

## *Italy*

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 countries<sup>1</sup>. 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).

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<sup>1</sup> 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

- Italy faces medium-to-high water stress, despite abundant rainfall.
- Significant regional disparities exist in service coverage, levels and quality, for water supply and sanitation. Real losses in networks are high compared to other member states. Compliance with the UWWTD remains a challenge.
- Climate change will exacerbate risks of both flooding and drought, with disparate impacts across regions.

### Context

Italy faces the lowest rate of economic growth in Europe over coming years, as well as a declining total population. Despite near universal public water supply connection rates, availability remains an issue in some regions. Similarly, compliance with wastewater treatment standards slightly below the EU average belies significant regional disparities in service coverage and levels. Italy faces significant future flood risks, especially in northern river basins.

Although it receives significantly more rainfall than the European average, Italy suffers medium-to-high water stress (OECD, 2013). This situation results from the uneven distribution of precipitation, high rates of evapotranspiration, high levels of run-off, low storage capability, and intense consumptive use of water. Northern regions, in general, receive more rain than southern ones (WWF, 2018). Further, some 70% of Italy's groundwater is located under northern regions (OECD, 2013). Many southern regions rely on water imported from farther north.

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

	Indicator	Value (rank if applicable)	Data Source	Year
<b>Economy and Demographics</b>	GDP per capita	EUR 27 700 (12/28)	Eurostat	2016
	Projected GDP growth	1.0% (28/28)	IMF	2016-2022
	Projected urban population variation by 2050	1.09x (17/28)	UN	2017-2050
<b>Water Supply and Sanitation</b>	Estimated annual average expenditure <sup>(1)</sup>	EUR 291	ARERA	2016
	Population not connected	1%	EC	2015
	Annual domestic sector consumption per capita	58,8 m <sup>3</sup> per capita	<a href="#">ARERA<sup>(2)</sup></a>	2016
	Leakage rate for public water supply	39%	EC	2017
	Non-revenue water	39%	EurEau	2017
	Compliance with UWWTD Art.3, 4 and 5 (Index)	92%	EC	2014
<b>Flood Protection</b>	Estimated annual average expenditure per capita	EUR 4	<a href="#">EC survey</a>	2013-15
	Pop. potentially affected in flood risk areas	100%	<a href="#">EC report</a>	2015
	Value of assets at risk (rise 2015-30):	1.5x (14/28)	WRI	2015-2030

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

(1) According to last ARERA figures (ARERA 2017, Annual Report), estimated annual average expenditure in 2016 (including 10% VAT) at national level - considering a typical domestic family of three components with annual 150 mc consumption - amounts to 291 euro/year (about 1,94 euro per mc) – on a sample of 102 operators serving 37.931.369 inhabitants.

(2) ARERA 2016, Annual Report.

## Main drivers and projections of future investment needs

### *Water supply and sanitation*

Table 2 projects future investment needs in water supply and sanitation. While more accurate projections may have been available for selected countries, proxies have been used which facilitate comparisons across countries. Other water-related investments could not be projected, due to lack of comparable data.

Italy has achieved near-universal connection to drinking water supplies and maintains a high standard of drinking water, despite periodic delivery and quality problems in some regions (EC, 2017). Non-revenue water levels are very high, at around 44%, mainly depending on real losses<sup>2</sup> for a significant proportion of total abstractions. This is above the average non-revenue water rates of most other member states, although direct cross-country comparisons cannot be made (EurEau, 2017). This national-level figure obscures important regional differences (EC, 2017).

Non-compliance with the Urban Wastewater Treatment Directive remains a concern (EC, 2017). Nearly one in three agglomerations of more than 2 000 person-equivalents are

<sup>2</sup> See ARERA 2017, Document 623/2017/I/IDR

involved in EU infringement procedures. Connection to wastewater collection and treatment systems lags drinking water connections, with around 90% of the population covered (EurEau, 2017). Compliance with treatment standards, especially for more stringent treatment, remains below target (EC, 2017). Of note: data discrepancies between regions - and unavailability in some - makes national-level data compilation impossible (EC, 2017).

Italy's population is forecast to fall over the next 30 years, while undergoing continuing urbanisation (UN, 2017). This will continue to put pressure on cities, while simultaneously reducing economies of scale of infrastructure provision in rural areas. Despite an average age of about 30 years, Italy's underperforming water infrastructure will require significant renewal over coming years (EC, 2017).

