



E 4.1.1 Training materials for Innovation Procurement in the water sector

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AAC: Agencia Andaluza del Conocimiento

AdTA: Águas do Tejo Atlântico, S.A.

CENTA: Fundación Centro de las Nuevas Tecnologías del Agua

FUERM: Fundación Universidad Empresa de la Región de Murcia

IFTS: Institut de la Filtration et des Techniques Séparatives

OiEau: Office International de l'Eau

PPA: Associação Parceria Portuguesa para a Água



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ADI-NA : Agence de Développement et d'Innovation Nouvelle-Aquitaine (in English, Nouvelle-Aquitaine Development and Innovation Agency)

AFB : Agence Française pour la Biodiversité (in English, French Agency for Biodiversity)

ANI : Agência Nacional de Inovação S. A. (in English, National Innovation Agency)

BMWi : Bundesministerium für Wirtschaft und Energie (in English, Federal Ministry for Economic Affairs and Energy)

CCAA : Autonomous Communities

CDTI : Centro para el Desarrollo Tecnológico Industrial (in English, Centre for the Development of Industrial Technology)

CSIC : Consejo Superior de Investigaciones Científicas (in English, Spanish National Research Council)

DAE : Direction des Achats de l'État (in English, Directorate of Public Procurement)

DGE : Direction Générale des Entreprises (in English, Directorate General for Enterprise)

DREETS : Direction Régionale de l'Economie, de l'Emploi, du Travail et des Solidarités (in English, Regional Directorate for the Economy, Employment, Labour and Solidarity).

EAFIP : European Assistance For Innovation Procurement

EAFRD : European Agricultural Fund for Rural Development

EDM : Early Demand Map

EEZ : Estación Experimental del Zaidín (in English, Zaidín Experimental Station)

EMASESA : Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (in English, Metropolitan Water Supply and Sanitation Company of Seville)

EMFF : European Maritime and Fisheries Fund

ENEI : Estratégia Nacional de Investigação e Inovação para uma Especialização Inteligente (in English, National Smart Specialization Strategy)

ERDF : European Regional Development Fund

ESAMUR : Entidad Regional de Saneamiento y Depuración de Aguas Residuales (in English, Regional Entity for Sanitation and Wastewater Treatment)

ESF : European Social Fund

ESIF : European Structural and Investment Funds

EU: European Union

FID : Fostering Innovation through Demand

GDP : Gross Domestic Product

GIS EAU : Groupement d'intérêt scientifique EAU (in English, WATER scientific interest Group)

GPP : Green Public Procurement

IMPIC : Instituto dos Mercados Públicos, do Imobiliário e da Construção (in English, Institute of Public Markets, Real Estate and Construction)

INAP : Instituto Nacional de Administración Pública (in English, National Institute of Public Administration)

IOPP : Innovation Oriented Public Procurement

IP: Innovation Procurement

IPR : Intellectual Property Rights

IRNAS : Instituto de Recursos Naturales y Agrobiología de Sevilla (in English, Institute of Natural Resources and Agrobiology of Seville)

LaViSO : Laboratoire Vivant du Sud-Ouest pour l'Eau (in English, South West Living Laboratory for Water)

LIPOR: Serviço Intermunicipalizado de Gestão de Resíduos do Grande Porto (in English, Greater Porto Intermunicipal Waste Management Service)

Living Lab : Living Laboratory

LNEG : Laboratório Nacional de Energia e Geologia (in English, National Laboratory of Energy and Geology)

MEC : Ministerio de Economía y Competitividad (in English, Ministry of Economy and Competitiveness)

MICINN : Ministerio de Ciencia e Innovación (in English, Ministry of Science and Innovation)

MITECO : Ministerio para la Transición Ecológica y el Reto Demográfico (in English, Ministry for the Ecological Transition and the Demographic Challenge)

MSB : Mid-Size Businesses

OFB : Office Français de la Biodiversité (in English, French Biodiversity Office)

ONCFS : Office National de la Chasse et de la Faune Sauvage (in English, National Office for Hunting and Wildlife)

