector / GDP	50% (23/28)	2015	World Bank	Medium

Flood risk management

The national government is responsible for developing and implementing flood protection plans at a river basin level in the context of River Basin Management Plans (EC, 2017). The Czech Republic has a track record of undertaking significant investments in both man-made and natural infrastructures, including protective dykes, reservoirs, and dams, often with the assistance of EU funding (OECD, 2005).

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