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COMISIÓN NACIONAL DE LOS MERCADOS Y LA COMPETENCIA

E/CNMC/07/19 STUDY ON URBAN WATER AND WASTEWATER SERVICES IN SPAIN

30th January 2020

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Contents

EXECUTIVE SUMMARY

Urban water and wastewater services are essential for life and for the development of economic activities. They have a direct impact on the quality of life of the population, and as a result, their efficient management is essential to the general well-being.

These activities constitute what is known as the "urban water cycle". It includes the collection of the resource (whether in rivers, reservoirs, wells or the sea), its purification and transport to urban centres, and its collection, treatment and subsequent return to the environment.

Most of these activities have the features of a natural monopoly, which determines how they are provided. From the point of view of competition, it implies that, in any case, there can be competition *for* the market. In addition, these services are prone to other market failures, such as externalities (involving public health and the environment) and information asymmetries (between regulators and operators and between operators and consumers). All this justifies intense public involvement, which occurs both through regulation and through the public administration's direct provision of these services.

The way in which urban water supply and sanitation services are regulated and provided has a unique impact on the well-being of the public, especially considering the scarcity of water in Spain. The fact that these activities generally leave no room for competition *in* the market does not mean that the public sector is unable to establish economic mechanisms to incentivise the more efficient provision of these services.

Experience in management of urban water and wastewater services in other European countries shows that the introduction of appropriate tools that enhance competition *for* the market and transparency, as well as yardstick competition, encourage operators to improve the efficiency and quality of their services.

Accordingly, the CNMC has deemed it convenient to analyse the provision of urban water and wastewater services in Spain, from the point of view of competition and efficient economic regulation. The analysis focuses specifically on urban environments. Thus, it does not cover either water management or water allocation between various uses (urban, industrial and agricultural).

Currently, the Ministry for the Ecological Transition and the Demographic Challenge is working on the Green Paper on Water Governance in Spain, which will be structured into 12 subject areas, two of which refer specifically to the challenges in urban environments[1]. To help it prepare the Green Paper, the

[1] "Regulación del ciclo integral del agua urbana" [Urban Water Cycle Regulation] and "Gestión del ciclo integral del agua en pequeños municipios" [Management of the Water Cycle in Small Municipalities].

Ministry has opened "*spaces for dialogue with the competent administrations at the local, regional and state levels and with the stakeholders in the various territories*" in an effort to *"gather opinions on the shortcomings of the current governance model and proposals for improvement*". The ultimate goal is to have the proposals included in the Green Paper provide a framework for "*informing future political and legislative reforms"*. With this study, the CNMC seeks to help identify issues involving the urban water cycle that, in its opinion, must be addressed in order to provide these services more efficiently, for the benefit of the public and the general interest.

The urban water sector is highly regulated at every administrative level (European, state, regional and local). Its regulatory framework is complex and not always transparent.

The theoretical and comparative analysis carried out reveals several deficiencies or limitations in the current regulatory framework that prevent the full use of the advantages associated with a model of competition *for* the market and the efficient and sustainable provision of services.

On the one hand, urban water systems are local or regional in their scope (if municipalities opt for a cooperative approach to provide the service). It is estimated that there are currently around 2,500 urban water systems in Spain. It is, therefore, a highly fragmented market. From a theoretical point of view, there is a consensus as to the presence of significant economies of scale in the sector. Moreover, a comparative analysis of international experiences shows that increasing the scale at which the service is provided enhances its efficiency. Given the small size of most Spanish municipalities, it may be necessary to expand the scope of the service to a more suitable scale by providing it jointly to several population centres.

On the other hand, the limited information available is not enough to be able to draw an accurate image of a sector that is characterised by strong information asymmetries. There are hardly any sources of information on urban water and wastewater services, with the most widely used source being private. Systematic, clear, objective, accurate, accessible and timely information would help to ensure that the bidding processes for urban water and wastewater services can be more adequately designed, executed and monitored.

It has also been determined that the pricing does not take into account the economic characteristics of the sector or the resource. This, together with the institutional and functional complexity of the urban water cycle, results in a large disparity in price structures and levels of cost recovery, and does not generally incentivise desirable behaviours from a public perspective, such as saving water. A suitable and efficient pricing structure would go some way towards achieving these objectives.

In addition, yardstick competition instruments, such as benchmarking or sunshine regulation, which could increase competitive pressure on monopoly operators, are not used in Spain. Experience in neighbouring countries like England, Germany and Portugal, shows that the use of these mechanisms introduces competitive pressure and leads to a more efficient industry and, ultimately, to improvements in the use of resources and to greater consumer welfare.

Finally, the study shows that there is room for increased competition in related markets. The current regulation of activities such as the installation, maintenance and reading of water meters includes restrictions that in many cases would unreasonably limit competition.

Concerted action at various administrative levels is required to solve many of the problems identified. The current competence framework distribution of the urban water cycle means that, in order to satisfactorily address the problems identified, cooperation and coordination between public administrations must be enhanced. In this regard, comparative experience shows that many countries have opted to create national supervisory and regulatory bodies to promote this technical coordination and guide the competent administrations. This issue is precisely one of the points of debate in the dialogue spaces led by the Ministry for the Ecological Transition and the Demographic Challenge.

In order to guide public administrations on how to deal with the above problems, the CNMC offers a series of recommendations:

1) Systematically collect and publish information on the urban water cycle: it is essential to improve transparency by systematically publishing disaggregated information on various aspects, including the number of water systems and their territorial scope, the efficiency in the provision of water services, the criteria used by regional administrations to design and subsequently review water fees, the bidding processes and the condition of infrastructure.

   This would increase the general level of knowledge of the sector and reduce information asymmetries, which would have a positive impact on every stakeholder (administrations, companies and users) and on market operation. Improving the levels of information would allow for the systematic preparation of reports, studies and statistics that are accessible to the public.

2) Restructure the organisation of urban water and wastewater services as required to optimise the scale of their provision: there is a need to conduct a rigorous and detailed study of the efficiency of urban water and wastewater services in terms of the scale of the various water systems currently in place. In those cases where problems are identified involving the scale of the service provided, organisational measures should be taken

to achieve the optimum scale and maximise the efficiency of the service provided.

3) Use benchmarking tools to create greater competitive pressure: sunshine regulation should be used by developing and publishing benchmarking exercises in which the various urban water operators are compared with each other and ranked based on efficiency and quality indicators. The maximum effectiveness of these exercises is achieved when participation in them is mandatory and the results are published non-anonymously.

4) Develop a common reference methodology to design efficient and pro-competitive rates: this would increase transparency, ensure that efficiency criteria in production and consumption are met throughout Spain, and facilitate the involvement of more companies in bidding processes, and thus enhance market competition, since companies would be better able to anticipate their revenue from the service.

5) Eliminate unjustified or disproportionate restrictions to competition in related markets: not all the activities that make up the urban water cycle fall under the category of a natural monopoly, meaning they could, in principle, work under a competitive regime. Such is the case of the water meter installation, maintenance and reading activities, markets that are related to urban water and wastewater services.

6) Review the governance of the urban water cycle: by taking advantage of the dialogue spaces opened by the Ministry for the Ecological Transition and the Demographic Challenge, as part of the process of preparing the Green Paper on Water Governance in Spain, thought should be given to those governance reforms that are needed to improve the regulation and provision of these services, taking as reference the success stories in neighbouring countries.

1. INTRODUCTION

Water is an essential asset for both life and economic activities. In 2002, the United Nations recognised, through the Committee on Economic, Social and Cultural Rights, the human right to water. This right was explicitly recognised by the General Assembly in 2010[2].

Water as a resource is a public good, access to which must be guaranteed. This idea underlies the legislation of most countries. In Spain, water is considered a public good.

The management of said public good encompasses issues of enormous complexity, such as the allocation of water for various uses, the impact on the environment or issues of resource distribution between territories, that go beyond the intended scope of this study, which focuses solely on an analysis of water management in urban areas, where issues of economic efficiency have a greater impact.

In Europe, the first recital of the Water Framework Directive defines water as a "*commercial good*", though with the proviso that "*it is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such"*.

In contrast, the services needed to provide water in conditions that are suitable for its consumption and subsequent return to nature in environmentally acceptable conditions are economic activities.

These activities constitute what is known as the "urban water cycle", which spans everything from capturing or storing the resource (whether in rivers, reservoirs, wells or the sea), its purification and transport to urban centres, to its collection, treatment and subsequent return to the environment - in short, urban water and wastewater services.

Most of these activities have the features of a natural monopoly, which conditions how they are supplied. From the point of view of competition, it implies that, in any case, there may only be competition *for* the market. These are also services that exhibit other market failures, such as externalities and information asymmetries. All of this justifies intense public involvement, which occurs both through regulation and through the government's direct provision of these services.

The way in which urban water and wastewater services are regulated and provided has a unique impact on the well-being of the public, especially considering the scarcity of water Spain. The fact that these activities generally leave no room for competition *in* the market does not mean that the public sector

[2] Resolution 64/292 of the United Nations General Assembly.

is unable to establish economic mechanisms to incentivise the more efficient provision of these services.

Experience managing urban water services in other European countries shows that both the introduction of appropriate tools that stimulate competition *for* the market, as well as transparency measures and yardstick competition, encourage operators to improve the efficiency and quality of their services.

As a result, this study aims to analyse the provision of urban water and wastewater services in Spain from the point the point of view of competition and efficient economic regulation. The analysis focuses specifically on urban environments. Thus, it does not cover either water management or water allocation between various uses (urban, industrial and agricultural).

Currently, the Ministry for the Ecological Transition and the Demographic Challenge is working on the Green Paper on Water Governance in Spain, which will be structured into 12 subject areas, two of which refer specifically to the challenges in urban environments[3]. In order to prepare the Green Paper, the Ministry has opened "*spaces for dialogue with the competent agencies at the local, regional and state levels and with the stakeholders in the various territories*" in an effort to *"collect opinions on the shortcomings of the current governance model and proposals for improvement*". The ultimate goal is to have the proposals included in the Green Paper provide a framework for "*informing future political and legislative reforms*". With this study, the CNMC seeks to help identify issues involving the urban water cycle that, in its opinion, must be addressed in order to provide these services more efficiently, for the benefit of the public and the general interest.

While preparing this study, the CNMC held various meetings with sector associations, academic experts and different government agencies. It also requested information from the General Directorate of Water of the Government of the Canary Islands, the Spanish Association of Water Supply and Sanitation (AEAS) and the competition authorities of the other EU Member States that make up the European Competition Network.

The study is structured into eight sections. After this introduction, Section 2 presents the legal framework for urban water services. Then, Section 3 presents the economic characterisation of the sector. In Section 4, the services are analysed from an economic theory perspective and various theoretical possibilities for introducing competition are studied. In Section 5, the main trends observed at the international level are reviewed. In Section 6, the main problems

[3] "Regulación del ciclo integral del agua urbana" [Urban Water Cycle Regulation] and "Gestión del ciclo integral del agua en pequeños municipios" [Management of the Water Cycle in Small Municipalities].

involved in providing the services of the urban water cycle in Spain are identified from a perspective of efficient economic regulation and enhancing competition. Finally, sections 7 and 8 present the conclusions and provide a series of recommendations.

2. LEGAL ANALYSIS

The legal framework of the urban water and wastewater services market in Spain is defined by norms that emanate from the different jurisdictional levels of the Spanish legal system.

The regulation of Spain's urban water market is made complex by the distribution of powers between the state, regional and local governments. In addition, European regulation, especially after the entry into force on 22 December 2000 of Directive 2000/60/EC of the European Parliament and of the Council, of 23 October 2000, establishing a framework for Community action in the field of water policy, commonly known as the Water Framework Directive (WFD), has led to the introduction of a new water management model in the EU.

2.1. European regulations

There is no European water policy per se; rather, any such policy falls within the environmental policy of the European Union (EU)[4]. It is a shared competence between the EU and the Member States, such that the principle of subsidiarity, enshrined in Art. 5 of the Treaty on European Union, applies.

Despite this, European water laws are relatively abundant. All of them have a pointed environmental character and their main goal is to preserve water quality and to manage it sustainably as a natural resource, though this does not mean that they do not include provisions of an economic nature.

Before the entry into force of the WFD, there were already numerous European standards on water. Most notably among these due to their effect on the urban water and wastewater services market were Council Directive 91/271/EEC of 21 May 1991, concerning urban wastewater treatment[5], and Council Directive

4 Articles 191-192 TFEU.

5 Transposed into Spanish law by Royal Decree-Law 11/1995 of 28 December, which lays out the rules applicable to the treatment of urban wastewater.

On 14 April 2011, the EU Court of Justice (CJEU) ruled (Case C-343/10) that Spanish authorities were violating EU law by not properly collecting and treating urban wastewater discharged by 43 agglomerations (cities and residential complexes). In 2017, the European Commission filed a new appeal against Spain before the Court of Justice for delaying the adoption of appropriate measures in 17 of the 43 urban agglomerations to which the judgment refers. Finally, in July 2018, the CJEU ordered Spain to pay into the Union budget a lump sum of 12 million euros, as well as a penalty payment of 10,950,000 euros for each six-month delay in applying the measures necessary to comply with the 2011 judgement (Case C-205/17).

98/83/EC of 3 November 1998, on the quality of water intended for human consumption[6].

However, the WFD marks an important milestone in European water regulation, as it is the first standard that attempts to establish a framework for the comprehensive regulation of the water cycle. Its purpose is *"the protection of inland surface waters, transitional waters, coastal waters and groundwater"* (Art. 1 WFD), to which end it lays out a series of environmental targets that must be achieved within 15 years (Art. 4 WFD), that is, no later than 22 December 2015. This period may be extended for technical or economic reasons (Art. 4.4 WFD).

The WFD introduced three important developments:

- The river basin and the river basin district as the foundations for structuring the obligations of Member States[7].
- Water planning based on river basin districts[8]. This type of planning has been applied in Spain since the start of the 20th century.
- The principle of cost recovery[9].

Art. 9 WFD contains the principle with the greatest economic impact of the Directive. This article requires the Member States to take into account *"the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis conducted [...], and in accordance in particular with the polluter pays principle"*. Therefore, the Directive links cost recovery to the polluter pays principle and includes in the costs to recover those related to resources and environmental costs. As a result, it aims to ensure that the Member States guarantee the efficient use of resources by no later than 2010.

However, cost recovery continues to be a pending issue for the water sector in most European countries, including Spain.

The WFD was transposed into Spanish regulation through Law 32/2003 of 30 December, on fiscal, administrative and social order measures, Article 129 of which includes an amendment to the Consolidated Text of the Water Law.

6 Transposed into Spanish law by Royal Decree 140/2003 of 7 February, which lays out the sanitary criteria for the quality of water for human consumption; and by Royal Decree 1074/2002 of 18 October, on bottled drinking water, amended in turn by Royal Decree 1744/2003 of 19 December.

7 Articles 3 and 5 WFD.

8 Article 13 WFD.

9 Article 9 WFD.

2.2. National legislation

2.2.1. Full urban water cycle

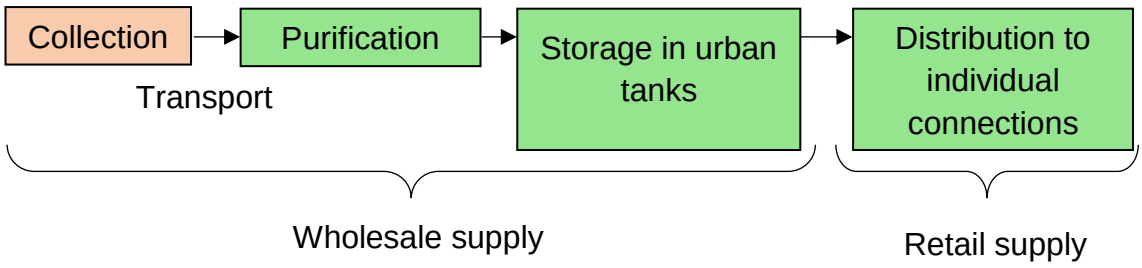
To understand the urban water sector and its jurisdictional distribution in Spain, we must first understand the phases of the full water cycle.

The cycle can be divided into two large blocks, which in turn cover different phases: water supply and wastewater services.

First, water supply encompasses the activities of collection, transport, purification and distribution:

- Collection: the full water cycle begins with collection or abstraction. Water is collected from sources such as rivers, reservoirs, wells, or even the sea in the case of desalination, and is channelled and stored for long-term use.
- Transport and purification: once collected, the water is transported by pipes, canals or tunnels to water treatment plants for purification, and from there to the urban areas, where it is stored in urban tanks. The phases described so far comprise the “wholesale supply” of water.
- Distribution: water, now suitable for human consumption, is channelled from urban tanks through transport pipes and secondary pipes to the connections and meters of buildings and homes. This phase is also known as the “retail distribution” of water.

Figure 1. Supply phase



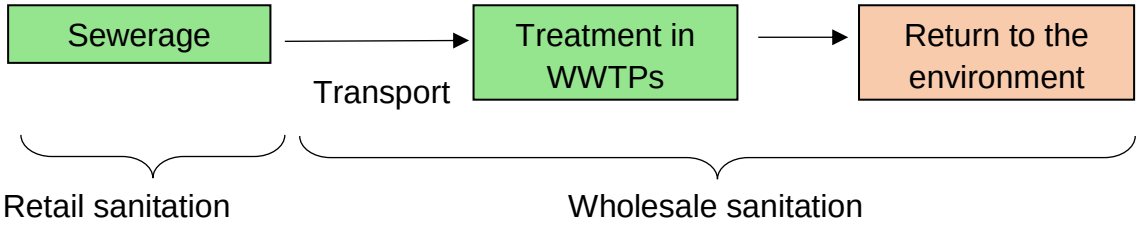
Source: compiled internally.

Secondly, wastewater services include the activities of sewerage, water treatment and return to the environment:

- Sewerage: once used, urban water is collected through pipes and transported to interception points with main drains. This phase is also known as “retail sanitation”.

- Treatment: from the interception points, the water is transported to Wastewater Treatment Plants (WWTP), where it is processed and transformed into clean water that is suitable to be returned to the environment (wholesale sanitation).

Figure 2. Sanitation phase



Source: compiled internally.

As we will see later, the collection of water from the environment and its subsequent discharge are subject to administrative concessions granted by basin authorities. These phases, shown in red in the above diagrams, are beyond the scope of the analysis of this report. The scope of the Study is strictly limited to the urban water and wastewater services in Spain (phases shown in green).

2.2.2. Division of responsibilities involving the full urban water cycle

Various administrative levels are involved over the course of the cycle: the State, the regional governments and the municipalities, as per the powers attributed to them by the Spanish Constitution (CE), the Statutes of Autonomy, and Law 7/1985 of 2 April, Regulating the Rules of Local Government (LRBRL).

Article 149.1 of the Spanish Constitution grants exclusive powers to the State in the areas of "*legislation, management and concession of water resources and uses when the water runs through more than one Autonomous Community*"[10]. *"Public works of general interest or whose implementation affects more than one Autonomous Community*"[11], including water works, also fall under the sole authority of the State.

[10] Article 149.1.22ª CE.

[11] Article 149.1.24ª CE.

In contrast, Art. 148.1 CE allocates powers to the Autonomous Communities for *"public works of interest to the Autonomous Community in its own territory*"[12], as well as in relation to "*the projects, construction and exploitation of water resources, canals and irrigation systems of interest to the Autonomous Community, mineral water and hot springs*"[13].

Art. 25.2.c) LRBRL assigns to municipalities*, "under the terms of the national and regional legislation* […], *the supply of residential drinking water and the disposal and treatment of wastewater*". Of note is the mention that is made of the national and regional legislation, as it can alter the separation of powers outlined thus far.

Therefore, the State and the Autonomous Communities are responsible for the management and use of water resources, while the municipalities are responsible for providing urban water and wastewater services, which are the subject of this analysis. The basic criterion for the distribution of power between the national and regional governments is the territory through which the water flows.

As concerns the urban water and wastewater services, this activity is restricted to local entities[14]. However, the attribution varies according to the population of the municipality. Thus, although all municipalities with a population of fewer than 20,000 must provide drinking water and sewerage services to households, it is the provincial council or equivalent entity that coordinates, in concert with the affected municipalities, the supply of drinking water to homes and the removal and treatment of wastewater[15]. This coordination may result in the direct provision of the service by the Provincial Council or in the implementation of shared management arrangements through consortiums, associations or other formulas, unless the municipality proves that it can provide the services at a lower effective cost[16].

The provision of these services can be managed directly or indirectly. The former involves the management by the local entity itself, by a local regional body, by a

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12 Article 148.1.4ª CE.

13 Article 148.1.10ª CE.

14 Article 86.2 LRBRL. In turn, the activity reservation contained in Art. 86.2 LRBRL is part of the reservation of essential services allowed by Art. 128.2 CE: "*Public initiative in economic activity is recognised. By law, essential resources or services may be reserved for the public sector, especially in the case of a monopoly. Likewise, the intervention of companies may be allowed when the general interest so requires*".

15 Article 26.2 LRBRL.

16 The current wording of Art. 26.2 LRBRL is the result of the reform introduced by Law 27/2013 of 27 December, on the streamlining and sustainability of local governments. This wording, among other issues, was appealed in 2014 before the Constitutional Court by the Governing Council of the Board of Andalusia, which argued that it violates the local autonomy enshrined in arts. 137 and 140 CE. However, the Court rejected that having councils coordinate certain services violates local autonomy.

local public business organization or by a local commercial company whose share capital is publicly owned. Indirect management refers to the new service concession contract contained in Law 9/2017, on Public Sector Contracts[17].

2.2.3. Public water domain and river basin authorities

The key national law involving water regulation is Royal Legislative Decree 1/2001 of 20 July, which approves the Consolidated Text of the Water Law (TRLA)[18].

The TRLA defines the public water domain as part of the public state domain and, as such, it is inalienable, imprescriptible and not subject to seizure[19]. In particular, the public water domain of the State comprises[20]:

- Inland waters, both surface and replenishable ground waters, regardless of the replenishment time.
- The channels of natural currents, continuous or discontinuous.
- The beds of lakes and lagoons and those of surface reservoirs in public channels.
- Aquifers, in terms of the acts that make available or affect water resources.
- Waters from the desalination of seawater.

The powers for managing the public water domain are distributed between the State and the Autonomous Communities through the water basin authorities. These agencies are responsible for managing water within one river basin, which can span the territory of more than one Autonomous Community.

In inter-community basins (those that extend beyond the territory of one Autonomous Community), the river basin authorities are called Hydrographic

[17] The new law on Public Sector Contracts does away with the public service management contract, and with it, the regulation of the different methods for indirectly managing public services that were present in Article 277 of the previous consolidated text. In its place, and pursuant to the new Directive on awarding concession contracts, a service concession arose, which was added within the category of concessions to the already existing concept of works concession.

[18] The Water Law is implemented in several regulations: Royal Decree 849/1986 of 11 April, which approves the Public Water Domain Regulation; Royal Decree 907/2007 of 6 July, which approves the Water Planning Regulation; and Royal Decree 927/1988 of 29 July, which approves the Regulation for the Public Administration of Water and Water Planning, implementing Titles II and III of the Water Law.

[19] Article 132 CE.

[20] Article 2 TRLA.

Confederations, which are autonomous bodies within the Ministry for the Ecological Transition and the Demographic Challenge (MITECO).

Its functions include the administration and control of the public water domain[21]. The right to the private use of water is only acquired by legal provision or by administrative concession[22], such that in order to be able to supply urban water, municipalities must have a concession issued by the relevant river basin agency. In addition, municipalities must have a discharge authorisation[23].

In the case of intra-community basins, meaning those that do not exceed the boundaries of an Autonomous Community, the functions described so far are assigned to the Water Authority of the Autonomous Community if it has accepted this responsibility in its Statute of Autonomy[24]. All Autonomous Communities have accepted this responsibility.

2.3. Regional regulations

Although the LRBRL assigns powers to local authorities over the entire urban water cycle, it is common for regional regulations to alter that distribution. In most cases, the framework built by state regulations is made more flexible, allowing the regional government to take over responsibilities involving some phases of the cycle, generally the wholesale phases.

Likewise, many Autonomous Communities use hydraulic infrastructure planning instruments and take over management responsibilities for those infrastructures declared to be of regional interest, or they promote the supra-municipal management of urban water services.

Finally, most regional regulations allow municipalities to delegate powers related to the urban water cycle to the regional government.

All this means that, in practice, the distribution of responsibilities for the urban water cycle between the regional and local governments varies substantially between municipalities, even within the same Autonomous Community.

Table 1 summarises the division of responsibility for each phase of the urban water cycle, as laid out in the legislation of the Autonomous Communities.

[21] Article 23 TRLA.

[22] Article 52 TRLA.

[23] Articles 100 ff. TRLA.

[24] 2nd AP TRLA.

Table 1. Theoretical division of responsibility for the phases of the urban water cycle

THEORETICAL DIVISION OF RESPONSIBILITY FOR THE PHASES OF THE URBAN WATER CYCLE				
Autonomous Community	**Wholesale supply**	**Retail supply**	**Retail sanitation**	**Wholesale sanitation**
Andalusia	Local entities / Supra-municipal entities	Local entities	Local entities	Local entities / Supra-municipal entities
Aragon	Local entities	Local entities	Local entities	Local entities
Asturias	Regional government / Local Entities	Local entities	Local entities	Regional government / Local Entities
Balearic Islands	Regional government / Local Entities	Local entities	Local entities	Regional government / Local Entities
Canary Islands	Regional government / Local Entities / Private	Local entities	Local entities	Regional government / Local Entities
Cantabria	Regional government / Local Entities	Local entities	Local entities	Regional government / Local Entities
Castilla y León	Local entities	Local entities	Local entities	Local entities
Castilla-La Mancha	Regional government	Local entities	Local entities	Regional government
Catalonia	Regional government / Local Entities	Local entities	Local entities	Regional government / Local Entities
Extremadura	Regional government / Local Entities	Local entities	Local entities	Regional government / Local Entities
Galicia	Regional government / Local Entities	Local entities	Local entities	Regional government
La Rioja	Regional government / Local Entities	Local entities	Local entities	Regional government / Local Entities
Madrid	Regional government	Local entities	Local entities	Regional government
Murcia	Regional government (desalination) / Local Entities	Local entities	Local entities	Regional government
Navarra	Local entities	Local entities	Local entities	Local entities
Basque Country	Local entities	Local entities	Local entities	Local entities
Comunidad Valenciana	Regional government	Local entities	Local entities	Regional government

Source: compiled internally.

Some Autonomous Communities have created specific entities to handle all or part of their responsibilities involving water, including those related to the urban cycle.

Such is the case of Aragón (Instituto Aragonés del Agua), Asturias (Junta de Saneamiento), Balearic Islands (Agencia Balear del Agua y de la Calidad Medioambiental), Castilla - La Mancha (Agencia del Agua de Castilla – La Mancha), Catalonia (Agencia Catalana del Agua), Galicia (Aguas de Galicia) and the Basque Country (Agencia Vasca del Agua)[25]. In general, the powers of these entities focus on the planning, development and financing of infrastructures.

[25] The aforementioned entities have jurisdiction over water. In addition, some Autonomous Communities have agencies that provide services within their purview (primarily in the wholesale phases): Andalusia (Agencia de Medio Ambiente y Agua de Andalucía), La Rioja (Consorcio de Aguas y Residuos de La Rioja), Madrid (Canal de Isabel II), Murcia (ESAMUR), Navarra (NILSA) and Comunidad Valenciana (EPSAR). For more details, see Annex I.

For more details on the regional regulations, see Annex I.

2.4. The "price" of urban water services

In Spain, from a legal point of view, water as a good has no price, since it is inalienable by virtue of being part of the public domain. The amount paid by the end consumers of urban water is a consideration for the services that allow them to have potable water, and then to treat it and return it to the environment in acceptable conditions.

Two elements influence how this compensation is determined:

- The compensation for the urban water and wastewater services, set at the local level and, where appropriate, reviewed at the regional level.
- The state and regional fees and charges, which encumber the use of the public water domain or are intended to cover the cost of water works or environmental aspects. The taxable entity is the government agency that holds the concessions on the public water domain, which in the case of the urban water cycle are local authorities. Therefore, said fees are not charged directly to the end users of urban water services, though the local authorities pass them on in the bill for the urban water supply services.