OWL-2 : Open Water Living Lab

PCP : Pre-Commercial Procurement

PEAASAR II : Plano Estratégico de Abastecimento de Água e Saneamento de Águas Residuais (in English, Strategic Plan for Water Supply and Water Sanitation Residuals)

PFRA : PlateForme Régionale des Achats (in English, Regional Procuring Platforms)

PMC : Preliminary Market Consultation

PNUEA : Programa Nacional para o Uso Eficiente da Água 2012-2020 (in English, National Program for the Efficient Use of Water 2012-2020)

PPA : Parceira Portuguesa para a Água (in English, Portuguese Association for Water)

PPI : Public Procurement of Innovative solutions

PRB's : Public Research Bodies

RACPS : Red Andaluza de Compra Pública Sostenible (in English, Andalusian Network of Innovation Procurement)

R&D : Research and Development

R&D&I : Research, Development and Innovation

RIS3 : Research and Innovation Strategy for Smart Specialisation

SAGE : Schéma d'Aménagement et de Gestion de l'Eau (in English, Water Development and Management Plan)

SME : Small and Medium-sized Enterprise

TRL : Technology Readiness Level

TWIST : Transnational Innovation Strategy in the Water Sector

UGAP : L'Union des Groupements d'Achats Publics (in English, Union of Public Purchasing Groups)

uL3 : Urban Lisbon Living Lab

WATERS : WATER Environment Resources Societies

WFD : Water Framework Directive

WWTP : Wastewater Treatment Plant



1. INTRODUCTION

The TWIST -Transnational Innovation Strategy in the Water Sector project, funded by the Interreg Sudoe program, aims to develop an open innovation model in wastewater management, by giving compliance with the Water Framework Directive (WFD) and promoting Innovation Procurement (IP).

The IP stands as a fundamental tool for the public sector to act as a tractor in the introduction of innovations in the market, leading to greater industrial competitiveness and efficient use of resources. For this reason, TWIST has designed a guide for the early identification of technological needs of the public sector that can potentially be satisfied through the IP in the field of activity of the 3 Living Laboratories (Living Labs) created under TWIST (E.3.3.2. "Guideline for the early identification of the needs of the public sector in the scope of water management"):

1. Open Water Living Lab (OWL-2) in Spain: oriented to the co-creation, exploration and evaluation of innovations in the field of wastewater treatment and reuse.
2. Laboratoire Vivant du Sud-Ouest pour l'Eau (LaViSO) in France: oriented to the co-creation, exploration and evaluation of innovations in wastewater treatment and management of infrastructures.
3. Urban Lisbon Living-Lab (uL3) in Portugal: oriented to the co-creation, exploration and evaluation of innovations in treated wastewater reuse and recovery of resources.

Although this guide has been expressly designed to be applied in each of the regions participating in the TWIST project with the aim of identifying three common needs and carrying out IP pilot actions within the project activities, it is easily adaptable for its application in other regions and/or to identify the needs of an individual organization as can be seen in the aforementioned guide.

This document takes as a starting point this guide as well as the level of knowledge in the IP processes detected in Working Group 3 (GT3) “Analysis of results and market exploration: common strategy for the identification of market opportunities”:

The ultimate purpose of this document is to provide material to support the training and awareness of public buyers and companies as a fundamental aspect to promote IP processes in the field of water.

This training materials for IP in the water sector will identify the instruments and initiatives to support innovation public procurement at the European, national (Spain, France and Portugal) and regional levels (in the regions of the participating partners) that could be used by the key agents in each region, which is why it draws not only on current regulations on IP but also on support tools, recommendations, guidance, instruments, initiatives and resources in this matter that can be applied to the water sector.