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

ITALY		Baseline 2015	2020	2030	Total by 2030	2040	2050
BAU water supply and sanitation	CAPEX	2692	3461	4821	-	6288	7751
	TOTEX	11847	11960	12270	-	12665	12919
Scenario Compliance + for water supply and sanitation	ADD. CAPEX	-	1214	1119	12487	-	-
	ADD. TOTEX	-	4199	2979	39063	-	-
Compliance with DWD, access and efficiency (water supply)	ADD. CAPEX	-	139	139	1394	-	-
	ADD. TOTEX	-	485	485	4848	-	-
Compliance with UWWTD (sanitation)	ADD. CAPEX	-	1075	980	11093	-	-
	ADD. TOTEX	-	3715	2494	34215	-	-

*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.

(1) Italy provided projections: based on ARERA 2017 Annual Report, the projected investment needs for the water sector for the period 2016-2019 reaches EUR 12.7 billion– EUR 3.2 billion yearly.

*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***

Table 3 projects 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).

Italy has been prone to river, pluvial, and coastal flooding across almost all its regions (OECD, 2013). These flood events have historically come at significant economic cost, well above the EU member state average for the years 2002-2013 (EC, 2017).

Northern Italy's river basins are amongst the most at risk in all member states from increases in future hundred-year flood events due to climate change (EEA, 2017). Nonetheless, Italy

sits around the member state average for projected increases in the value of assets at risk due to possible future riverine flooding with more frequent return periods (WRI, 2017).

Italy incorporates nature-based flood defence infrastructure alongside artificial infrastructure in its 2020 ERDF and EARFD planned investment programmes (EC, 2017).

**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	
<b>Italy</b>	1,31	1,08	1,27	2

*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 and compliance with the WFD***

Italy is a relatively large country with a long coastline and 75% of its land in hilly or mountainous areas (WWF, 2018). It contains seven river basin districts, including two trans-boundary ones. Climate change is expected to exacerbate already marked regional differences. The short length of Italy's rivers, especially in more southern regions, means strong periods of rainfall can cause sudden rapid flows in rivers, implying not only a reduced ability to capture rainfall, but also risks of topsoil losses, erosion, and flooding (WWF, 2018).

Italy's land area is about 44% dedicated to agricultural production, with forests (23%) the next largest land-use type (Eurostat, 2017). A large proportion of land (22%) is classified as unused and abandoned. Agricultural conversions were increasing from 2006-2012 compared to the previous five years, while residential sprawl seems to be declining.

Agriculture is the largest user of freshwater resources, accounting for around half of water use (slightly more than its share of land use), primarily for irrigation, and is expected to remain at about this level (OECD, 2013). In 2013, abstraction for public supply per capita was the largest in the EU.

Groundwater provides the majority of Italy's public and industrial water use needs (OECD, 2017). Groundwater abstraction appears to be occurring at rates above sustainable recharge levels in many regions (OECD, 2013). Groundwater quality varies across regions (OECD, 2013).

Only about 29% of natural water bodies and 16% of modified/artificial water bodies meet the good ecological status or better required by the EU Water Framework Directive (EC, 2017).

Diffuse pollution (notably from nitrates and phosphates) from agriculture is the major source of non-compliance with water quality standards, affecting 38% of surface water bodies (EC, 2017). One quarter of surface waters are affected by point source pollution. The intensity of these, and other, pressures varies considerably across regions.

## Past financing strategies and room for manoeuvre to finance future needs

### *Water supply and sanitation*

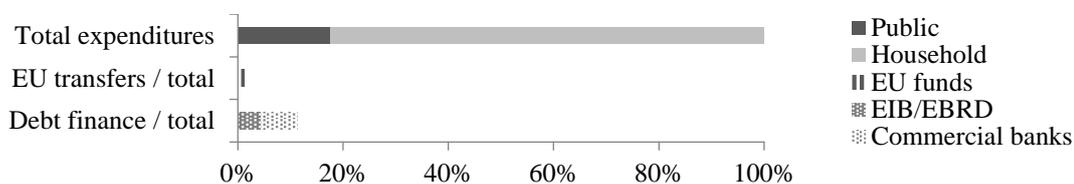
Italy has been relying mostly on household expenditures to cover WSS-related costs (Figure 1). The contribution of public funds has been below 20%. The country has very marginally benefited from water-related EU transfers. It has used some debt to finance investment.