Since the transposition of the WFD in 2003, the principle of cost recovery has been included in the TRLA (Art. 111 a), whose application is meant to incentivise the efficient use of water with an adequate contribution for the various uses, in accordance with the polluter pays principle, considering at least the uses of supply, agriculture and industry. To this end, the law allows the agency that is authorised to supply the water to set up tariff structures by consumption brackets so that it can satisfy the basic needs at an affordable price while discouraging wasteful consumption.

2.4.1. Local prices and rates of urban water services

Local authorities are responsible for establishing the compensation that the end users of water have to pay. The legal nature of this compensation varies depending on the legal nature of the service provider[26].

[26] The new Law on Public Sector Contracts (Law 9/2017 of 8 November, on Public Sector Contracts) has resolved a long-running legal/doctrinal controversy on the legal nature of the compensation for urban water services, which revolved around whether it was a tax (therefore of a fiscal nature) or a tariff (or private price). This controversy resulted in several Supreme Court rulings of various types (STS of 3 December 2012, STS of 22 May 2014, STS of 28 September 2015, STS of 23 November 2015, STS of 24 November 2015).

When urban water services are provided by the local authorities themselves, the compensation will be a **tax** set pursuant to Legislative Royal Decree 2/2004 of 5 March, which approves the Consolidated Text of the Local Tax Authorities Law (TRLHL)[27]. In this case, the local entity only intervenes to set the amount.

In contrast, when the services are provided by a company (public, private or mixed), the compensation for urban water services is a "**non-tax public charge**"[28]. These compensations, in the case of supply services, are subject to the authorised price regime[29] (not so in the case of wastewater services). This means they are subject to a dual filter. First, the compensations proposed by the service managers must be approved at the local level. They are then forwarded to the regional government for the approval of the body responsible for authorising prices.

The responsibility for authorising prices at the regional level is generally implemented through price commissions[30]. The theoretical objective of having the regional government review the prices is to ensure that the proposed prices reflect changes in operator costs or service characteristics.

The legal nature of the compensation does not affect the analysis carried out throughout this Study, meaning that the words "price", "tariff" and "tax" will be used interchangeably to refer to the compensation for the service.

Beyond the TRLA reference to cost recovery, there is no national regulation that specifies the criteria that local authorities must follow when crafting the tariff, nor is there a common methodology that is applied. The result is a huge disparity in the design and structure of the tariffs and prices for the service to supply urban water.

Before Law 9/2017 was approved, the criterion laid out by the General Directorate of Taxes in its Report of 20 May 2016 was followed: "*if the public water supply and sewerage services are directly managed by a local entity, without any type of delegation, the compensation paid by the users must be legally considered a tax. In contrast, if these services are managed by a private municipal company, or by a private company through an administrative service management contract, the compensation cannot be classified as public-law revenue, but as private-law revenue".*

27 Articles 20.4.r) and t) of the TRLHL.

28 Article 20.6 of the TRLHL (introduced by Final Provision 12 of Law 9/2017).

29 Annex 2 of Royal Decree-Law 7/1996 of 7 June, on urgent fiscal measures and to promote and liberalise economic activity.

30 Not all Autonomous Communities have price commissions, although all have jurisdiction over authorised prices.

2.4.2. Tariffs and levies on local tariffs for urban water services

The taxes and levies set by the national/regional government and river basin authorities are passed on in the urban water bill by local entities.

At the national level, the TRLA specifies three taxes related to the water supply that correspond to river basin authorities:

- The tax for using the assets of the public water domain[31] taxes the occupation, use and exploitation of that part of the public water domain that is not considered a water resource and that requires an administrative concession or authorisation. However, water concessionaires are exempt from paying the tax for the occupation or use of the public domain lands necessary to carry out the concession.
- The discharge tax[32] is intended to finance the activity of providing administrative oversight of discharges and the actions to protect and preserve water bodies. All discharges, including unauthorised ones, are taxed. This tax is independent of those that the regional governments or local entities can charge to finance sanitation and treatment works.
- The regulation tax and the water use tariff[33], whose purpose is to recoup the cost of water works that are paid for in whole or in part by the State.

The regional governments also set taxes and levies related to the urban water cycle. Generally, these taxes are of an environmental nature or intended to finance, operate and/or maintain water works.

As studied previously, the water regulations in most Autonomous Communities grant the regional government authority over the wholesale phases of the urban cycle. Therefore, most of the regional taxes and levies are collected to finance the wholesale phases, which are managed by the Autonomous Communities. These taxes are summarised in Table 2.

[31] Article 112 TRLA.

[32] Article 113 TRLA.

[33] Article 114 TRLA.

Table 2. Autonomous fees and charges

REGIONAL TAXES AND LEVIES: PHASE OF URBAN CYCLE FINANCED						
Autonomous Community	**Administration**	**Use of the public water domain**	**Wholesale supply**	**Retail supply**	**Retail sanitation**	**Wholesale sanitation**
Andalusia	General Service Tax	-	Water Works Improvement Tax			
Aragon	-	-	-	-	-	Water Pollution Tax
Asturias	-	-	-	-	-	Tax on Environmental Effects of Water Use
Balearic Islands	-	-	-	-	-	Water Treatment Tax
Canary Islands	-	-	-	-	-	Discharge Tax
Cantabria	-	-	Water Supply Tax	-	-	Waste-Water Tax
Castilla-La Mancha	-	-	Conveyance Tax	-	-	Treatment Tax
Castilla y León	-	-	-	-	-	-
Catalonia	Water Tax	Tax for Using the Goods of the Public Water Domain	Water Tax			
Extremadura	-	-	Treatment Tax			
Galicia	Water Tax	-	-	-	-	Discharge Coefficient
La Rioja	-	-	Treatment Tax	-	-	Treatment Tax
Madrid	-	-	Supplemental Fee			
Murcia	-	-	-	-	-	Treatment Tax
Navarra	-	-	-	-	-	Treatment Tax
Basque Country	-	-	Water Tax			
Comunidad Valenciana	-	-	-	-	-	Treatment Tax

Source: compiled internally.

Of note are the cases of Andalusia, Catalonia and Galicia, where there is a tax specifically aimed at financing water management expenses. Finally, in Catalonia there is a tax for using the assets of the public water domain that mirrors its national counterpart.

3. ECONOMIC CHARACTERISATION

One of the characteristics of the urban water and wastewater services is that there are barely any official figures on it. The only information available from government agencies comes from the National Statistics Institute (INE), which publishes a Water Supply and Sanitation Survey annually. The latest published figures are from 2016.

Although this Survey is highly representative in terms of the population covered (its data covers 85% of the Spanish population), for the purposes of this study, it was necessary to supplement this information[34] with additional sources of a private nature[35].

In any case, there is a shortage of data and sources of information on the sector, which limits the ability to conduct a thorough economic characterisation of the urban water sector in Spain.

3.1. Characterisation of the demand in the sector

3.1.1. Demand for supply services

Approximately 20% of the water consumed in Spain is for urban use[36]. According to AEAS data[37], in 2016 (latest available data), 4,642 hm^3 of water was collected for urban use, of which 67% came from surface sources, 28% from underground sources and the remaining 5% from desalination, as shown in Graph 1.

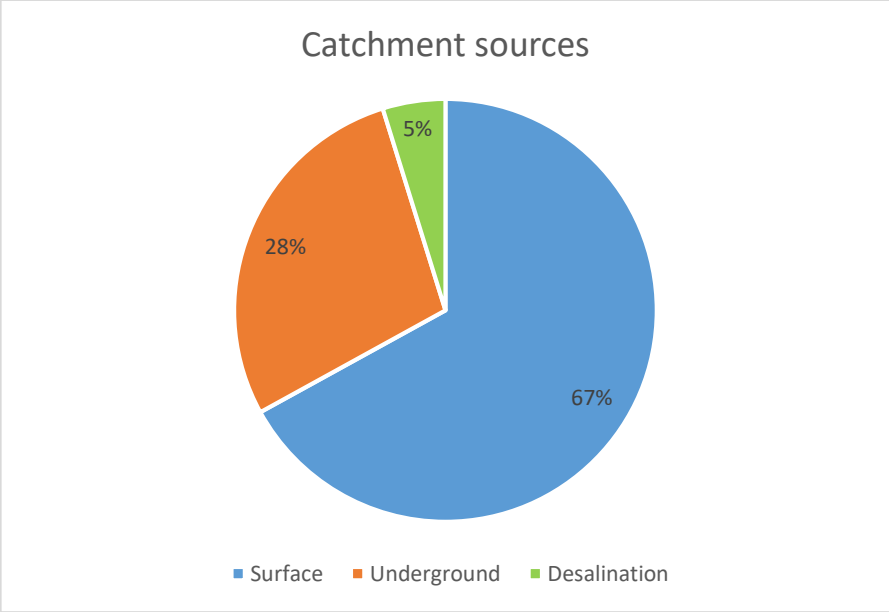
[34] The Survey contains highly detailed information on the volumes of water used in the different phases of the water cycle. It also publishes some economic data, such as the amount invoiced and an estimate of the average cost of water, generally aggregated at the national or regional level. The Survey does not disaggregate data on operators in the sector.

[35] The most complete private database is that of the Spanish Association of Water Supply and Sanitation (AEAS).

[36] MITECO (Ministry for the Ecological Transition and the Demographic Challenge).

[37] The AEAS data are used because the INE data comes from operators that only provide the retail supply service.

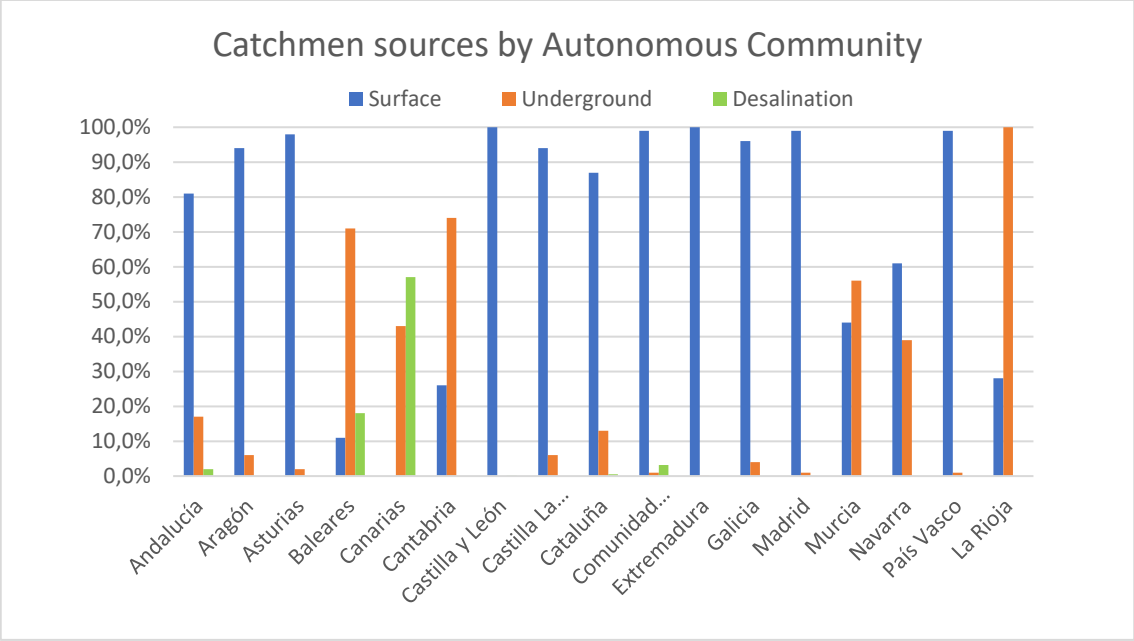
Graph 1. Sources of water collected for urban use at the national level, 2016



Source: prepared internally from AEAS data.

The distribution by Autonomous Community varies, although in the majority, most of the water collected is from surface sources, with the exception of the Balearic Islands, Cantabria, Valencia, Murcia and La Rioja, where the main source is underground, and the Canary Islands, whose main source of water is desalination. Apart from the Canary Islands, the percentage of desalinated water used is most notable in the Balearic Islands and Valencia, which rely the most on this source of water (Graph 2).

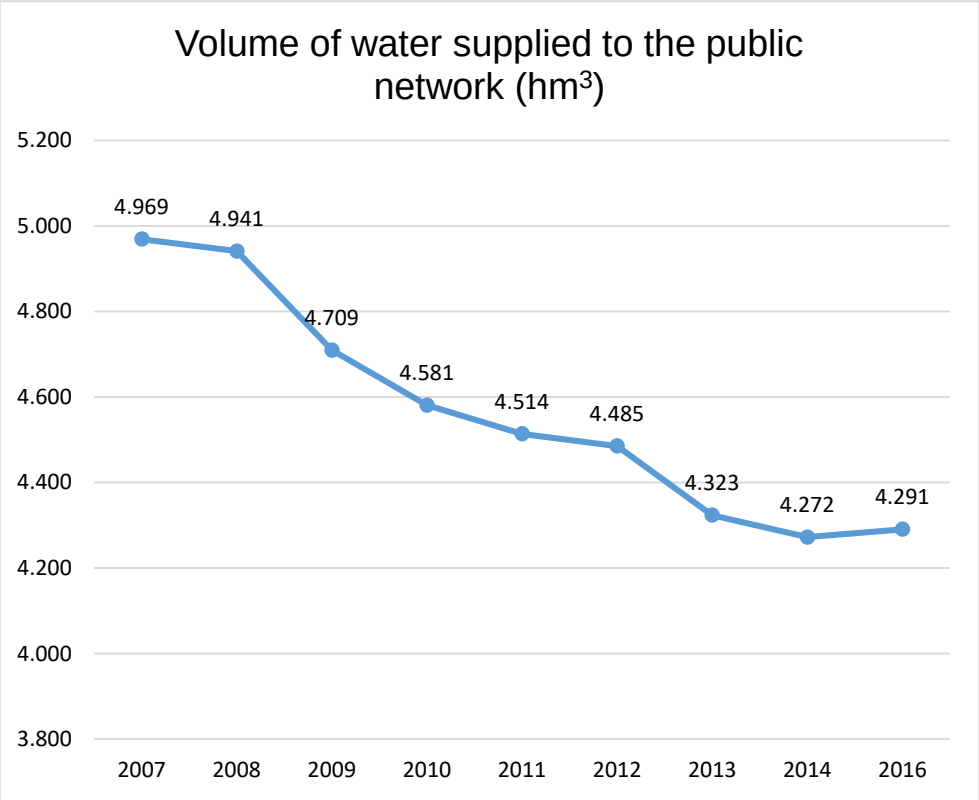
Graph 2. Sources of water for urban use by Autonomous Community, 2016



Source: prepared internally from AEAS data.

As for the volume of water supplied to public supply networks at the national level, according to INE data, it totalled 4,291 hm^3 in 2016. An analysis of all the historical data shows a gradual decrease in water supplied since 2007, with a slight rebound in 2016 (Graph 3).

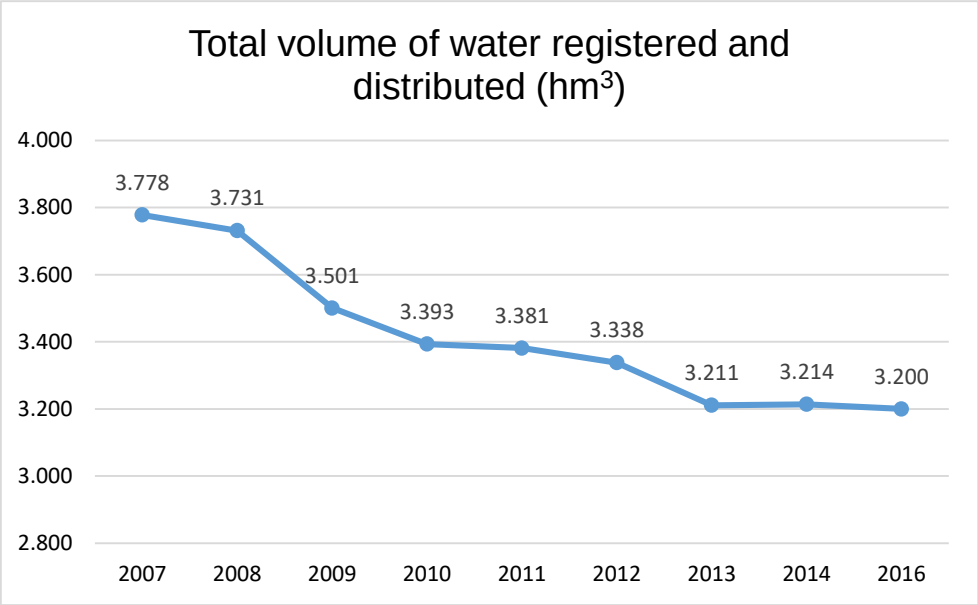
Graph 3. Volume of water supplied to the public network. Historical data



Source: Compiled internally from INE data.

Consequently, the total volume of water registered and distributed also follows a decreasing trend since 2007. This is the water registered by meters in the individual connections to users (Graph 4).

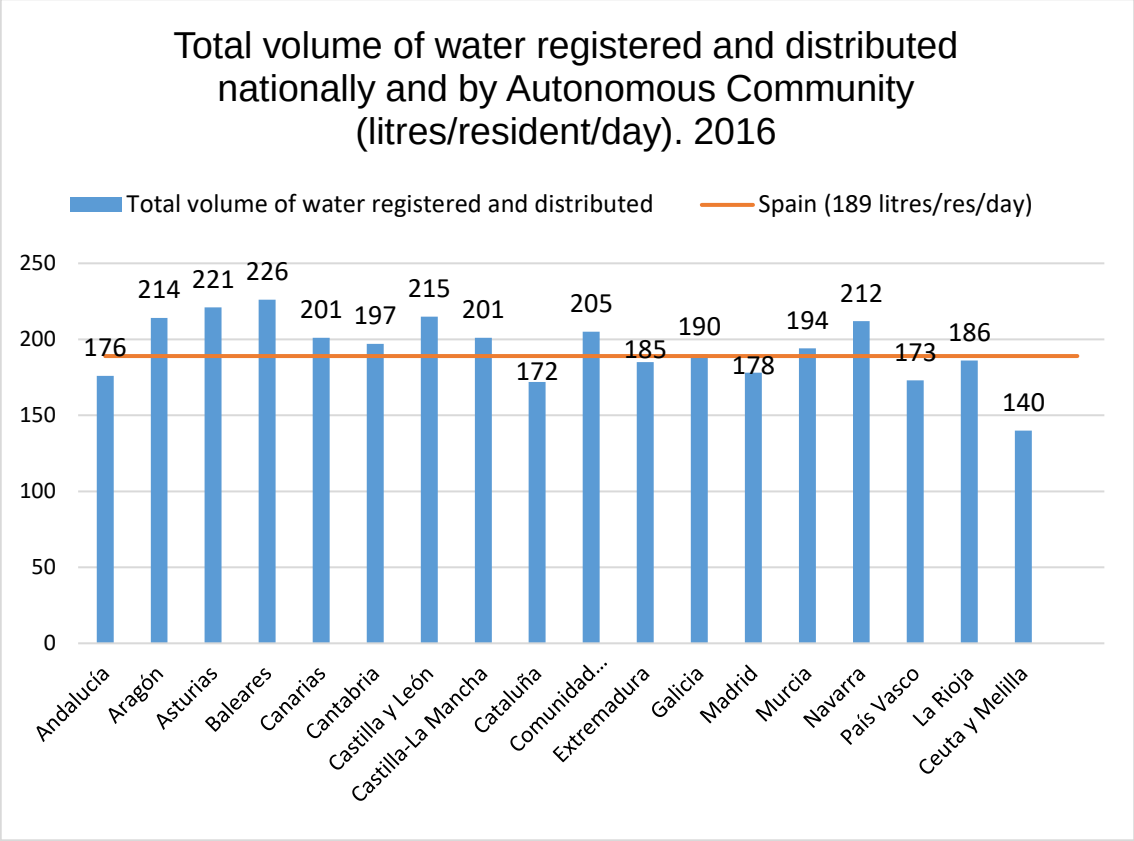
Graph 4. Total volume of water registered and distributed. Historical data



Source: Compiled internally from INE data.

In terms of average per capita consumption, 189 litres were consumed per resident per day in Spain. The following graph shows the average per capita consumption in each Autonomous Community in relation to the average national consumption (Graph 5).

Graph 5. Total volume of water registered and distributed nationally and by Autonomous Community. 2016.



Source: Compiled internally from INE data.

The difference between the volume of water supplied to the network and the volume of water registered and distributed is the volume of unregistered water (URW). The URW covers heterogeneous items that can be classified as apparent losses and real losses of water.

Apparent losses are non-measurable water consumption. They are broken down into:

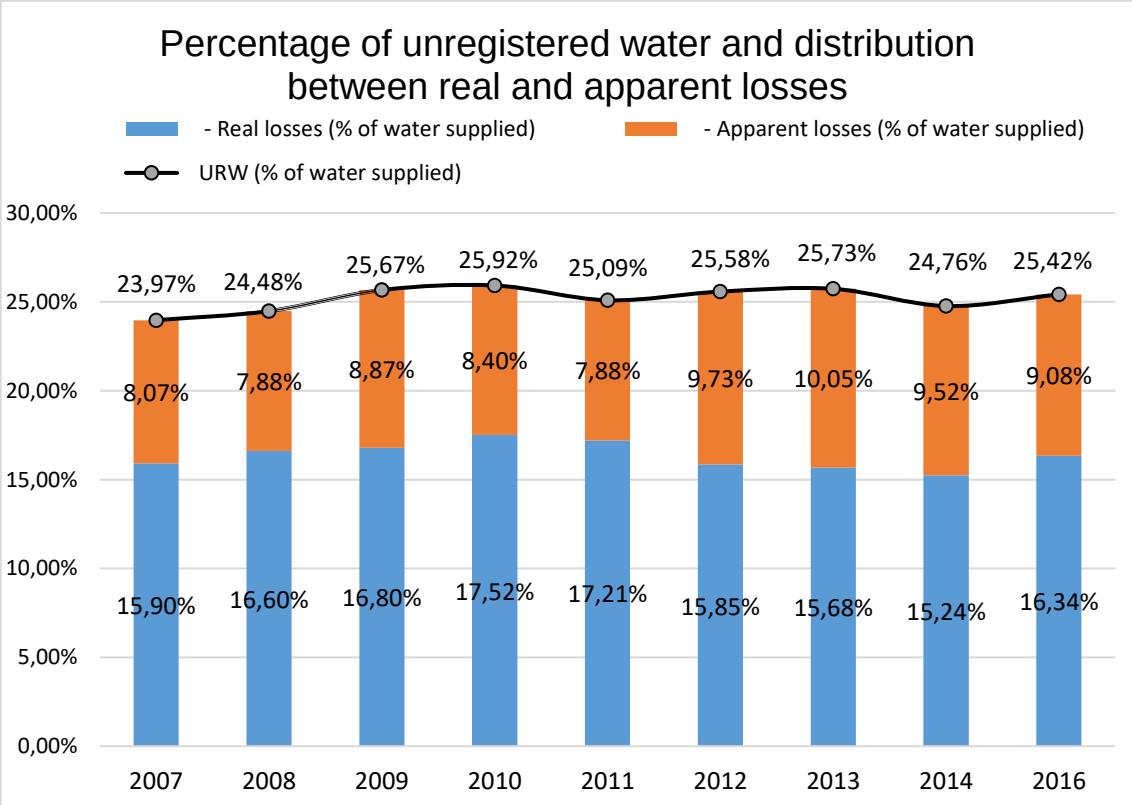
- Meter inaccuracy: include meter measurement errors when measuring low water flows.
- Authorised consumption not measured: that which is not measured by meters. This consumption may be billed (for example, municipal irrigation) or it may not.
- Unauthorised consumption (fraud): that involving illegal water connections or taps and, therefore, not measured or billed.

In contrast, real losses are the physical losses of water in the distribution network up to the user's measurement point. These include water leaks and breaks in the distribution network and connections.

The URW may be regarded as a measure of network efficiency, especially for the real losses component, although it must be interpreted with caution because, as noted, it includes items other than losses in the networks that can have a significant impact.

As Graph 6 shows, the percent of water supplied nationwide that is not registered has hovered around 25% since 2007. Most of the URW are real losses (16.34% in 2016).

Graph 6. Percentage of unregistered water and distribution between real and apparent losses (Spain). Historical data



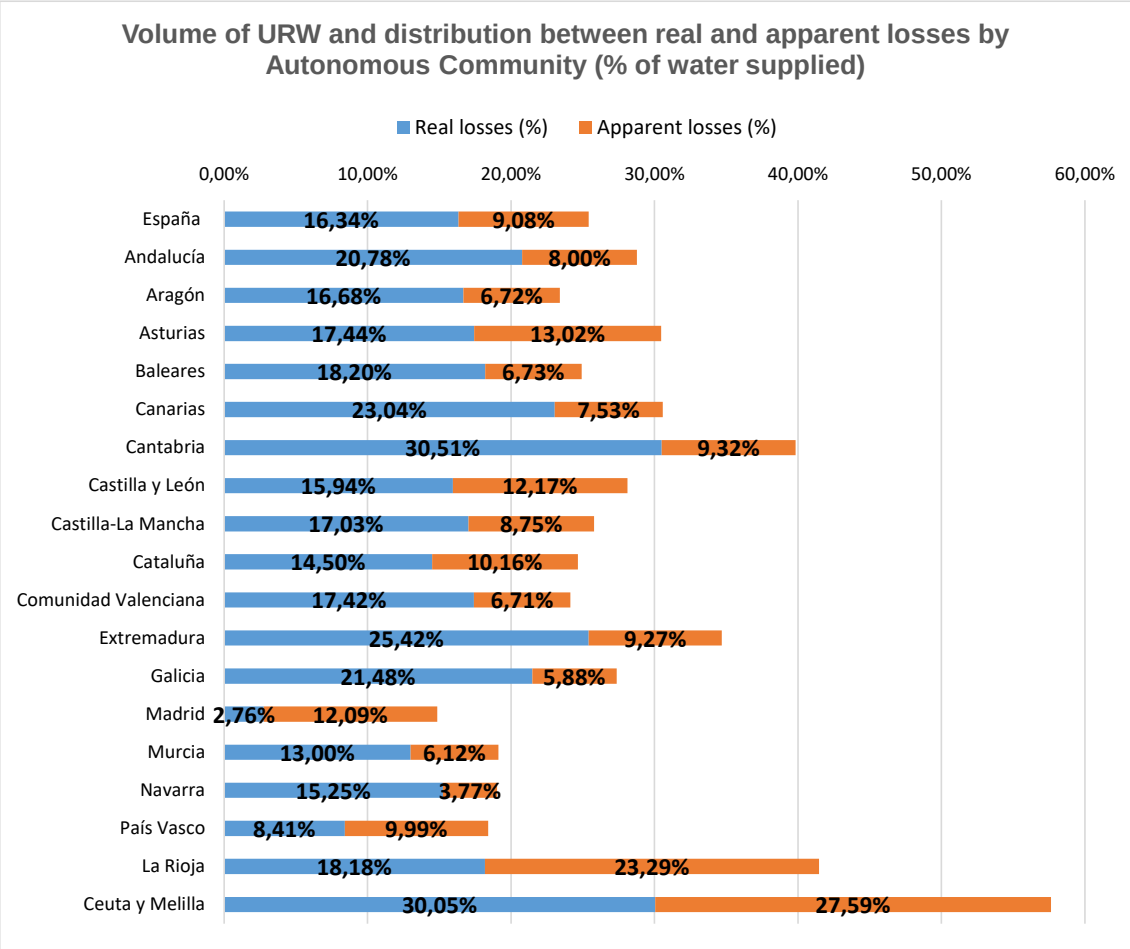
Source: Compiled internally from INE data.

At the Autonomous Community level, there are significant differences in the volume of URW, measured as a percent of the total water supplied to the network (Graph 7). The lowest values are in the Community of Madrid (14.85%), the Basque Country (18.4%) and Navarre (19.02%). At the opposite end are Ceuta

and Melilla (57.64%), followed some distance behind by La Rioja (41.47%) and Cantabria (39.83%).

If we consider only the percentage of real losses, the regions with the worst performance are Ceuta and Melilla (30.05%), Cantabria (30.51%) and Extremadura (25.42%). The best result is in Madrid, with real losses of 2.76%.