With this vision, the document has been structured in the following chapters and sub-chapters:

1. Introduction
2. What is the Innovation Procurement
3. Why develop Innovation Procurement actions in the water sector
 - 3.1. Innovation as a determining factor in the development of a region
 - 3.2. Innovation and the water sector: problems and challenges to face
 - 3.3. Livings Labs and Innovation Procurement in the water sector
4. Instruments and initiatives to support Innovation Procurement
 - 4.1. Instruments and initiatives at European level
 - 4.2. Instruments and initiatives at the national level
 - 4.2.1. Spain at the national level
 - 4.2.2. France at the national level
 - 4.2.3. Portugal at the national level
 - 4.3. Instruments and initiatives at the regional level
 - 4.3.1. Spain at the regional level
 - 4.3.2. France at the regional level
 - 4.3.3. Portugal at the regional level
5. Examples of cases developed of Innovation Procurement

- 5.1. Innovation Procurement cases finished
- 5.2. Innovation Procurement cases on going
- 6. Stages of Innovation Procurement processes and actors involved
 - 6.1. Decalogue of the European Union about Innovation Procurement*
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 - 6.4.3.1. Types of contract
 - 6.4.3.2. Main award procedures in IP
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 - 6.4.3.3. Writing of the procurement document or descriptive document for contract tender
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 - 6.4.4.1. Control of the execution of the contract
 - 6.4.4.2. Evaluation and analysis of the impact of the contract results
 - 6.4.4.3. Preparation of results reports
 - 6.5. Support tools and guidance from official organisms
- 7. Bibliography

The preparation of this document has had the participation of the partners involved in activity 4.1. Training material for Innovation Procurement (IP) in the water sector: AAC, CENTA, FUERM, IFTS, OiEau, AdTA and PPA.

2. WHAT IS THE INNOVATION PROCUREMENT

The innovation procurement is the result of the **binomial public procurement + innovation**.

On the **public procurement** side, we have to take into account that the European Commission in its communication “Making Public Procurement work in and for Europe” (COM(2017) 572 final) highlights that “public procurement matters more than ever” to the extent that “a substantial part of public investment in our economy is spent through public procurement [...] making it a fundamental element of the investment ecosystem” that should be used “in a more strategic manner, to obtain better value for each euro of public money spent and to contribute to a more innovative, sustainable, inclusive and competitive economy”.

Looking for “spending tax-payers’ money well”, the European Commission has modernized its public procurement directives and has been proposed that the public procurement opens the door, through the **innovation procurement**, “to higher quality and more efficient solutions that value environmental and social benefits, better cost-effectiveness; and new business opportunities for enterprises” and is not limited to satisfying the primary needs of public entities (C(2018) 3051 final).

On the **innovation** side, starting from the base that has been defined by “multitude of academics, public and / or private organizations and even in the legal regulations itself” and studied “from different perspectives generating a wide literature around the term, without unanimity in the acceptance of a single definition”, it is necessary to know what we mean by innovation in order to know what we are talking about at all times, because it cannot happen that we are calling totally different terms in the same way and, consequently, we are talking about different things (Romero, 2014 revised 2017). For this reason, the Commission, in its guidance on innovation procurement (C(2018) 3051 final), recognise that “innovation can have multiple meanings” and takes as reference points the definition made of the term innovation

by Directive 2014/24/EU and the OECD's Oslo Manual, as well as adopts a broad vision of **innovation procurement**, understanding it as “any procurement that has one or both of the following aspects:

- buying the process of innovation – research and development services – with (partial) outcomes;
- buying the outcomes of innovation created of others.

In the first instance, the public buyer buys the research and development services of products, services or processes, which do not exist yet. The public buyer describes its need, prompting businesses and researchers to develop innovative products, services or processes to meet the need. In the second instance, the public buyer, instead of buying off-the-shelf, acts as an early adopter and buys a product, service or process that is new to the market and contains substantially novel characteristics”.

That said, taking into account that the studies “Country Profile. The strategic use of public procurement for innovation in the digital economy smart 2016/0040” (European Commission, 2020) show that no all countries of the European Union have a definition of innovation in the context of public procurement or of innovation procurement in their national public procurement legal framework or guidance documents (Germany, France, Spain, Latvia, Poland, Portugal, Sweden and Switzerland), and that “Authorities around the world have set targets to direct a percentage of their public procurement budgets to research and development and innovation” (C(2018) 3051 final), we need to have a reference about what we understand by innovation procurement applicable at least to the regions of TWIST's project and scalable to the rest of the European Union's regions, consequently, as countries are expected to apply the European Commission guidance for improving their innovation procurement strategies in line with the European Union guidance. We will take as a starting point the definitions of the European Union towards which they will tend to converge:

According to the European Commission C(2018) 3051 final), and as noted above, **innovation procurement** “refers to any procurement that has one or both of the following aspects:

- buying the process of innovation – research and development services – with (partial) outcomes;
- buying the outcomes of innovation created of others”.

