

# PUBLIC POLICIES AS STRATEGIC ASSET MANAGEMENT ENABLERS: THE CASE OF PORTUGAL

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## Abstract

Urban water supply, wastewater and storm water services (globally, water services) are essential to the society. The lack of permanent, safe and respondent services has inevitable consequences on the public health and well-being of the communities, on the economy and on the environment. Goal 6 of the Sustainable Development Goals (SDGs) recognises this, and failing to meet it necessarily affects the accomplishment of many of the other SDGs. Water services provision depends on expensive and long-lasting physical assets. Managing them strategically (e.g., according to the international standards on asset management, series ISO 55x and to the IWA recommendations on infrastructure asset management) is therefore fundamental for sustainable societies. Countries need to have sound public policies that enable asset management. Portugal is a paradigmatic case. This paper presents key building blocks of an enabling public policy for water services, using Portugal to exemplify possible implementation solutions. It elaborates on key governments' goals, on the importance of a coherent public policy to meet them, on key building blocks that a sound public policy should consider in order to enable asset management and on the links between public policy building blocks and asset management. It also presents how Portugal has been implementing this process, addressing challenges to overcome.

**Keywords:** Public policy, water service, utility, asset management, policy-maker, Portugal

## 1. Global challenges and goals

The 17 Sustainable Development Goals (SDGs) of the United Nations are nowadays “THE” reference framework for any country to foster development and sustainability. They are a great synthesis of the most relevant aspects any country or any region needs to consider in its public policies, including those related to urban water services, specifically addressed in Goal 6 – Clean water and sanitation. However, water services influence and are influenced by almost all the other Goals. In particular, access to safe and reliable water services is key to overcome poverty (SDG1), hunger (SDG2) and inequalities (SDGs 5 &10), for economic growth (SDG8), public health (SDG3) and education (SDG 4), for the sustainability of cities and communities (SDG11), and for peace and justice (SDG 16). The quality of water services also influences life in land (SDG15), life below water (SDG14) and clean energy production (SDG7). On the other hand, innovation and infrastructures (SDG 9), climate action (SDG 12), responsible consumption and production (SDG13) and adequate partnerships (SDG 17) are critical to meet SDG6. This framework is valid for developing regions, where major shortcomings in terms of access to safe water still exist. It is also fully valid for developed regions, where challenges due to climate change, public health (e.g. emerging contaminants), migrations, safety and security, social inequities and sustainability are drivers for change.

It is therefore based on this framework that many governments and organisations set their own goals and implement the actions to achieve them. Urban water systems need to contribute to a more circular economy, be able to cope with emergent pollutants, become more flexible and resilient to face future uncertainties and extreme weather conditions. We need water-smart cities that integrate

surface water in urban planning, increasingly adopt nature-based solutions, explore alternative water sources, new materials, massive sensing, digital intelligence or advanced treatment technologies.

However, water smart cities and urban water systems of the future do not start from scratch. They are built upon existing assets. Governments and utilities need to cope with the slow pace of evolution driven by expensive and long-life water assets and often also with an increasing accumulated deficit in water system rehabilitation. There is the need for roadmaps from the current state of urban water systems to an envisaged state that allows meeting the intended government global goals, taking benefit from available or emerging technology, governance models, management systems, and business opportunities. To cope with these challenges, sound public policies are highly needed. Governments at all levels have a very important role to play. They need to understand that at the end of the line the water utilities, who own and manage the water systems, need to act in alignment with them. For this, public policies need to provide them an appropriate environment that accelerates change, fosters the long-term value of the assets and effectively contribute to achieving the global government's goals.

## 2. Linking government's goals, public policy and asset management to better serve society

"Asset management is the coordinated activity of an organisation to realize value from assets." Conversely, "An asset is an item, thing or entity that has potential or actual value to an organisation" (ISO 55000, 2014). Asset management is ruled by four main principles:

- i. Assets exist to provide value to the organization and its stakeholders.
- ii. Asset management transforms strategic intent into technical and financial decisions, plans and activities.
- iii. Leadership and workplace culture are determinants of value realization.
- iv. Asset management provides assurance that the assets fulfil their required function.

Applied to the case of urban water services, and particularly to the urban water infrastructures, implementing asset management has a major impact on societies, immediately and in the medium- and long-terms.