Graph 7. Volume of unregistered water and distribution between real and apparent losses by Autonomous Community, 2016



Source: Compiled internally from INE data.

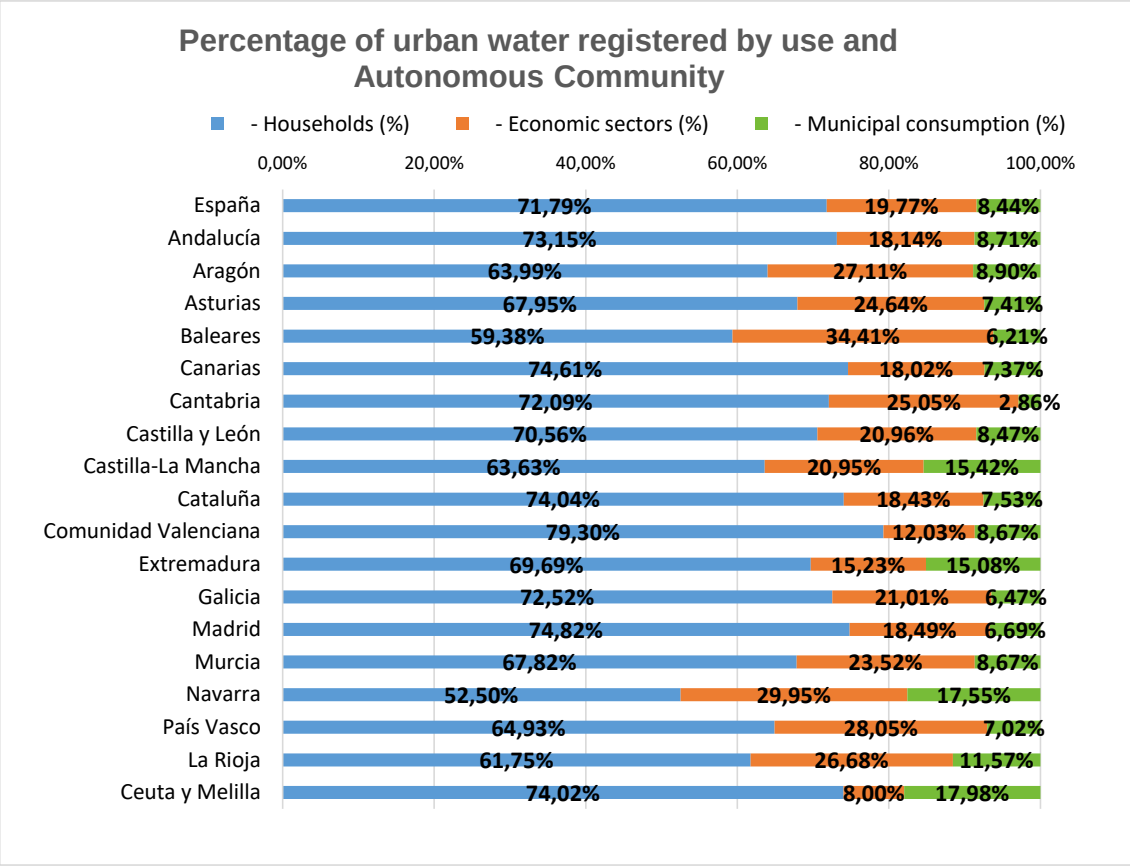
As for the end use of the water, urban demand is characterised by heterogeneity in how water is used. Not only is it used for domestic consumption, but it is also demanded for municipal, industrial, commercial and even agricultural uses[38] when it is obtained from connections to the public water network.

[38] According to the INE, the percentage of agricultural uses in urban water demand is scarce.

Both at the state and regional levels, most of the registered water supplied is used in homes for household purposes (71.79% for the whole of Spain). The rest is divided between consumption by economic sectors (19.77% nationally), which include industry and services, and municipal consumption (8.44% nationwide).

The relative importance of each differs between the various regions. Especially noteworthy are the cases of the Balearic Islands, Navarre and the Basque Country, where consumption by economic sectors exceeds or is close to 30% of the total, as shown in Graph 8.

Graph 8. Percentage of urban water registered by use and Autonomous Community, 2016



Source: Compiled internally from INE data.

3.1.2. Demand for wastewater services

Unlike for the water supply, between 2007 and 2013 there was an increase in the volume of treated wastewater (Graph 9). Between 2014 and 2016, the trend reversed, although the volume of treated wastewater remained higher than in 2007. This may be due to the requirement to comply with the EU Directive on the

treatment of urban wastewater[39]. In 2016, 4,726 hm^3 of wastewater was treated in Spain. It should be noted that this volume exceeds that of water supplied to the supply network. The difference is the rainwater that reaches the treatment plants through the sewage system.

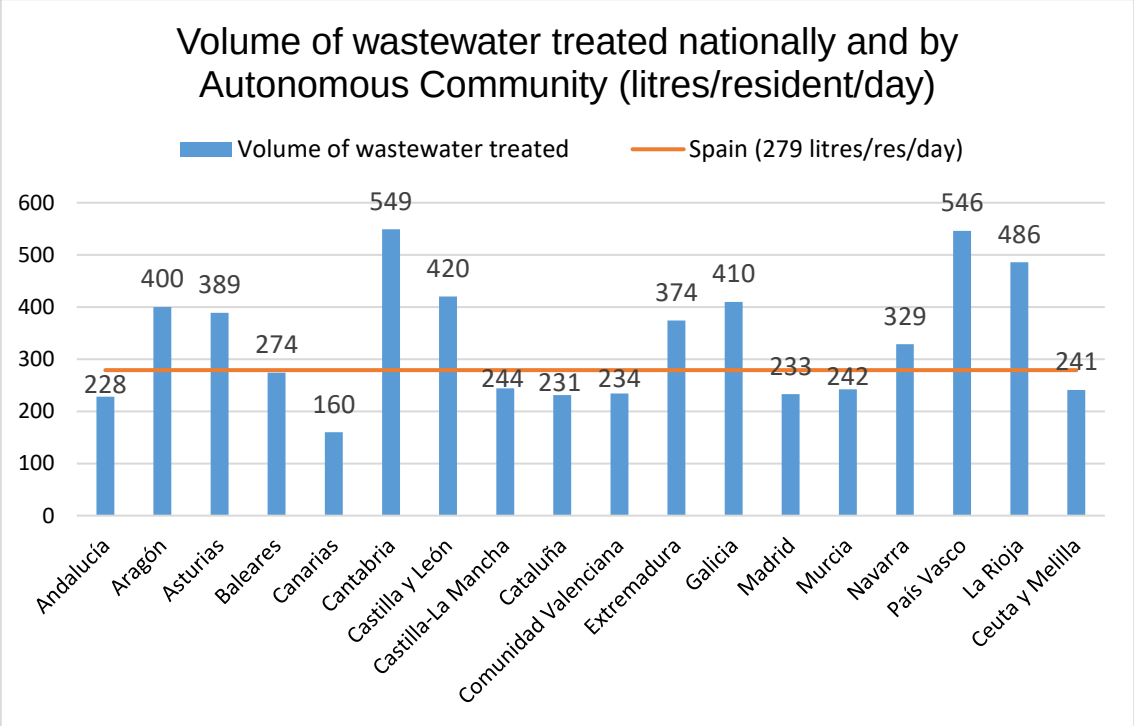
Graph 9. Volume of treated wastewater in Spain. Historical data.

Source: Compiled internally from INE data.

In terms of average wastewater treated per capita, in 2016, 279 litres were treated per inhabitant and day in Spain. The graph below (Graph 10) shows the average volume treated per capita in each Autonomous Community in relation to the average volume treated nationwide.

[39] Council Directive 91/271/EEC of 21 May 1991, concerning urban wastewater treatment.

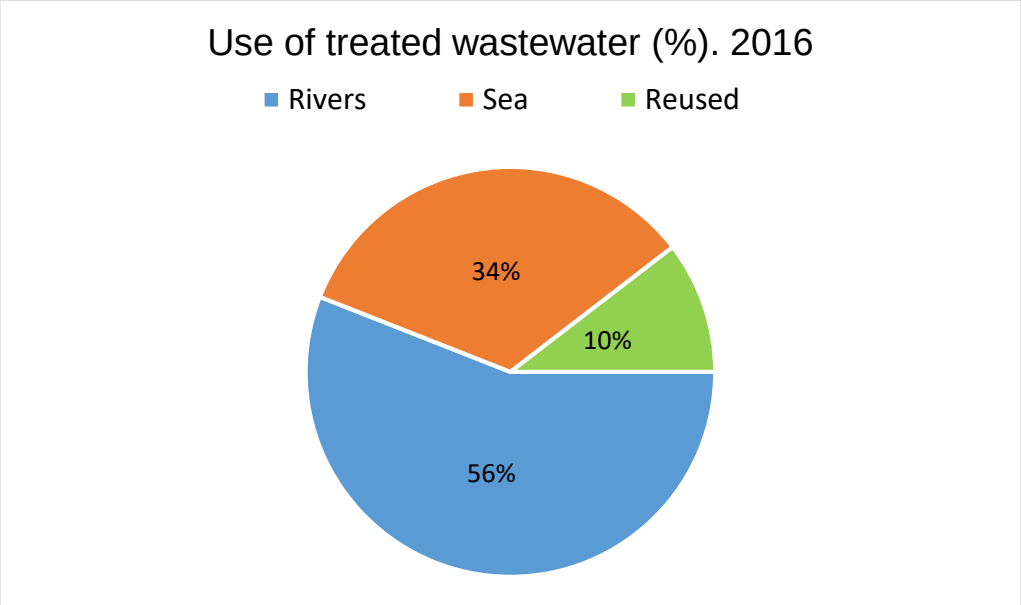
Figure 10. Total volume of wastewater treated nationally and by Autonomous Community. 2016.



Source: Compiled internally from INE data.

Most of the treated water is returned to rivers (56%) or to the sea (34%). Only 10% is reused (Graph 11).

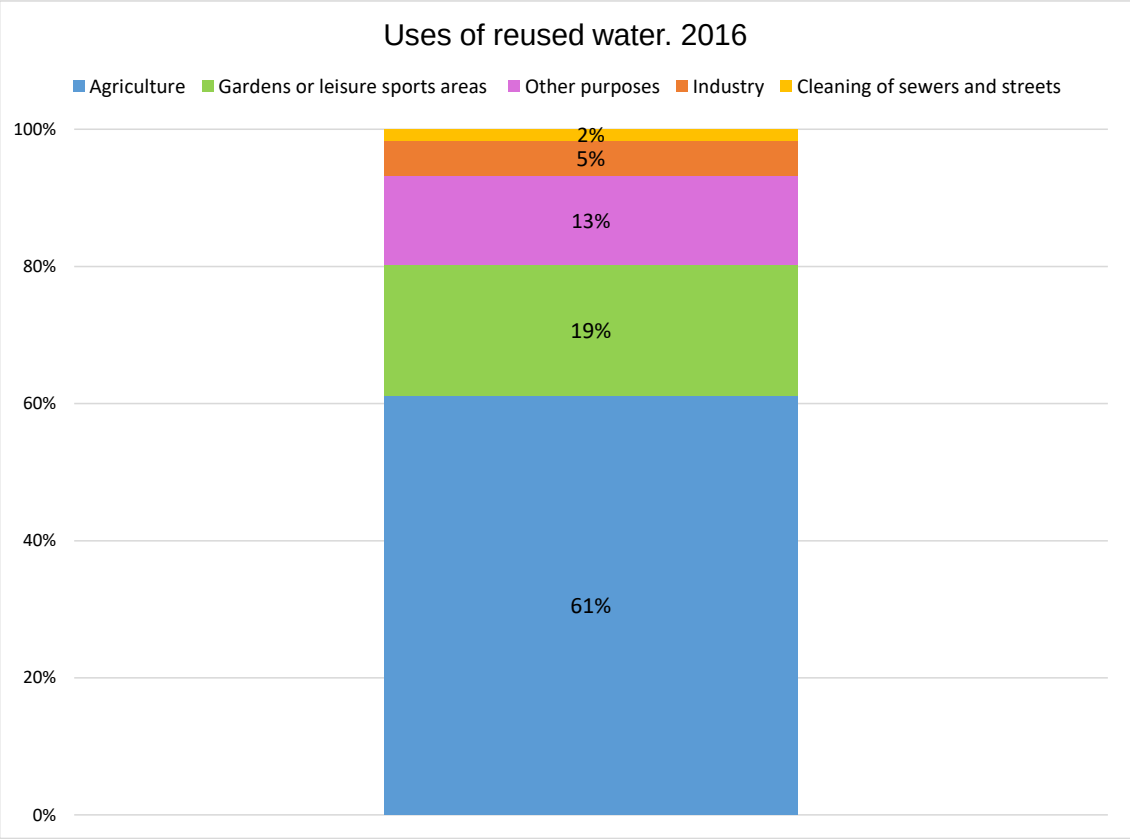
Figure 11. Use of treated wastewater. 2016.



Source: Compiled internally from INE data.

Treated water is mostly often reused for agriculture (61%), as Graph 12 shows. The rest is used in industry (5%), to irrigate gardens or leisure sports areas (19%), to wash sewers and streets (2%) and for other purposes (11%).

Graph 12. Uses of reused wastewater. 2016.



Source: Compiled internally from INE data.

3.1.3. Elasticity analysis

One of the characteristics of urban water demand, as we will see later, is that it is relatively inelastic, especially for a certain consumption threshold associated with essential uses (water for drinking, personal hygiene or food preparation). As the essential nature of the consumption is reduced (garden irrigation or filling of pools), the elasticity of the demand increases.

The above is a common observation in developed countries, although studies on the elasticities of water demand are still scarce. According to the OECD[40], based on a review of the literature, the most common values of price elasticity range between -0.1 and -0.25, such that for a 10% increase in the price of water, the demand falls between 1% and 2.5%.

The OECD indicates that the effect seems to be greater when changes are made to the structure of the urban water tariff. Studies involving the United States and the city of Barcelona have estimated that going from a volumetric tariff to an increasing block tariff reduces demand by 10-14% on average, although caution

[40] OECD (2009).

is warranted when interpreting these results because the change in tariff structure was accompanied by awareness campaigns on water consumption.

In the specific case of Spain, there are hardly any estimates of urban water demand. In a 2007 report[41], the Ministry of the Environment recognised that "*a detailed analysis is still needed of how prices affect the demand for water in Spanish households*". The most commonly used estimate refers to an econometric pilot study of the elasticity of demand in the Júcar Basin using municipal data. Those results indicate a price elasticity of -0.56 and an income elasticity of 0.04. These estimators, robust with a confidence interval above 95%, have been used as benchmark values by the river basin authorities.

3.2. Characterisation of the sector on the supply side

As already indicated, municipalities are responsible for urban water services in Spain, although it is usual (for reasons of efficiency) for supra-municipal administrative bodies to assume part of this responsibility, either because their interest is deemed to supersede the municipal interest or because of partnership arrangements between municipalities (associations, for example). As a result, even though there are currently 8,131 municipalities in Spain[42], industry sources estimate that there are around 2,500 urban water systems[43].

3.2.1. Market shares and legal nature of the operators

Based on the available AEAS information, market shares can be calculated for each phase of the full cycle (wholesale supply, retail supply, retail sanitation and wholesale sanitation) in terms of the population served. It is not possible to calculate aggregate market shares (for all segments of activity in the sector)[44], or in terms of billing, volume of water supplied/treated or geographical scope of activity.

In addition, it is important to keep in mind that the private data available do not include all the operators in Spain. However, they can be considered representative, since they do cover a high proportion of the Spanish population, although the representativeness varies depending on the phase of the cycle considered. The most representative data are for the retail supply (81.02% of the population) and the wholesale sanitation (80.4%). The data on the wholesale

41 Ministry of the Environment (2007a).

42 INE.

43 AEAS.

44 AEAS only provides disaggregated data on the population served by each operator.

supply and retail sanitation are for operators that provide services to 53.34% and 51.05% of the population, respectively[45].

Calculating market shares based on the population served shows that the main operators by activity segment are:

- In the wholesale supply segment, Canal de Isabel II Gestión, S.A. […][46]; ATLL Concessionària de la Generalitat de Catalunya, S.A. […]; and Mancomunidad de los Canales del Taibilla […]**.**
- In the retail supply segment, Canal de Isabel II Gestión, S.A. […], FCC AQUALIA, S.A. […], and Aigües de Barcelona, Empresa Metropolitana de Gestió del Cicle Integral de l'Aigua, SA […].
- In the retail sanitation segment, Canal de Isabel II Gestión, S.A. […] and, far behind, Acciona Agua Servicios, S.L.U. […] and Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA) […].
- In the wholesale sanitation segment, Canal de Isabel II Gestión, S.A. […], Acciona Agua Servicios, S.L.U. […] and Aigües de Barcelona, Empresa Metropolitana de Gestió del Cicle Integral de l'Aigua, S.A. […].

However, if the market shares of the companies that are owned by the Suez Group are considered together, this group has the highest share in retail supply […], retail sanitation […] and wholesale sanitation […], according to the data provided by AEAS.

Regarding the legal nature of the operator, both in supply[47] and treatment, the majority of the population is served by public entities (35% and 66%, respectively), followed by private companies (33% for supply and 20% for treatment), mixed companies (22% and 7%) and municipal services (10% and 6%), as shown in graphs 13 and 14.

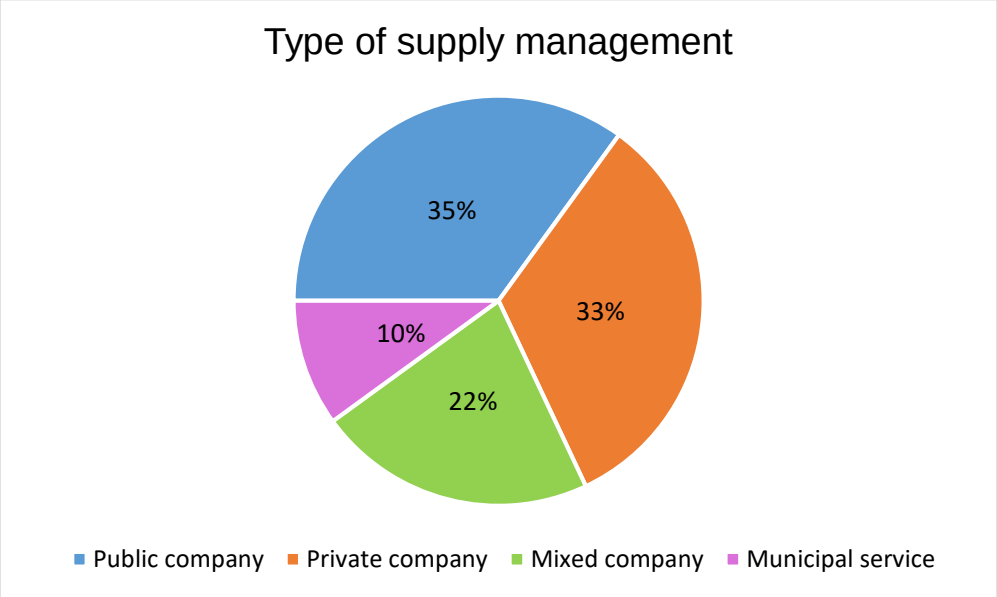
[45] According to AEAS, the lower representativeness of the wholesale supply data and retail sanitation data is due to the fact that, in the case of the wholesale supply, it is usually the River Basin Districts and other entities that are responsible for supplying water for purification, meaning the AEAS does not have information about their activity. Regarding the retail sanitation, or sewerage, since this activity is less modernised than the rest, it is usual for the municipalities themselves to manage the sewerage directly or to have preservation and maintenance contracts with private companies. In any case, this leads to the AEAS having less information on this segment.

[46] Information whose exact content has been deemed confidential is indicated by square brackets.

[47] It includes wholesale and retail supply.

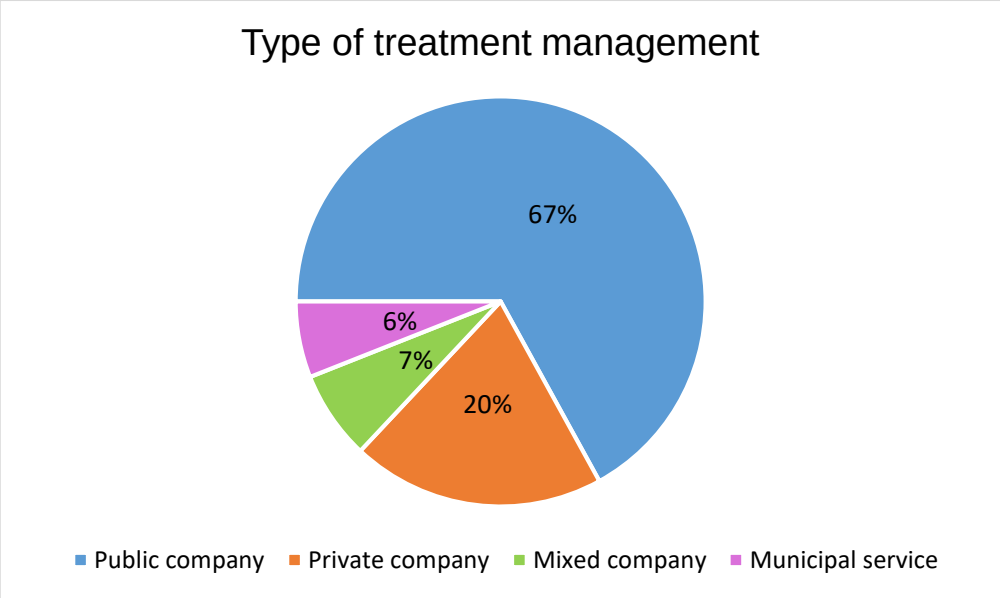
In the case of sewerage, AEAS estimates that the service received by 43% of the population is provided by private companies, 41% by public companies, 15% by mixed companies, and only 1% is managed directly by the local government.

Graph 13. Type of supply management, 2016



Source: prepared internally from AEAS data.

Graph 14. Type of treatment management, 2016



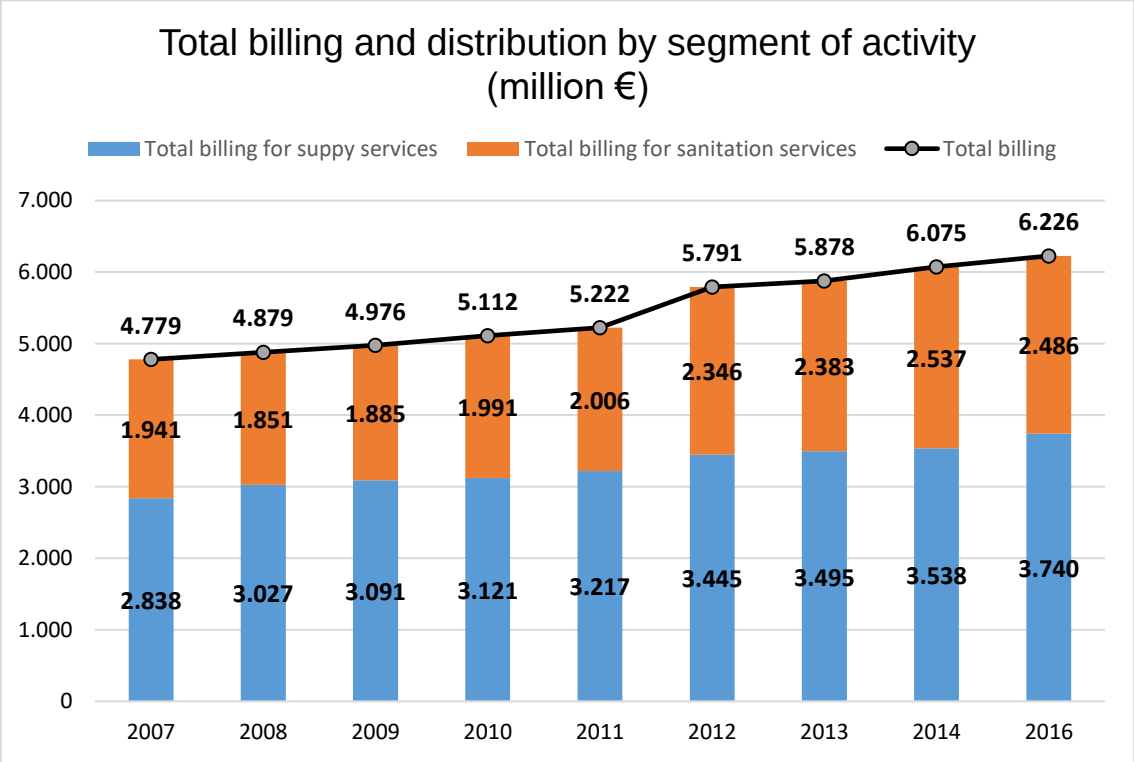
Source: prepared internally from AEAS data.

However, in the case of treatment, it should be noted that the data refer to the entities that supervise the installation of the plants and oversee the operator. Although most of this service is publicly managed, the operation of the plant, meaning the activities related to the maintenance and proper operation of the plant, is awarded through contracts to private companies. Therefore, the plants are operated by private companies that are usually supervised by public entities.

3.2.2. Invoicing

According to INE data, since 2007, the turnover in the sector has followed an upward trend, totalling 6.226 billion euros in 2016, of which 60% came from water supply activities and the remaining 40% from sanitation. The trend in the billing and its distribution by segment of activity is shown in Graph 15.

Graph 15. Total billing and distribution by segment of activity. Historical data.



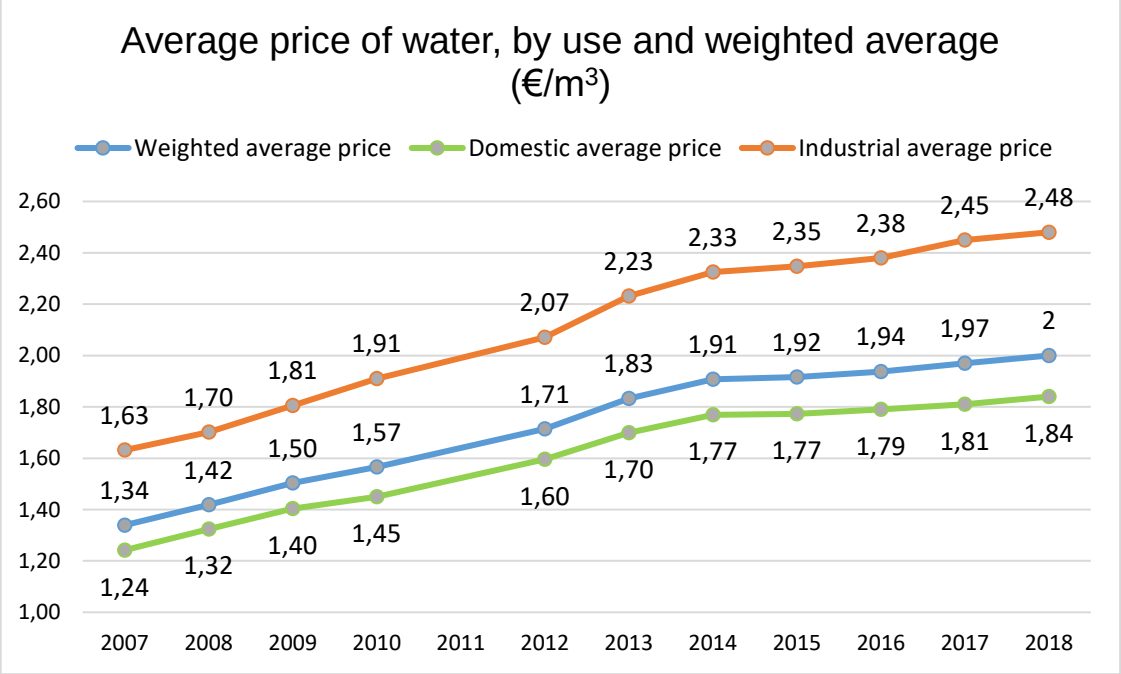
Source: Compiled internally from INE data.

This upward trend occurred even though water consumption decreased over this same period. The graph thus reflects an increase in prices.

3.2.3. Prices

As Graph 16 shows, according to AEAS data[48], the price increase has been continuous since 2007 for both domestic and industrial use[49]. In 2018, the last year for which figures are available, the weighted average price of urban water in Spain was €2/m^3, an increase of almost 50% compared to 2007.

