DATA ON THE WATER SERVICE IN ITALY

BLUE BOOK

EXECUTIVE SUMMARY

2025

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VERITAS

KEY MESSAGES

1

The **new wastewater directive** has introduced stringent targets for improving the quality of wastewater. It is estimated that in order to **adapt the large Italian purification plants** to the need to insert quaternary treatment systems, a total of **645 million to 1.5 billion will be needed as a sum of the investment and operating costs required**, depending on the technologies used. Investments in the purification sector are necessary, considering that in Italy there are still **856 built-up areas in infringement proceedings** for a generated organic load equating to about **27 million equivalent inhabitants**, of which **76%** are located **in the South**.

2

Implementation of governance and **overcoming the management fragmentation** of the water sector are processes in full development thanks also to the contribution of the reform actions implemented by the NRRP. To date, the **main critical issues** related to the failure to entrust the areas are mainly reported **in some regions of the South** and **are, in any case, largely being resolved**. **85% of citizens are served by a single entity** that manages the integrated water service; there are still about **7 million citizens** where at least one of the water services is managed by local authorities (**economic management**).

3

In 2023, companies operating in the water sector recorded a total **turnover of 8.9 billion euros** (**0.4% of national GDP**) and contributed to employment with over **29,000 employees** (**0.5%** of industrial sector employees and **0.1%** of total employees). The analysis of the economic and financial data shows that large operators (i.e. those serving a catchment area of more than 250,000 inhabitants) account for more than half of the total turnover generated. Considering the extended supply chain, however, **the added value of the sector rose to 11 billion euros in 2023**, getting closer and closer to the value of other key industrial sectors for our country such as the pharmaceutical industry (with a value of 11.9 billion euros) and surpassing others (e.g. leather goods, 9.6 billion euros).

4

The average annual expenditure for water service in Italy in 2024 was EUR 384, for a household of three people with a consumption of 150 cubic metres, an **increase of about 5% compared to 2023**. Tariffs vary significantly at the regional level. Northern Italy has the lowest average expenditure with 337 euros per year, while the Centre reaches the maximum expenditure value of 466 euros per year. Southern Italy, with 381 euros, stands slightly below the national average.

5

Investments by industrial water service operators are growing with an average per capita expenditure value rising from **33 euros per inhabitant in 2012** to **65 euros per inhabitant in 2023** (**+99% in 11 years**). **Investment capacity is strictly proportional to the size of the operator**. Operators with a turnover of less than 25 million euros invest an average of **44 euros per inhabitant**, while larger ones exceed **68 euros per inhabitant**. Local management, on the other hand, shows a lower investment value (29 euros per inhabitant in 2023) although it is increasing compared to 2022 as a probable effect of the NRRP.

On the regulatory front, the **RAB** is an essential tool for enhancing infrastructure investments, with a **total value of around 16.3 billion euros**. Integrated with the concession system, it guarantees a **balance between the need to renew infrastructure and economic sustainability for operators**, while protecting the accessibility of the service for citizens. The concession process, with differentiated deadlines at national level (**the value of tenders in the next 10 years is about 12 billion euros**), offers interesting prospects for a planned renewal and for the adoption of new standards, in line with European best practices.

6

The regulation of technical quality is helping to further improve the standards of the water service. **Most of the investments (about 27%) are still earmarked for the recovery of network losses**, together with interventions for the sewerage-treatment sector (28% of the total). The commitment of the operators is also evident, for example, in the resource quality controls: **in 2023**, **over 260,000 samples were taken to monitor the quality of the water**, a number 175% higher than the minimum value of samples that operators are required to take during the year.

7

In recent years, the Italian territory has experienced **an increasingly marked alternation between periods of drought and surplus rainfall**, due to the increase in temperatures. Over the past twenty years, this variability has been further accentuated, making the development of river basin monitoring systems for the protection of water resources essential. The **Drought Scan monitoring system**, for example, has highlighted a significant change whereby, while **until the 2000s prolonged drought events** mainly affected the basins of the **Centre-South**, **from 2000** onwards it was the **Centre-North** that was affected by an increase in the intensity and frequency of droughts. This is a trend that could intensify in the future.

8

The demographic trend in Italy is changing: after decades of growth, **in the coming years, the Italian population will be inclined to decrease**. According to ISTAT forecasts, it could decrease at a national level by about **2.5 million individuals by 2043**. However, while the population of some areas will tend to decrease, others will see an increase in the number of inhabitants. Negative changes, in a context in which water service operators are called upon to increase investments, represent a critical issue since **the costs will weigh on a smaller number of users with a consequent impact on the tariff**. One solution may be **regional or macro-area tariffs**, with a mitigation of per capita costs of up to about 25% (e.g. in southern Italy).

9

Water is an inalienable human right, fundamental to health and well-being, recognised internationally only in 2010. **Italian Legislative Decree 18/2023 introduces a risk management-based approach to ensure safe drinking water that is accessible to all**. Today, in Italy, the **AnTeA system** ensures transparency and sharing of drinking water data, facilitating cooperation between authorities, resource management and response to water emergencies.

10

EXECUTIVE SUMMARY

The water sector is now facing **complex and interconnected challenges**. The effects of climate change are exacerbating **the problem of water scarcity**, increasing the frequency of droughts and extreme weather events, and at the same time there are still critical management issues that require integrated strategies and greater coordination between the various stakeholders involved.

EUROPEAN LEGISLATION: THE LATEST DEVELOPMENTS

At the European level, several regulations have been adopted in recent years to improve the management of water resources, with a focus on sustainability, water quality and resilience to climate change. Among the main innovations is **the revision of the Drinking Water Directive (EU Directive 2020/2184)**, which introduces stricter standards for the quality of water intended for human consumption, promoting greater transparency and access to information for citizens. Another important development concerns **Directive (EU) 2024/3019 on urban wastewater treatment**, which introduces important updates to improve the quality of receiving water bodies and protect the environment. Enacted on 1 January 2025, with some provisions applicable from 1 August 2027, among the various innovations, the directive **extends the obligation to collect and treat wastewater** to urban agglomerations with more than 1,000 equivalent inhabitants, reducing the previous limit of 2,000 inhabitants. In addition, the directive **introduces stricter standards** for the removal of nutrients such as nitrogen and phosphorus, as well as micropollutants. Adjustments, for example in relation to large plants with tertiary and quaternary treatments, will have to be completed **for the period between 2033 and 2045.**

STRICTER STANDARDS FOR WASTEWATER TREATMENT

ADAPTING THE ITALIAN TREATMENT FLEET: BETWEEN 600 MILLION AND 1.5 BILLION EUROS

To ensure the adaptation of the Italian plant park to the objectives of the European directive, with reference to **purification plants with a design capacity of more than 150,000 P.E.** (107 plants), updated estimates (albeit indicative) of the **costs of adapting** the quaternary treatment phases were carried out. Taking into account the quaternary treatment technologies and systems that, in accordance with the sector literature[2,3], are the most appropriate for the removal of emerging contaminants and adjusting the cost estimates based on the advanced treatment units that are already present[1], indicative values of the economic needs of the wastewater treatment plant under consideration are obtained (Table 1). Specifically, **the average investment (CAPEX) for the entire plant portfolio varies from a minimum of approximately 645 million euros to a maximum of 1.5 billion euros** depending on the type of treatment applied.

TABLE 1

ACTUAL COST OF INTEGRATED SUPPLY CHAIN FOR PLANTS LARGER THAN 150,000 POPULATION EQUIVALENTS

Trattamenti quaternari e filiere	Trattamenti presenti in EEA 2021	Capex+Opex medio filiera [€/a]	Capex+Opex [€/AE/a]	Capex medio [€/a]	Capex medio totale [€]	Opex medio [€/a]
Ozono (O_3)	O_3+FS	69.316.040	1,8	41.929.790	644.563.648	27.386.249
Biofiltro (GAC)	FS	141.955.168	3,7	76.041.231	1.168.940.096	65.913.937
Ozono (O_3) + Biofiltro GAC	O_3 + FS	170.937.874	4,4	101.025.312	1.553.006.665	69.912.562
Ultrafiltrazione (UF) + Biofiltro (GAC)	MF	316.532.568	8,2	86.545.415	1.330.415.160	229.987.152

Source: ENEA calculation based on EEA data

863 BUILT-UP AREAS CURRENTLY INVOLVED IN INFRINGEMENT PROCEEDINGS. 76% IN THE SOUTH

Moreover, Italy is currently subject to **four infringement proceedings** for failure or inadequate compliance with the directive on urban wastewater treatment. At national level, there are still **856 built-up areas involved in infringement proceedings** for a generated organic load equating to about **27 million equivalent inhabitants**, with the largest number of procedures concentrated in Southern Italy (649, corresponding to **76% of the built-up areas** and **65% of the load generated**). However, the North/South divide is not only related to the purification sector, but also manifests itself in various other aspects of water management, starting with governance.