Figure 1. Water services: public policy and asset management

Figure 1 illustrates the link between government's goals, public policies and asset management. Governments act for the well-being of societies. As previously referred, the UN SDGs synthesize the common sustainability goals of humankind, safe and reliable water services being in the core of it. Although with this reference, each government needs to take into account its own role and context and define its specific goals. In order to achieve them, governments need to establish and implement a public policy that drives an effective management of assets and resources, maximizing their value for the society and for the environment, in a long-term perspective. In practice, public policies creating an enabling environment for asset management will

achieve their goals more efficiently and effectively.

Benefits from having a favourable environment for water utilities to adopt asset management include, among other:

- Improved use of financial resources;
- Demonstrated compliance with the governments goals and related utilities' objectives;
- Well-grounded priority setting and solutions selection and implementation;
- Transparency and accountability of the decisions;
- Alignment between government's strategic goals and intents with all the value chain until daily water systems operations;
- Opening room for research and innovation;
- Managed risk, particularly with regard to critical infrastructures;
- Incorporation of a long-term perspective.

Overall, a broad implementation of AM by water utilities is in the critical path for all governments committed in complying with the UN SDGs.

### 3. Public policy enabling strategic asset management

In general terms, any public policy regarding access to safe and reliable water services should adopt a holistic approach addressing key building blocks such as those listed in Table 1. The successful implementation of public policies for water services depends on the ability to manage the implementation of all these elements concurrently, ensuring an effective global and integrated approach (Baptista, 2014). Additionally, the introduction of asset management enablers in the public policy for water promotes the long-term value of the water assets. A holistic approach of asset management in all these building blocks of a water public policy is essential for the long-term sustainability of the infrastructures. Table 1 contains recommendations on how to achieve this.

*Table 1. Building blocks of a public policy enabling asset management*

<b>Public Policy Building block</b>	<b>This public policy building block can provide a supportive environment for effective asset management implementation by...</b>
Strategic planning	... including strategic directions and setting up priorities for asset management, as a relevant component of the public policy, taking into consideration a long-term vision for the existing assets and maximizing their value, to support the policy objectives.
Legal framework	...including the requirements, enforcement mechanisms and penalty tools in the legislation conducive to better asset management practice; ... regulating this subject, avoiding legal gaps and overlaps, and overcoming existing barriers.
Institutional framework	... including clear mandates and adequate skills (in the institutional framework in general and in the laws of the regulatory authorities), to promote the enforcement of asset management in the sector as a common practice of the service and program providers.
Governance models and contracts	... including clear obligations and incentives to promote the adoption of asset management, such as, for instance, good leadership, accountability mechanisms, AM implementation goals and specification of the end of contract target value of the asset portfolio and service levels in the contracts. One of the aspects to foster is that public procurement addresses life cycle costs, performance and risk, instead of allowing selection based only the lowest bid or lowest investment cost.
Quality of service goals	... including in the quality of service assessment system a set of performance indicators able to assess the asset management practice and setting up realistic quality of service targets.
Tariff and tax policy	... including the medium- and long-term cost coverage of the needed investment to assure the adequate quality of service, accounting for long-term sustainability of the assets.
Financial resources	... being mobilized in a way that allows implementing the strategic plan, aligning the mechanisms for allocation of funds with the defined priorities, and introducing incentives and requirements in this allocation that lead to effective asset management by the service and program providers.

Public Policy Building block	This public policy building block can provide a supportive environment for effective asset management implementation by...
Infrastructure construction and rehabilitation	... adopting the adequate and emerging methodologies, technologies and practices to optimize the value of existing assets and to promote the transition between the current state of the assets and the long-term envisaged state through a balanced share between new assets (expansion) and maintenance and rehabilitation of existing assets.
Operational efficiency	... enabling and encouraging a long-term view of operational efficiency gains, by making use of economies of scale (assuring the alignment with asset management strategic goals, scope and process) and by monitoring and promoting better operational processes and practices by the service and program providers.
Training and capacity building	... identifying and addressing needs in terms of education, training of the staff and capacity building of the service and program providers that are felt necessary to achieve the long-term vision regarding the asset management good practices.
Research and innovation	... identifying the existing gaps and enabling and promoting problem-driven research and innovation on asset management, fostering co-production and knowledge transfer and promoting a strong link between the knowledge and practice.
Business development	... enabling and promoting creative, healthy and sustainable enterprises, which help implementing new services and products to better support good practices of the service and program providers on asset management.
Data, information, and knowledge	... recognizing that sound data, information and knowledge on assets, on their condition and on asset systems performance is critical for decision making by the service and program providers on asset management decisions; by independently verifying that information is accurate and trustworthy.
Community engagement and users protection	... reaching out and engaging the community; by enabling the creation of awareness of the assets value, including an intergenerational responsibility perspective; by ensuring that users have the possibility to complain about poor service quality due to failures on asset management practices.