Likewise, they distinguish approaches to address innovation procurement (European Commission, online a):

“1. **Public Procurement of Innovative solutions (PPI)** can be used by procurers when challenges of public interest can be addressed by innovative solutions that are nearly or already in small quantity on the market. PPI can thus be used when there is no need for procurement of new R&D to bring solutions to the market, but a clear signal from a sizeable amount of early adopters/launch customers that they are willing to purchase/deploy the innovative solutions if those can be delivered with the desired quality and price by a specific moment in time. A PPI may still involve conformance testing before deployment.

2. **Pre-Commercial Procurement (PCP)** can be used by procurers when there are no near-to-the-market solutions yet that meet all the procurers' requirements and new R&D is needed to get new solutions developed and tested to address the procurement need. PCP can then compare the pros and cons of alternative solutions approaches and de-risk the promising innovations step-by-step via solution design, prototyping, development and first product testing. PCP is a public procurement of R&D services that does not include the deployment of commercial volumes of end-products”.

Moreover, the European Commission, in its EU Framework Programme for Research and Innovation H2020, includes a “useful **legal definition** of public procurement of innovative solutions (PPI) as a basis for the eligibility of procurement actions for EU co- financing. It stipulates that **Public Procurement of Innovative solutions (PPI)** is procurement where contracting authorities act as a launch customer for innovative goods or services which are not yet available on a large- scale commercial basis, and may include conformance testing. Public procurement of innovative solutions does not include the procurement of R&D services, which is known as ‘pre-commercial procurement’ (PCP).

Pre-Commercial Procurement (PCP) means procurement of research and development services involving risk-benefit sharing under market conditions, and competitive development in phases, where there is a separation of the research and development phase from the deployment of commercial volumes of end-products". (European Commission, 2015).

However, we must not lose sight of the fact that "any public purchase, if admitted and properly valued in the award criteria, may end up being a public procurement of innovation" (INAP, 2013), therefore, **public procurement** refers, it can act in three ways, from the point of view of the **degree of maturity of the innovation at the beginning of the hiring** (Innovation Policy Platform, online):

1. **Regular Procurement of Innovation:** "occurs when public sector organisations buy ready made products for which no R&D is required, can incorporate innovation-related criteria in the tender specifications and in the assessment of tender documents, for instance".
2. **Public Procurement of Innovative solutions:** "public procurement can strategically create a demand for technologies or services that do not yet exist. This procurement involves purchasing a not-yet-existing product or systems".
3. **Pre-Commercial Procurement:** "public procurement can target the purchase of research and development services to support the activities and decisions of government and public authorities. This is the case for pre-commercial procurement of R&D (with no guarantee that the public sector will buy the goods or services developed)".

Finally, we want to emphasize that although the IP typologies are two: PPI and PCP, in Public Administration there is a growing tendency to encourage public procurement to be carried out as far as possible taking into account innovation criteria, and the term **Regular Procurement of Innovation** has been coined to refer to the public procurement of goods and/or services with innovation criteria, so in order to differentiate it from the IP typologies we will use the term **Public Procurement with Innovation criteria**.



3. WHY DEVELOP INNOVATION PROCUREMENT ACTIONS IN THE WATER SECTOR

Developing Innovation Procurement actions in the water sector requires contextualizing the IP at the sectoral level, therefore, before addressing why Innovation Procurement actions should be developed in the water sector, we will discuss the importance of innovation and its promotion as a determining factor in the development of a region, the problems detected in relation to innovation and technology transfer in the water sector, as well as we will identify the main challenges facing the competent Public Administration in water matters.