[1] Database European Environment Agency 2021.
[2] C-Baresel, M. Ek, H. Ejhed, A.-S. Allard, J. Magnér, L. Dahlgren, K. Westling, C. Wahlberg, U. Fortkamp, S. Söhr, M. Harding, J. Fång, J. Karlsson, Sustainable treatment systems for removal of pharmaceutical residues and other priority persistent substances. Water Sci Technol 1 February 2019; 79 (3): 537–543. doi: https://doi.org/10.2166/wst.2019.080
[3] Pistocchi A, Andersen HR, Bertanza G, Brander A, Choubert JM, Cimbritz M, Drewes JE, Koehler C, Krampe J, Launay M, Nielsen PH, Obermaier N, Stanev S, Thornberg D. Treatment of micropollutants in wastewater: Balancing effectiveness, costs and implications. Sci Total Environ. 2022 Dec 1; 850:157593. doi: 10.1016/j.scitotenv.2022.157593. Epub 2022 Jul 29. PMID: 35914591.

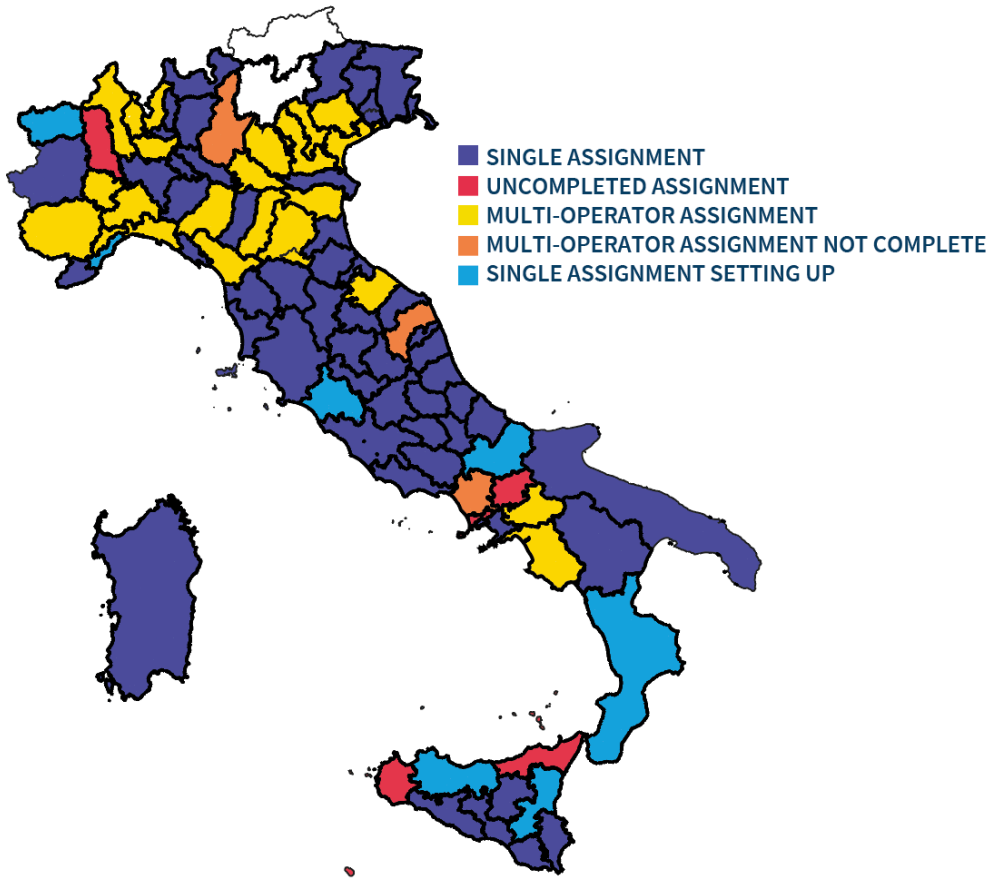
UNIQUENESS OF THE MANAGEMENT SERVING 54% OF ITALIANS

At the national level, **the governance of the water service is still far from the full application of the principle of unified management**, according to which the number of existing OTAs (62) should correspond to an equal number of service operators. Management can therefore be defined as '**fragmented**' not only in a vertical sense, where there is no integration of all segments of the supply chain under a single management entity, but also in a horizontal sense with the coexistence of different management entities, including local management bodies, even in areas where the sole operator has been chosen. To monitor the state of sector governance, the Utilitatis Foundation has been running a number of specific observatories for several years now through which to analyse the situation of assignments and the fragmentation of the service.

To facilitate visualisation, Figure 1 shows the situation of concessions in Italy up to 2024. **54% of the national population resides in areas where the service is entrusted to a single operator** and in the entire territorial area there is no local management or, if there is, it is limited in number and under safeguard. A percentage destined to increase soon, thanks to the **takeover of the single operator in several regions** where today the uniqueness of management is being established (9% of the national population). On the other hand, 29% are affected by areas with **"multi-management"**, i.e. where a single manager has been identified but several industrial operators are simultaneously active in the area to which the service has been regularly entrusted and there is no local management; these are territorial areas essentially located in Northern Italy. In some cases (4% of the population), the coexistence of several industrial operators has not yet been followed by the identification of a single operator. **The assignment is incomplete for 5% of the national population**: in these areas a single operator has not yet been identified and several industrial or economic operators operate. These include the case of ATO2-Piedmont, where the Region has exercised its substitute powers by appointing a Commissioner ad acta to identify the single area manager; the Sannita District, the Napoli Nord District and the ATI of Messina and Trapani.

FIGURE 1

STATUS OF SERVICE ASSIGNMENTS IN ITALIAN TERRITORIAL AREAS [SITUATION AS OF 2024]



Source: Utilitatis Foundation calculation based on operator, Arera and EGA data

NEXT YEAR, THE CONTRACTS FOR 7.7 MILLION USERS WILL EXPIRE

The expiration of future assignments is an important opportunity to overcome management fragmentation and strive for a single management. Of the 134 assignments analysed by the Foundation's observatory, 22 end over the next year (7.7 million people affected), 34 between 2 and 5 years (6.8 million people), 37 between 6 and 10 years (18.4 million people) and 41 will expire in over 11 years (14.2 million people).