Graph 16. Average price of water, by use and weighted average. Historical data.



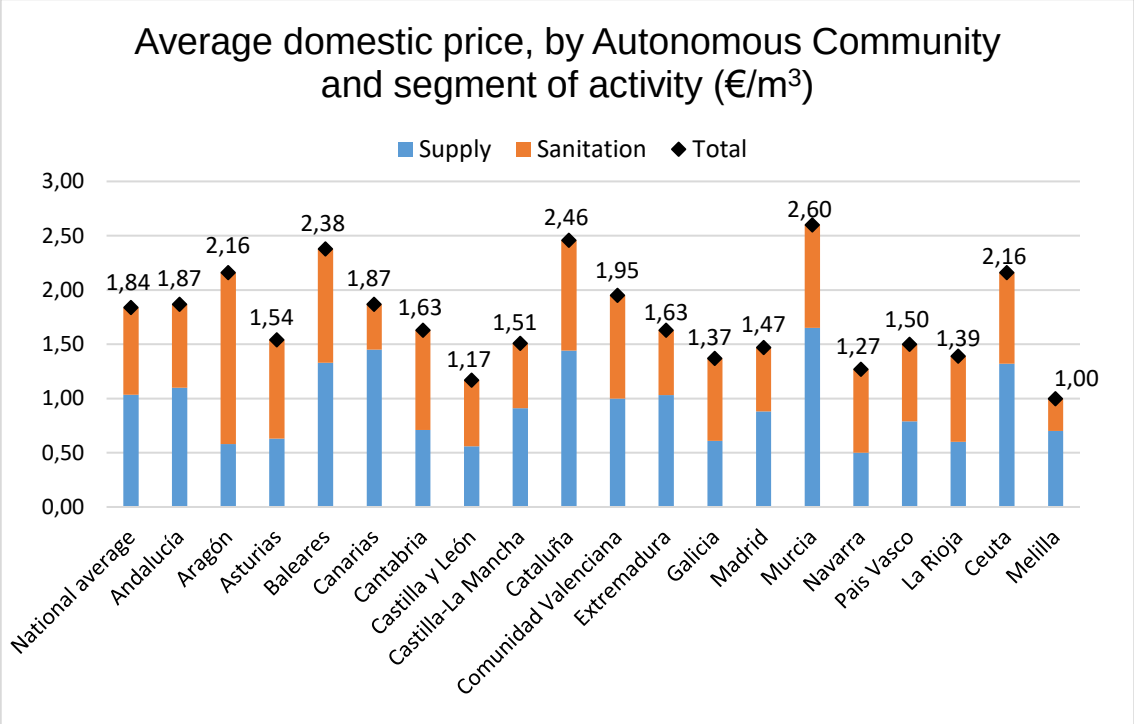
Source: prepared internally from AEAS data.

At the regional level, there are significant differences in the average price of water (graphs 17 and 18). In the case of household consumption, the highest average price in 2018 was recorded in Murcia, where a cubic metre of water cost €2.60, more than double the price of a cubic metre in Melilla (€1). The differences are greater for industrial uses: the highest average price per cubic metre (Balearic Islands, €6.35/m^3) is over four times that of the lowest price (La Rioja, €1.54/m^3).

[48] AEAS (2018). The prices published by AEAS are a statistical approximation of the price paid by the average household and industrial user. These two prices yield a weighted price that aims to represent the statistical price paid for urban water in Spain. The representativeness of these estimates in population terms is 73.5%. Estimates do not include VAT.

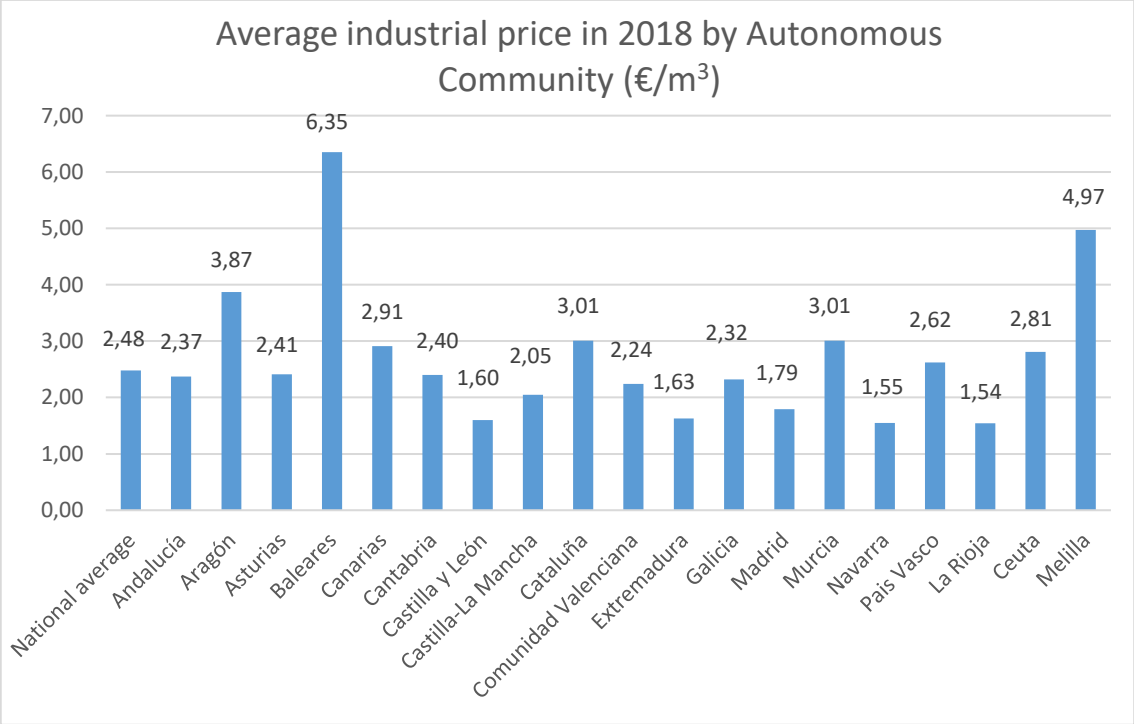
[49] Data for 2011 are not available.

Graph 17. Average domestic price, by Autonomous Community and segment of activity. 2018



Source: prepared internally from AEAS data.

Graph 18. Average industrial price, by Autonomous Community 2018



Source: prepared internally from AEAS data.

Table 3 summarises the main characteristics of water rates in Spain, differentiating between supply, sanitation and treatment rates. The table can be used to draw a series of conclusions.

Table 3. Structure of urban water rates.

Tariff Structure	Fixed rate				Variable rate				
	%con Fixed Rate	% with Minimum Consumption	% w/o Fixed Rate or Minimum Consumption	% with Meter Rental	No blocks	Flat Rate	2 blocks	3 blocks	4 blocks or more
Supply	84%	14%	2%	45%	0%	4%	6%	30%	60%
Sewerage	71%	10%	19%	-	10%	36%	13%	16%	25%
Treatment	64%	4%	32%	-	2%	52%	7%	16%	23%

Source: AEAS.

With regard to supply services, it should be noted that all price structures are based on consumption; in the AEAS sample, there are no tariffs without a variable charge. In any case, the most frequent tariff structure is the two-part tariff, since 98% of the tariffs have a fixed component, either in the form of a base charge or minimum consumption, and a variable component. In addition, the variable component in more than half of the tariffs (60%) consists of four or more blocks.

The situation is different for the sanitation and treatment services. Although infrequent, there are tariffs consisting only of a fixed part independent of the flow rate (10% for sanitation and 2% for treatment). More than 30% are flat tariffs, meaning they do not take into account the volume of water to be treated. In fact, this is the most common tariff structure for these services.

However, the above conclusions should be taken with caution. Table 3 is based on a study conducted by AEAS from a sample of 993 municipalities. Although they represent 73.5% of the population, the sample excludes a large number of municipalities (in Spain there are currently 8,131).

The widespread existence of prices based on consumption requires the installation of meters. In fact, in 2016 the ratio of meters to households in Spain was 0.83[50], so the use of these devices may be deemed to be widespread.

[50] Ratio obtained from AEAS data (total number of meters in Spain: 21,000,000) and INE data (number of dwellings according to the Population and Housing Census 25,208,623).

4. THEORETICAL ANALYSIS OF THE SERVICES IN THE URBAN WATER CYCLE

4.1. Economic nature of the sector and market failures

When studying water services from an economic point of view, it is necessary to keep in mind that, as already indicated, in Spain, since it is a public good, there is no charge for the water itself; rather, a fee is charged for the services that provide water suitable for consumption and its subsequent treatment and return to nature in environmentally acceptable conditions.

Therefore, it is necessary to distinguish between water as a resource on the one hand, and the water supply and wastewater services on the other. In both cases, market failures occur in the provision of these services, which may require the public sector to intervene.

Next, we analyse the possible market failures that affect this sector and that could justify public intervention.

Firstly, in relation to *water as a resource*, it is worth asking whether water is a public good in an economic sense; that is, if its consumption is non-rivalrous and not-excludable. Water is a natural resource that is constantly renewed but of limited quantity. Therefore, it is considered to be a partial public good, since its consumption is non-excludable but it is, at least in part, rivalrous. In the economic literature, these goods are known as public goods[51].

Secondly, there are strong positive externalities in water consumption, insofar as it is an essential good for life (its consumption generates positive externalities in terms of public health) and economic activity (apart from being a basic input in many production processes, the improved public health associated with the consumption of clean water contributes to worker productivity, with the ensuing positive effects on production).

Therefore, the presence of externalities and characteristics of a public good are the reasons why the management of water, as a natural resource, is subject to regulation.

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[51] In general, the economic literature considers water, as a natural resource, to be a partial public good, specifically a *common good*. However, some authors also consider it a pure public good (for non-rivalrous and non-excludable consumption). Relevant references include:

- Kotchen (2014): Defines clean water as a pure public good.
- OECD (2009): Presents different cases in which water can be considered from a private good to a pure public good.
- Hanemann (2006): States that water is a public good or a private good depending on the circumstances.

As for *water and wastewater services*, some authors[52] argue that it is a partial public good because its consumption satisfies the conditions of non-rivalry (since the cost of extending the service to another person is close to zero) and non-excludability, although the latter only partially (according to these authors, although it is possible to disconnect a person from the service, the service's social value is much higher than its economic value. In fact, the cost of exclusion in terms of public health or social segregation is much higher than the cost of subsidising low-income customers).

These services also have important externalities, both positive and negative, closely related to public health and the environment. On the one hand, the provision of clean, quality water that is suitable for human consumption has a strong positive impact on public health through disease control. On the other hand, returning untreated wastewater to the environment has negative consequences from the point of view of sanitation and environmental pollution[53].

In addition, the urban water and wastewater services industry has traditionally been considered a natural monopoly[54], at least in terms of infrastructure, because services are provided through a fixed network, characterised by high fixed and sunk costs. The infrastructure requires very capital intensive, specific and long-term assets. It has thus been argued that it is not economically efficient to replicate this infrastructure.

Finally, there are important information asymmetries[55] in the market, both between regulators and operators, in terms of costs and know-how, and between operators and consumers (for example, in relation to service quality).

All this justifies the public sector's involvement in the provision of these services, either by intervening in the provision of the service or through regulation. As a result, these are deemed to be general interest services within the European Union[56].

4.2. Characteristics of the sector

Beyond market failures, the urban water sector has a number of characteristics that must be taken into account when designing any public sector intervention in this area.

52 Marques (2010).

53 Finger, Allouche, & Luis-Manso (2007).

54 OECD (2015).

55 OECD (2015).

56 Recital 15 of the WFD.

The OECD[57] notes the main characteristics of the sector. In particular, it mentions the following:

- The inelasticity of demand. Empirical evidence shows[58] that the demand for water is quite inelastic for normal household uses, although it becomes more elastic as the use is less essential (for example, watering gardens or filling swimming pools). Internationally, as already noted, the most commonly observed values of price elasticity range between -0.1 and -0.25%. The value of price elasticity in Spain seems to be somewhat higher, -0.56, according to Ministry of the Environment estimates[59].
- Inelasticity of the supply, which derives from the difficulty of rapidly varying the availability of water, especially in specific circumstances, such as droughts. Among other reasons, this is due to a lack of sufficiently large water markets due to the absence of a transport and interconnection infrastructure.
- High fixed costs. In itself, this characteristic does not necessarily imply limited competition. However, together with the specificity of the assets and the presence of economies of scale, it may imply the existence of a natural monopoly.
- Economies of scale, which is related to the condition of a natural monopoly in the industry. In any case, empirical evidence[60] seems to indicate that these services have an optimum scale, which may be different in each country or region, depending on its characteristics. Thus, there are economies of scale up to a certain level, after which diseconomies of scale are observed.
- High transport costs. Estimated at around 50%[61] of the total, versus the 5% they represent in the case of electricity or 2.5% in the case of gas[62].
- To the above characteristics, Marques[63] adds the existence of economies of scope, meaning that the same entity provides wholesale and retail services. Vertical integration is routinely used to take advantage of these economies of scope. In some countries, the same operator provides

57 OECD (2004).

58 OECD (2009).

59 Ministry of the Environment (2007a).

60 Marques (2010); Hoffjan, Müller, & Reksten (2014).

61 Hoffjan, Müller, & Reksten (2014); Gee (2004).

62 Gee (2004).

63 Marques (2010).

different types of services (supply and sanitation services[64] or joint supply of water, electricity, gas, etc[65].).

Based on the above characteristics, the OECD considers different alternatives for potentially opening the sector to competition[66], which are discussed in Section 4.4.

4.3. Theoretical approach to pricing urban water services

The structure and design of urban water prices and tariffs deserve special attention due to their relevance on the final impact on consumers, and to their heterogeneity in practice. In addition, their design is essential to achieving economic, social and environmental objectives.

Because of this, we analyse the different tariff structures[67], and their effects on the market, from a theoretical point of view:

- Fixed-charge tariffs: consist of constant fees that are charged to each user periodically. The charges may be the same for all users or vary depending on the type of activity in the building (household, commercial, industrial), the number of people per home or technical parameters (the diameter of the connections, for example). The main advantage is that it is not necessary to install meters, which simplifies the accounting of the charges and provides stable revenue to the supplier. However, this system does not incentivise efficient water consumption (since the charges are independent of consumption), and it is unfair because it does not take into account the users' ability to pay.
- Volumetric tariffs: they consist only of a variable part, meaning a price is set for each cubic metre consumed. They require the installation of meters. Even though they take into account water consumption, this system is not optimal from the point of view of efficiency and equality because the price per cubic metre consumed is the same, and thus excessive consumption is not penalised.
- Two-part tariffs: these tariffs consist of two parts that seek to replicate the cost structure of water services. They have a fixed charge, usually known as a "service fee", and a variable charge that depends on the water consumption, and which is usually referred to as the "consumption fee". From a theoretical point of view, the fixed charge should cover the fixed

64 England and Wales.

65 Germany.

66 OECD (2004).

67 Instituto Aragonés del Agua (2013).

costs of the service, including the amortisation of investments. However, for reasons of consumption efficiency and of equality, it is normal to prioritise the variable part over the fixed part: if the fixed charge is very high, the rate will be regressive (the average cost per cubic metre will be higher with low consumption than with high consumption) and will dilute the deterrent effect that the variable charge has on consumption.

The fixed, or service, fee often increases with the size of the meter (or the contracted flow rate or the diameter of the connection). The justification is that consumers with a larger diameter connection or flow rate require oversizing the supply infrastructure, and therefore create higher fixed costs.

- Two-part tariff by blocks: consists of a fixed fee and a variable fee that is structured by consumption blocks. The price of each block may increase, in which case the tariff will be progressive, or decrease (regressive rate). The tariff will most commonly increase to discourage excessive consumption. The main advantage of this tariff is that it satisfies the principles of efficiency and equality. The main drawback is its lack of simplicity. As the number of blocks increases, so does the complexity.
- Tariffs with minimums: consist of a minimum amount of water that is billed, regardless of whether it is consumed or not. Above this minimum, a marginal price is set for each cubic metre consumed, which can be progressive by blocks or charged at a constant price. In practice, the existence of minimums is equivalent to a two-part tariff whose fixed part is equal to the minimum consumption amount, and where the first consumption block is free.
- Seasonal tariffs: higher rates are set during periods when the cost of providing the service is higher, for example, in tourist areas due to the increase in the infrastructure required to supply water, or during times of drought. The main advantage is that they better reflect the scarcity of the resource and the costs of providing the service, which makes the tariffs more efficient. The main drawback is the increased complexity of the rate and its accounting.
- Hourly rates: incentivise or penalise consumption at certain times of day. Although this tariff prioritises efficient consumption, it is complex and its administration requires a high degree of technology.

In addition to the different price structures, discounts or surcharges may be included in the bill. The discounts try to account for social issues that are not directly related to the water supply service. The cases vary depending on the social situation in each locality (age of the population, income, level of sprawl,

family size, etc.), although discounts are customary for users below the poverty line, large families, seniors or retirees.

Surcharges are much less common and are usually more related to excessive water consumption, penalising users who have facilities where water use is not considered an essential service (swimming pools, gardens, etc.)

In Spain, the most frequent price structure is the two-part tariff, although volumetric tariffs are also used. The fixed rate usually depends on the gauge of the meter that supplies water to the user. The variable rate depends on the amount of water consumed, with 2 to 4 tariff blocks being customary. In some cases, the amount varies depending on the geographical location of the users (it differs between urban centres and scattered towns), the type of consumption (household, commercial, industrial, government agencies, etc.), or the type of housing (flats, housing blocks, single-family homes, etc.). The tariff often takes into account social issues (if the users are large families or pensioners, for example)[68].

4.4. Introduction of competition into the sector

Comparatively speaking, there have been few cases in which competition has been introduced into urban water supply and sanitation services. Economic theory distinguishes two ways of competing in the marketplace:

- On the one hand, competition **in** the market occurs when several companies compete in the same market to offer their products. There can be different degrees of competition. The most intense case is that of perfect competition, in which a very large number of buyers and sellers interact to trade a homogeneous product at a price that everyone accepts as a given (the agents in the market accept the price). Perfect competition only occurs under very specific conditions (absence of market power, homogeneous product, perfect information, no barriers to entrance and exit, etc.), and other market structures usually prevail in reality[69].
- On the other hand, competition **for** the market occurs when the characteristics of the market make it inefficient for several companies to compete with each other. The clearest case is that of a natural monopoly where, given the technology of production and demand, cost subadditivity

[68] Ministry of the Environment (2007b)

[69] In fact, as Baumol (1982) pointed out, it is not necessary for the market structure to be perfectly competitive for the result to be competitive; rather, the key lies in the contestability of the markets.

exists[70]. This means that it is less expensive for a given good or service to be provided by a single company than by several companies. Under these circumstances, the competition is for the market itself: the option to carry out the activity for a certain period of time is tendered. The result is an ex-ante competition in which companies bid to acquire the right to engage in the activity, and the threat of ex-post competition, which maintains the competitive intensity because the winning company knows that its right is temporary and that it will have to compete again if it wants to continue with the activity[71].

Recent decades have seen a transition towards competition in the market models in various industries that had traditionally been considered natural monopolies, known as network industries. These liberalisation processes have not permeated throughout the urban water sector. In fact, to date only Scotland, England, Wales, some US states and Australia[72] have introduced competition in the market in some segment of the urban water cycle activity.

Although the urban water industry has traditionally been considered a natural monopoly, not all activities that comprise the urban cycle fit into this category. As a result, there is room to open "upstream" and "downstream" activities to competition:

- Upstream, competition could be introduced amongst different sources of water, which would require having fully developed markets for trading usage rights[73].
- Downstream, competition could be introduced between companies engaged in retail water marketing. These companies would buy the water from the wholesale carrier and sell it to the end customer, along with other retail services involving the public, such as billing, customer service and providing advice on consuming and saving water. This is the British model (studied later).

However, some authors believe that, even considering how not every phase that makes up the urban water cycle exhibits the characteristics of a natural

[70] Baumol (1977).

[71] One of the first authors to point out this possibility was Demsetz (1968).

[72] Marques (2010).

[73] The markets for trading usage rights, commonly known as "water markets", allow holders of water use licences to trade those rights, thus achieving an efficient allocation of permits. In Spain, they are regulated in arts. 67-72 TRLA and arts. 343-353 RDPH.

monopoly, the deregulation processes carried out in other network industries cannot be replicated in some of these phases[74].

First, most of the costs of the urban water cycle involve the transport of water in both the supply and sanitation phases. These costs are estimated at around 50% of the total, versus the 5% they represent in the case of electricity, or the 2.5% in the case of gas[75]. These are sunk costs that are associated with specific assets.

The high percentage of the transport costs implies that: 1) water cannot be transported long distances at reasonable costs, meaning there are no national water transport networks, which divides the national market into smaller markets, thereby limiting the size of any one potential market (their scale is local or regional)[76]; and 2) the costs of downstream activities are conditioned by the high upstream costs, which reduces the profit margin of retail water activities, and thus the margin for competing in this segment[77].

Second, the presence of sunk costs is not limited to the transport networks. Different sources estimate that sunk costs account for between 70% and 80% of the total industry costs[78], due to the specificity of many of the assets that make up water infrastructures, such as water purification and treatment plants, which lack alternative uses.

The two characteristics above allow us to understand why the process of water liberalisation, both upstream and downstream, is taking place more slowly and prudently than the processes carried out for the remaining network industries. This is what leads most of the literature to rule out competition in the market models and to opt for competition for the market models as the best option to enhance competition in the urban water sector[79].

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74 Hoffjan, Müller, & Reksten (2014): "*It is neither feasible nor desirable to simply transfer the competition model in electricity to the water industry*".

Balance & Taylor (2005): "*The claim that water is like gas or electricity and should be reformed is considerably exaggerated*".

75 Hoffjan, Müller, & Reksten (2014); Gee (2004).

76 Cabrera & Cabrera (2017); OECD (2004); Hoffjan, Müller, & Reksten (2014); Balance & Taylor (2005).

77 Balance & Taylor (2005); Department for Environment, Food and Rural Affairs (2013).

78 Gee (2004); Hoffjan, Müller, & Reksten (2014).

79 Marques (2010).

And this is precisely what we see in practice, with most countries having opted for models based on competition for the market and benchmarking and yardstick competition[80], methods that are recommended by the OECD[81].

Benchmarking is a tool that involves comparing the performance of different operators in order to determine the best ones and identify best practices. To do this, information is collected from market operators and rankings are developed based on different parameters that highlight their efficiency in providing the service.

It is not so much a regulatory method in itself, but a tool to improve performance (in fact, this method is used internally by many companies[82]). As a result, it is normally used in broader regulatory schemes that rely on different types of benchmarking, better known as yardstick competition[83].

In the water sector, there are two types of yardstick competition: on the one hand is yardstick competition in prices, and on the other is sunshine regulation. The former is a form of price regulation for monopolistic companies in which different monopolistic operators are compared and the most efficient is allowed to obtain higher profits from its activities. The goal is to set the maximum prices of the various companies by setting a baseline that uses the costs of the most efficient operator in the market, thus incentivising production and dynamic efficiency. Alternatively, a shadow company whose costs reflect the average productivity in the industry can be used as a benchmark[84].

An example of this regulatory method is known as CPI-X, in which the regulator sets a ceiling on the average price increase allowed for each operator that uses the CPI as a reference. The cap will be below the CPI because it is reduced by an amount (X) that condenses the efficiency gains that the regulator expects the operator to achieve before the next price revision. Since the cap remains fixed for a period of time, the operator has incentives to achieve efficiency improvements greater than those anticipated by the regulator to obtain maximum profit, given the regulatory restriction on the price increase.

The main advantage of yardstick competition in prices is that it achieves its objective with lower information requirements than other forms of regulation. Whenever there is a relatively large number of companies (a requirement that is

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80 Described for the first time in Shleifer (1985), and applied to the water sector, Littlechild (1988).

81 OECD (2004): *"The combination of these factors offers a limited margin for standard horizontal competition. […] The two main alternatives for introducing competition into the market are mainly aimed at increasing production efficiency […]. The alternatives are competition via concessions and competition via benchmarking*".

82 Cabrera, Dane, Haskins, & Theuretzbacher-Fritz (2011).

83 De Witte & Marques (2010).

84 Shleifer (1985).

met in the urban water sector), it is possible to use a regression analysis to estimate the costs of the most efficient company, and of the industry as a whole, by considering a series of observed characteristics. From there, the maximum prices allowed for each operator can be calculated[85]. Benchmarking is, therefore, an essential part of this model, as it is vital to determining the parameter X.

Yardstick competition sprung from the regulatory reforms in the United Kingdom during the 1980s and 1990s. Its application to the British urban water sector, by setting ceilings on how much regional monopoly operators could raise their prices, has yielded very positive results in terms of efficiency[86].

Lastly, competition through sunshine regulation involves exposing those operators whose performance is below average. It relies on publishing and disseminating the results of benchmarking exercises to generate public and social opinion and debate, and thereby incentivise operators to provide the service more efficiently. In addition to promoting dynamic efficiency, it helps reduce information asymmetries in the sector. Unlike yardstick competition in prices, it is a non-coercive method because it does not impose specific price requirements on operators. In order to maximise the effectiveness of sunshine regulation, operators are required to take part in the benchmarking exercises, the published results of which cannot be anonymous, meaning the most/least efficient operators must be identified. Marques (2010) also recommends assigning the authority to prepare and publish these reports to an independent national public entity to ensure the objectivity of the exercises.

Although sunshine regulation is a non-coercive form of regulation, it is regarded as an effective tool for improving the efficiency and quality of the urban water sector, in which service quality standards are essential. In addition, the application of economic regulation in the strict sense (price regulation) in this sector is complicated when the service is overseen at the municipal level[87]. Price regulation, particularly when applying yardstick competition techniques, requires centralising this authority in an entity whose scope extends beyond any single municipality.

85 OECD (2004).

86 OECD (2004).

87 Marques (2010).

5. INTERNATIONAL TRENDS

A comparative study of how urban water supply and wastewater services are organised in different countries can be used to check for the presence of various models, a presence that is explained based on the characteristics of each country, such as its geography, population density, the availability and quality of water resources, its political and administrative organisation, as well as how all these variables have evolved over time.

However, there is one pattern that is evident in all of them: at least initially, the water supply and wastewater services are provided by local authorities. Over time, as the services are modernised, the environmental requirements expand and the population grows, the convenience of increasing the scale on which the services are provided becomes more readily apparent, thereby making them more efficient.

In fact, the most important reforms in recent decades have been aimed, first, at achieving the ideal scale by restructuring the industry and, subsequently, at gradually liberalising the services in those countries that have implemented the most ambitious reforms. Finally, there is also a trend towards creating specific agencies to supervise or regulate these services.

Throughout this section, we analyse the most frequent areas of reform at the international level in relation to urban water and wastewater services, and we identify best practices that can be applied to the Spanish case.

5.1. Industry restructuring (increased scale)

There is no consensus in the literature on the ideal scale of urban water services, as it varies between countries and even between regions, depending on their characteristics (geography, quality of water sources, urban development, etc.). In any case, given the high fixed costs of the activity, it is obvious that this sector has strong economies of scale.

When fixed costs are high, increasing the scale at which the service is provided yields lower average costs, as the increase in production will be proportionally greater than the increase in costs. In the case of the water sector, this is due to the characteristics of the technology and infrastructure used, such as water treatment and purification plants or water distribution and collection systems. This is largely explained by dimensional economies (for example, increasing the cross section of the pipes results in a proportionally larger increase in the volume of

water transported through them, which translates into lower average costs)[88]. Achieving the ideal scale is essential to providing the service efficiently.

Therefore, in those countries where reforms have been implemented to increase the efficiency of their urban water services, and most particularly in those that have taken steps towards gradually opening the market, the first reform adopted has been to restructure the sector by increasing the geographical scope of the service.

These countries include the United Kingdom (specifically, England and Wales), Portugal, Netherlands, Italy and France.

The most intense consolidation process to date has occurred in **England and Wales**. In the second half of the twentieth century, the number of operators in the market gradually fell from more than 1,000 to 32[89].

Until 1973, urban water was the purview of municipalities. As a result, in England and Wales there were over 1,000 entities providing water supply services and more than 1,400 entities for wastewater services. Although most of them were local entities, there were also private companies.