## 4. The case of Portugal

### 4.1 Brief historical background

When Portugal joined the European Union (EU), in 1986, the service coverage was quite low and the quality of the service provided was very poor in most of the country. Even in the bigger cities, water interruptions were frequent, tap water was not safe to drink, and most of the wastewater was disposed in non-controlled septic tanks or drained directly to the receiving bodies, without any treatment. By joining the EU, Portugal started to access cohesion funds aiming at leveraging the country development. The effectiveness of these funds was not the same for all essential services. For instance, the mobility sector evolved significantly in this period, but with weaknesses about the railway transport mobility. The case of water services has globally been a rather successful story, “The Portuguese miracle”, as Paul Reiter, former Executive Director of IWA, used to call it. Why? Because in 1993 a coherent public policy started to be established and implemented. A major reform in the legal and institutional frameworks and sound strategic planning were key corner stones for this process. As regards the physical assets supporting the services, the main governments’ objectives in the first years were to build new infrastructures to increase the service coverage and improve the quality of service. In recent years, the major challenge is to insure service sustainability by maximising the value of the existing infrastructures, in a long-term perspective.

With a consistent public policy (1993-2019), Portugal mobilized for a wise allocation of large public investments in the water sector (c.a. 13 billion EURO in a 10 million inhabitants country), and the coverage and quality of the service provided by public infrastructure improved considerably at national level. Figure 2 illustrates the national evolution between 1993 and 2017, in terms of access to drinking water supply and wastewater management services, drinking water quality, coastal bathing water quality and inland bathing water quality. The high investment effort, predominantly

applied to bulk services, resulted into significant progress in the physical access to services, in drinking water quality and in bathing water quality (Figure 2).