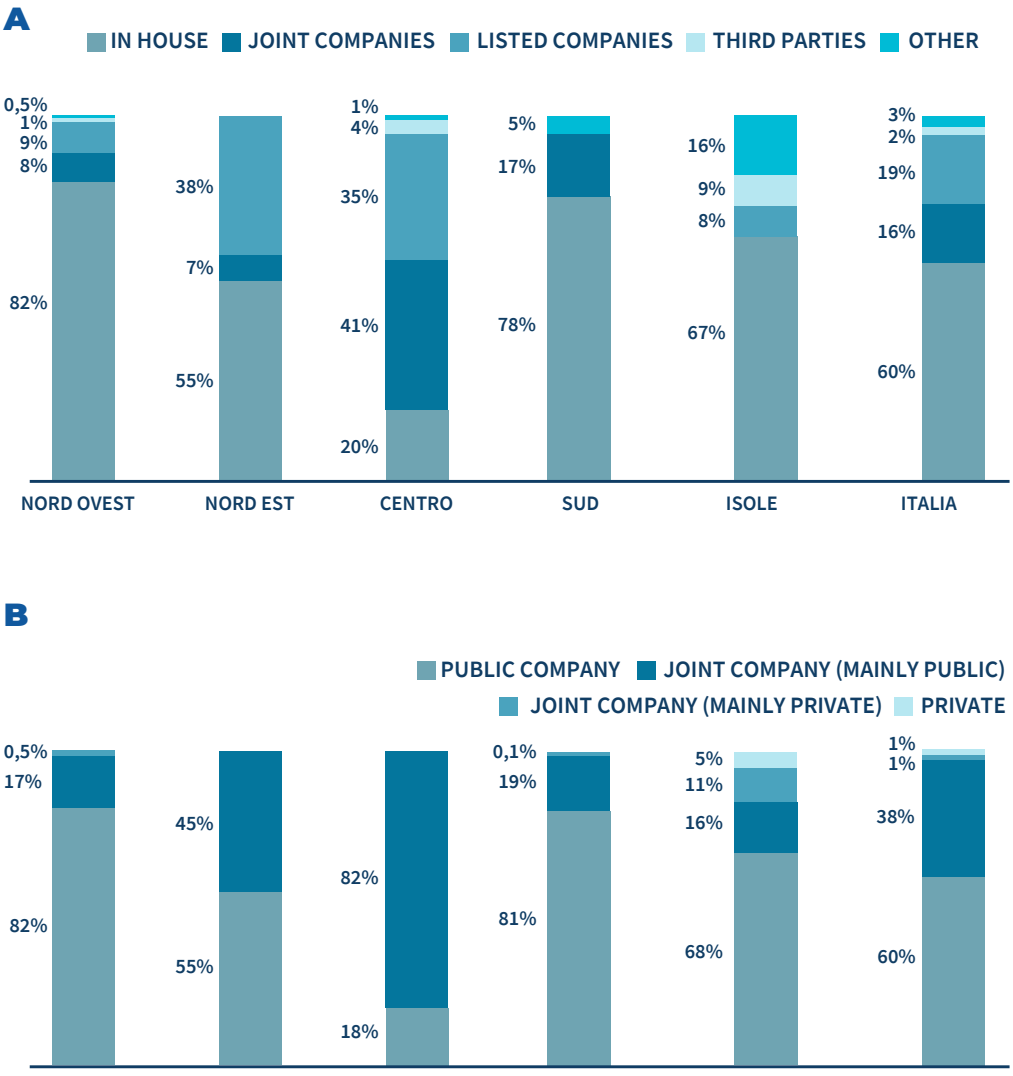
IN-HOUSE AND PUBLIC SHAREHOLDING ARE THE MOST COMMON FORMS

Among the **methods of management assignment** in the various territorial areas (Figure 2A), **at the national level the most prevalent is represented by local provision (60% of the population)**, followed by assignments to listed companies (19%), assignments to joint enterprises (16%), concessions to third parties for 2% and other management (including private individuals) around 3%. If in the North and southern Italy (including the islands) most of the population is affected by a service with local assignment; in central Italy there is greater coverage by listed companies (35% of the population with full integration of services) and joint enterprises (41%).

Consistently (Figure 2B), **at the national level, most of the population is covered by a service provided by public companies (60%) or joint enterprises with a public majority (31%)**. Companies with a majority private or fully private shareholding are residual. It is interesting to note a greater presence of majority public companies in the central regions, while it is only in the islands that there is a more significant presence of private companies.

FIGURE 2

PERCENTAGE DISTRIBUTION OF THE POPULATION SERVED BY SII BY TYPE OF ASSIGNMENT (A) AND SHAREHOLDING (B) BY MACRO-AREA [YEAR 2024]



Source: Utilitatis Foundation calculation based on operator and EGA data

INTEGRATED URBAN WATER MANAGEMENT FOR 85% OF THE ITALIAN POPULATION

1,368 MUNICIPALITIES MANAGED LOCALLY (7 MILLION INHABITANTS)

82% OF MUNICIPALITIES MANAGED LOCALLY ARE IN THE SOUTH

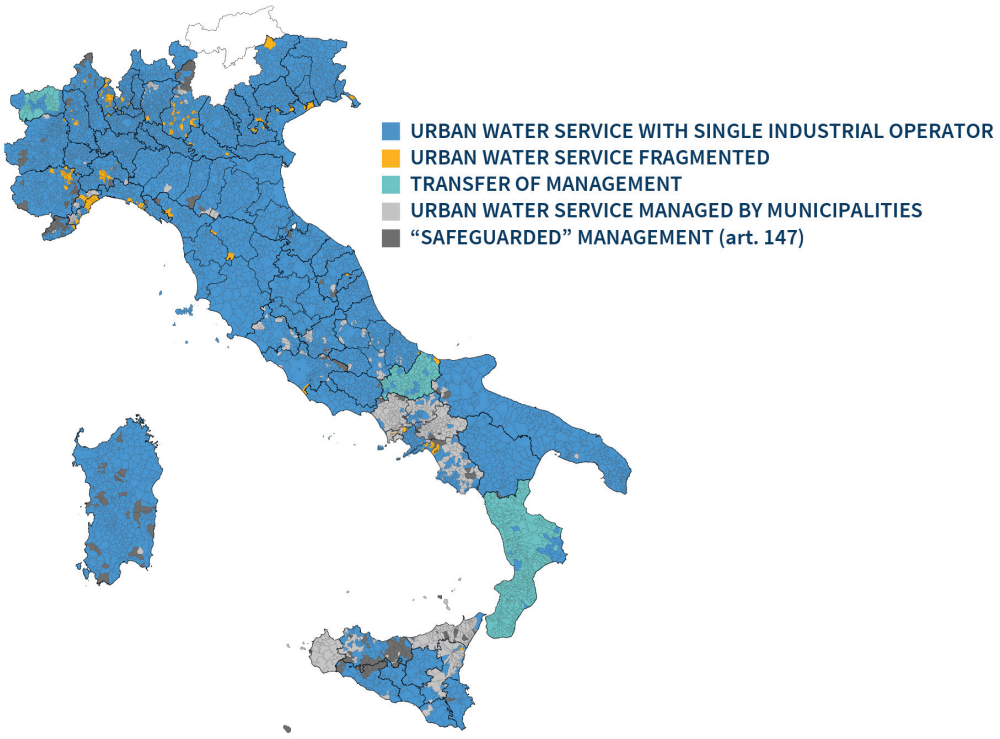
The process of consolidating the management of the water service therefore continues, also with the contribution of the reform actions implemented by the National Recovery and Resilience Plan (NRRP). **However, there are still some critical issues**, especially in southern Italy, **where there is still local management, even in territorial areas entrusted** according to the pro tempore regulations in force.

In Italy today there are **6,057 municipalities where the water service is integrated and managed by a single industrial operator** for a population served of **49.3 million inhabitants**, equal to **85% of the national population** (Figure 3). For 196 municipalities (about 1.5 million inhabitants), there is no vertically integrated management.

There are at least **1,368 municipalities in which one of the three segments of the water service** (aqueduct, sewerage, purification) **is managed directly by the municipality**. This amounts to **18% of Italian municipalities** for a total population of **about 7 million inhabitants** (12% of the national total). **82% of local management is concentrated in the South** (64%) **and on the islands** (18%); this amounts to 1,126 municipalities where about 6.7 million inhabitants reside, the equivalent of 95% of the population on a national scale. There are **only 3 regions where there is no such management: Friuli-Venezia Giulia, Umbria and Veneto**. While in the North West there are still several municipalities managed by local authorities, for the most part under safeguard regime, it is in the South and in the islands that there is a marked presence in a general situation of improvement thanks to the takeover of the single operator in some territorial areas (e.g. Calabria, ATI Catania, Molise). Campania, Sicily and Calabria are today the regions with the largest number of inhabitants served by this type of management, respectively: 3.1 million (56% of the population of Campania) and 1.6 million in both Sicily and Calabria (53% and 89% of the regional population respectively).