In order to better coordinate the management of water resources, successive reforms of the water policy were approved, two of which stand out in particular[90]:

- In 1973, ten *Regional Water Authorities* were created that took over all responsibility in the area of water resources management, as well as the provision of water supply and wastewater services. As a result, all local water operators disappeared. As for private companies, the reform did not affect them, and they continued to provide their services as agents of the Regional Authorities. They accounted for some 20% of the supply of drinking water in England and Wales.
- In 1989, the sector was privatised. The Regional Water Authorities became private companies and began to be publicly traded. Privatisation also meant a change in ownership of the infrastructures, hitherto public, which was transferred to private management companies. The new privatised companies were entrusted with managing urban water and wastewater services. The objective was to increase the efficiency of the companies. Pre-existing private companies were also entrusted with providing the service. With privatisation, the laws applicable to existing private companies and to new privatised companies were standardised. Each of them became the monopoly provider of water services in a given

88 Ferro & Lentini (2010).

89 Ofwat.

90 Ofwat (2006).

territorial area. Operators are subject to regulation through a CPI-X scheme (described in Section 4.4.). To this end, an economic regulator was created: Ofwat (Water Services Regulation Authority).

The market structure resulting from these reforms has been essential to introducing competition into the market in the United Kingdom, as discussed in the next section.

In **Portugal**, municipalities are responsible for providing water and wastewater services, although the State assumes these powers when necessary for reasons of general interest. It has, in fact, done so in the wholesale sector in much of the country. Although not as ambitious as in the United Kingdom, in 2015 Portugal consolidated the state-owned wholesale supply and sanitation systems in order to increase the scale on which these services are provided, resulting in a substantial reduction in the number of operators in the market, which currently stands at three (more information in Annex V).

In the **Netherlands**, supply services, both wholesale and retail, are provided by 100% statutory companies (private financing is prohibited by law). Since 1970, the government has endorsed successive mergers between companies, giving way to the current situation, with only ten companies in the market. This consolidation is also evident in the wholesale sanitation services, provided by the Water Boards, of which there are currently 25. This is in contrast with the sewerage services (retail sanitation), which are highly fragmented, as they are provided by the 443 Dutch municipalities[91].

In 1994, **Italy** approved an extensive reform of its urban water services with the so-called Galli Law. Today, however, the situation is far different from that envisaged by the Law, since subsequent reforms have slowed the consolidation process. Nevertheless, it had a clear influence on the industry's structure and there have been some advances, such as reducing the number of water systems from more than 8,000 to 64 through the creation of the Optimal Territorial Areas (ATO). This reduction has not been mirrored in the number of operators because, as explained in Annex IV, the principle of one service operator per ATO has not been applied in many cases due to a lack of political will. According to OECD estimates, there are currently around 2,000 operators[92]. Currently, and given the scarce implementation of the ATOs, draft legislation has been introduced[93] that

[91] Marques (2010).

[92] OECD (2015).

[93] Bill AC52 of 23 March 2018 "Rule in the area of public and participatory management of the full water cycle".

replaces the spatial domain of the ATOs with a model of "water districts" that must coincide with the river basins[94].

For its part, **France**, in 2015, enacted the Notre Law, which restructures the country's territorial administrative organisation. This reform includes a requirement for French municipalities to undertake a regrouping process that allows for the supra-municipal management of urban water cycle services, thereby increasing the scale on which the services are provided. The mandate was opposed by many of the municipalities, which has delayed its enactment from January 2020 to January 2026.

5.2. Forms of competition in the sector

Next are three examples at the international level of the different ways to introduce competition into urban water and wastewater services: competition *in* the retail services market (United Kingdom), competition *for* the supply and sanitation market (France) and yardstick competition (Germany).

5.2.1. Competition *in* the market (United Kingdom)

The reference regions for the introduction of competition *into* the urban water services market are Scotland, England and Wales, where retail water and wastewater services for non-household customers[95] have been opened to competition. They are the first case of liberalisation of the sector worldwide. Water supply and sanitation for households continues to be provided under a monopoly regime, subject to price regulation based on the CPI-X scheme (where X is determined by benchmarking).

The retail market has been opened at different rates in the British regions. In Scotland, the retail market for all non-household customers was opened in 2008. It covered the supply and sanitation segments from the start. In England and Wales, an initial reform was approved in 2005 that opened retail services exclusively for the water supply segment and for non-household customers. In addition, the opening was limited to non-household customers whose consumption was above a certain threshold (high-consumption customers)[96]. In April 2017, in England, the opening was expanded to all non-household customers (the threshold was eliminated) in both the supply and sanitation segments, creating a single retail services market with Scotland[97].

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94 Tornos Mas, J. (Dir.) (2019).

95 Companies, public sector and non-profit organisations.

96 Over 5 million litres of water a year in England, or more than 50 million in Wales.

97 Water Act 2014.

Table 4. Comparison of retail markets in the United Kingdom

COMPARISON OF RETAIL MARKETS IN THE UNITED KINGDOM			
Regions	**Year opened**	**Markets open to competition**	**Customers eligible to participate in the market**
Scotland	2008	Supply and sanitation	All non-household customers
England	2005: supply to high-consuming non-household customers 2017: supply and sanitation to all non-household customers	2005: supply 2017: supply and sanitation	2005: high-consuming non-household customers 2017: all non-household customers
Wales	2005	Supply	High-consuming non-household customers

Source: compiled internally.

The law does not include a formal definition of "retail services", although these include all the services that require direct contact with customers. Thus, retail companies, whose market is open to competition, provide services such as advice on water consumption; the installation, maintenance and reading of meters[98]; billing; the processing of discharge permits (for industries or businesses that want to discharge into the general network); service connections and terminations; the processing and resolution of complaints, etc.

As a result, companies that provide retail services have become intermediaries between non-household end customers and the wholesale company, which has a monopoly in a given region. Retail companies buy water from the wholesale company and sell it to their non-household customers, along with other services.

A particular feature of urban water markets in the United Kingdom is the scale on which wholesale supply and wastewater services are provided. In Scotland, there is only one company that covers the entire territory. It is the statutory company *Scottish Water*. In England and Wales, there are currently 32 companies, each of which holds a monopoly in part of the territory.

The size of the wholesale market in Scotland and England substantially simplifies the operation of the retail market, and can be considered an essential component in the success of the deregulation. To explain this, let us consider the Scottish market as a benchmark, as it has been in operation longer[99].

There are three types of agents in the Scottish market: the economic regulator, WICS (Water Industry Commission for Scotland); the wholesale company

[98] Unlike Spain, the presence of meters in the United Kingdom is not widespread. In 2013, only 40% of consumers in England and Scotland had a meter (Ofwat, 2013).

[99] Annex III contains information on the operation of the market in England.

(Scottish Water) and retail companies; and the market operator, CMA (Central Market Agency).

WICS was created in 2005. It is responsible for issuing licences to operate in the retail market and for approving the tariffs for the wholesale services provided by Scottish Water. Wholesale prices are thus regulated[100].

As for the companies, there is full legal, accounting and functional separation between the wholesale and retail activities of the former, vertically integrated monopolist. Scottish Water had to create a new company to provide retail services to non-household customers. This company, Business Stream, applied for and obtained a retail licence to operate in the market, just like any other company that wished to go into competition.

Relations between Scottish Water and retail companies are governed by an agreement between them ("model agreement"). In addition, Scottish Water has a legal obligation to publish a "Wholesale Charges Scheme" annually, which lists the prices of its wholesale services, previously approved by WICS.

Finally, CMA is a private company owned by market participants (both licensed suppliers and Scottish Water). To enter the market, membership in CMA is required. CMA is responsible for the systems and processes that make the market operational. It also maintains a central registry of end customers, records changes in retail providers and calculates the specific amount that each retailer must pay to the wholesaler for the consumption of its customers at the wholesale rates approved by the economic regulator.

Since the wholesale prices are regulated, there is no negotiation in this regard between the companies in the retail segment and Scottish Water. Therefore, the added value of the retail activity is found in the greater efficiency in the provision of the retail services, as well as of other types of services involving personalised customer service or advice on water consumption.

In fact, the main added value of introducing competition in this section is the ability of the state-owned companies or government agencies that have offices and subsidiaries throughout the country to have a single water supplier, which makes it possible to combine their billing and thus lower administrative costs[101].

Eleven years after competition was introduced into the Scottish retail segment, Business Stream remains the dominant operator (in 2013[102], it had a 95% market share) and changes in suppliers are unusual. Even so, WICS welcomed the

[100] It is due to the fact that the wholesale company is monopolistic.

[101] Hough & Priestley (2016); Department for Environment, Food and Rural Affairs (2013).

[102] This is the most recent published figure.

introduction of competition. It estimates that, currently, 60% of non-household customers pay less, receive better service or a combination of both[103].

5.2.2. Competition *for* the market (France)[104]

At the international level, the country that best represents the competition *for* the market in the urban water sector is France.

The structure of the sector in France is very similar to Spain. The municipalities have authority over the urban water cycle, and thus the market is highly fragmented, although municipalities can form inter-municipal associations to increase the scale of the services. There are an estimated 13,500 water supply systems and 15,000 sanitation systems (the number of municipalities totals 37,000)[105].

Municipalities can opt to manage the services directly (*régie*) or to grant management to a third party (*gestion déléguée*), in which case a public tender is issued to select the operator that provides the service. In either case, the infrastructure is publicly owned.

In delegated management, a distinction is made between *affermage*, in which the management of the service is delegated but the municipality finances investments, and concessions, in which the concessionaire both manages the service and invests in the infrastructure. *Affermage* contracts last between 10-15 years, the average being 11 years. The concessions have somewhat longer durations to offset the investments, with the legal limit being 20 years.

More than a third of the municipalities delegate the provision of services, although in terms of population they account for 75% of the supply services and more than 50% of the wastewater services. Approximately 85% of the delegated management contracts are *affermage* contracts, which reflects how widespread this practice is.

In France there is no specific regulator for urban water services. Municipalities have the authority to set the rates and conditions of the service. In the case of indirect management, these issues are specified in the service delegation contract, within the framework of the rules for public procurement.

The main data on the sector come from the National Observatory of Water Supply and Sanitation Services (*Observatoire National des Services d'Eau et d'Assainissement*), created in 2009. It is currently part of the French Agency for

[103] WICS (2013).

[104] Marques (2010).

[105] Balance & Taylor (2005).

Biodiversity. Since 2012, the Observatory has been publishing a Report on the Status and Performance of the Services,[106] which includes data on the organisation, management, price and performance of the services[107].

5.2.3. Yardstick competition (Germany)

In Germany, the provision of urban water and wastewater services is governed by a competition-*for*-the-market model: municipalities are responsible for these services, although they may choose to provide the services themselves or delegate them to third parties (whether statutory, mixed or private). Germany has over 6,000 water providers[108]. It is common for municipal companies (*Stadtwerke*) to provide water services in conjunction with electricity, gas or public transport services, especially in large cities[109].

The German case is unique in that the efficiency of water operators is promoted through regional benchmarking projects (endorsed by the *Bundesländer*) or organised by private associations[110]. They consist of evaluating the different operators by considering a series of parameters and then comparing them to determine the relative performance of each. The results are anonymous: operator rankings are not published, but the participants' average performance in each of the parameters is published, which allows each operator to check its relative position with respect to the industry average.

In the German case, participation in benchmarking exercises is not mandatory. 13 of the 16 *Bundesländer* carry out exercises of this type and publish a report on the performance of the various water services, although the data are anonymous[111].

Both the Bundeskartellamt and the operators welcome the preparation of these reports as a way to promote competition. Since their introduction, every indicator has improved. Specifically, the increase in urban water prices has been lower than inflation since 2001[112].

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[106] In 2017, the 6th National Report was published, with data from 2014.

[107] Agence Française pour la Biodiversité. Press release of the 6th National Report of the National Observatory of Water Supply and Sanitation Services: "*The ultimate goal of the report is to reduce leaks in drinking water systems by requiring local authorities to be more knowledgeable of their networks and have a minimum performance threshold*".

[108] Bundeskartellamt (2016).

[109] Balance & Taylor (2005).

[110] Bundeskartellamt (2016).

[111] BDEW - Bundesverband der Energie- und Wasserwirtschaft et al. (2015).

[112] BDEW - Bundesverband der Energie- und Wasserwirtschaft (2013).

Although the reports are considered positive, they exhibit a series of limitations[113]: participation is voluntary, the published results are anonymous (they do not specify which operators are more/less efficient) and, finally, they are based on different *Bundesland* indicators, there being no national reference that can be used to make comparisons between regional benchmarks.

The first two problems (voluntary participation and anonymous results) decrease the impact of the exercises by circumventing one of the advantages of these instruments, namely the incentives for operators to make improvements to their processes when their management deficiencies are publicly known (name and shame). That is why, in a 2016 report, the Bundeskartellamt recommended a continuing analysis of these areas[114].

5.3. Regulatory bodies

The changes that have taken place in recent decades in the organisation and provision of urban water services, together with the economic, social and environmental importance of these services, have also been reflected internationally in terms of the institutional architecture. Specifically, there is a growing trend towards creating regulatory and/or supervisory bodies with specific authority over the urban water cycle.

Marques (2010) identified 136 urban water regulators in 57 countries worldwide: 12 in Africa, 5 in Asia, 16 in Europe, 2 in Oceania and 22 in America. This is a recent phenomenon: according to the OECD, most of the regulatory bodies worldwide have been set up in the last 25 years, meaning that in most cases, they are in the early stages of development compared to other public services[115].

An analysis of the characteristics of the regulators of the urban water cycle at the international level reveals a great deal of diversity in terms of their administrative structure, degree of independence and authority:

- Some regulators are integrated into the administrative structure of the State, in which case they do not enjoy independence, while others are autonomous bodies or independent agencies.

[113] Bundeskartellamt (2016).

[114] Bundeskartellamt (2016): "*The Bundeskartellamt believes that, given the characteristics of the natural monopoly of the water supply market, there are areas in benchmarking projects that can be explored to achieve greater efficiency improvements. In particular, as concerns the quality and depth of the analysis, the introduction of standard indicators at the national level, the obligation to participate or the obligation to make the results of these exercises available to supervisory authorities and the courts*".

[115] OECD (2015).

- The regulators can be bodies that specialise in the urban water sector, or they can have a multisectoral nature.
- They may be mere supervisors of the urban water cycle, or true regulators with the power to design tariff structures and/or methods and to issue fines. Other common functions are oversight of service quality, managing and publishing sector information and consumer protection.
- They may have authority over all or some of the operators. An OECD survey of 34 regulators worldwide[116] showed that in direct management models, most regulators engage in both regulatory and supervisory duties of statutory, private or mixed companies. In other cases, such as in the states of Hawaii, Ohio and Pennsylvania in the US, the regulator is tasked exclusively with supervising the private companies that participate in water management. In countries like Australia (State of Victoria), the regulatory body was created to oversee the public system in its entirety.

According to data obtained by the CNMC[117] (see Table 5), most EU-member States currently have independent regulators of the urban water cycle, in keeping with the international trend. Most European regulators are multisectoral in nature and regulate other public services, typically related to energy. Only six member States have exclusive regulators[118].

Likewise, most regulators have authority over prices and tariffs. These vary depending on the degree of administrative decentralisation and on the management model of urban water services (the various types of direct or indirect management). In general, regulatory bodies have powers to establish a method for calculating tariffs, which are subsequently authorised by the government agency that is entrusted with the water supply service. For example, in Estonia, the regulator authorises prices in municipalities with more than 2,000 “equivalent inhabitants”[119]. This is the responsibility of the town council in smaller municipalities. In the case of Denmark, the regulator sets price caps for those companies that manage more than 200,000 cubic metres per year.

[116] OECD (2015).

[117] In the spring of 2018, the CNMC sent an information request to the member countries of the European Competition Network to find out which of them have supervisory and/or regulatory bodies for the urban water cycle. The CNMC received a response from 20 countries. A summary of countries with regulators and/or supervisors is provided in Table 5.

[118] United Kingdom, Denmark, Portugal, Croatia, Poland and Belgium (Flanders).

[119] Unit of measure used in the field of water treatment, based on the amount of pollution emitted per person per day, included in Council Directive 91/271/EEC of 21 May, concerning urban wastewater treatment.

Table 5: Independent regulatory bodies of the urban water cycle in the EU.

	REGULATORY BODIES OF THE URBAN WATER SECTOR IN EUROPE		
Country	**Name and year established**	**Features**	**Price Regulation**
Belgium (Flanders)	Flemish Regulation Authority (Flanders Environment Agency)	Sole regulator. State agency	YES
Bulgaria	State Energy and Water Regulatory Commission (2005)	Independent multi-sector regulator	YES. Price caps
Croatia	Council for Water Services	Independent sole regulator	YES
Denmark	Danish Water Utility Regulatory Authority (2009)	Independent sole regulator	YES. Price caps (only for companies that manage 200,000 m^3)
Slovakia	Regulatory Office for Network Industries (2001)	Independent multi-sector regulator	YES
Estonia	Estonian Competition Authority (2010)	Competition authority and multi-sector regulator. State agency	YES (areas> 2,000 h-e approved by the Authority. Areas <2,000 h-e approved by the municipality)
Hungary	Hungarian Energy and Public Utility Regulatory Authority (1994)	Independent multi-sector regulator	YES
Italy	Italian Regulatory Authority for Energy, Networks and Environment (1995)	Independent multi-sector regulator	YES
Ireland	Commission for the Regulation of Utilities (1999, 2014 includes water management)	Independent multi-sector regulator	YES
Latvia	Public Utilities Commission (2001, water management 2009)	Independent multi-sector regulator	
Lithuania	National Energy Regulatory Council (1997)	Independent multi-sector regulator	YES
Malta	Regulator for Energy and Water Services (2015)	Independent multi-sector regulator	
Poland	National Water Management Authority - Regional Water Management Boards	Sole regulator. State agency	YES
Portugal	Water and Waste Services Regulation Authority (ERSAR) (2000)	Independent sole regulator	YES
United Kingdom: England and Wales	Water Services Regulation Authority (1989)	Independent sole regulator	YES
United Kingdom: Scotland	Water Industry Commission for Scotland (2005)	Independent sole regulator	YES
United Kingdom: Northern Ireland	Northern Ireland Authority for Utility Regulation	Independent multi-sector regulator	YES
Romania	Romanian Authority for Public Services (2004)	Multi-sector regulator. State agency	YES

Source: prepared internally based on information request sent by the CNMC to the ECN member countries (2018), and Marques (2010).

6. ANALYSIS OF THE SPANISH MODEL FROM ACOMPETITION POINT OF VIEW

Municipalities have jurisdiction over the provision of water services, and they can decide whether to provide the service through direct or indirect management. In the latter case, the private partner in the service provision must be chosen through a public tender.

As a result, in Spain there is competition *for* the market to provide water services in those cases where municipalities choose to manage the service indirectly (French model).

In light of the characteristics of the urban water and wastewater services studied so far, and of the reforms carried out in other countries to increase the competitive efficiency and intensity of the sector, we now analyse the Spanish urban water model from a competition point of view.

The starting point is the study of the current scale at which these services are provided in Spain in comparison to the optimal scale. Regardless of the competition model, achieving an optimal scale is essential to provide efficient services and to maximise the benefits of competition.

Secondly, we analyse the main problems of the current regulatory framework. The economic justification for regulating the urban water cycle, apart from social and public service considerations, is that it is almost entirely a natural monopoly. In this sense, regulation seeks to prevent monopoly operators from exploiting their market power. But regulation by itself will not always be efficient; rather, it relies on a good design. Specifically, there is a need to:

- Have sufficient, quality information on the sector and on tenders.
- Have a pro-competitive and efficient regulatory framework.
- Have a price regulation model that creates the right incentives for producers and consumers.

Thirdly, it is important to study the possibility of introducing other competition tools used successfully in neighbouring countries, such as benchmarking or yardstick competition, as well as to analyse the situation in certain related markets.

6.1. Problems of scale

As previously studied (see Section 4.1), in those countries that have implemented reforms in order to increase the efficiency of their urban water services, the main reform has been to restructure the sector by increasing the geographical scale of the service provision, in many cases by assigning powers to supra-municipal entities at least for some of the phases of the urban water cycle.

This increase in scale seeks to exploit the economies of scale present in this sector, given the high fixed costs that characterise it, and thereby reduce the average cost and achieve the ideal production scale. If the lower costs are reflected in the prices, this has a direct and positive impact on end users.

Focusing on a competition perspective, reaching this ideal scale is essential. When the provision of services is framed within a model of competition *for* the market, as is the case with urban water services in Spain, the provision on a smaller-than-ideal scale diminishes the appeal of these activities to potential operators, who will opt out of bidding on those tenders where the scale involved is inefficient.

In Spain, the services that make up the urban water cycle are highly segmented. Industry sources[120] estimate that there are about 2,500 supply and sanitation systems, with large differences in terms of scale. Although there have been no rigorous analyses on the ideal scale for providing this service in Spain, there is a general perception among experts that in many cases, the scale is insufficient[121].

In fact, even though municipalities have jurisdiction over urban water, many of the phases that comprise it are managed by supra-municipal organisations, either because they are declared to be of regional or general interest (this is what usually happens with the wholesale phases), or because the municipalities themselves delegate their power to supra-municipal or regional entities. This shows that providing these services jointly to several municipalities is often more efficient, meaning there are economies of scale that must be leveraged.

Given this situation, it is necessary to consider the need to expand the territorial scope for providing the services involved in the urban water cycle beyond the municipal territory in those cases in which the scale of the municipality is insufficient. The current legal framework requires the consent of the affected municipality. Law 27/2013 of 27 December, on the streamlining and sustainability of local governments, amended the LRBRL in 2013 by introducing, among other changes, a new paragraph to Art. 26.2 of the LRBRL, which empowers provincial councils or equivalent entities to coordinate the provision of a series of municipal services, including the provision of drinking water to households and the disposal and treatment of wastewater, in those municipalities with a population below 20,000 inhabitants. 95.05% of Spanish municipalities satisfy that parameter.

On this basis, the Provincial Council proposes, with the consent of the affected municipalities, how to provide the services, whether directly by the Council or by implementing shared management schemes consortia, associations or other

[120] AEAS.

[121] Cabrera E. J. (2017).

arrangements. If a municipality does not give its consent, the services would continue to be provided at the municipal level.

An essential prerequisite to ensure that the service is provided on an efficient scale is a rigorous and general analysis of the scale of the urban water cycle in Spain, an analysis that is largely incomplete as a consequence of the lack of robust and reliable information on the sector, which is another problem related to water supply and sanitation, one that we will study later.

There are opposing forces that, once a certain scale for providing the services is reached, not only exhaust the economies of scale, but actually introduce diseconomies of scale. On the one hand, this sector is characterised by high fixed costs; and on the other, as the geographic scope of the service is increased, so are transport costs[122]. This means that in Spain, there are coexisting urban water systems at scales that are higher, equal to and lower than the ideal scale. As a result, the solutions also vary between systems. Some cases will require contracting the scale, while in others it will be necessary to expand it.

Although there are no studies for the Spanish case, a review of the empirical evidence on economies of scale in countries with institutional schemes in the urban water sector similar to Spain's shows the potential for reducing average costs by increasing the scale on which the service is provided. This is evident in countries like France, Italy and Germany[123].

Taking into account the existence of 2,500 water systems, and based on international empirical experience and evidence, everything seems to indicate that the most common problem in Spain is the insufficient scale.

6.2. Lack of information and transparency, and asymmetric information

In order to design an efficient regulatory framework, it is essential for the public sector to have sufficient, quality information. Only then will it be possible to identify and diagnose the problems of the sector in question and develop efficient regulation to achieve the proper operation of the market.

One of the main problems with the water sector in Spain is the lack of transparency. No government agency that oversees the urban water cycle collects, analyses or publishes information on the sector periodically. The only information available from government agencies comes from the INE, which publishes a Water Supply and Sanitation Survey every two years. However, this source of information is incomplete (although it is highly representative in terms

[122] This is why the academic works cited in Section 3 indicate that there is an optimal scale for water services, which will vary between regions depending on various characteristics.

[123] González-Gómez & García-Rubio (2008) review the literature on empirical evidence.

of the population served) because it offers data primarily on the volumes of water that is supplied and treated, but it does not provide data that can be used to draw a complete picture of the situation in the sector, especially in terms of the economy and the number of market participants[124].

Because of this, the following observations regarding the limited public information available can be made:

1. The only figures available are aggregate data at the national or regional level. There are no data for river basin districts, even though water as a resource is managed by river basin, meaning that the municipalities within the same basin face similar conditions in terms of the quality or availability of the resource, which makes them more comparable than municipalities belonging to different river basins. There are also no data with a lower degree of aggregation. Considering how the urban water cycle generally involves a much lower scale than the regional one, it would be greatly beneficial to have data that reflect this situation.

2. There are no official data on the number of water supply and sanitation systems in Spain. Industry sources[125] estimate that, although there are more than 8,000 municipalities in Spain, the possibility of grouping to provide water services would yield approximately 2,500 systems, but this is an informal estimate given the incomplete knowledge available. Nor is there information on the geographic scope of these systems, the municipalities that comprise them or the population served, which impedes, for example, analyses of the scale of service provision and their production efficiency.

3. There is no information on the sector's efficiency in terms of quality of service (supply stability, frequency and duration of supply outages, degree of treatment of the sewerage, number of complaints made and resolved[126], etc.).[127]

   Unlike in other countries, there is no public body to collect information on the sector in order to process it and evaluate the relative efficiency of each operator. It is not possible to establish comparisons between operators in

[124] The INE does not publish data on average water prices, the number and legal nature of operators, billing, number and size of water systems, degree of market concentration, etc. It also does not publish data that can be used to calculate some of the previous indicators.

[125] AEAS.

[126] In its latest National Study on Drinking Water Supply and Sanitation in Spain (2018), AEAS includes some data on customer service.

[127] The Ministry of Health publishes data on the quality of urban drinking water, that is, the resource, but from a purely sanitary standpoint through SINAC (National System of Information on Drinking Water).

order to stimulate improvements in efficiency and quality. It is therefore impossible to implement new measures to enhance and boost competition, such as benchmarking models, studied later, which require reliable information.

4. There are no official and accessible sources of information on prices, which would be necessary in order to accurately assess the degree of cost recovery and to evaluate whether the design of the tariffs and prices of the service is adequate[128]. The Ministry of the Environment itself discussed in a 2007 report[129] the difficulties of estimating the degree of cost recovery in Spain due to the opacity involving the costs and revenues of the sector. However, other countries, such as Portugal, the United Kingdom, Italy and France, do periodically publish specific reports on the urban water sector (they are prepared by the economic regulator of the sector, with the exception of France, which lacks such an agency).

5. When management is taken over by a company under an authorised price scheme, the review process is opaque. The criteria that guide the review by the city councils and the regional price commissions are not public, nor are there defined indicators that guide the price reviews undertaken by the commissions[130]. Prices should be set based on a robust economic analysis that adheres to the principles set out in the WFD and in Art. 111 bis of the TRLA (efficient use of water with adequate contribution of the various uses, in accordance with the polluter pays principle and based on tariff structures by consumption blocks).

6. There is no way to know the degree of competition in the processes to bid for the management of municipal water services. The only information available is the contracting profiles of each government agency (which, in the case of water, are the local entities) or the State contracting platform, which does not have sufficient or adequate information. In many cases, the municipalities do not provide information to these platforms, or do so very poorly. Therefore, the number of companies that submit bids for tenders, the bids made, the duration of the contracts, the proportion of renegotiated contracts, the number of concessions revoked, etc. are all unknown. This lack of transparency is likely to diminish the potential of the market competition model by making it difficult for tender information to reach all of the potentially interested operators[131].

[128] Fuentes (2011).

[129] Ministry of the Environment (2007b).

[130] Generally, the law does not consider which criteria must be followed.

[131] The principle of transparency is one of the basic pillars of public procurement and is contained in Article 132 of Law 9/2017 of 8 November, on Public Sector Contracts.

Many of the problems involving a lack of information also translate into the existence of information asymmetries between the various agents in the urban water cycle (operators, government agencies and consumers) that negatively affect the degree of competition for the market. These information asymmetries translate into poorly designed and executed tenders, and the subsequent oversight of concessions, which prevents leveraging the advantages derived from competition. In particular, there are information asymmetries between the competent agencies and operators, between the operators themselves and between operators and consumers:

- The following problems have been observed between competent agencies and operators:
    - On the one hand, the government agencies own the infrastructures and should, in theory, know their true condition. In practice, the status of the urban cycle infrastructure is not monitored[132], meaning investments are not made sometimes until problems arise. Much of the infrastructure of the urban water cycle is underground, and any deterioration is not apparent.

