

Sweden

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

- Sweden achieves very high compliance rates with the requirements of the EU DWD. High consumption per capita and urban sprawl may drive future investment needs up.
- All wastewater treatment plants already provide secondary or tertiary treatment.
- Sweden does not face any core issue in terms of financing capacity. Current price levels demonstrate the ability to recover costs of WSS services.
- Climate change is projected to increase risks of flood and costs for supplying drinking water.

Context

Sweden is a relatively wealthy country in Europe, with moderate future economic growth forecasts, despite strong expected urban population growth over coming decades. Land use is dominated by forests (over two-thirds).

Sweden has abundant water (thousands of lakes, freshwater and streams) and a relatively low population. Total water abstraction represents only 1% of all available freshwater resources, which is among the lowest intensity of water use in the OECD. However, the country is characterised by relatively high levels of abstraction for public supply per capita. As the domestic sector accounts for about a third of total abstraction, such high per capita demand, if maintained, may lead to increased investment needs, even more so as urban sprawl remains a concern (OECD, 2014^[1]).

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 46 900 (4/28)	Eurostat	2016
	Projected GDP growth	2.0% (15/28)	IMF	2016-2022
	Projected urban population variation	1.3x (3/28)	UN	2017-2050
Water Supply and Sanitation	Estimated annual average expenditure per capita	EUR 141	Authors based on Eurostat	2011-2015
	Population not connected to public water supply	14%	Eurostat	2015
	Annual household consumption per capita	77.5 m ³	Eurostat	
	Leakage rate for public water supply	19%	EC	2017
	Non-revenue water	c.18%	EurEau	2017
	Compliance with UWWTD Art.3, 4 and 5	98% (9/28); xx% (x/28); xx% (x/28)	EC	2014
Flood Protection	Estimated annual average expenditure	N/A	EC survey	2013-15
	Population potentially affected in flood risk areas	N/A	EC report	2015
	Expected increase in urban damage	2.05x (24/28)	Authors based on WRI	2015-2030

Note: Rank 1 implies best in class among the EU member countries for which data is available for each indicator.

Main drivers and projections of future investment needs

Water supply and sanitation

Sweden performs well on network performance and connection measures for water supply and sanitation. In terms of compliance with microbiological, chemical and indicator parameters laid down in the DWD, the country reaches very high rates of 99-100% (European Commission, 2017_[2]).

The share of the population connected to urban wastewater treatment systems is among the highest in European countries. All wastewater treatment plants provide secondary or tertiary treatment (OECD, 2014_[2]). Sweden reported that in 2012, 88.9% of the wastewater load collected is subject to more stringent treatment in accordance with Article 5 of the UWWTD (European Commission, 2017_[2]).

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. A major caveat is the lack of accurate cross-country data on the state of the asset and on whether the business as usual appropriately reflects the need to renew existing infrastructures.

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

SWEDEN		Baseline 2015	2020	2030	Total by 2030	2040	2050
BAU water supply and sanitation	CAPEX	456	548	723	-	909	1111
	TOTEX	1350	1436	1591	-	1723	1852
Scenario Compliance + for water supply and sanitation	ADD. CAPEX	-	173	219	2103	-	-
	ADD. TOTEX	-	476	511	5369	-	-
Compliance with DWD, access and efficiency (water supply)	ADD. CAPEX	-	14	14	140	-	-
	ADD. TOTEX	-	60	60	595	-	-
Compliance with UWWTD (sanitation)	ADD. CAPEX	-	159	205	1963	-	-
	ADD. TOTEX	-	416	452	4774	-	-

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).

New contaminants are likely to increase the costs of wastewater treatment beyond those presented in Table 2. In particular, as one of the Baltic Coastal Countries, Sweden has agreed to develop measures to address micro-plastics and urban and stormwater discharges to rivers, and to consider cost-effective mitigation measures to reduce legacy pollutants and contaminants of emerging concern, including pharmaceuticals (HELCOM, 2018_[3]).

Flood risk management

While Sweden has to date not been directly exposed to severe flooding, a preliminary assessment highlighted that global warming and changing precipitation patterns will increase risk of flooding of urban areas by rivers and lakes in parts of the country. Other flood types are not included in the assessment due to a lack of data or methods to predict future floods (European Commission, 2017_[2]).