FIGURE 3

TYPE OF MANAGEMENT OF THE WATER SERVICE IN ITALIAN MUNICIPALITIES [YEAR 2024]



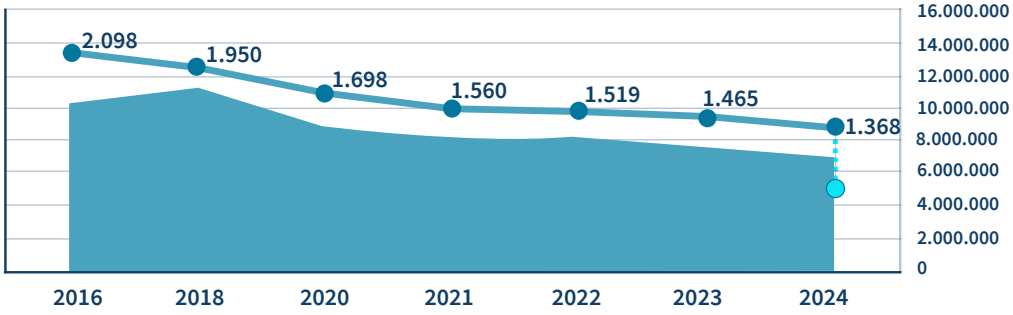
Source: Utilitatis Foundation calculation based on operator and EGA data

SINGLE-OPERATOR TAKEOVER PROCESSES IN CALABRIA, MOLISE AND VALLE D'AOSTA

The process of takeover of the single operator in different territorial areas of our country, in recent years, **has progressively reduced the number of economic operators** and the related underlying population. Comparing the data of the Utilitatis Foundation historical records (Figure 4), it emerges that **in the last 7 years the number of accounts managed locally has decreased by about 700 units** with a drastic drop in the underlying population that from about 10–11 million in 2018, is now around 7 million. It is estimated that **in the coming years** there will be **a significant contraction of local management**, in the order of about 500 municipalities (1.7 million inhabitants), in the territories where the management reorganisation is taking place through a gradual takeover of the management by the contractor, mainly **in Molise and Calabria** (in Valle d'Aosta the process is almost complete). Looking at the historical records, we can see a clear decrease in the values discussed as well as an improvement in the industrial organisation of the service.

FIGURE 4

CHANGE IN THE NUMBER OF MUNICIPALITIES AND THE POPULATION AFFECTED BY LOCAL MANAGEMENT [YEARS 2016–2024]. THE LIGHT DOT INDICATES THE EXPECTED CHANGE WITH THE TAKEOVER OF THE MUNICIPALITIES IN MOLISE AND CALABRIA.



Source: Utilitatis Foundation calculation based on operator data

244 LOCAL MANAGEMENT CASES "UNDER SAFEGUARD" (400,000 INHABITANTS SUPPLIED)

Among the local management cases, there are, however, some companies that have the possibility to carry out the service on the basis of the exemptions provided by the sectoral legislation. The snapshot of the Italian situation at the end of 2024 sees at least **244 municipalities under safeguard regime** (18% of the total of municipalities under local management) **for a population served of about 400 thousand inhabitants** (6% of the national population in which at least one of the services is managed by local authorities).

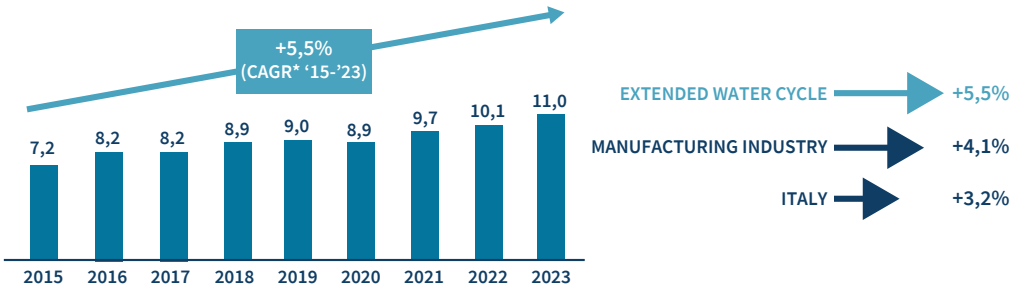
Taking into account the percentage of the population not yet served by the single-area water company, the concessions that are about to expire, and the presence of utilities that specialise only in particular stages of the supply chain, **it is reasonable to assume that in the coming years, the water sector will continue to be affected by corporate aggregation processes and/or vertical integration**, which will result in continuous economic and employment growth.

ADDED VALUE OF THE EXTENDED SUPPLY CHAIN: 11 BILLION EUROS IN 2023

From this point of view, the water sector already occupies a prominent place in the Italian economic and industrial landscape. **The extended supply chain reached an added value of 11 billion euros in 2023**, growing with an average annual rate of **+5.5% from 2015 to 2023** (Figure 5). This performance is higher than the manufacturing average, which grew by +4.1% and the country's aggregate (+3.2%) in the same period.

FIGURE 5

ADDED VALUE OF THE EXTENDED WATER CYCLE IN ITALY (BILLIONS OF EUROS AND CAGR*), 2015–2023 AND GROWTH OF ADDED VALUE, BENCHMARKING (CAGR*) [YEARS 2015–2023]



Source: TEHA Group calculation based on ISTAT and AIDA data, 2025. N.B. For all data, the historical records have been updated following the annual revision of the ISTAT data. (*) Compound average annual growth rate.

383 BILLION EUROS THE ADDED VALUE OF THE WATER RESOURCE (20% OF GDP)

Through the activation of supply and sub-supply chains, the **extended water cycle generates a total added value of 30.6 billion euros in Italy**, starting from its direct value of 11 billion euros. This means that for every euro of added value generated by the extended water cycle, **an additional 1.8 euros are activated in the entire economy**, due to an economic multiplier of 2.8; **257,000 jobs are generated**.

Considering then **the supply chains that exploit water** as a production input (352.5 billion euros of added value), these generate **an added value of 383 billion euros, equal to about 20% of the national GDP**.

SII TURNOVER 8.9 BILLION EUROS IN 2023

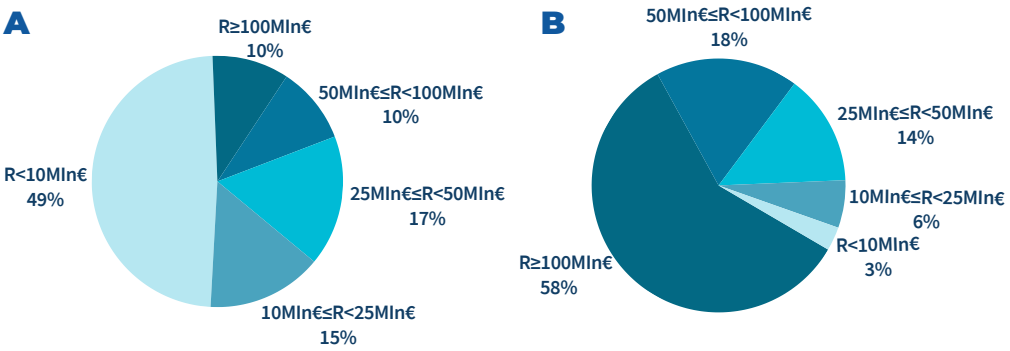
Focusing on the integrated urban water management, in 2023, **the companies[4] recorded a total turnover of 8.9 billion euros, equal to 0.4% of the national GDP**. In addition to the economic contribution, these companies also play a significant role in terms of employment, employing more than 29,000 workers, equivalent to 0.11% of the total number of employees in Italy and 0.5% of those in the industrial sector.

LARGER COMPANIES COVER 58% OF TOTAL TURNOVER

From a dimensional point of view, the selected sample (Figure 6) shows that as many as 49% of the companies recorded revenues of less than 10 million euros, however these only account for 3% of the total turnover. In contrast, **companies with a turnover in excess of 100 million euros are only 10% of the sample but produce 58% of the total turnover**.