      The lack of public information regarding the condition of the infrastructure not only lowers the efficiency of the service and makes it difficult to make investment decisions; it can also make it less appealing for operators to take part in the bidding processes, with the ensuing negative effect on competition. If the bidders do not know the true condition of the infrastructure they will use to provide the service if they win the tender, they will have less incentive to be involved in it. This problem is exacerbated in those tenders whose conditions require the successful tenderer to invest in the infrastructure.
    - On the other hand, the government agency that is authorised to set prices requires a large amount of information from the operators on their costs. However, it lacks direct access to said information, and it is the operators themselves that provide it. The operators have incentives to report higher costs in order to increase their profits through higher prices.

  There will thus be an information imbalance between the municipality and the operator, which can result in poorly designed tenders and specifications, deficient enforcement of the terms of the concession and the quality of the service, or price reviews that are ineffective, since they are not guided by efficiency criteria.

[132] Cabrera & Cabrera (2017). Page 162.

- Between the operators themselves: the absence of public information on the state of the infrastructure can give an advantage in the bidding processes to operators that were previously awarded the service because they will know the true condition of the infrastructure. Other bidders will be at a competitive disadvantage if they lack said information[133].
- Between service operators and end consumers: end consumers cannot correctly and completely assess the quality of the services they receive. Being a public service, citizens often take the urban water service for granted and are unable to demand a higher quality, given the lack of information on it and the absence of references against which to compare it. There are measures (such as benchmarking exercises) that can be implemented - that rely on the pressure exerted by more informed consumers - to reduce this information asymmetry and enhance competition between operators.

This lack of information translates into problems shaping the overall image of the sector[134]. This opacity hinders the ability to both assess the effectiveness of the regulation that already exists, and to design a new and efficient regulation that corrects the deficiencies of the existing one. It also has a negative impact on competition in the sector. The way that competition for the market works requires the information to be symmetric (to avoid competitive advantages) and complete (to ensure the proper design and execution of the tenders, the subsequent enforcement of the terms of the concession and the price review).

6.3. Design and execution of tenders and enforcement of contract terms

As already noted, in Spain there is scarcely any competition in the urban water sector, with the exception of those cases in which its management has been tendered by municipalities (in terms of population served, 57% in the case of supply and 27% in the case of sanitation). Therefore, when a municipality opts for indirect management, the degree of competition depends directly on how the bidding procedures are designed and executed, as well as on the degree to which the terms of the contract are enforced.

In the specific case of the water sector, there are two particularly relevant issues in relation to tenders[135]:

[133] Chong, Saussier, & Silverman (2015).

[134] The problems in obtaining official information on this sector are also described in the report “Prices and Costs of Water Services in Spain”, written by the Ministry of the Environment in 2007.

[135] OECD (2004).

- The contract duration. Contracts with long expiration timelines have the advantage of creating incentives for the concessionaire to make investments. This is exacerbated in the urban water sector, where investments often have long amortisation periods. In contrast, short-duration contracts increase competitive pressure because tenders are more frequent. There is, therefore, a trade-off between investment incentives and the desire for competition.
- Contract renegotiations. Longer contracts are much more likely to be renegotiated. When a contract is signed, it is impossible to anticipate every possible contingency that may arise during the term of the contract; in other words, the contract is incomplete. However, the possibility of renegotiating can introduce incentives for bidders to place unrealistic bids that will subsequently be renegotiated. This behaviour undermines the bidding process.

It is obvious that properly designed and executed tenders, as well as the subsequent enforcement of the terms of the contract, are essential to the success of the service being outsourced. On the one hand, a poorly designed, executed and/or enforced contract is an outsourcing attempt that can lead to the internalisation of the service and to the loss of the resources that were allocated to outsourcing it. On the other hand, the possibility that the municipality will decide to change from the indirect management of the service to direct management can have a significant disciplinary effect on the service manager[136], but this will only occur if the oversight is rigorous and if the municipality that outsourced the service has the (technical and economic) capacity to take it over. Therefore, poorly designed, executed and enforced tenders result in economic and social losses for the awarding entity and for consumers.

As noted earlier, a lack of information and transparency during the bidding processes for urban water services impedes a rigorous evaluation of these issues, although some authors believe that competition for the market is limited[137].

6.4. Prices

The role of prices in a market is to convey information to agents about the preferences of individuals or the relative scarcity of the good or service exchanged to match supply and demand. As a result, it is essential for the degree of competition (and information) in the market to be high.

[136] OECD (2004).

[137] González-Gómez, García-Rubio, & González-Martínez (2014).

When the provision of a good or service is carried out in the context of a natural monopoly, the monopolist has incentives to set a high price to increase its profits. To keep prices from being too high and certain consumers from being pushed out of the market, prices are subject to regulation by the public sector.

The goal of price controls should be to ensure the sustainability and efficiency of the service provided, from the standpoint of both production (provide the service at the lowest possible cost, given a certain level of quality) and economics (internalise externalities, for example). In addition, regulation must pursue both static and dynamic efficiency.

From a dynamic perspective, price controls in a natural monopoly allow the public sector to introduce incentives to the private sector to increase the efficiency with which the service is provided over time. That is, an efficient price regulation aims to guarantee not only that the service is provided sustainably (while preventing the company from using its monopolistic position to exploit the consumer), but also to stimulate efficiency improvements that ultimately translate into lower prices, higher quality and investment incentives.

However, the current regulation on urban water prices in Spain does not satisfy these requirements. There are failures in the regulation since the sustainability of the supply is not guaranteed (prices do not cover costs), nor is static and dynamic efficiency encouraged (the design of price structures is inadequate).

Next, we consider in detail the most common problems related to the tariffs of urban water services in Spain, and their economic consequences.

6.4.1. Failure to recover costs

One of the characteristics of the prices of urban water services in Spain is that they are low in relation to other countries, including those in which water is abundant, such as Switzerland, Germany and Denmark. As an example, according to OECD data, the unit price of household urban water services is 3.5 times higher in Denmark than in Spain[138]. This would indicate that prices do not reflect the true cost of the services[139].

In a 2007 report, the Ministry of the Environment estimated that[140] the cost recovery of urban water services ranges from 57% (in the former North river basin[141]) to 96% (in the Júcar river basin). A high proportion of the unrecovered

[138] OECD (2010).

[139] According to PWC (2018), Spain is the only country in the EU where the tariffs do not allow covering all of the operating or investment costs (CAPEX) (PWC, 2018).

[140] Ministry of the Environment (2007b).

[141] In 2008, the North River Basin was divided into the Cantabrian and Miño-Sil basins.

costs is associated with environmental costs. In addition, the Ministry's report notes that "*if we consider that a significant part of the wholesale water infrastructure* [and] *urban distribution networks* […] *has already exceeded its useful life, by a considerable period in many cases, and that their replacement would have to be considered, the cost recovery would be significantly reduced. The cost of replacing all of them would place the cost recovery for wholesale services, in some cases* [...], *at 20% instead of the current 57%*"[142].

It is important to clarify that cost recovery estimates are complex due to the lack of information on the subject and to accounting differences for the revenue and costs in those cases in which information is available. They should thus be taken with reservations. The Ministry of the Environment warns of this in its report and recommends, among other issues, standardising both the accounting criteria for the services of the full water cycle[143] and the criteria used to design and calculate fees, rates and tariffs.

However, even taking precautions, the data reflect a huge variability in cost recovery at the national level. In some places, once the environmental costs are considered, the cost recovery is practically 100%, while in others it barely reaches 50%.

The most important thing is that in no case are the costs fully recovered. The low degree of recovery, in addition to violating the WFD, has serious implications for the sustainability of the service and leads to significant economic inefficiencies, both in production and consumption.

From the point of view of consumption, since water prices do not reflect the cost of providing the service, water consumption is in effect being subsidised, and consumers are being encouraged to use greater amounts of a scarce resource.

From the point of view of production, the failure to recoup costs creates two problems:

- It creates perverse incentives when the competent entities make infrastructure investment decisions. Many water infrastructures have been financed by larger entities than municipalities (regional or national government agencies, or the European Union through the European

[142] The latest evaluation report on the degree of compliance with the WFD prepared by the European Commission (European Commission, 2019) estimates that the percentage of cost recovery in Spain, including environmental costs, is between 34% in the Miño-Sil basin and 86% in Guadalete and Barbate. However, these data refer to the degree of cost recovery of all uses (agricultural, urban and industrial).

[143] (European Commission, 2019) In its last report, the European Commission welcomed the preparation by the General Directorate of Water (MITECO) of a common methodology for calculating the level of cost recovery.

regional policy)[144]. Town councils may not have incentives to increase prices to include infrastructure replacement costs, and thus undertake new investments, given their political cost. They can rely on higher levels of government to fund them in the future[145]. This may translate into a delay in making necessary investments, a problem that worsens if we consider that most of the water infrastructure is underground, meaning any deterioration is not visible[146].

- This has serious implications on the sustainability of the service. Since the price of the service does not cover its costs, the service is being implicitly subsidised by other means (mainly through the budgets of the various agencies involved).

6.4.2. Improperly designed price structures

Beyond the problem of cost recovery, other deficiencies have been identified involving the inappropriate design of the current price regulation. In many cases, the current tariffs do not take into account the economic characteristics of the sector or the resource, which are analysed in Section 4 of the Study. The problems with the design of the price and tariff structures must be corrected to ensure the efficient use of the resource and the sustainability of the service.

In addition, to the extent that these are prices for a service provided under a monopoly scheme, its design should be aimed at achieving its efficient provision, both from a static and dynamic perspective.

The main problems identified are as follows:

1. Although the most frequent tariffs are two-part tariffs, there are still one-part tariffs, as discussed in Section 3.2.3. (2% of supply tariffs, 19% of sanitation tariffs and 32% of treatment tariffs lack a fixed rate). The one-part tariffs are not adequate for urban water services, where fixed costs account for a high proportion of the total[147]. An efficient tariff should replicate the cost structure of the service. In this case, the tariff should be broken down into a fixed rate, aimed at covering fixed costs, and a variable rate.
2. It is not enough for the tariff to have two parts. Sliding tariffs that increase with consumption are needed to guarantee efficient water use. For a

[144] Maestu & del Villar (2006).

[145] Cabrera E. (2008).

[146] Cabrera & Cabrera (2017).

[147] As an approximation, between 70% and 80% of total industry costs are sunk costs (GEE, 2004; Hoffjan, Müller, & Reksten, 2014).

sliding tariff to be effective, it is not enough for the variable component to be divided into segments that increase in price with consumption. It is also necessary to pay attention to the relationship between the variable and fixed rates; if the fixed rate is too high, the sliding nature of the tariff decreases (the average price will not necessarily increase with consumption). Moreover, the sliding nature of the tariff depends on the number of segments in the variable part and the jumps between segments.

For example, García-Rubio, Ruiz-Villaverde and González-Gómez (2015) compare the sliding tariffs in Barcelona, Alicante and Guadalajara for the same average monthly consumption. All three tariffs have a similar ability to raise revenue. However, as a consequence of the lower fixed rate, the larger number of segments and the greater jumps between segments, the Barcelona tariff is more effective and encourages more efficient water consumption[148].

3. There are few examples of tariffs in Spain that include scarcity criteria. Neither the municipal prices nor the fees and taxes set at the national and regional levels (reflected in the final tariff) usually include elements that take into account the scarcity of water. This distorts the price signals, since consumers cannot identify periods of shortage and adjust their consumption.

   A simple way to provide scarcity signals is to introduce seasonal rates, with different prices depending on the time of year and the corresponding availability of water. An example is the Community of Madrid, where the tariff for the urban water service is highest between June and September[149].

   Another possibility is to introduce price discounts for reducing consumption compared to previous years. In Zaragoza, a 10% discount on the variable part is given if consumption decreases by at least 10% in relation to the previous two years[150]. In Madrid, a discount equivalent to 10% of the variable part is applied if annual consumption has decreased compared to the previous year[151].

[148] García-Rubio, Ruiz-Villaverde, & González-Gómez (2015).

[149] Order 1330/2018 of 18 April, of the Minister of Presidency, Justice and Spokesperson of the Government, approving the rates for the conveyance, distribution, sewerage, treatment and reuse services provided by Canal de Isabel II, Public Limited Company.

[150] Tax Ordinance No. 24.25: Tax for providing services related to water supply (2017-2019)**,** BOP No 298 of 29 December 2016.

[151] Order 1330/2018, of April 18, of the Minister of Presidency, Justice and Spokesperson of the Government, approving the rates for the conveyance, distribution, sewerage, treatment and

4. It is common for water bills to include amounts for non-water related items[152] (one example is the garbage collection fee). This practice reduces the transparency and simplicity of the invoice, and distorts consumption by disassociating the amount paid from the volume consumed. For consumers to adjust their consumption based on prices, the amount paid must be related to consumption, and consumers must understand the invoice and its various components.

The above deficiencies result, in part, from the failure of both river basin authorities and municipalities to use common criteria in the design, calculation and application of the fees, rates and tariffs that make up the economic-financial regime of water.

Regarding the design of the taxes and levies set at the state level and subsequently passed on in the final price by local entities, basin authorities use very different practices to calculate the taxes and tariffs specified in the TRLA. The same happens with the regional levies and taxes. The regional governments have introduced different types of taxes on the full water cycle that affect heterogeneous items in many cases, and in those situations in which they tax the same items, they are implemented differently.

Each municipality also follows its own criteria when designing the price to be paid by the end consumer. At the municipal level, the differences affect the structure of the tariff (one part or two), its sliding or constant nature, the number of consumption segments in the case of sliding rates, the billing period, and the distinction made, or not, between the tariffs applied to different urban uses. This explains the enormous price diversity in Spain and the uneven degree of cost recovery.

It is not a question of pricing the services equally throughout Spain, as this would be inefficient since the costs are not equal. Costs are influenced by a multitude of factors, such as the distance separating the municipality from its supply sources, the quality of the water collected[153], the type of processing needed to purify it[154], the geography of the municipality, and its size and population density.

However, some uniformity in the criteria used to craft the tariff would be desirable. There should be common guidelines for the price structure and the elements that comprise it (not for the tariff levels) that take into account the specifics of each municipality. This would increase transparency, ensure that efficiency criteria in

reuse services provided by Canal de Isabel II, Public Limited Company, BOCM No 93 of Thursday, 19 April 2018.

[152] Ministry of the Environment (2007b).

[153] Generally, groundwater is less polluted than surface water.

[154] Desalination is more expensive than other processes.

production and consumption are met throughout Spain, and facilitate the participation of more companies in bidding processes and, therefore, competition, because companies would be better able to forecast their revenue from the service.

Finally, the current system for regulating urban water prices does not incentivise operators to increase their dynamic efficiency. This means that the various agencies involved in setting the price of urban water services (local and regional pricing commissions) do not generally consider specific efficiency criteria that allow using the regulation to promote competition or provide an efficient service.

In most cases, the revisions conducted by the regional pricing commissions are limited to checking whether the rate increase proposed by the service operator is greater, equal to or less than inflation (the new tariff is authorised if it does not exceed inflation). Partly as a result of the lack of information about the sector, there is no rigorous and thorough analysis of the justification of the new price proposed by the operator. By way of example, there is no record of cases in which operators requested a downward revision of tariffs to reflect increased production efficiency. One of the reasons is that the commissions are not empowered to cap tariff increases based on cost reduction or service improvement targets. They only have the power to authorise or reject the tariff change.

Due to the importance of this issue and its close relationship with benchmarking instruments, it is analysed in the following section.

6.5. Absence of benchmarking instruments (lack of incentives for dynamic efficiency)

The non-inclusion of incentives to greater dynamic efficiency requires special attention. The various benchmarking tools and their characteristics were already studied in Section 3.4: benchmarking exercises, sunshine regulation and yardstick competition in prices (the main example of which is CPI-X). These tools allow for the introduction of competitive tension in sectors where competition **in** the market is not possible, and they create incentives for operators to increase the efficiency of the service over time (dynamic efficiency). Given the characteristics of the sector - a natural monopoly and a large number of potentially comparable operators - they are especially suitable for enhancing competition in urban water and wastewater services.

These instruments are used in other European countries and regions, and especially in those that have enacted reforms to make the provision of urban water services more efficient. As already noted, such is the case in England, Wales, Portugal, the Netherlands and Germany.

The international experience on the use of these tools has been very positive. The most representative case is that of the United Kingdom, particularly England and Wales, where, after the industry was privatised in 1989, a powerful regulatory framework was built to ensure that the new privatised companies provided a top-quality service without exploiting their market power. When regulating the industry, benchmarking and price regulation, through CPI-X, play a pivotal role. According to OECD estimates, not only have they improved the efficiency of the industry over time[155], but they have also had an effect on prices, which are estimated to be 30% lower than they would be in the absence of regulation[156].

Although England and Wales are the regions where the benchmarking instruments are applied to their full potential, other countries where these tools have not been applied as ambitiously have also seen positive results:

- In Portugal, the regulatory entity ERSAR (*Entidade Reguladora dos Serviços de Águas e Resíduos*) conducts benchmarking exercises annually. ERSAR believes that these exercises have enhanced service quality, particularly as concerns the volume of unregistered water, energy efficiency and upgrades to the infrastructure[157].
- In the Netherlands[158], the National Association of Water Companies (Vewin) has been publishing a benchmarking exercise with voluntary participation since 1997. In 2009, the Drinking Water Law made these exercises obligatory. They are carried out every three years. Even before participation was mandatory, the preparation and publication of these exercises is considered to have had a positive impact on the industry[159].
- Germany[160] has been holding regional benchmarking exercises since 2002 (some of them endorsed by the Länder governments, others of a private nature). Since then, the rate of urban water price increases has been below inflation[161].

Finally, in a study carried out with data from the Netherlands, England and Wales, Australia, Portugal and Belgium, De Witte and Marques (2009) provide empirical evidence that services are more efficient in countries where incentive-based

[155] OECD (2004).

[156] OECD (2014).

[157] WAREG

[158] By law, in the Netherlands, urban water services are provided by 100% public companies.

[159] OECD (2014).

[160] In Germany, municipalities are responsible for urban water services, although they may choose to provide the services themselves or delegate them to third parties (be they public, mixed or private companies).

[161] BDEW - Bundesverband der Energie- und Wasserwirtschaft (2013).

regulatory systems - whether benchmarking, sunshine regulation or yardstick competition - are used[162].

Benchmarking instruments yield efficiency gains by helping to correct market failures in the sector. Specifically:

- Because these instruments rely on more information and transparency in the sector, they reduce or solve problems involving asymmetric information, both between operators and regulators and between operators and consumers[163].
- They create incentives for dynamic efficiency by rewarding the most efficient operators.
- They empower consumers to hold the operator, and the government agency tasked with providing the service, responsible. They also make the government, which is ultimately responsible for the service, more accountable to consumers.

None of these instruments has been applied in Spain. The involvement of different administrations in urban water services makes it difficult to set up a regulatory system with these characteristics. Given the municipal jurisdiction, establishing and implementing benchmarking exercises and applying sunshine regulation would require assigning this function to a supra-municipal entity. Ideally, conducting these exercises at the national level would allow them to cover every operator and expand the benchmarks.

As for price regulation, while it does, in principle, exist through the approval of tariffs by the municipalities and, where appropriate, the regional pricing commissions, as indicated earlier this is not a technical regulation based on a detailed review of the tariff and on the introduction of dynamic incentives for operators.

These issues would have to be addressed and the necessary reforms enacted in order to introduce benchmarking instruments into the regulation of urban water services. The most efficient way to do this is probably by creating a specialised and independent body at the national level. The application of benchmarking measures is complex, both in terms of gathering and processing information, and of developing the instruments, so it is essential that this jurisdictional body be specialised. In fact, the countries that have promoted this type of reform the most ended up creating bodies with these characteristics (for example, Italy and Portugal). In contrast, in those countries where these tools are applied without a

[162] De Witte & Marques (2010).

[163] Marques (2010).

specialised body, recommendations for improvement tend to reflect this need (for example, the Netherlands[164]).

Thus, Italy and Portugal can provide a reference for Spain. These are countries where the organisation of water services is very similar, and where benchmarking tools are being successfully introduced.

6.6. Related markets

Although the services that make up the urban water cycle are generally considered a natural monopoly, some of the services in the cycle do not strictly exhibit the characteristics of a natural monopoly (cost subadditivity) and can be provided under a free competition scheme. Thus, if these activities are regulated, it must be done in a way that adheres to the principles of efficient economic regulation (necessity and proportionality).

A good example is the activities related to the installation, maintenance and reading of meters, as well as the subsequent billing of the end user for their consumption. These activities are related markets of the urban water and wastewater services that can be economically provided under a system of free competition. However, as discussed below, the current regulation of these activities often excludes competition.

6.6.1. Markets for the purchase, installation and maintenance of meters

The purchase, installation and maintenance of water meters are all regulated in the regional and/or local laws that govern urban water services. These are generally municipal ordinances, although there are Autonomous Communities that have approved regulations at a higher level[165]. There is thus a wide variety of regulations.

A review of the regulations on urban water services reveals that they often contain restrictions on the acquisition, installation and maintenance of water meters. The following provide an example of this:

- In Andalusia, Decree 120/1991 of 11 June, which approves the Household Water Supply Regulation, states that "*all meters or measuring devices that are installed to measure or monitor the water consumption of each*

[164] OECD (2014).

[165] For example, Andalusia with Decree 120/1991 of 11 June, which approves the Household Water Supply Law.

subscriber shall be the property of the supplying Entities, who shall install, maintain and replace them"[166].

- The ordinance of the Bilbao Bizkaia Water Consortium that regulates the provision of the water supply service allows the user to provide the meter (Art. 38), but it can only be installed and maintained by the supplying entity or by companies contracted by it for these purposes (arts. 40, 45 and 48).
- The regulation of the metropolitan water service of the Barcelona Metropolitan Department[167] (arts. 45 ff.) allows the user to purchase the meter and contract any company to maintain it, but it requires that the installation be done by the supplying entity (if the user purchases the meter from the supplying company, said company shall also be responsible for its maintenance).

Given the existence of restrictions on the performance of these activities, it is worth analysing, from the point of view of efficient economic regulation, what market failure justifies them and if such restrictions are proportional for their intended purpose.

The market for the purchase, installation and maintenance of water meters does not exhibit the characteristics of a natural monopoly that would justify restricting access to it. One possible economic justification would be the asymmetry of information that makes it difficult for the user to know how to correctly install the meter and the negative externalities of not properly maintaining it.

An analysis based on the principles of efficient economic regulation requires considering whether it is possible to correct these difficulties in a way that is less distortionary than the current regulation provides for, opening to competition these three activities and adopting certain measures that minimise possible externalities and reduce asymmetric information. In fact, this is possible by enforcing the regulation as it pertains to the technical characteristics of measuring instruments, which are regulated in the metrological control regulations, primarily Royal Decree 244/2016 of 3 June, which implements Law 32/2014 of 22 December, on Metrology.

The purpose of these measuring instruments is to determine the amount of water consumed, ensure that the measurement is correct and prevent any of the parties, in this case the operator and end consumer, from tampering with the meter. This allows the billing to account for the consumption, encouraging the efficient use of the resource and eliminating the information asymmetry between the service operator and the end consumer. Therefore, as long as the meter

[166] Article 37, Decree 120/1991.

[167] Approved in the 6 November 2012 session of the Metropolitan Council of the Metropolitan Area of Barcelona.

meets the requirements legally established in the state regulations for measuring devices, it should be freely available to the user and installed and maintained by the company that the user deems most appropriate.

In fact, there are regulations on urban water services that grant end users the freedom to purchase the meter and arrange for its installation and maintenance, which shows the possibility of opening these activities to competition. The Ordinance for the Management and Efficient Use of Water in the City of Madrid[168] lays out the obligation to install individual meters in each home, premises, establishment or consumption unit that can be individually metered (Art. 10). It does not specify the ownership of the measuring device, or who should perform the installation and maintenance.

6.6.2. Market for reading meters and billing consumption

The closure of the markets for the purchase, installation and maintenance of meters substantially reduces the size of other related markets; specifically, the markets for reading meters and billing consumption.

In the wake of the approval of Royal Decree 314/2006 of 17 March, which approved the Technical Building Code, all new buildings and homes must have individual water meters. In buildings constructed before that date, and especially in older buildings, it is common for there to be a single meter to record the consumption of the entire community of owners. In these buildings, owners can install individual meters in their homes to individualise their consumption. Since they are not strictly part of the water installation, these meters do not have to be installed by the water utility.

The installation and reading of these individual meters are thus open to competition. There are several companies that install this and other types of meters (for example, individual meters for the consumption of hot water for heating). In addition to the installation of the meters, these companies handle the reading and individualisation of consumption, meaning they allocate the amount billed by the water supply company to the community of owners among each of the owners based on the reading of individual meters. In these cases, the invoice that the end users of the water receive is issued by the meter company, not by the utility company (the utility bills the community of owners, not each owner individually).

This highlights two issues:

- First, these companies have the technical knowledge, ability and experience to install and maintain meters. The fact that they are operating

[168] Approved by Plenary Agreement at its Ordinary Session of 31 May 2006.

in the market to individualise consumption in communities of owners demonstrates that they could also operate in the installation and maintenance market analysed in the previous section. Local and/or regional regulations on the provision of urban water services that prevent these companies from installing, maintaining and reading individual meters in newly constructed buildings would unjustifiably reduce the effective competition in this market.

- Second, the meter companies are qualified to engage in reading and billing activities for consumption because they are already doing so in those buildings where they individualise community consumption. However, when the meters are owned by the water utility, these activities are usually vertically integrated within the utilities, which excludes the participation of third parties. The only way that competition between reading and billing companies is possible when the meter is owned by the utility is to have the utility outsource these activities. Therefore, local regulations are protecting the utility companies from competition when they exclude the possibility of letting the users own their own meters and having them hire a different company to take the readings. This thus eliminates the possibility of finding a company that provides this service at a lower price than that charged by the utility.

There is a need to review why the activity of these companies is being excluded from the entire meter reading and billing market when there are no market failures. Currently, they can only operate to individualise consumption in buildings where there are only community meters.

Therefore, there is room for more competition in the related markets for installing, maintaining and reading meters, as well as for the billing of consumption.

7. CONCLUSIONS

The report has highlighted the most relevant problems, from the standpoint of the competition, namely the way in which urban water services are regulated and provided, and discussed the instruments that would allow the services to be provided more efficiently while ensuring the benefits of competition for the market. All this would have a positive effect on the economic and environmental sustainability of the services and, ultimately, on the well-being of the public, by helping to address future challenges in a context of water scarcity and climate change.

The preparation of the Green Paper on Water Governance in Spain by the Ministry for the Ecological Transition and the Demographic Challenge provides an opportunity to assess how to effect the necessary reforms to ensure the efficient and sustainable provision of water services in cities.

With this study, the CNMC is contributing to this debate by identifying those aspects that, in its opinion, require action from the relevant government agencies, namely:

- The scale of service delivery: a comparative analysis of international experiences shows that increasing the scale at which the service is provided increases its efficiency. Given the small size of most Spanish municipalities, it may be necessary to expand the scale of the service by providing it jointly to various population centres in order to reach the ideal scale to provide the service.
- The scarcity and asymmetry of information: the limited information available is insufficient to be able to draw an accurate image of a sector that is characterised by strong information asymmetries. Systematic, clear, objective, accurate, accessible and timely information would help to ensure that the bidding processes for urban water services can be designed, executed and monitored more adequately.
- Non-recovery of costs: in addition to being required by the Water Framework Directive, this has important implications in terms of the service's sustainability and creates significant economic inefficiencies, both in production and consumption.
- The inadequate and inefficient design of tariffs, which does not take into account the economic characteristics of the sector or the resource. This, together with the institutional and functional complexity of the urban water cycle, results in a large disparity in price structures and levels of cost recovery, and does not generally incentivise desirable behaviours from a public perspective, such as saving water. A suitable and efficient pricing structure would help to achieve these objectives.