3.1. INNOVATION AS A DETERMINING FACTOR IN THE DEVELOPMENT OF A REGION

The working table online “Open Water Living Lab CENTA. Hacia un modelo de innovación abierta en el sector del agua en las regiones del espacio SUDOE” (CENTA, 2021) has allowed the TWIST project partners to confirm that, as of today, innovation has replaced capital and production as a factor of wealth: the close relationship between the development of countries and their level of technological innovation is unquestionable, its strengthening being essential as an engine to respond to the new challenges that today's society demands through an economy based on knowledge in which R&D&I activities acquire an increasing weight within the framework of the itself, acquiring a role much or more relevant than the production processes.

The regions of the European Union need to find ways to be more resilient and competitive to be able to confront on a global scale with other more advanced economic powers and with emerging economic powers. In this context, the Research and Innovation Strategy for Smart Specialization (RIS3) is developed at the regional

level, the objective of which is to promote a new economic model, based on a firm and determined commitment to innovation, science, technology and internationalization, in that each region must take advantage of its competitive advantages and its specific potential for excellence.

Smart specialization strategies and interregional and macro-regional cooperation should encourage regions to exploit existing complementarities and create inter-territorial value chains, promoting the convergence of innovation indicators.

Taking as a starting point that the RIS3 of the regions of the SUDOE space establish the water sector as a vector of innovation, and with the aim of reinforcing the synergistic and networked operation of R&D&I in the water sector, the TWIST project aims to establish a common supra-regional framework that promotes R&D&I in the water sector, through an organization and collaboration model for the co-creation, experimentation, evaluation and placing on the market of technologies and innovative products around the implementation of three specialized and complementary Living Labs that are being developed in three of the participating regions (Andalusia, Aquitaine and Lisbon).

3.2. INNOVATION AND THE WATER SECTOR: PROBLEMS AND CHALLENGES TO FACE

The CENTA's online working table (2021) highlighted that, taking into account that innovation is an essential tool to respond to the new challenges that today's society demands, the water sector in this sense is peculiar: the vulnerability of water resources to climate change, the circular economy as a transition towards the new model of economic development, the duality of natural resource – productive asset, among others, are challenges that require new and better management approaches, more efficient technologies and solutions adapted to the current context, for which innovation results essential and decisive.

Based on the foregoing, it could be understood that in the water sector there is a context of opportunity for innovation, with challenges that act as a lever for R&D&I in

the face of the need to search for new, more effective solutions. However, reality does not offer a clear reflection of this situation, or at least its reflection is uneven depending on whether it is one disciplinary sphere or another and depending on the types of agents (companies, administration, etc.). Thus, faced with a clear demand for innovation, the offer sometimes does not respond to needs or presents enormous difficulties in transferring it to the market.

To face the challenges of water, it is necessary to integrate innovation (technological and social) in the sector, which requires a good understanding of the needs of society and the market, the ability to explore new ideas as well as the skills of companies and administrations to implement new solutions.

For this to be possible, an analysis must be made of the singularities that characterize this sector, and that condition technological demands and responses, as well as in relation to social perception regarding water.

Likewise, the report on the promotion of innovation and technology transfer in the water sector of MITECO (2020a) addresses the problems detected around this issue and identifies the main challenges faced by the competent Public Administration in water matters for address them:

"The water policy of the last decades has had to evolve from a simple satisfaction in quantity of demands, towards planning and management of water resources in a context of comprehensive efficiency, improvement of the useful life of the asset and its maintenance, optimization and reduction of energy consumption and water losses. Likewise, the new national and community regulations lead to an increase in the quality required in the purification, sanitation and reuse processes, and the protection of ecosystems, which add to the pressure derived from current non-compliance with the Water Framework Directive, in which there are a high number of exemptions from compliance with environmental objectives due to their technical infeasibility or disproportionate costs, although term extensions will not be possible beyond 2027.

All of this is in line with global changes in recent decades, which have resulted in increased pressures on water resources and other resources in general, and with the need to comply with the requirements of national and community regulations

mentioned, both in the field of water and in the rest of the sectoral policies. This context advises that the public water administration explore alternatives through innovative projects that respond to real needs that conventional technologies are not capable of solving. The adoption of innovative products or services requires a prior effort to consolidate administrative mechanisms that favour both internal communication and cooperation with the scientific-academic field in the search for new solutions."