FIGURE 6

DISTRIBUTION OF THE NUMBER (A) AND TURNOVER (B) OF INDUSTRIAL OPERATORS ACTIVE IN THE WATER SERVICE [SAMPLE OF 244 OPERATORS; YEAR 2023]



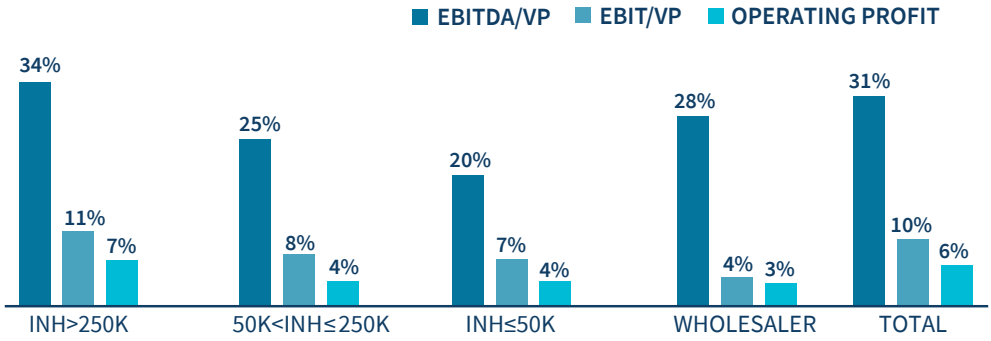
Source: Utilitatis Foundation calculation based on AIDA Bvd data

SMALL OPERATORS SHOW GREATER VULNERABILITY THAN THE HIGHLIGHTED MANAGEMENT MARGINS

The focus on the analysis of economic margins carried out on monoutilities reveals a trend related to the size of the operators (Figure 7). While **larger operators demonstrate very positive performances**, **smaller operators demonstrate** values that indicate **difficulties** in covering total costs, with a value of 20% for EBITDA/VP, 7% for EBIT/VP and 4% for operating profit. Wholesalers have slightly lower values than the industry average.

FIGURE 7

ECONOMIC MARGINS OF MANAGEMENT [SAMPLE OF 194 MONOUTILITIES; YEAR 2023]



Source: Utilitatis Foundation calculation based on AIDA Bvd data

[4] Sample of industrial operators covering about 83% of the Italian population.

DIFFERENCES IN COST MANAGEMENT BETWEEN LARGE AND SMALL OPERATORS

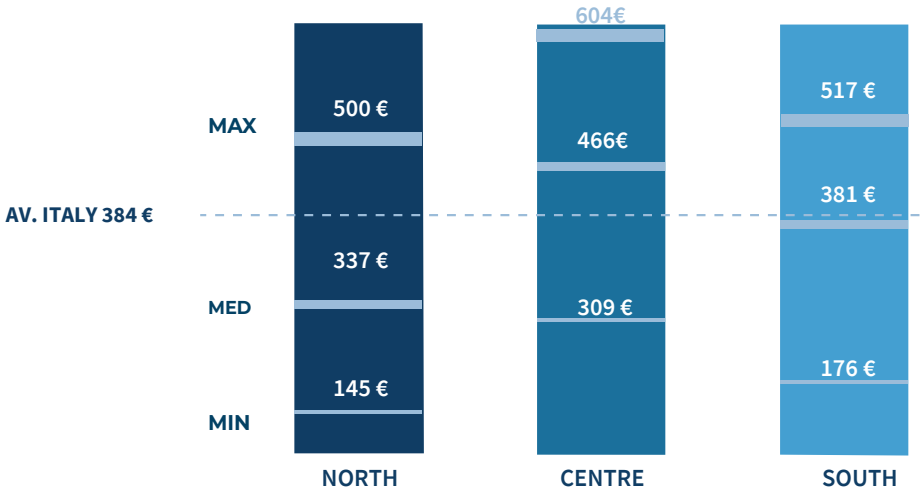
From the overall analysis of the cost items, it emerges that **expenditure on services (47% of the total) and personnel (20%) has the greatest impact on the overall budget for small operators**. Consistent with the amount of capital invested in fixed assets, there is a very high incidence of depreciation for large operators (about 19% of the total). This phenomenon reflects **a clear difference between large and small operators in cost management and therefore in the allocation of resources for infrastructure investments**. The former certainly have greater financial and operational capacities to invest in infrastructures, optimise costs and improve service efficiency, while small operators struggle to modernise infrastructures and support the necessary investments, with the risk of higher tariffs to cover management and maintenance costs. This aspect contributes to the territorial differences observed in the water tariffs of our country.

384 EUROS AVERAGE SPENDING ON THE SERVICE IN ITALY IN 2024

The territorial differences observed are also reflected in the service tariffs. An analysis of the amounts charged to resident households for the integrated water service was conducted on **a sample of almost 38 million inhabitants** (the equivalent of 65% of the Italian population), including the utilities of 62 tariff basins. For the sample considered, **in 2024, the average expenditure for a domestic household of three members with a consumption of 150 cubic metres of water per year was EUR 384**, with differences in various areas of the country (Figure 8). Northern Italy has the lowest expenditure at 337 euros per year, well below the national average, while the Centre reaches the maximum expenditure value of 466 euros per year. Southern Italy, at 381 euros, stands slightly below the sample average.

FIGURE 8

MINIMUM, AVERAGE AND MAXIMUM VALUES OF THE ANNUAL FEE FOR THE SII (INCLUDING VAT AT 10%), CONSIDERING A USER OF 3 COMPONENTS WITH A CONSUMPTION OF 150 CUBIC METRES PER YEAR, SUBDIVIDED BY MACRO-AREA [DATA IN EUROS; YEAR 2024]



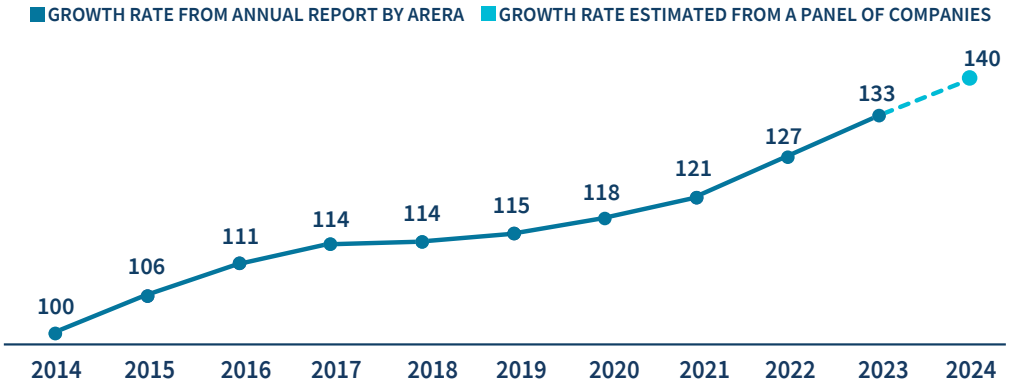
Source: Utilitatis calculation based on tariff proposals and manager and EGA websites

40% INCREASE IN EXPENDITURE SINCE 2014

By analysing the increase in fees through the data published annually by the Authority (compiled for the period 2014–2023) and the estimate made based on the sample for the period 2023–2024, we obtain the trend of tariff increases over the decade (Figure 9). Taking 2014 as the base year, **in 10 years the increase in fees was 40%, with an average growth rate of about 4% per annum**. The trend over time shows a marked increase in the first two years, more than 5% per year: we can attribute this phenomenon to **a correct recovery of the full coverage of the efficient costs of the service** that the previous regulatory model failed to guarantee. This signal also brings with it an interpretation of the reasons that have constrained the development and renewal of infrastructures since the end of the 1990s (when the flow of public subsidies ran out) until the attribution of competences to the national regulatory authority. Since 2016 and for a few years, there has been a less evident growth trend, also probably due to the tariff consequences of the implementation of technical quality regulations. In recent years and in particular, **from 2020, there has been a significant growth in fees up to about +5% per year**. The estimated growth in fees between 2023 and 2024, defined on the basis of the sample analysed in this study, is **+5.4%**. It should be noted that the acceleration of tariff growth in the last period was driven by the off-scale increase in prices for the supply of energy, which, as noted above, has a strong impact on the operating costs of the service.

FIGURE 9

ESTIMATED AVERAGE TREND OF INTEGRATED URBAN WATER SERVICE FEES OVER THE LAST TEN YEARS [DATA IN EUROS; YEARS 2014–2024]



Source: Utilitatis calculations based on ARERA data and data from the websites of operators and EGA

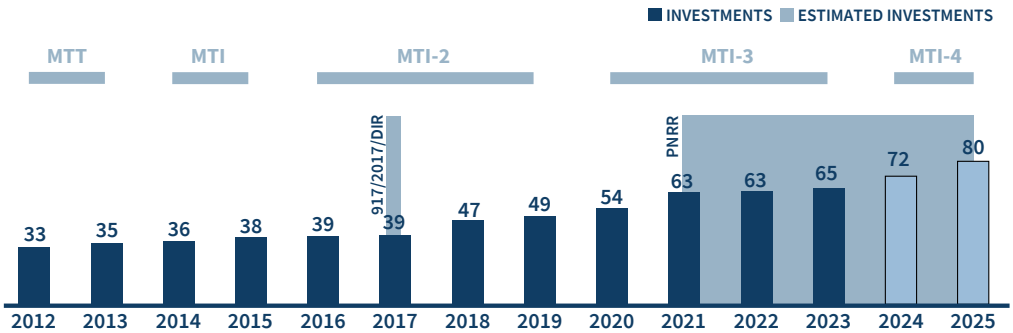
Tariff changes also reflect different investment capacities. A balanced tariff system is essential in order to ensure the implementation of adequate investments and the sustainability of water resource management in the long term.