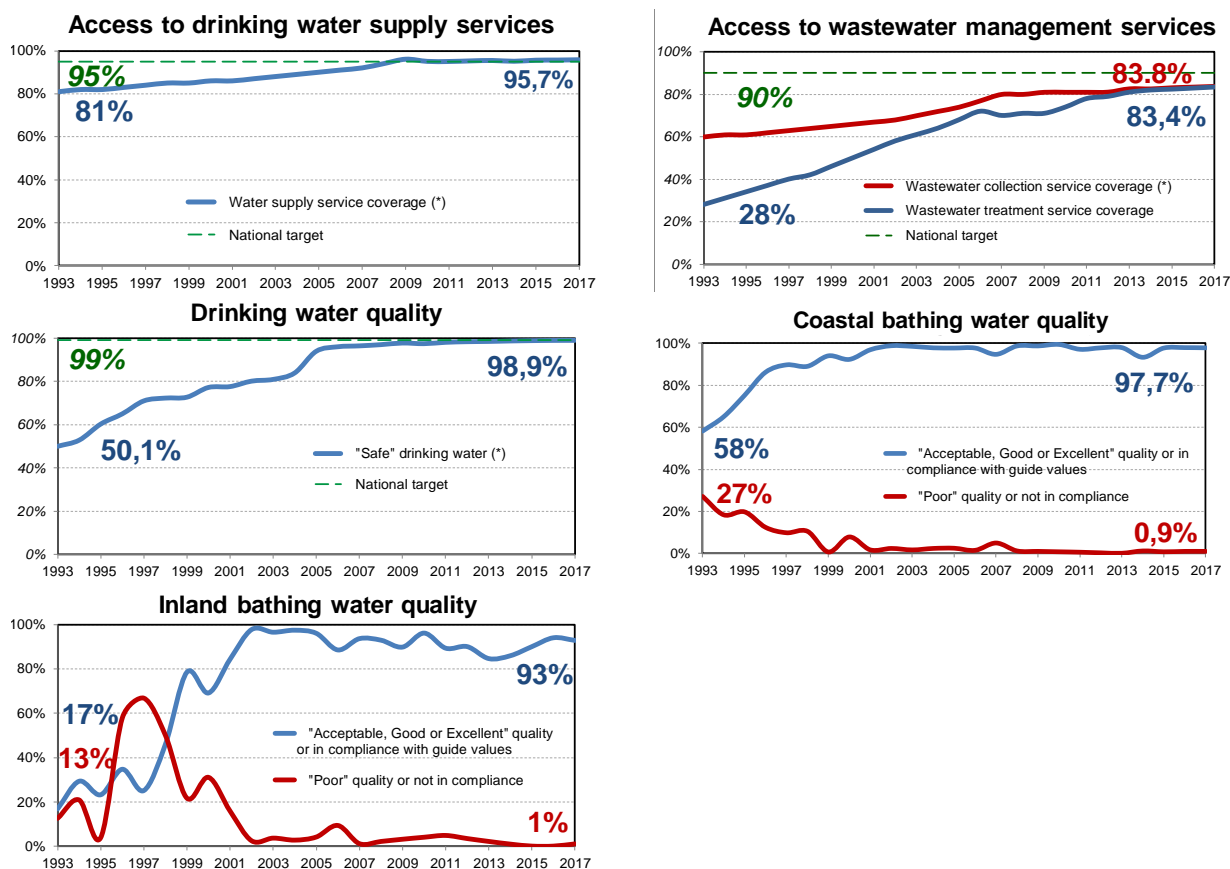


Figure 2 Evolution on water services and water resources in Portugal between 1993 and 2017 (source: ERSAR)

Portugal has currently a very valuable water asset portfolio, mostly recent but some being too aged, complex and demanding in terms of management. Effective asset management is nowadays a priority to ensure that the value of these assets is duly managed, ensuring sustainable water services provision.

#### 4.2 Public policy enabling strategic asset management in Portugal

Table 2 provides some examples of what Portugal did about each building block of the public policy listed in Table 1. This table also refers to some difficulties, less successful issues, challenges and recommendations to overcome them. The national regulatory authority for the water services, ERSAR, has had a pivotal role in this process.

Table 2. Building blocks of a public policy enabling asset management of the urban water systems – the case of Portugal

Public Policy Building block	In the case of Portugal...
Strategic planning	... since 2000, the national strategy for the water sector is defined in strategic plans for a period of 7 years. These plans include an assessment of the situation, the establishment of national objectives, the definition of priorities, an estimation of investment needs and the definition of the funding strategy. These plans are assessed and reviewed periodically. The current national Strategic Plan (2014-2020) (MAOTE, 2015) has introduced a paradigm shift for the sector, defining that the strategy should be less concentrated on the construction of new infrastructures and more focused on asset management.

Public Policy Building block	In the case of Portugal...
Legal framework	<p>... and with regard to municipal systems, some IAM practices are recognised in the legislation as duties of water utilities. In particular, the water utilities serving more than 30 000 inhabitants are required to have an infrastructure asset management (IAM) system. This requirement has helped to attract the attention of the water utilities to asset management. However, since legislation does not refer to specific requirements that are associated with an IAM system and there is no verification of compliance with these duties and penalty tools, in practice, this is not yet adopted in many water utilities. As regards multi-municipal systems, a technical report about the performance and condition of the infrastructures and the future rehabilitation and renewal requirements shall be delivered every 5 years. These reports are subject to external certification.</p> <p>The regulatory authority has recently made efforts in order to make the legal requirements more specific (and thus increase legal effectiveness by allowing easier identification of any breaches of duty, etc.), namely through the development of new asset knowledge and management indices. These indices are audited annually as part of the quality of service assessment process (ERSAR 2018).</p>
Institutional framework	<p>... ERSAR has mandate and skills to promote the enforcement of asset management, included in its regulatory model. The enlargement of the scope to regulatory intervention (applicable since 2011) to all water utilities has promoted the improvement in utilities' information management and accounting systems, which are fundamental bases of IAM. The dissemination of service quality information and the annual awarding of utilities of excellence have also contributed to fostering competitiveness in the sector. Additionally, ERSAR has had an important role in the circulation of technical guides and in the promotion of and support to IAM projects. The major challenges are related with the financial sustainability of the services due to the limited power of the regulator to set the tariffs (only recommendations could be issued). The recent strengthening of ERSAR's powers, will allow this authority to define the sector's tariffs and apply fines and the enforcement of debts. This is a challenge to overcome in order to further improve service quality and ensure full cost-recovery.</p>
Governance models and contracts	<p>... strong incentives for the aggregation of the small and medium size water utilities into larger ones, getting economies of scale, are paving the way to sound asset management practices.</p> <p>... ERSAR is responsible for the legal and contractual regulation of the water services, and includes the asset management in this activity. In particular, by requiring some IAM practices as part of the contracts and defining minimum targets in terms of quality of service indicators.</p>
Quality of service goals	<p>... ERSAR is responsible for the quality of service regulation and includes asset management concerns in this activity. Within the scope of quality of service regulation, a fully audited annual assessment and comparison process for all water utilities operating in mainland Portugal is in place since 2011. The quality of service assessment is currently based on 16 performance indicators for each service: drinking water supply, wastewater management and municipal waste management. The results of this assessment process are publicly available in the Annual Reports on Water and Waste Services in Portugal (RASARPs) aiming to incentivize utilities to increase efficiency and to consolidate a culture of concise, reliable and easily interpretable information for all (e.g. ERSAR 2018). Since 2014, this information is also available through a freely downloadable mobile ERSAR app. Since 2016, several new asset management indices are included.</p>
Tariff and tax policy	<p>... ERSAR has set out a tariff policy for public water services with the goal of promoting a gradual trend towards cost recovery, consistent with the economic capacity of the population. Asset management is also addresses in this activity, for long-term sustainability of the assets, particularly by accommodating the need of expansion and rehabilitation costs in the tariffs according to sound priorities.</p> <p>... an effort has been made to introduce tax instruments, which encourage desirable behaviour, for example the efficient use of water as a primary resource or as final destination, through a water resources usage tax. These taxes feed the Environmental Fund, which partially returns to the water utilities, namely to support activities related with asset management, such as back off activities (e.g. improving the asset registries), expansion and rehabilitation of water systems.</p>
Financial resources	<p>... the funding programme for the water services includes measures to support good practices on asset management, in accordance with the priorities defined in the national strategic plan. Additionally, some incentive mechanisms that has started to be used is to require minimum values of the asset knowledge and management indices to assign certain kinds of EU funds. Even so, some studies have revealed that there is a rehabilitation funding gap and this tendency will increase in the near future if the current investment trend is kept (e.g. Amaral, 2017). This, combined with the reduction of subsidies from EU, is a major challenge to the sector in the medium term.</p>