- The absence of benchmarking instruments, which could increase the competitive pressure on monopoly operators. Experience in neighbouring countries, such as England, Germany and Portugal, shows that the use of these mechanisms leads to a more efficient industry and, ultimately, to improvements in the use of resources and greater consumer welfare.
- There is room for more competition in related markets: the current regulation of activities such as the installation, maintenance and reading of meters includes restrictions that in many cases unreasonably limits competition.

Joint action at various administrative levels is required to solve many of the problems identified. The current competitive structure of the urban water cycle means that, in order to satisfactorily address the problems identified, cooperation and coordination between government agencies must be enhanced. In this regard, the comparative experience shows that many countries have opted to create national supervisory and regulatory bodies to develop this technical coordination and guide the competent government agencies. This issue is precisely one of the points of debate in the dialogue spaces led by the Ministry for the Ecological Transition and the Demographic Challenge.

In order to guide government agencies on how to deal with the above problems, the CNMC offers a series of recommendations.

8. RECOMMENDATIONS

The analysis resulting from this Study demonstrates the need to introduce reforms into the urban water and wastewater services sector in Spain. Accordingly, this section proposes a series of recommendations aimed at leveraging the advantages associated with a model of competition for the market and the more efficient provision of services.

ONE. Systematically collect and publish information on the urban water cycle

The lack of information on the urban water cycle constitutes one of the main problems in the sector and underlies most of the issues described in this study. The lack of information prevents having an accurate picture of the market and creates problems involving information asymmetry between the different agents.

It is thus essential that transparency be improved through the systematic publication of disaggregated information on various aspects. Specifically, we recommend gathering and publishing information on, among others, the number of water systems and their territorial scope, the efficiency of the service provided, the criteria used to design the tariffs and their subsequent review by the regional governments, the bidding processes and the status of the infrastructure.

This would allow raising the general level of knowledge of the sector and reduce information asymmetries, which would have a positive impact on every stakeholder (agencies, companies and users) and on market operation. Improving the levels of information would allow for the systematic preparation of reports, studies and statistics that are accessible to the public.

TWO. Restructure the organisation of urban water services as necessary to achieve the ideal scale for their provision

The urban water sector is characterised by the presence of strong economies of scale. Given how fragmented these services are in Spain, it is likely that in many cases, the ideal scale for providing them has not been reached.

It is necessary to conduct a rigorous and detailed study of the efficiency of the different urban water systems currently in existence in terms of their scale. The experience in neighbouring countries where the configuration of the urban water cycle is similar to Spain’s shows that increasing the scale can contribute to greater efficiency.

In those cases where problems are identified involving the scale of the service provided, organisational measures should be taken to achieve the optimum scale and maximise the efficiency of the service provided.

THREE. Use benchmarking tools to create more competitive pressure

Benchmarking instruments are one of the most useful tools for increasing competitive pressure in sectors such as urban water supply and sanitation that involve a large number of monopoly operators. International empirical evidence shows how implementing these instruments, in any of their variants, translates into greater efficiency in the provision of services.

Specifically, the CNMC recommends the use of sunshine regulation, by preparing and publishing benchmarking exercises that compare the different urban water operators to each other and rank their relative positions based on efficiency and quality indicators. The maximum effectiveness of these exercises is achieved when participation in them is mandatory and the results are published non-anonymously.

FOUR. Develop a common methodology for designing tariffs that are efficient and promote competition

In order for the tariffs of urban water and wastewater services to be efficient, they generally have to have a two-part structure, they have to be sliding in nature, include scarcity criteria, cover costs and not include charges that are unrelated to water. However, in Spain there is enormous diversity in the design of these rates, meaning they do not always satisfy these characteristics. At the municipal level, there are differences in terms of the structure of the tariff (one part or two parts), its sliding or constant nature, the number of consumption segments in the case of sliding rates, the billing period, and the distinction made, or not, between the tariffs applied to different urban uses.

This has implications in terms of the sustainability of the service and the efficiency of production and consumption. Moreover, the price reviews done by regional agencies often do not consider specific static and dynamic efficiency criteria, which can be used to regulate prices from a point of view that promotes competition or the efficient provision of the service.

We thus recommend that a method be developed for designing tariffs that provides guidance to the relevant government agencies in terms of the structure, composition and review of said tariffs. This would increase transparency, ensure that efficiency criteria in production and consumption are met throughout Spain, and facilitate the participation of more companies in bidding processes and,

therefore, competition for the market, since companies would be better able to forecast their revenue from the service.

FIVE. Eliminate unjustified or disproportionate restrictions to competition in related markets

Not every activity that comprises the urban water cycle fits into the category of a natural monopoly, meaning they could, in principle, function in a competitive scheme. Such is the case of the meter installation, maintenance and reading activities, and of markets related to urban water and wastewater services.

We thus recommend eliminating the restrictions identified on the purchase, installation and maintenance of water meters that are unnecessary or disproportionate, in particular those contained in the regional and local regulations that prevent companies other than water utilities from selling, installing and/or maintaining water meters.

We similarly recommend eliminating the restrictions identified in the market for reading meters and billing consumption that are either unnecessary or disproportionate. The exclusion of metering companies, which currently can only provide consumption individualisation services, from the entire market could only be justified by the existence of a market failure.

SIX. Review the governance of the urban water cycle

The nature of the challenges associated with improving efficiency and competition in urban water and wastewater services in Spain demonstrates the need to reflect on their governance.

As part of the framework for preparing the Green Book on Water Governance in Spain, the Ministry for the Ecological Transition and the Demographic Challenge is in discussions with the agencies involved in managing the urban water cycle.

We recommend taking advantage of this dialogue to reflect on those governance reforms that are necessary to improve the oversight and provision of these services, using the successful experiences in neighbouring countries as a reference.

ANNEX I: REGULATION OF THE AUTONOMOUS COMMUNITIES

1. Andalusia

The allocation of jurisdiction between the Autonomous Community of Andalusia and the municipalities in the region is regulated by Law 9/2010 of 30 July, on Waters of Andalusia (LAA).

Andalusian municipalities have jurisdiction over the management and provision of all the services in the water cycle, as well as over the approval of the rates or tariffs charged for these services. As for the infrastructure, they are responsible for planning, developing, managing and constructing the water infrastructure projects that fall within the purview of the municipality, as well as for their operation. The exception is water projects that are in the interest of the Autonomous Community of Andalusia, which are planned, programmed and carried out by the regional government[169].

The Law also regulates the so-called supra-municipal water management systems for urban use[170], defined as groups of water resources, infrastructures and management instruments that provide wholesale supply and wastewater services in specific territorial areas that span more than one municipality. This is because in certain cases, it is more efficient to distribute and purify water at the supra-municipal level.

It is the Governing Council of the Junta de Andalucía that determines, based on technical and economic viability criteria, and after consulting with the local entities affected, the territorial scope of each management system. Once the supra-municipal management system is created, it is managed by a supra-municipal organisation (consortium, association or the like) or by the provincial council.

Regarding the economic-financial regime of urban water services in Andalusia, the LAA adds two taxes to those included in the TRLA: the improvement tax[171], to finance water infrastructure projects associated with the full water cycle for urban use, and the general services tax[172], to cover the administrative expenses of the Andalusian Water Agency.

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[169] Article 13 LAA.

[170] Article 32 LAA.

[171] Articles 72 and ff. LAA. The improvement tax levies the use of water for urban use in order to provide financing for water works associated with the full cycle of water for urban use. This tax is sub-divided into two taxes:

- A tax to improve treatment water works of interest of the Autonomous Community.
- A tax to improve water works under the jurisdiction of the Local Entities.

[172] Articles 100 and ff. LAA. The general service tax provides revenue to the Autonomous Community to cover the administrative expenses of the Andalusian Water Authority, which are aimed at ensuring the proper use and conservation of water.

2. Aragon

Water in the Autonomous Community of Aragon is regulated in Law 10/2014 of 27 November, on Waters and Rivers of Aragon (LARA).

The LARA allows municipalities to organise and provide the services of the full water cycle (both wholesale and retail), as well as to approve tariffs, although it allows those that so decide to do so to delegate or entrust these administrative responsibilities and to provide services to the respective counties if agreed by the institutions involved[173].

In addition, the LARA grants the regional government powers that seek to leverage the more general overview that is available to a supra-municipal agency and thus achieve a certain homogeneity in the services provided[174]. These powers are exercised by the Instituto Aragonés del Agua[175] through the Aragonese Urban Supply Plan and the Aragonese Sanitation and Treatment Plan.

As part of these Plans, the Autonomous Community organises and regulates water management systems for urban use, without prejudice to the jurisdiction of the Local Entities, and determines their territorial scope, especially when they do not coincide with county boundaries. The water management systems for urban use are groups of water resources, infrastructures and management instruments for the provision of wholesale supply and treatment services[176]. That is, the regional government, through planning, can create supra-municipal systems for the provision of wholesale services. These services can be carried out by the counties, at the request of the counties themselves, and by agreement with the Instituto Aragonés del Agua[177].

The Plans also include the supply, sanitation and treatment infrastructures that are deemed necessary, and specifies whether they are of regional, county or local interest, and it defines the framework for financing any works. As a result, the regional government can take over the management of the wholesale phases of the cycle through planning, and it can grant financial assistance to the municipalities for any of the phases of the urban cycle.

[173] Article 32 LARA.

[174] Article 15 LARA.

[175] The Instituto Aragonés del Agua is a public-law entity with its own legal personality, which reports to the regional government of the Autonomous Community of Aragon.

[176] Arts. 44 and ff. LARA.

[177] Article 62.1 LARA.

The planning also lays out the conditions for providing the services of the full water cycle for urban use, the quality required of these services and their control. In this regard, objectives for the efficiency of the infrastructures and technical criteria for their design can be defined.

Likewise, the Autonomous Community has the power to regulate the basic pricing criteria of the full water cycle, without prejudice to the ability of local entities in Aragon to set the price of the tariffs.

As for the economic/financial regime, the LARA introduces a tax on water pollution[178] to finance the costs of building, operating, preserving and maintaining sanitation and treatment facilities.

3. Asturias

Water services in Asturias are regulated in Law 1/1994 of 21 February, on Water Supply and Sanitation in the Principality of Asturias.

According to this Law, the regional government is responsible for the following:

- General planning, through master construction and management plans, which must specify the minimum levels of service and quality required.
- The planning and execution of the infrastructures of interest to the Autonomous Community, as well as the management of the services it owns.
- The provision of water transport and purification services that are owned by the Autonomous Community (wholesale services).
- Collaboration with local entities to plan, execute and manage those works and services within their purview. To this end, the regional government provides local entities with technical assistance and can approve the creation of consortia to provide supply and sanitation services.

The councils are assigned their own powers, subject to the general planning carried out by the regional government, which include providing the water distribution and sewerage services (retail services). They also provide water transport and purification services when owned by said councils.

Therefore, water transport and purification services may fall under the jurisdiction of the regional government or the councils. In fact, the Law itself states that the water transport and purification services in the centre of Asturias are of regional interest, and thus fall under the jurisdiction of the regional government.

[178] Article 79.2 LARA.

The Law also created the Sanitation Board, an autonomous body in the region that is responsible for planning, executing and operating the purification infrastructure; distributing the revenue from the Tax on the Environmental Effects of Water Use; and specifying quality targets for effluent streams.

As concerns the economic/financial aspects, the Law introduced a sanitation tax to finance the expenses of investing in, operating and maintaining facilities and installations for treating wastewater. However, the tax was replaced in 2014 by the Tax on the Environmental Effects of Water Use.

4. Balearic Islands

The Autonomous Community of the Balearic Islands does not have a specific law on the urban water cycle, meaning any related powers are allocated as dictated by the relevant national laws.

However, as in other Autonomous Communities, it has its own specific body for planning, building, operating and maintaining water infrastructures. This body is the Balearic Agency for Water and Environmental Quality, which is currently part of the Council for the Environment, Agriculture and Fisheries. It has jurisdiction in the areas of studying, drafting and approving plans and programmes related to the wholesale phases of the water cycle.

As for economic/financial aspects, there has been a water sanitation tax in the Balearic Islands since 1991[179] that is intended to finance sanitation projects in urban centres and, in general, the entire water policy of the Autonomous Community of the Balearic Islands[180].

5. Canary Islands

The use of water resources and the organisation of the public water domain is governed by Law 12/1990 of 26 July, on Waters of the Autonomous Community of the Canary Islands. Responsibility in this area is exercised by the Government of the Canary Islands, the Regional Department for the Ecological Transition, the Fight Against Climate Change and Territorial Planning, and the Island Water Councils, autonomous bodies that report to the Island Councils.

The water regime of the Canary Islands has unique features with respect to the general regime, specifically regarding the ownership and management of water

[179] Currently regulated in Legislative Decree 1/2016 of 6 May, which approves the Consolidated Text of Law 9/1991 of 27 November, regulating the water sanitation tax.

[180] The water sanitation tax applies to wastewater discharges, both those made to public or private sewer networks, and those that are made directly to the environment.

and infrastructure. For historical reasons, the role of the private sector in the Canary Islands is more prominent than in the mainland. Specifically, there is a regime of private ownership of water involving water associations and "heredades" (private farmland). These private-law institutions are groups of private water owners created pursuant to the Law of 27 December 1956, on Water Inheritance in the Canary Islands, which reflect a historical practice of water use that dates back to the incorporation of the Canary Islands into the Kingdom of Castile.

As a result, water may be bought and sold by members of *heredades* and water associations, which gives rise to the so-called water market.

Although Law 12/1990 on Water in the Canary Islands includes water's character as a public good, in order to respect the rights created under the previous legislation, it specified a transitory regime that allows holders of private water concerns, such as wells, galleries or springs, as well as the holders of authorisations to prospect for water that were valid when the Law went into effect, to register in the Water Registry as temporary users of private waters. This registration allows them to continue these practices for a period of up to 50 years, after which they are entitled to receive the corresponding administrative concession. The users that chose not to register maintain their ownership for a period of up to 75 years, but do not enjoy the administrative protection associated with registering in the Water Registry.

As for the infrastructure, it is generally owned by the municipalities, although they can also be owned by the regional or national government if they have been declared of regional or general interest, respectively. The specific nature of the case in the Canary Islands is that there are also private infrastructures, owned by the *heredades* and water associations (wells, galleries and general pipelines; therefore, wholesale supply infrastructure).

6. Cantabria

The regulation of urban water and wastewater services and infrastructures in Cantabria is contained in Law 2/2014 of 26 November, on Water Supply and Sanitation of the Autonomous Community of Cantabria (LASA).

This Law does not substantially alter the division of powers between the regional government and Local Entities that is outlined in the national regulations, although it allows municipalities to delegate their powers to the regional government or to other entities[181]. In addition, if the municipalities are unable to

[181] Article 5 LASA.

properly exercise their powers or fail to comply with them, the regional government may step in[182].

The role of the Autonomous Community consists of drafting and approving the General Supply and Sanitation Plan of Cantabria, which is the strategic planning instrument in the area of water in the region.

As for the infrastructures, the regional government has authority over those declared of interest to the Autonomous Community, in which case it is responsible for preparing and approving construction projects, as well as the operation, preservation and maintenance of any infrastructures[183]. The LASA states that the urban wastewater treatment plants that are part of urban agglomerations are of regional interest. Notwithstanding the foregoing, the municipalities or other entities may be responsible for their conservation, maintenance and operation[184].

As concerns economic/financial aspects, the LASA regulates two sources of revenue: the wastewater fee[185], the collection of which is intended to finance the sanitation systems of the Autonomous Community of Cantabria, and the regional water supply fee[186], which is payable in exchange for the water supply service provided by the Autonomous Community.

7. Castilla y León

The Autonomous Community of Castilla y León does not have its own regulations on water and wastewater services, so power is distributed between the regional and local governments as specified in the national regulation.

However, given the problems that municipalities often face due to the technical complexity and high cost of these investments, the Autonomous Community of Castilla y León has a method for collaborating with the municipalities, namely the Urban Water Infrastructure Master Plan, approved by Decree 151/1994 of 7 July. This Plan is broken down into Regional Supply and Sanitation Plans, which include the infrastructure works that are deemed necessary to undertake, as well as the associated cost sharing between the regional and municipal governments.

[182] Article 8 LASA.

[183] Article 4 LASA.

[184] Article 7 LASA.

[185] Article 21 and ff. LASA. The waste-water tax is a levy of the Autonomous Community that taxes the generation of wastewater, as determined by water use in the case of household wastewater, and the pollutant load discharged in the case of industrial waste-water.

[186] Article 38 and ff. LASA.

8. Castilla – La Mancha

The water cycle in Castilla - La Mancha is regulated by Law 12/2002 of 27 June, on the Full Water Cycle (LRCIA).

The general scheme outlined in the law assigns responsibility to the regional government for the planning, execution and management phases of the wholesale urban water cycle (supply and purification). To this end, the regional government drafts the Water Supply Master Plan and the Urban Wastewater Treatment Master Plan. All of these responsibilities are implemented by the Water Agency of Castilla - La Mancha.

For their part, the municipalities build and operate the infrastructure necessary for the retail management of the supply and sanitation services. They are also responsible for preparing and approving the regulations for the services under their jurisdiction and the tariffs for those services.

As for the economic/financial regime, the LRCIA not only regulates the taxes that finance the actions of the Board, but it also contains requirements for the prices and taxes that are approved at the municipal level. Specifically, it states that the prices and rates approved by local governments to finance the costs of the services under their jurisdiction must be calculated in such a way that they cover the depreciation costs of the part associated with the municipal investment, the operating, maintenance and preservation costs of the facilities under their care, as well as the costs of upgrading civil works and existing equipment

If, over the course of managing the water services, the local governments receive revenue in excess of the costs, said excess must be applied to projects to improve the infrastructure or the service.

As for the regional revenue, this is provided by two taxes:

- A transport tax[187], intended to finance the management and investment expenses of the wholesale infrastructures specified in the Water Supply Master Plan.
- A purification tax[188], intended to finance management costs and, where appropriate, investment costs for the infrastructures specified in the Urban Wastewater Treatment Master Plan.

[187] Article 40 LRCIA.

[188] Article 47 LRCIA.

9. Catalonia

Legislative Decree 3/2003 of 4 November, which approved the consolidated text of the Catalan water law (TRLAC) specifies, among other issues, the distribution of power between the Autonomous Community and local authorities in relation to the urban water cycle.

According to the TRLAC, the local entities are responsible for all the phases of the urban water cycle[189], although the facilities that make up the basic supply networks, whether publicly or privately owned, may be transferred or assigned to the regional government, which shall continue using them for the basic service of supplying municipalities[190]. Likewise, the local entities can delegate to the regional government the management of the facilities that make up the wholesale public sanitation systems under their jurisdiction[191].

As for the regional government, it exercises its powers involving water and hydraulic works through the Catalan Water Agency. Among its functions are two that are related to the urban cycle:

- On the one hand, to coordinate the activities of the agencies responsible for supply and sanitation in Catalonia[192].
- And on the other, to organise wholesale supply services, which includes the approval of the corresponding tariffs, and sanitation services.[193] In this sense, the basic supply networks, regardless of their ownership and management regime, are subject to the control and supervision of the regional government.

The above notwithstanding, there is one particular case within Catalonia: the Ter-Llobregat supply network. The TRLAC states that the production and supply of drinking water (that is, the wholesale supply activities) for municipalities on the Ter-Llobregat network are a public service of interest to the regional government, and therefore fall under its jurisdiction[194]. As a result, the goods and facilities that are part of the Ter-Llobregat[195] supply network are part of the public service that falls under the purview of the regional government, which is the owner of the

[189] Article 3 TRLAC.

[190] Article 32 TRLAC.

[191] Article 52 TRLAC.

[192] Article 8.1.i) TRLAC.

[193] Article 8.1.l) TRLAC.

[194] Article 34 TRLAC.

[195] Article 35 TRLAC.

works and facilities that it executes and that are financed from its own resources and that are part of the network[196].

Regarding the economic/financial regime, the TRLAC introduces two taxes:

- A tax for using the assets of the public water domain[197], equivalent to the tax for the occupation of the national public water domain within the scope of powers of the regional government.
- A water tax[198]. This is an ecological levy that taxes the use of water, including both its collection and distribution, and the emission of pollutants, among other uses. The revenue from this tax is intended to cover the costs of investing in and operating the infrastructure, the expenses of the Catalan Water Agency and to prevent pollution.

10. Extremadura

The Autonomous Community of Extremadura also does not have a specific regulation for the urban water cycle. However, the regional government has exclusive jurisdiction over the planning, construction and operation of those water works that are not classified as being of general interest by the State or that affect other Autonomous Communities, by virtue of their Statute of Autonomy[199].

Regarding the economic/financial regime, Law 2/2012 of 28 June, on urgent measures in tax, financial and gaming matters of the Autonomous Community of Extremadura, introduced a sanitation tax[200], whose purpose is to finance the water infrastructure associated with the full water cycle borne by the Autonomous Community.

11. Galicia

Law 9/2010 of 4 November, on Waters of Galicia (LAG), regulates the distribution of powers involving the urban water cycle between the regional government and local entities.

The Law gives jurisdiction to local entities over the entire cycle, except in the case of the infrastructures declared of general interest to the Autonomous Community,

[196] Article 38 TRLAC.

[197] Article 80 TRLAC.

[198] Article 62 TRLAC.

[199] Article 9.1.36 Statute of Autonomy of Extremadura.

[200] Article 33 and ff. of Law 2/2012. It taxes the availability and use of water as determined by water consumption.

whose construction and management are the responsibility of the regional government, and in the case of the wastewater treatment service (wholesale sanitation), which the LAG itself declares to be of interest to the Autonomous Community.

The public agency Aguas de Galicia has regional jurisdiction over water, as well as for planning through the general supply and sanitation plans of Galicia[201]. These plans contain the criteria for coordinating the actions of the local entities, as well as the infrastructures of interest to the region.

Local entities may delegate the exercise of their powers to the regional water authority.[202] Likewise, the regional water authority may take over the management of the supply and purification infrastructures when the local entity is not adequately executing its powers[203].

Regarding the economic/financial regime, the LAG creates two taxes:

- The water tax[204], the proceeds from which finance pollution prevention programmes; the infrastructure investment, operation and management expenses; and the expenses of Aguas de Galicia.
- The coefficient for discharging wastewater to public treatment systems[205]. This tax is associated with the purification service provided by Aguas de Galicia. The revenue from this tax is used to finance the operating and investment expenses of the treatment infrastructure.

12. La Rioja

In La Rioja, the distribution of powers between the regional and local governments is regulated in Law 5/2000 of 25 October, on Sanitation and Wastewater Treatment of La Rioja, and in Decree 4/1998 of 23 January, which set up the Water and Waste Consortium of La Rioja and approved its charter.

The Water and Waste Consortium of La Rioja is a public-law entity through which the regional government exercises its powers in the area of water. The 174 municipalities of La Rioja are in the Consortium. As concerns the urban water cycle, the Consortium is responsible for:

[201] Article 11.5 LAG.

[202] Article 27.4 LAG.

[203] Article 33 LAG.

[204] Article 42 and ff. LAG. This is a levy of the Autonomous Community of Galicia that taxes the use and consumption of water due to the environmental damage that its use could cause.

[205] Articles 66 and ff. LAG.

- The construction and/or operation of municipal infrastructures to supply drinking water that are entrusted to it by its member entities.
- The provision of sanitation and wastewater treatment services, as laid out in the framework of the region's Master Plan for Wastewater Sanitation.
- The administration and distribution of the sanitation tax.

The sanitation tax is a tax of the Autonomous Community of La Rioja that is intended to finance sanitation, purification and supply activities, as well as environmental programmes related to water quality.

13. Madrid

Law 17/1984 of 20 December regulates the supply and sanitation of water in the Community of Madrid, and specifies the distribution of powers between the Community of Madrid and municipalities. Specifically:

- The Community of Madrid is responsible for the transport, treatment and reuse of water[206]; in other words, for wholesale water and sanitation services.
- The municipalities are responsible for the distribution and sewerage[207], meaning the retail phases of supply and sanitation.

However, the regional government can, at the request of the municipalities, take over the functions that correspond to the latter[208].

This is, in fact, what has happened. The vast majority of municipalities[209] have signed agreements with Canal de Isabel II to have it take over the distribution of drinking water and sewerage, which allows Canal de Isabel II to manage the full urban water cycle.

Since 2012, the Community of Madrid has had two entities related to the full urban water cycle and to the provision of its related services: on the one hand, the public entity Canal de Isabel II and, on the other, Canal de Isabel II, S.A., a public limited company.

The Canal de Isabel II, created in 1851, is currently a public company that is set up as a public-law entity. Art. 6 of Law 17/1984 entrusts it with the water transport, purification and reuse services, as well as with all the functions related to the water services that are entrusted to the Community of Madrid. It is also

[206] Article 2 of Law 17/1984.

[207] Article 3 of Law 17/1984.

[208] Article 5.2 of Law 17/1984.

[209] 111 of 179 municipalities.

responsible for the remaining activities in the full water cycle by virtue of agreements signed with Madrid's municipalities.

In 2008, Law 3/2008 of 29 December, on fiscal and administrative measures, was approved. This law declared the Canal de Isabel II as an internal resource of the Community of Madrid (3rd additional provision) and enabled it to create a public limited company with a minimum public ownership of 51% to carry out activities related to water supply, sanitation, hydraulic services and hydraulic works (articles 16.1 and 16.3). The corporation was finally created in 2012 under the name Canal de Isabel II, S.A. Given the economic situation at the time of its creation, the decision was made to delay private investors from purchasing company stock. Today, 100% of the shares of Canal de Isabel II, S.A. remain in the hands of the government; specifically, the capital is owned by the Community of Madrid and 111 municipalities.

Relations between the public entity and the company are governed by the "Contract-programme between Canal de Isabel II and the company Canal de Isabel II Gestión, S.A.", which has a 50-year duration. The company is responsible for the functions that hitherto corresponded to the public entity, that is, "the operation, maintenance and conservation of the [General Network of the Community of Madrid], and the provision of water supply, sanitation and reuse services", although some functions are expressly reserved for the public entity (such as those related to concessions of the public water domain).

To provide these services, the Community of Madrid and the public entity have assigned to the company the public domain assets that make up the general network of hydraulic infrastructures, ownership of which is maintained by the regional government, the Canal and the municipalities.

Once the company Canal de Isabel II, S.A., was created, the municipalities that wanted the Canal to continue providing supply and sewerage services signed agreements with the regional government and the public entity Canal de Isabel II through which they became shareholders in the company, which continues to provide their services.

With regard to the economic/financial regime of water services in the Community of Madrid, Law 17/1984 specifies that the invoice for these services must cover all the expenses resulting from the provision of water supply and sanitation services, and will draw on the principles of unity, equality, progressivity and sufficiency. In addition, it may include a supplementary fee intended to finance infrastructure works and environmental actions related to water quality, which will be established as a surcharge for the cubic metres consumed or as an estimated fee based on consumption and pollutant load[210].

[210] Article 12 of Law 17/1984.

The Law provides for the Governing Council of the Community of Madrid to set the maximum rates for the different services, as well as the sliding rates that may be established in respect of the uses, the amount consumed or as required for any technical or social reasons[211].

The maximum tariffs applicable to the water transport, distribution, sewerage, purification and reuse services in the Community of Madrid are regulated in Decree 241/2015. It should be noted that the scope of the Decree covers only the tariffs associated with the services provided by the Canal de Isabel II Gestión, S.A., and excludes those set by providers other than said public limited company.

14. Murcia

In the Region of Murcia, the regional government, through the public entity[212] ESAMUR, is responsible for the wholesale supply phases, although only in the case of water from desalination, and for wholesale treatment, as laid out in Law 3/2000 of 12 July, on Sanitation and Wastewater Treatment in the Region of Murcia and Implementation of the Sanitation Tax.[213]

In any case, the regional government can delegate its powers to Local Entities or other organisations and vice versa, if this helps make the public management more efficient[214].

The actions of the regional government and the local entities in matters of sanitation and purification are coordinated through a General Plan for Sanitation and Treatment of Wastewater in the Region of Murcia and, as needed, through Special Sanitation and Treatment Plans[215].

Regarding the economic/financial regime, Law 3/2000 introduces the sanitation tax[216], which is specific to the Autonomous Community and is exclusively allocated to sanitation and treatment activities.

15. Navarra

In Navarra, every phase of the urban water cycle is the responsibility of the Local Entities. However, pursuant to Law 10/1988 of 29 December, on Wastewater

[211] Article 13 of Law 17/1984.