PER CAPITA INVESTMENTS BY INDUSTRIAL OPERATORS IN 2023: 65 EUROS PER INHABITANT

The historical records show the progressive improvement of the estimate of per capita investments made by Italian industrial operators in recent years (Figure 10). **The investments made** by the sample of the historical records[5] of the Utilitatis Foundation observatory, **in the years 2021–2023, amount to approximately 4.4 billion euros**, rising, in terms of per capita value, **from 63 euros per inhabitant in 2021 to 65 euros per inhabitant in 2023**, with a growth over the period of **+7%**. Also considering the years 2024 and 2025, the volume of investments grows to about **8 billion euros**, rising, in terms of per capita value, to **80 euros per inhabitant in 2025** (an increase of +27% over the five-year period). Overall, from 2012 to 2023, **investments increased by +99%**.

FIGURE 10

HISTORICAL RECORDS OF GROSS PER CAPITA INVESTMENTS MADE BY INDUSTRIAL OPERATORS [SAMPLE OF 38 OPERATORS; YEARS 2012–2025]



MTT, Transitional Tariff Method (2012–2013); MTI, Water Tariff Method (2014–2015); MTI-2, Water Tariff Method for the second regulatory period (2016–2019); MTI-3, Water Tariff Method for the third regulatory period (2020–2023); MTI-4, Water Tariff Method for the fourth regulatory period (2024–2029).

Source: Utilitatis calculations based on operator data

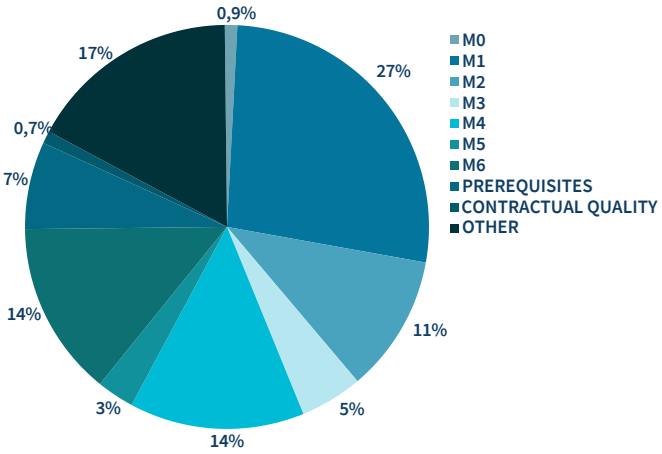
27% OF INVESTMENTS FOR NETWORK LOSSES (2 BILLION EUROS) BETWEEN 2021 AND 2023

The analysis of the data relating to investments for service quality makes it possible to assess how **in the period 2021–2023 most of the investments concerned the reduction of water losses** (about **2 billion euros** in the period considered, equal to 27%), **the upgrading the sewerage system** (about **1 billion euros**, 14% of the total) and **wastewater treatment systems** (about **1 billion euros**, 14%). Approximately 700 million euros in three years are invested in resolving service interruptions (indicator M2; 11% of the total), while the other indicators are allocated a lower flow of resources, including the new indicator M0, which has just been included and has recorded approximately 100 million euros of investments in the last 2 years.

[5] The sample analysed refers to a panel of 38 industrial operators serving a resident population of about 21 million inhabitants as of 2023 (equal to 36% of the national population).

FIGURE 11

INVESTMENTS BY MACRO-INDICATOR [EXTENDED SAMPLE: 73 OPERATORS; YEARS 2021–2023]



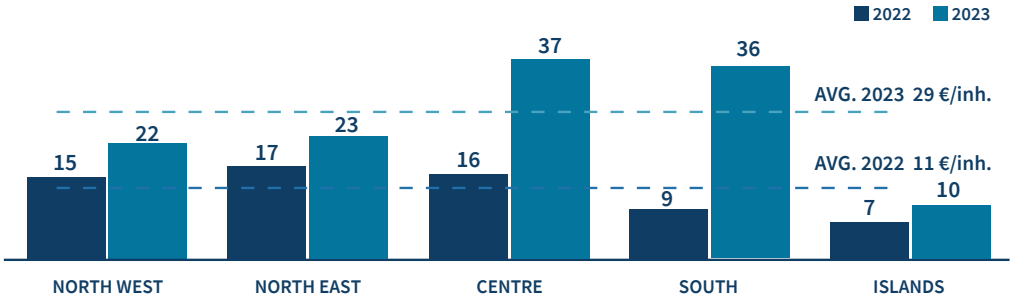
Source: Utilitatis Foundation calculation based on operator data

LOCAL MANAGEMENT IN 2023: 29 EUROS PER INHABITANT

On the other hand, **local management cases** still remain below the average of industrial operators, despite having marked a net increase in per capita investments for the water sector, a probable effect of the NRRP funds. At the national level, **the average value of investments rose from 11 euros per inhabitant in 2022 to 29 euros per inhabitant in 2023**, an increase of 159% (Figure 12).

FIGURE 12

AVERAGE INVESTMENTS MADE BY ECONOMIC OPERATORS IN ITALY [DATA IN EUROS PER INHABITANT; YEARS 2022–2023]



Source: Utilitatis Foundation calculation based on CCC (final account certificates) data from Municipalities

The overall analysis of investments and service quality in the Italian water sector shows **a transformation taking place, characterised by a significant increase in investments, a progressive modernisation of infrastructure and a strengthening of regulatory mechanisms**. These interventions, ranging from the improvement of quality standards through the regulation of technical quality to the adoption of extraordinary financial instruments such as the PNRR or React-EU, represent a virtuous model of integrated development that aims to bridge the territorial divide and overcome complex challenges such as the effects of ongoing climate change.

NPIISWS: 12 BILLION EUROS OF PROJECTS FOR THE RESILIENCE OF THE SYSTEM

From this point of view, in December 2024, **the National Plan for Infrastructure Interventions and for the Safety of the Water Sector (NPIISWS)**was officially adopted, an instrument that currently contains **418 project proposals** for a total value of **12.4 billion euros, of which approximately 12 billion is the volume of funding required**, mainly aimed at improving the resilience of the national water infrastructure.

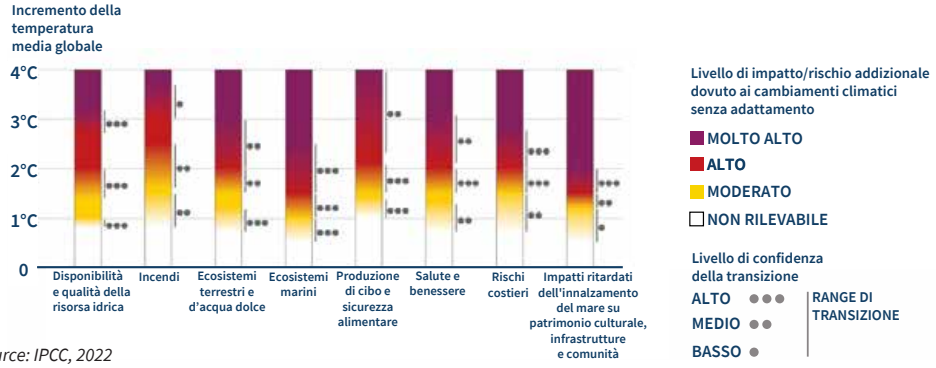
While on the one hand **the effects of climate change** are aggravating the problem of water scarcity, increasing the frequency and intensity of droughts and extreme weather events, **demographic scenarios** on the other hand project a different future from today in terms of water demand. Both of these variables can have an impact on investments and service tariffs as well as on the economic and financial management of companies in the sector, not to mention the potential impact on safety related to human consumption.