Public Policy Building block	In the case of Portugal...
Infrastructure construction and rehabilitation	... technical regulation, manuals of best practice, good consulting services and decision support software exists on asset management (e.g. ERSAR 2010 a&b; 2017; ERSARA 2017 a-d). Despite this, improvements in many water utilities, the application in smaller utilities, with limited technical and financial resources, is still a big challenge. One of the aspects to improve is that public procurement is still very much driven by investment costs criteria, instead of by life cycle costs, performance and risk criteria.
Operational efficiency	... ERSAR is responsible for enabling and encouraging a long-term view of operational efficiency gains. The quality of service assessment system has contributed to push the level of operational efficiency in water utilities; however, there is plenty of room for improvements.
Training and capacity building	... continuous training of staff and capacity building initiatives for utilities have been implemented in with success, regarding asset management practices (e.g. iGPI initiatives, ProAguas program). The National Civil Engineering Laboratory (LNEC) has taken a leading role in this regard.
Research and innovation	... research and innovation projects are continuously produced to support leading-edge asset management practices. The activity in IAM research began under the research programme 'Water Infrastructure Asset Management' (Alegre, 2008). Since then, several relevant research and collaborative projects followed, at national, European and international level (e.g., AWARE-P project, EU TRUST project, the iGPI initiatives, igpi.aware-p.org). An integrated IAM methodology was developed and materialised in the publication of two technical guides (ERSAR 2010 a&b). An innovative IAM decision support software was also developed and tested in several utilities (Coelho et al., 2013). Master dissertations (e.g. Serra, 2016) and PhD thesis have brought relevant scientific contributions (e.g. Feliciano, 2016; Amaral, 2017, Gonçalo, -). Many national and international conferences, workshops, courses and meetings have been organised in Portugal (e.g., IWA LESAM 2007; IAM workshop in IWA World Water Congress 2014).
Business development	... more private companies offer services to support rehabilitation, for instance to update the network records and new software tools.
Data, information, and knowledge	... ERSAR collects, validates, processes and disseminates data and information on the existing assets and their performance and sustainability.
Community engagement and users protection	... ERSAR is responsible for enabling community outreach and engagement in establishing the assets long-term vision. Many utilities try to engage their community; however, there is still significant room for improvement. ... ERSAR recognises that users should be protected by giving them the possibility to complain about poor quality of service, inclusively due to incorrect asset management practices; in this regard, ERSAR manages users' complains.

## 5. Conclusion

In conclusion, the sustainability of water systems does not solely depend on the will of individual utilities to implement asset management. It is crucial to pave the way to service effectiveness and sustainability by including the asset management concern in the public policies for water, with the right tools and incentives.

The recent experience achieved in Portugal, in view of the world's drivers and challenges, demonstrates that the establishment of a sound public policy enabling asset management for the water sector is a key success factor for the water services sustainability.

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