[212] Regional Wastewater Treatment Entity.

[213] Article 17 of Law 3/2000.

[214] Articles 3 and 4 of Law 3/2000.

[215] Article 6 of Law 3/2000.

[216] Articles 22 and ff. of Law 3/2000. The tax is levied on the production of wastewater as determined by water use.

Sanitation in Navarra, the regional government is responsible for planning sanitation activities through a Master Plan.

The Plan must provide the outline and basic sanitation guidelines for the territory of the Autonomous Community[217]. The infrastructures included in this plan are, in principle, built and managed by the Local Entities, although the regional government will take over these duties when the entities request its cooperation in the exercise of their powers. Likewise, in the event that the Local Entities are unable to execute the provisions contained in the master plan, or voluntarily fail to comply with them, the government of the Autonomous Community will carry them out by subrogation[218]. The regional government has a public company, NILSA, for this purpose[219]. In addition to the above duties, NILSA advises the Local Entities.

Regarding the economic-financial regime, Navarra charges a sanitation tax to finance treatment works and facilities[220].

16. Basque Country

In the Basque Country, the Local Entities are responsible for every phase of the urban water cycle, in accordance with Law 1/2006 of 23 June, on Water (LA). However, the regional government, through the Basque Water Agency, has regulatory and control powers in relation to the supply, sanitation and treatment of water.[221] The water works of general interest in the Autonomous Community will be planned and executed by the Basque Water Agency, although the Basque Government may subsequently authorise their transfer to other agencies or water user associations to provide the service required.[222]

Regarding the economic-financial regime, the LA introduces a water tax[223], the revenue from which is allocated to pollution prevention, to finance investment expenses, as well as to achieve proper environmental conditions for water as a whole through internal investments or by granting aid to finance enforcement of water planning.

Finally, in order to guarantee compliance with the principle of cost recovery, the 6th additional provision states that the supplying entities must allocate in their

[217] Article 2.1.a) of Regional Law 10/1988.

[218] Article 4 of Regional Law 10/1988.

[219] Navarra de Infraestructuras Locales, S.A.

[220] Article 9 and ff. of Regional Law 10/1988.

[221] Articles 5 and ff. LA.

[222] Article 39 LA.

[223] Articles 42 and ff. LA. The water levy taxes water consumption.

tariffs at least the investment, maintenance and operating costs of their wholesale supply and sanitation network.

17. Comunidad Valenciana

Law 2/1992 of 26 March, of the Valencian Government, on the treatment of wastewater in the Valencian Community, states that the planning, construction, management and operation of supply works and facilities (wholesale supply), and the discharge and treatment of wastewater (wholesale treatment), are of interest to the autonomous community[224].

The regional government's responsibilities include:

- Planning, through a master sanitation and purification plan of the Valencian Community or, where appropriate, through zonal sanitation and treatment plans, the goal being to coordinate the actions of the regional government and the Local Entities[225].
- Prepare projects, execute works and operate the facilities and services that it directly oversees, as well as the construction by agreement, by substitution or by any other legally allowed method, of any other facilities that the Local Entities do not carry out or that are jointly executed[226].

The Law creates the Public Entity of Wastewater Treatment of the Valencian Community (EPSAR), which is a public-law entity tasked with managing and operating facilities and services, carrying out infrastructure works, and supplying and treating water[227].

Regarding the economic-financial regime, the Law regulates the sanitation tax[228]. This is an environmental tax, the revenue from which is allocated to finance the construction, management and operating costs of wastewater discharge and treatment facilities.

[224] Article 2 of Law 2/1992.

[225] Article 6 of Law 2/1992.

[226] Article 3 of Law 2/1992.

[227] Article 14 of Law 2/1992.

[228] Article 20 and ff. of Law 2/1992.

ANNEX II: THE SITUATION IN THE UNITED KINGDOM

England and Wales[229]

In 1989, the entire water supply and sanitation sector in England and Wales was privatised. From then on, the companies and infrastructure became private. Each company was granted a licence (25 years) to provide the service. The licence was granted with no public tenders.

Therefore, a de facto monopoly was granted to these companies for 25 years. The companies that received the licences are the owners of the infrastructures and provide all the services of the full water cycle in their geographical area: extraction, purification, transport, storage, distribution, sewerage, treatment and return to the environment[230].

Given the essential nature and natural monopoly characteristics of these services, an economic regulator, Ofwat, was created whose objective is to supervise the water market and promote, as far as possible, effective competition in the market. It does this by employing a CPI-X scheme, which in turn is set based on a comparison between the companies that relies on the yardstick competition or benchmarking principle.

In 2008, the British government asked Professor Martin Cave to prepare a study on the different options for introducing competition into the market to address future challenges (climate change, demographic growth, environmental obligations (Water Framework Directive), etc.). This report is known as the Cave Report, and its proposals resulted in the reform of 2014.

Already in 2005, a reform had been approved that began to introduce competition in the market, particularly in the retail segment, although only for water supply services (not for wastewater treatment). The result was Water Supply Licensing (WSL). This regime allowed third parties to enter the retail segment. To this end, it created two new licences:

- A retail licence.
- A combined licence.

[229] Department for Environment Food & Rural Affairs (British Government) (2015): Impact Assessment (Defra 1346). Introducing Retail Competition in the Water Sector.

[230] There is an exception to the monopoly of the contracted companies in a region. They are called "*inset appointments*". Legally, these are modifications to the licence through which a certain company is named provider of water services in a certain area. Its licensee is modified, and another company is allowed to also provide these services in that area, although for a specific installation, as long as certain criteria are met.

The original licences (called “instruments of appointment”) were not affected by the two new ones. Thus, new and existing companies were subject to different licences, but in both cases they had very similar obligations.

Both the retail licence and the combined licence allowed the licensee to provide retail services to any non-household customer that used more than 50 million litres of water a year[231]. The regulation does not provide a formal definition of “retail services”, although these include billing and other public services.

The main difference between the two types of licence is that the retail licence allowed the licensee to buy water from the appointed wholesaler, while the combined licence allowed the licensee to introduce its own water into the network of the incumbent.

The two types of licence used the network of the incumbent, including the treatment plants, to bring the water to the end consumer. Therefore, new companies needed access to the network of the incumbent. Access conditions were negotiated directly with the incumbent.

The method for calculating the price to access the network was known as the “cost principle”: the price of water that the new supplier pays to the wholesale incumbent is calculated as the difference between the retail price of the incumbent and the costs that the latter avoids by not supplying the end consumer.

To prevent the incumbent from discriminating against potential new suppliers when providing accessing to its network, the retail companies of the incumbents were not allowed to request a retail licence for the area of activity of their wholesale parent company.

However, this system failed in its attempt to introduce competition into the retail segment. Only eight companies applied for retail licences (of which one was revoked), and only one customer requested to change suppliers. In the case of combined licences, even though seven companies were issued this licence, none even tried to introduce their own water into third-party networks[232]. This system failed due to the presence of significant barriers to entry:

- The fact that potential newcomers had to negotiate access conditions with the incumbents. The Cave Report proposed replacing the current system with a regulated system based on nationally agreed market and operating codes.

[231] Subsequently, following the recommendations of the Cave Report, in 2011 England reduced the threshold to 5 million litres a year. Wales kept it at 50.

[232] Ofwat (2015): “Information Notice (IN 16/04): Replacing combined water supply licences in England and Wales.”

- The “cost principle”. Its main problem was that it provided a very small margin for retailers to compete. The Cave Report proposed replacing this principle with an access price regime in which the retail price of water was calculated based on all the economic costs, and not just the short-term costs.
- The small size of the market, given the thresholds set (5 million litres a year in England and 50 million in Wales). Ofwat proposed eliminating thresholds for non-household consumers, extending licences to retail sewage sanitation services, and introducing self-supply licences that would allow retail customers to buy water directly from the wholesaler.

The Cave Report also identified other necessary reforms in this system:

- The legal separation between wholesale and retail activities. The opposite could lead to situations in which the wholesaler prioritised its retail operations to the detriment of incoming companies. The Report also proposed waiving this obligation for small companies (because in these cases, the costs of implementing the separation could outweigh the resulting benefits).
- The elimination of the rule that prevented the retail company of an incumbent from providing retail services in the same area of activity. In particular, the Cave Report noted that this rule discouraged incumbents from participating in the retail market because it prevented them from providing this service nationally to potential non-household clients that had facilities in different areas of the country.

In 2014, a new Water Law was approved *(Water Act 2014)* that regulated the introduction of competition into the retail sector of the full water cycle for public entities and large companies (non-household customers). Specifically, it provided for the complete liberalisation of retail services for non-domestic consumers as of April 2017, although only for England.

To this end, it eliminated the licensing regime introduced in 2005, resulting in the disappearance of the previous retail and combined licences. The companies that entered to compete in the new market have had to request some of the new licences:

- Water supply licence, whose content is variable. The licence can contain up to four authorisations: a retail authorisation to provide these services to non-household customers in England; a limited retail authorisation to provide these services to high-consumption customers in Wales (50 million litres per year); a wholesale authorisation to be able to introduce water into the supply system of a third party with which to supply the customers to whom retail services are provided in England (equivalent to the old

combined licence); and a supplementary authorisation, equivalent to the previous one to operate in Wales with high-use customers. None of the licences issued to date include wholesale authorisations or supplementary authorisations. That is, no retail service company is introducing its own water into the network of the incumbent.

- Sewerage licence: only includes one type of authorisation. This is the retail authorisation, which allows providing retail sewerage services in England (Wales is excluded).

Therefore, the reform incorporates some of the previous proposals:

- It eliminates the threshold of 5 million litres per year, but only for England. Wales, which is not included in the reform, maintains the 50-million threshold.
- It includes the liberalisation of retail sewerage services.
- It eliminates the prohibition on letting retail service companies owned by wholesale incumbents provide their services in the same area of activity.
- It introduces a regulated regime for accessing the infrastructure and purchasing water from wholesalers.
- It replaces the "cost principle" with rules issued by Ofwat to calculate the prices for accessing the networks.

In April 2017, the retail water services market for non-household customers began operating in England. Three types of agents are involved in the market: the economic regulator, Ofwat; wholesale and retail companies; and the market operator, MOSL.

Ofwat is responsible for granting retail licences and approving regulations related to the market. These regulations include the publication of a "sample wholesale contract" that wholesale and retail companies must use to regulate their relations. Ofwat has also issued a Price Code, which contains the rules involving the prices that wholesale companies can charge retailers for their services, and which imposes transparency obligations, among other issues[233]. Finally, despite the liberalisation of the market, and as an intermediate step towards effective competition, Ofwat continues to regulate the prices of retail services to non-household customers[234]. It will do so until at least 2020. The goal is to protect

[233] Ofwat views these rules as tremendously important because wholesale charges account for 90% of the costs that non-household customers bear for water services (Information Notice: Wholesale charging rules and information requirements (2016)).

[234] Wholesale prices are still regulated because the wholesale operator continues to be a monopolistic operator.

consumers from potential abuses stemming from strong market positions that are expected to be phased out as competition permeates the market.[235]

As for the companies, the Water Act 2014 does not require incumbents to legally separate their wholesale and retail activities[236]. However, since 2014 Ofwat has engaged in different price controls for each segment of activity, which has in effect forced the incumbents to separate the accounting of their activities. Moreover, the enforcement of competition regulations, avoiding the abuse of a dominant position, has led the incumbents to a de facto functional separation.

Relations in the market between wholesale and retail companies are governed by contracts signed between them, pursuant to Ofwat's "model wholesale contract". The wholesale companies are required to publish a "schedule of charges" in which they list the prices they charge for their services, which must abide by the rules contained in the Ofwat Price Code[237].

MOSL (Market Operator Services Limited) is a private company owned by the water companies that are involved in the market (both the retail companies that compete with each other and the wholesale companies that provide services to them). To enter the market, membership in MOSL is required. As for its functions, MOSL is responsible for the systems and processes that make the market work. In addition, it keeps track of clients and manages changes in retail service providers. Finally, it calculates the amounts that retail companies must pay to wholesalers based on the consumption of their end customers. It does so based on the contents of the codes published by Ofwat (for example, the Price Code) and the "schedules of charges" published by the wholesale companies. In fact, participating companies (wholesalers and retailers) must satisfy stringent reporting requirements so that MOSL can settle accounts between them[238].

Scotland

Scotland was the first country in the world to open the retail water market to competition. Since 1 April 2008, non-household customers[239] have been able to

What is new is that retail prices are also regulated, even though the services are provided on a competitive basis.

[235] Ofwat (2016): Business retail price review 2016: Statement of method and data table requirements.

[236] David Hough; Sara Priestley (2016): Increasing competition in the water industry. BRIEFING PAPER Number CBP 7259. House of Commons Library.

[237] Ofwat (2017): Legal framework for retail market opening.

[238] www.mosl.co.uk

[239] Companies, public sector and non-profit organisations.

choose their water provider (the liberalisation was included in the Water Act 2005)[240].

The difference between England/Wales and Scotland is that outside the competitive segment of the market there is only one company: Scottish Water. It is a public company that provides wholesale services (meaning all those that do not interact directly with the public) and is regulated by WICS (Water Industry Commission for Scotland). To avoid anti-competitive behaviour, WICS regulates Scottish Water's wholesale prices through a 5-year CPI-X scheme.

WICS was created in 2005, and in addition to being responsible for setting prices for water supply and sewerage services, it issues licences to new suppliers and facilitates competition in the retail sector.

The Water Act 2005 allows WICS to issue licences to companies interested in providing retail services to non-household consumers. A non-household customer can also be issued a self-supply licence. In this case, it pays the wholesale supplier directly for the water it wishes to consume.

Thus, retail service companies buy water from Scottish Water (which actually transports it to the facilities of non-household consumers) and offer it, along with other services (such as online billing, 24-hour service, etc.) at competitive prices.

Before the market was liberalised, it was necessary to separate Scottish Water's wholesale and retail activities to ensure that Scottish Water and new entrants could compete on equal terms in the retail segment. To do this, the company Business Stream was created (a public retail company), which had to apply for a licence to operate in the retail sector and is subject to the same conditions as private companies.

The Central Market Agency (CMA) is responsible for managing the retail market. It is tasked with coordinating customer changes of retail operators as well as calculating the wholesale rates to be paid to Scottish Water. The CMA is made up of all licensed providers and Scottish Water, as its founding member.

Business Stream remains the dominant market operator in the Scottish retail segment (in 2013, it had a 95% market share), and changes in supplier are rare. Even so, WICS welcomed the introduction of competition. It estimates that, currently, 60% of non-household customers pay less, receive better service or a combination of both[241].

[240] The market for domestic customers is supplied by the public company Scottish Water under a monopoly.

[241] WICS (2013): "Water and sewerage services in Scotland: An overview of the competitive market".

ANNEX III: THE SITUATION IN ITALY[242]

Before 1994, the urban water supply and sanitation sector in Italy was highly fragmented. Jurisdiction in this regard was municipal and the most common supply method was direct management through municipal companies or directly by the municipality. In general, supply and sanitation activities were not integrated.

In 1994, the Galli Law was passed, which sought to reorganise how water services were managed by promoting the elimination of direct municipal management and the microenterprises typical of the sector. Its key features are:

- It introduced the Integrated Water Service (SII) concept, which involves the vertical integration of every phase of the full water cycle (collection, transport, purification, distribution, sewerage and treatment). The goal is for the whole cycle to be handled by a single agent.
- It introduced the concept of Optimal Territorial Area (ATO). These are the areas deemed optimal for providing water and wastewater services, such that a single manager can be entrusted with the full water cycle throughout the area. The territorial scope of the ATOs is determined by the regions based on hydrological and political/administrative criteria. In total, 91 ATOs were defined, which, on paper, meant a huge reduction in the number of water systems.
- It created the Authorities of the Optimal Territorial Areas (AATOs), one for each ATO, with the power to regulate, plan and monitor water cycle activities in the ATO. The AATOs would own the infrastructure. Specifically, the AATOs were responsible for conducting a study on the status of the infrastructure and the quality of the services, based on which they would write an investment and pricing plan.
- A single operator that is independent of the AATO is assigned to manage the water services in each ATO[243]. The operator can be a statutory, statutory-private or private company. If a private or mixed company is selected, the choice is subject to a bidding process. The AATO was responsible for ensuring that the operator complied with the terms of the concession, especially in terms of investments and tariffs.
- It introduced a new tariff system based on the principle of cost recovery.

[242] Marques (2010), Guerrini & Romano (2013), Ennis & Deller (2019).

[243] This thus requires separating the regulation of the activity, which corresponds to the AATOs, from the provision of services, which lies with the concessionaires.

- It created a National Commission (CONVIRI), an organ of the government (it was part of the Ministry of the Environment), with jurisdiction over service quality and prices.

The Law also introduced a price-cap scheme that was overseen by the Ministry of the Environment. In 1996, based on this assignment, the Ministry established the Standardised Tariff Method (MTN), which sought to normalise the criteria for setting tariffs at the national level. The standardised method was based on an "average real tariff", and consisted of a de facto revenue cap. The MTN included a return on capital of 7% based on the interest rates at the time. This figure was not updated until it was abolished in 2011.

The MTN was a general framework for the AATOs to consider when setting the tariffs within their ATO.

The purpose of the reform was to encourage new investments and improve the scale and efficiency of urban water cycle management by assigning it at the supra-municipal level.

Although the Law was passed in 1994, it was never fully implemented. According to a CONVIRI report[244], by 2008 only 75% of AATOs had finished organising and tendering water services to companies independent of AATO itself. This represents 57% of the municipalities and 66% of the population. In the rest of the municipalities, most of the water services were provided by the municipalities themselves through direct management.

One of the criticisms of the Galli Law is that it created great disparity in how water services were managed since it allowed AATOs to opt for different management methods. Another criticism was the lack of independence and the presence of AATO members on the boards of the companies that were awarded the service.

In response to this situation, the national government approved Law 133/2008, in which it agreed to privatise the management of water services. In accordance with this Law, supply and sanitation services were to be tendered to private or mixed companies. If a mixed company was selected, the private partner had to own at least 40% of the shares. Statutory companies are excluded from these services.

In 2010, a new Law was approved (42/2010). This Law did away with AATOs and transferred their powers to the regions. As a consequence, the number of ATOs decreased from 91 to 71 (some regions chose to have only one ATO per region).

The 2008 reform led to an intense debate that culminated with two referendums being convened in 2011. As a result of their outcomes (against the privatisation of water management), the prohibition of the involvement of public companies in

[244] CONVIRI, 2010.

water management was lifted (thus returning to the situation before the 2008 law) and the method for setting tariffs was amended to exclude the guaranteed return on the capital invested (which had been 7% since 1996).

Decree 201/2011 (known as "Salva-Italia") tasked the AEEG[245] with regulating the water sector, in addition to the sectors it already regulated (gas and energy). With these newly assigned powers, the old AEEG was renamed AEEGSI (*Autorità per l'energia electtrica il gas e il sistema idrico*). AEEGSI, unlike CONVIRI, is independent of the government and is financed with payments from the operators.

Starting on 1 January 2018, AEEGSI also took over responsibility for waste management, changing its name to ARERA[246]. Currently, according to ARERA, there are 64 ATOs, 12 of which coincide with the regional territories.

Each ATO has a Governing Body (*Ente di Governo dell'Ambito,* EGA) in which every municipality in the ATO is required to participate. The powers of the municipalities involving water management are transferred to the EGA.

Theoretically, the EGA entrusts the water service to a single operator, which provides all the services in the water cycle throughout the territory of the ATO and makes the necessary investments. If an ATO covers an entire region, management can be delegated by sub-areas whose size cannot be smaller than a province. Thus, it is possible for more than one operator to provide water services within an ATO.

To date, the allocation of water services to a single operator per ATO is a practice that is not widespread because many municipalities have not yet transferred their water-related jurisdiction to the EGA. It is common for numerous forms of management to coexist in some ATOs, resulting in an urban water sector that is still highly fragmented in Italy. In 2012, AEEGSI (now ARERA) estimated that approximately 3,000 companies provided urban water services in Italy[247].

In addition to assigning the management of urban water services, the EGA prepares the tariff that is submitted to ARERA.

ARERA

Since 2011, ARERA (formerly AEEGSI) has been responsible for regulating water services. These responsibilities include:

[245] Autorità per l'energia electtrica e il gas.

[246] Authorità di Regolazione per Energia Reti e Ambiente.

[247] AEEGSI (2012): "Consultazione pubblica per l'adozione di provvedimenti tariffari in material di servizi idrici", 204/2012/R/Idr.

- Defining the allowable costs and the criteria for determining tariffs in order to cover costs. AEEGSI sets the general tariff schemes and approves the rates proposed by the relevant government agency.
- Quality of service. The philosophy behind this responsibility is to protect end users by avoiding discrepancies in the quality of water services at the regional level through the introduction of minimum levels of quality in the management of full water services.
- Ensuring user rights by evaluating complaints, requests and reports.
- Preparing standard contracts for tendering the service.

ARERA does not have any responsibilities in the area of water quality.

ANNEX IV: THE SITUATION IN PORTUGAL[248]

In Portugal, municipalities are responsible for urban water and wastewater services. However, there is flexibility in terms of management modes, which explains the diversity of models observed in practice.

A distinction can thus be made between multi-municipal systems, which are state-owned systems in which there are reasons of national interest that justify the State's involvement and that provide services to at least two municipalities (they provide most of the wholesale services); and municipal systems, whose management mode is decided by the municipalities. They can opt for direct management through the municipality itself, by associating with other municipalities or with the State.

As for private sector involvement, the concessionaires of the multi-municipal systems can only be minority-owned by the private sector. This ownership restriction does not apply to concessionaires of municipal systems.

As of 31 December 2018, there were 327 supply operators and 269 sewerage operators in Portugal. In 2015, there was a substantial change in the landscape of the entities that provide the wholesale supply and sewerage services, particularly in multi-municipal concessions, when three new systems were created as a result of the merger of almost all the pre-existing systems.

In Portugal, there are three water service management models: direct management, delegated management and concession management.

Direct management

Multi-municipal systems can be managed directly by the State, although no examples of this currently exist.

Municipal systems can be managed directly by municipal, municipalised or inter-municipalised services (that is, involving several municipalities), in which case they are governed by the legal regime for the operation of municipal bodies. The difference between municipal and municipalised services is the degree of financial and administrative autonomy, greater in the latter case because they have their own budget, although in both cases the services are integrated into the municipalities and their tariffs are approved by municipal bodies.

Delegated management model

[248] ERSAR (2018): Annual Report on Water and Waste Services in Portugal. Volume 1. Characterisation of the water and waste sector.

The law does not provide for the delegated management of state-owned systems. However, there is one case of delegated management that has been maintained for historical reasons. This is the public company EPAL (Empresa Pública de Aguas Libres). After the concession contract between the State and the Lisbon Water Company, SARL, ended in 1974, the State created EPAL by Decree-Law, and in 1991 it transformed it into a statutory corporation with exclusively public capital. In the absence of a concession contract, EPAL is an example of delegated management, meaning the State created a company that it controls exclusively, assigning it the performance of a set of activities (collection, processing, transport and distribution of water for human consumption in the city of Lisbon and neighbouring municipalities) for an indeterminate period.

As for delegating municipally owned services to local companies, this has been possible since 1998. Local businesses can be entrusted with managing services of general interest, including water supply and sewerage.

This management model requires the signing of a management contract that defines the objectives to be pursued by the company and the pricing policy. Municipalities can also enter into public-private partnerships by selecting, through public procurement procedures, private partners for the capital of municipal companies (provided that public control over the company is maintained).

If a municipality chooses to delegate services to a local company, the contract must specify the objectives, investments and rates, which are reviewed every five years. If the municipality decides to establish a collaboration with a private partner, a minimum contract duration must be established, as well as options for buying and selling the respective shares.

Municipalities can also enter into collaborations with the State, and can delegate the service to local or state statutory companies.

Concession management model

The concessionaires of the multi-municipal water supply and sanitation systems are companies with mostly public capital (the public shareholder is the State, through the *Águas de Portugal* Group, or the municipalities to which the service is provided). Concessions can last for a period of up to 50 years. The grantor, which is the State, through the Ministry of the Environment, has audit, authorisation, suspension and approval powers. Since 2014, ERSAR has been assigned responsibilities for setting tariffs and monitoring the economic and financial aspects of state-owned systems.

Regarding municipal systems, municipalities or associations of municipalities can assign the management of the system to a company (with public or private capital) or to an association of users through a concession by way of a public

procurement procedure. The maximum duration of the concessions is 30 years. The concession contract lays out the rights and obligations of the concessionaire in terms of the service by defining the formula for annually updating the tariffs, subject to ratification by the grantor, as well as the conditions under which the concessionaire will be entitled to the reinstatement of the economic-financial balance.

ERSAR

ERSAR (*Entidade Reguladora dos Serviços de Águas e Resíduos*) is an independent administrative entity overseen by the Ministry that is responsible for the environment. It has management, administrative and financial autonomy as well as its own assets, and is not subject to government oversight in the exercise of its regulatory and supervisory functions. The term of the members of the entity's management body is six years and is not renewable.

ERSAR's mission is to regulate the public water supply and sanitation, and urban waste management sectors, as well as to coordinate and supervise the quality of water for human consumption.

ERSAR is the successor of IRAR, created in 1997. Through various regulations, the scope of the regulator's activities and powers were progressively expanded, culminating in 2009 with the expansion of its regulatory powers to all the entities managing these services, regardless of the management model.

ERSAR's powers are classified into two main groups: structural regulation of the sector and regulation of the behaviour/performance of the managing entities.

Structural regulation is a regulatory intervention at the macro level, since it is not focused on a particular managing entity, but on the sector as a whole. It is divided into the following components:

- Organisation of the sector: among other things, ERSAR seeks to increase the efficiency of water and waste services and to search for economies of scale and scope.
- Legislation: ERSAR proposes new laws or amendments to existing ones. It also issues regulations and recommendations and monitors the application of current legislation and of said regulations and recommendations.
- Information: ERSAR regularly offers and provides information to all agents by collecting, validating, processing and disseminating information on the sector and the managing entities.
- Qualification of the sectors: ERSAR technically supports the managing entities by preparing technical publications in association with research

and knowledge centres, by directly and indirectly promoting seminars and conferences, by supporting third-party events, by conducting opinion surveys and by promoting research and development in the sector.

Performance regulation is a regulation at the micro level since, unlike structural regulation, it is focused on each of the managing entities in the sector. It includes the following components:

- Legal and contractual regulation: ERSAR legally and contractually supervises managing entities throughout their life cycle, in particular by analysing the bidding and contracting processes, amending and terminating contracts, monitoring their performance and intervening when necessary to reconcile the parties. It also intervenes in system reconfigurations and mergers.
- Economic regulation of managing entities: ERSAR promotes price regulation to guarantee efficient and socially acceptable tariffs for users, without prejudice to the necessary economic and financial sustainability of the managing entities. The economic regulation also includes an evaluation of the investments to be made by the managing entities.

  Specifically, it sets the tariffs for state-owned systems. In addition, it supervises other economic-financial aspects of the entities that manage state-owned systems and it issues opinions, proposals and recommendations.

  In the case of municipal systems, it regulates, evaluates and audits the setting and application of tariffs, regardless of the management model. In this regard, it issues recommendations on how well the tariffs of the municipal systems conform to the provisions of the tariff regulation and other applicable laws. When the tariffs of the municipal systems do not conform to the regulation, it can issue binding instructions and fine any violations.

  Finally, it guarantees detailed billing by the service providers, where the different items that comprise the final cost of the invoice are broken down.
- Regulation of the quality of the service: ERSAR evaluates the performance of the managing entities and compares them with one another by applying a system of appropriately selected indicators so as to promote effectiveness and efficiency. This benchmarking exercise was introduced in 2004. It currently relies on 16 indicators for each service (supply and sewerage), structured into three subgroups (indicators that reflect the interests of users and the quality of the service provided, indicators related to the economic and technical sustainability of the managing entity, and indicators on the environmental sustainability of the service).

- Regulation of the quality of water for human consumption: ERSAR evaluates the quality of the water supplied to users, comparing the managing entities with one another. This competence constitutes a particular case of regulating the quality of the service.
- Regulation of interaction with users: ERSAR enforces the managing entities' compliance with users rights regulation and, in particular, it analyses complaints and ensures their resolution. ERSAR promotes the participation of the users of the services by creating consulting and information reporting mechanisms.

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