IN THE MEDITERRANEAN, THE RISK OF REDUCED WATER AVAILABILITY INCREASES

In recent decades, climate variability and its changes have made the challenge of ensuring the availability of water resources and their safety as fundamental elements for sustainable and fair development of both the natural environment and that linked to human activities in our territories even more burdensome and complex. The increase in extreme temperatures, the evaporative demand of the atmosphere and the variability of rainfall, which alternates between long droughts and periods of surplus rainfall, have and will continue to have an increasingly decisive impact on the Mediterranean, which is already experiencing **temperatures above 1.5 °C compared to the pre-industrial period (1850–1900)**. Such warming entails an additional increase in risk levels in several areas (Figure 13), including water availability and quality.

FIGURE 13

MAIN RISKS FOR THE MEDITERRANEAN BASIN AND THEIR INCREASE IN SEA LEVEL ACCORDING TO THE INCREASE IN FUTURE TEMPERATURES.



Source: IPCC, 2022

In Italy, from 1991 to 2024, the average annual surface temperature (which measures the values of different surfaces, such as soil, vegetation, roofs, bodies of water, etc.) **increased by about 1.6 °C**. In winter, the central and north-eastern Adriatic regions are warming up the most, while autumn is the season with the greatest increases, especially in the centre-north.

ITALY: PRECIPITATION VARIABILITY INTENSIFIED OVER THE LAST 20 YEARS

From the point of view of rainfall, the national territory has always been affected by both long periods of deficit and surplus, but **in the last twenty years or so this variability has intensified**. In the northern regions, in particular, in the period 2001–2024 there was an increase in the frequency of both months with severe-extreme drought and months with severe-extreme surplus compared to the previous twenty years, with **average increases of about 100% in both cases**. The centre also shows increases for both deficits and surpluses, of 35% and 23% respectively. In contrast, **the southern regions demonstrate an increase in surplus months compared to the period 1980–2000 of more than 200%, but an average reduction of months with severe-extreme drought of 40%**. However, this does not mean that the south is free from drought, as demonstrated by the crisis that hit much of the south and primarily Sicily between 2023 and 2024. Monitoring the trend of climatological parameters in the various river basins is therefore important for sustainable resource management.

DROUGHT SCAN RECORDS OF DROUGH INCREASE FOR ITALIAN BASINS

From this point of view, **the Drought Scan drought monitoring system**, implemented to more effectively monitor the characteristics and dynamics of droughts on a basin scale, confirms that, until the 2000s, **the basins of the centre-south** (Tiber, Garigliano, Volturno, Ofanto Basento, Tirso and Simeto) **were more exposed to prolonged drought events**, while **from 2000 onwards basins such as the Arno and the Po recorded an increase in the frequency and severity of droughts**, culminating, for the Po, with the 2021–2022 event. At the end of 2024, the only basin among those examined that had a rain deficit was the Simeto, still in a phase of severe drought, as shown by the value of -1.45 of the Drought Scan multi-scale synthetic index, {SPI}.

The Tiber, Garigliano, Volturno, Basento, Ofanto and Tirso basins are currently in good water conditions. Compared to the rainfall of the last 3 and 10 years, in fact, the Tiber has a surplus of precipitation equal to about 330 and 260 mm respectively, the Garigliano to 650 and 1440 mm, the Volturno to 610 and 1010 mm, the Basento to 300 and 480 mm, the Ofanto to 310 and 730 mm, and the Tirso to 210 and 160 mm. The Po has recovered 473 mm of equivalent rainfall in the last 3 years, after recording a deficit of -560 mm in the last decade. The Simeto, on the other hand, lost 270 mm in the last three years, but accumulated 230 mm in 10 years. The Arno is in a state of water stress, having recovered only 290 mm in the last 3 years, compared to a deficit of 1,400 mm accumulated in the last decade.

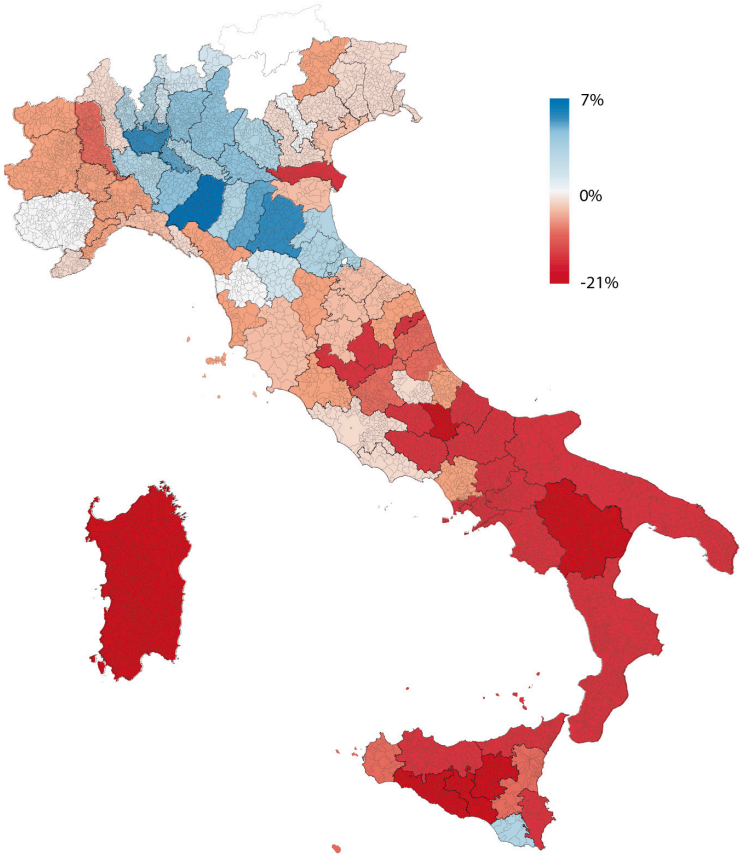
DEMOGRAPHIC SCENARIOS OF ITALY BY 2043: -2 MILLION INHABITANTS

However, the climate is not the only variable changing in the "water system": the resident population has also undergone significant changes in recent years. **After decades of growth, Italy's resident population has begun to decline, losing about 1 million and 350 thousand individuals in the period 2014–2023**. According to the median forecast scenario developed by ISTAT, the population could decrease by about 2.5 million individuals in the next twenty years, dropping to **about 56 million on 1 January 2043**, compared to 59 million residents on 1 January 2023. In the analysis of future demographic evolution, however, it is necessary to go down to a more detailed territorial level, especially when considering the political purposes of planning essential services such as water. Since the performance of the integrated urban water management is divided into territorial units called Optimal Territorial Areas (OTAs), knowledge of the demographic and social evolution in these territories is particularly interesting. In the great territorial variability, in the 90 OTAs defined by the regions in Italy, **assignment basins are identified where a variation in population is expected between 2023 and 2043 from a positive extreme of +7% (OTA 2 – Parma) to a negative minimum of -20% and -21% in OTA 5 – ENNA and OTA 6 – Caltanissetta** (Figure 14). In general, the OTAs of Emilia-Romagna and Lombardy could show population growth, with OTAs increasing by about 6% (such as the OTA of Bologna and the OTA of Milan). On the contrary, in the Centre-South, the OTAs of Marche, Lazio and Molise could undergo population decreases between -10% and -13%; finally, the OTAs of Sardinia and Basilicata would record a decrease of -15%.

UP TO -20% OF INHABITANTS IN THE SOUTHERN OTAs

FIGURE 14

CHANGE IN POPULATION BY OTA [PERCENTAGE VALUES; DIFFERENCE BETWEEN THE YEARS 2023 AND 2043, 1 JANUARY].