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	
Sweden	2,05	2,62	3,48	1

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 2010 by Hinkel et al, (number of people exposed to coastal flooding, and damage costs in the case of a coastal flood event).

In terms of vulnerability in the face of future climate change, in 2007, a national Commission on Climate and Vulnerability identified potential damages and positive effects. Potential damages included increased risks of flooding and coastal erosion as well as higher costs for supplying drinking water. Possible benefits included increased water supply and production of hydroelectric power (Swedish Commission on Climate and Vulnerability, 2007^[4]).

Other selected pressures affecting compliance with the WFD

Close to 60% of natural surface water bodies in Sweden achieve a good or high ecological status, while only 2% of heavily modified or artificial water bodies do so. Almost all (98%) of groundwater bodies achieve good chemical status, but none of surface water bodies, and none of heavily modified and artificial water bodies. Most (87%) of groundwater bodies are in good quantitative status (European Commission, 2017^[2]).

Diffuse pollution is a main pressure on Swedish surface waters. 17% of inland surface water bodies are affected by acidification, 13% by nutrients and 100% by long-range transported mercury. Several freshwater bodies and most marine ecosystems suffer from eutrophication. High loads of nitrogen from agriculture, wastewater, industry and shipping are major causes of eutrophication of the Baltic Sea (OECD, 2014^[1]).

Intensive use of hydropower and the presence of large channels have altered river morphology and hydrological conditions. Flow regulation and morphological alterations affect 29% and river management negatively affects 8% of water bodies (European Commission, 2017^[2]). The implementation of measures to reduce hydromorphological pressure in river basins is, therefore, likely to induce costs and investments.

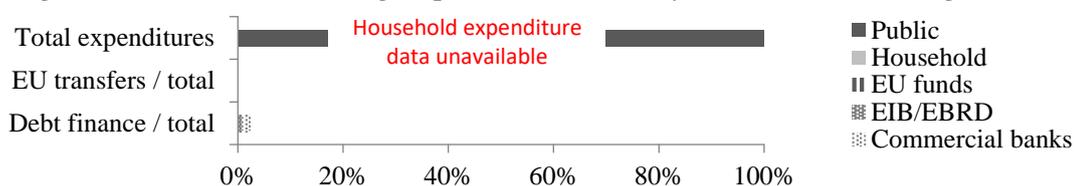
Past financing strategies and room for manoeuvre to finance future needs

Water supply and sanitation

Water supply and sanitation including the management of stormwater is the task of the local government or (the close to 300) municipalities. The municipalities own the facilities and are also responsible for running them. Each municipality determines the fees, which in most cases cover close to the full cost of water supply and wastewater management.

As such, revenues from water bills cover a vast majority of the investment and O&M costs of the provision of water supply and sanitation services. Smaller municipalities may subsidise by means of local tax. As per Figure 1 (NB: data on water-related household expenditures is not available), the need to recourse to debt finance is minimal. Further, the country has not benefited from - nor would have been in need of - EU transfers.

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



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

Based on criteria in Table 4, Sweden does not face any core issue in terms of financing capacity. Current price levels demonstrate the ability to raise and maintain tariffs towards full cost recovery of WSS services. Should higher levels of public spending be needed at some point, the authorities would likely be in a position to rely on borrowing.

Table 4. Indicators of future financing capacities for water supply and sanitation

	Indicator	Value (rank)	Year	Data Source	Assessment
Ability to price water	Water expenditures in lowest household income decile	N/A	2011-15	Authors based on Eurostat	High
	Full cost recovery equivalent in lowest household income decile	1.12% (2/28)	2011-15	Authors based on Eurostat	
	At-risk-of-poverty rate	16.2% (13/28)	2016	Eurostat	
Ability to raise public spending	Tax revenue / GDP	44.6% (25/28)	2016	Eurostat	High
	Government consolidated debt / GDP	42.2% (9/28)	2016	Eurostat	
	Sovereign rating	AAA	2017	Standard & Poor's	
Ability to use debt finance	Domestic credit to private sector / GDP	129% (4/28)	2015	World Bank	High

Flood risk management

Sweden does not currently compile figures on flood protection expenditures. In terms of financing, county administrations and municipalities might finance parts of the measures. Municipalities can apply for governmental subsidies in order to take local preventive measures. The amount of governmental subsidies has fluctuated over the years, without influence of the EU Flood Directive (European Commission, 2017^[4]).

References

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