Water supply and sanitation services are organised in integrated public utilities overseen by a central independent authority (ARERA) responsible for approving tariffs proposed by local authorities (EC, 2017). New tariff mechanism, issued in 2013, centred on the “Regulatory Matrix”, has introduced a set of innovative and asymmetric rules, which – taking into consideration the initial operating circumstances of each operator – provided incentives to invest in and to rationalise operating activities. Tariff calculation is based both on ex-post reimbursement criteria and on a revenue cap to promote efficiency.

Where utilities are compliant with regulatory framework, cost reimbursement let “full cost recovery principle” into service supplier allowed revenues, as provided by the WFD, concerning both economic and environmental costs. On this second side, until 2014 in a specific tariff component, ERC, made explicit both *environmental* costs – representing the cost of damage that water uses impose on the environment and ecosystems and those who use the environment – and *resource* costs - reflecting the costs of foregone opportunities which other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery (e.g. linked to the over-abstraction of groundwater).

In order to enhance cost-recovery, costs due to late payments - defined as Unpaid Ratio (UR) in 24 months - are recognised, and they are differentiated across geographical macro-areas, as a function of the different average incidence on the revenues – 2,1% for North Italy, 3,8% for Centre Italy and 7,1% for South Italy.

**Figure 1. 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).

Increasing legal and regulatory certainty attracts commercial investors and financiers. Since 2014, a steady investment growth was observed (+55% between 2015 and 2012, equivalent to 33 euros per capita per annum), dealing most of all with filling the infrastructure gap in sewerage and wastewater treatment activities (ARERA 2016, Annual Report). During 2016-

2019, projected investments financed through tariffs amount to EUR 7.8 billion<sup>3</sup> – EUR 9.9 billion including public funds - corresponding on a national average value of EUR 42 per inhabitant yearly.

Recent evolutions in water supply and sanitation are finalised to improve water affordability – by ensuring facilitations to low income users – and to define technical and infrastructural quality standards to be granted to end-users. Future investment needs are expected to reach these new objectives.

Table 4 indicates a range of potential financing issues for Italy. While under current levels of expenditure, affordability is not a determining constraint, it could become one with increased investment needs. Further, the country is unlikely to be in a position to rely on increased public spending given its already deteriorated fiscal condition.

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

	Indicator	Value (rank)	Year	Data Source	Assessment
<b>Ability to price water</b>	Water expenditures in lowest household income decile	2.34% (20/26)	2011-15	Authors based on EUROSTAT	Medium
	Full cost recovery equivalent in lowest household income decile	2.84% (13/28)	2011-15	Authors based on EUROSTAT	
	At-risk-of-poverty rate	20.8% (21/28)	2016	<a href="#">EUROSTAT</a>	
<b>Ability to raise public spending</b>	Tax revenue / GDP	42.9% (22/28)	2016	<a href="#">EUROSTAT</a>	Medium
	Government consolidated debt / GDP	132% (27/28)	2016	<a href="#">EUROSTAT</a>	
	Sovereign rating	BBB	2017	<a href="#">Standard &amp; Poor's</a>	
<b>Ability to attract private finance</b>	Domestic credit to private sector / GDP	88% (13/28)	2015	<a href="#">World Bank</a>	Medium
	Ease of doing business global rank	46 (20/28)	2017	<a href="#">World Bank</a>	

\* According to last ARERA figures (ARERA 2017, Annual Report), in 2016 estimated annual average expenditure (including 10% VAT) at national level - considering a typical domestic family of three components with annual 150 mc - consumption amounts to 291 euro/year (about 1,94 euro per mc) – on a sample of 102 operators serving 37.931.369 inhabitants. Section 1. Main challenges driving future investment needs

### ***Flood risk management***

The river basin authorities are responsible for developing and implementing flood protection plans at a river basin level and have undertaken significant investments in both man-made and natural infrastructures. Italy also has a National Operational Plan to coordinate regions' proposals to mitigate hydrogeological risks (EC, 2017).

<sup>3</sup> based on a sample of 130 operators serving 46 million of inhabitants.

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