Source: ISTAT calculations, 2025

FINDING A BALANCE BETWEEN VRG, INVESTMENTS AND DEMOGRAPHIC CHANGE

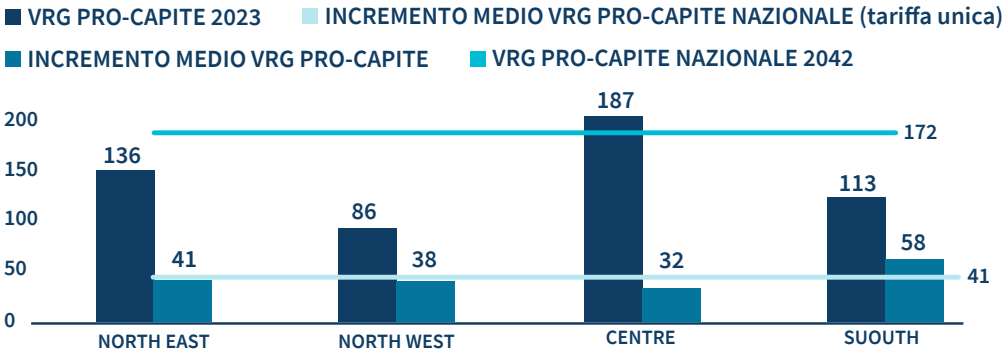
In the coming years, all utilities will face **an increase in the value of investments with a consequent increase in the VRG**, which will be all the greater the further away from the target they are today. More virtuous operators will need less effort to reach the investment target than those who are less virtuous. In the face of an increase in the cost of managing the service, **the demographic change**, especially in areas where there is a decrease in population, **represents a critical issue for the service operators** since the costs will weigh on a smaller number of users with a consequent impact on the tariff.

TARIFFS BY MACRO-AREA OR REGIONAL TARIFFS CAN MITIGATE THE INCREASE IN COSTS

In order to mitigate the effects of the demographic trend on the per capita cost of the service without accentuating territorial differences and at the same time guaranteeing the investments necessary to guarantee the continuity of the service by improving its quality, **the management basin could be enlarged by distributing the average variation of the VRG per capita not on the single OTA, but on the entire geographical macro-area**. In this way, looking for example at the macro-area of the South, where there will be a more drastic reduction in the population, switching from a manager tariff to a macro-area tariff would lead to a **mitigation of the increase in the cost per capita up to 25%**, which would represent a significant saving for users. By further expanding the catchment area and carrying out the analysis at national level, it can be seen that the increase in per capita VRG is reduced to **41 euros per inhabitant** (Figure 15), with a clear improvement in the sustainability of tariff management.

FIGURE 15

COMPARISON OF THE CHANGE IN THE VRG PER CAPITA BY GEOGRAPHICAL AND NATIONAL MACRO-AREA [DATA IN EUROS PER INHABITANT; YEARS 2023–2043]



Source: Utilitatis Foundation calculations based on operator data

AN EQUALISATION MECHANISM TO BALANCE THE DIFFERENCES BETWEEN TERRITORIES WITH DIFFERENT DEMOGRAPHIC SCENARIOS

These observations lead to the hypothesis of **the establishment of a single tariff, as a tool to better balance management costs with the need for new investments and future demographic scenarios**. The establishment of a single tariff entails the introduction of an **equalisation mechanism** to balance the differences between the different areas of the country. This mechanism would work by transferring financial resources from the most economically advantaged areas to those where water service management is more costly due to factors such as population decline, network extension and the need for more investment. In this way, the **economic sustainability of the service would be guaranteed in the most vulnerable areas**, without placing an excessive burden on the citizens residing there. A well-structured equalisation system would also allow each operator to recover the costs incurred for the service while encouraging strategic investments on a national scale to improve network efficiency, reduce water losses and promote the adoption of innovative technologies. In this way, the need for tariff increases could be reduced, improving the quality of the service offered throughout the territory. Through coordinated management of water resources, it will be possible to respond effectively to the challenges posed by demographic changes and the need for large infrastructure investments, ensuring all citizens access to a high-quality, safe and fair water service.

REGULATORY INTRODUCTION TO THE CONCEPT OF RISK FOR THE DRINKING WATER SUPPLY CHAIN

Italy, moreover, is taking significant steps towards sustainable water management, and among the other challenges that must be faced is that of water quality. At the regulatory level, the European Union has updated the legislative framework with **Directive (EU) 2020/2184, which introduced a risk management-based approach for the entire drinking water supply chain** and strengthened water quality parameters, with a focus on substances such as lead, chromium, perfluoroalkylated substances and microplastics. This directive was implemented in Italy with **Italian Legislative Decree 18/2023**, which regulates in more detail the safety criteria of water intended for human consumption. The main innovations introduced include the risk-based approach, extended to the entire water supply chain from collection to distribution inside buildings, the revision of water quality parameters with the introduction of new limits for potentially harmful substances, the improvement of access to drinking water with measures to reduce territorial inequalities, greater transparency and communication to provide citizens with up-to-date information on water quality, and the harmonisation of safety requirements for materials, products and reagents in contact with drinking water.

CENSIA: THE NATIONAL CENTRE FOR WATER SECURITY

To coordinate and monitor the application of the new regulations, **the National Centre for Water Safety (CeNSiA) was established and the digital platform AnTeA (Dynamic Territorial Register of Drinking Water) was developed** to collect and manage data relating to drinking water in Italy. Despite regulatory progress, Italy still has critical issues in the management of water resources, including geographical disparities in access to drinking water, with the North accounting for more than 40% of national water withdrawals, widespread water losses in distribution networks, and, as noted, the impact of climate change, with prolonged droughts and extreme weather events that put water reserves at risk. In this context, a fundamental role is played by the **Water Safety Plans (WSPs)**, introduced by the WHO in 2004 and now mandatory in Italy, including with a sanctioning regime. They are set to be **implemented by drinking water operators by 12 January 2029 and aim to prevent water quality risks** through the introduction of prioritised mitigation and control measures. Their management and approval is entrusted to CeNSiA through the AnTeA platform.

Water is essential for human life and health and was only recognised as an inalienable human right in 2010. As such, it is a key element in achieving the UN Sustainable Development Goals (SDGs), in particular SDG6, which aims to ensure universal access to safe drinking water by 2030. Protecting the resource, ensuring adequate infrastructure, excellent quality of service and protecting the environment is necessary to ensure the well-being of present and future generations.

THE NOTEBOOKS OF THE BLUE BOOK

1. DEMOGRAPHIC SCENARIOS AND WATER SERVICE

The water sector in Italy represents a strategic lever for economic development and environmental protection, but at the same time it highlights a complex and uneven infrastructural situation between the different geographical areas. The overall analysis of investments and service quality in the Italian water sector shows a transformation taking place, characterised by a significant increase in investments, a progressive modernisation of infrastructure and a strengthening of regulatory mechanisms.

2. PARTNERSHIP IN THE WATER SERVICE

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3. INVESTMENTS FOR WATER SECURITY AND SERVICE QUALITY

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UTILITATIS
FONDAZIONE

Promote knowledge, innovation and best practices when managing Local Public Services.

The Utilitatis Foundation is the fruit of a journey that began in 1995 with the establishment of the Istituto di ricerca sui servizi pubblici/Italian public services research institute, the then Proaqua, at the behest of Federgasacqua (now Utilitalia). Since its inception, it has taken the form of a non-profit consortium aimed at study and research activities of a technical-economic nature, as well as assistance to administrations or companies involved in service reorganisation processes.

In 1999, the institute expanded its research activities, at first focusing exclusively on the integrated water service, to other local public services, such as the natural gas distribution service and the municipal waste management service, transforming itself into the CRS-PROAQUA public utilities research centre. In 2006 the Research Centre took on its current name, UTILITATIS pro acqua energia e ambiente.

In May 2011, the consortium was transformed into a Foundation, strengthening its mission as an entity oriented towards promoting the culture of local public service management and the dissemination of legal, economic and technical content.

In 2021, the Founder Promoter, Utilitalia, supported the functional redesign of the Foundation, relaunching its study and research activities, increasing its scientific standing and, at the same time, developing its business activities with regard to both training and consultancy, also outside the federal sphere.

The Foundation's aim is to promote knowledge, innovation and best practices in the management of Local Public Services, improving their quality and efficiency as well as their economic, social and environmental sustainability, orienting the business model towards sustainable success, i.e. the stable creation of long-term value for its shareholders, in a form shared with the relevant stakeholders.

The Foundation's activities focus on drafting periodical industry-related publications such as the Blue Book and the Green Book, monographs dealing with technical, economic and governance aspects of the water and waste service, which contain proprietary data of the managers; the Orange Book, dedicated to innovation in public utilities; the Utilities Sustainability Report, which collects the extra-financial performance of Utilitalia's members; and on collaboration in study and research projects with other Italian and foreign research centres and foundations.