In this line, the CENTA's online working table (2021) states that "to face the challenges of water, it is necessary to integrate innovation (technological and social) in the sector, which requires a good understanding of the needs of society and the market, the ability to explore new ideas as well as well as the skills of companies and administrations to implement new solutions. For this to be possible, an analysis must be made of the singularities that characterize this sector, and that condition technological demands and responses, as well as in relation to social perception regarding water":

•Technological challenges versus management challenges: water is a tremendously complex reality, about which it is not possible to have a simplistic vision that remains purely technological. During the last century, the challenges for the water sector were in being able to mobilize resources to satisfy the demands in quantity, quality and opportunity at an affordable cost, which generated an important development in works and hydraulic technology. Already in its final stretch, environmental awareness was an important boost for development in the field of wastewater treatment technologies.

Today, the challenges of the XXI century are very different and are given by the uncertainty in the face of the effects of climate change and the need to protect the integrity of water ecosystems and their future sustainability. Undoubtedly, technology has to play an essential role to guarantee efficiency, but the challenge really lies in approaching management with appropriate, holistic and cross-cutting approaches, so innovation must go beyond the technological plane to spread to other areas.

•Pluridisciplinarity: the integrated planning and management of the water cycle is based on a systemic and interdisciplinary approach that requires the support of a

wide range of knowledge domains in fields ranging from technology, economics, biology to the social sciences. All this, in order to achieve an appropriate use of resources and to face the complexity of managing risks and uncertainties.

Thus, innovation in the sector must cover a wide range of subjects ranging from the management of water resources, socio-economic and other environmental aspects, as well as engineering and the development of new technologies, processes and methods of evaluation, simulation and monitoring, management of the services that accompany the phases of pre-use, use and reuse of water, etc.

R&D has been developing from an approach, probably necessary, of specialization. The generation of knowledge necessarily requires a focused effort, limited to a specific disciplinary area. However, innovation requires a much more open vision and perspective.

In this way, success for innovation in the water sector involves combining the development of highly specialized knowledge with disciplinary symbiosis and sectoral hybridization as an opportunity to identify and implement innovative technologies, processes or products.

•Public component: the water sector has an indisputable public component in its entirety, from the own nature of a public good that water resources have, to the provision of urban water and sanitation services. The protection and management of resources as well as services to end users (citizenship or productive uses) lie in the Public Administration.

The organization of the Public Administration is characterized by elements of legal security, transparency and bureaucracy that constitute a real brake on changes and innovation. This strong public component contrasts with the very important development and competitive level of companies in the water sector, both in engineering, technology and/or component companies, as well as in the service sector.

This conditions that the innovation has an uneven implantation in the sector, since the abilities to integrate processes and mechanisms of innovation in its structures are much more effective in the private sector than in the administration field.

With all this, the combination of factors such as demanding environmental regulations and water policies focused on the protection of the resource or the

strategic value of the water resource for productive sectors as important as agriculture or tourism, have motivated the business sector to optimize their processes and continuous improvement to reduce costs, as well as to improve the efficiency of water use. Thus, we can see how desalination processes have evolved towards more efficient technologies and configurations, or biological treatments have been widely developed and improved to purify wastewater. Another driver of innovation has been the need to incorporate reclaimed water as unconventional resources, as well as the recovery of by-products in purification processes (nutrients, sludge, etc.).

However, this impulse is insufficient for many technology-based companies that have developed innovative solutions, and that would need a greater and faster implementation of their products in the market, thus strengthening their business plans and achieving the necessary stability in the short term. to start growing and keep improving its products.

For this reason, the innovation model in the water sector needs a change that makes it possible to shorten the distance between technological development and the market, accelerate the commercialization process and promote the integration of innovation processes in the public sector. It is also necessary to promote a collaborative and specialization model in the innovation process in which all the agents involved are integrated and interact: research centres, companies, administrations and society".

3.3. LIVINGS LABS AND INNOVATION PROCUREMENT IN THE WATER SECTOR

One of the main characteristics of the Innovation Procurement (IP) is its potential to address the challenges of the public sector that cannot be solved by means of products or services available in the market (TWIST, online).

The IP is an R&D&I policy instrument that has considerable potential and represents **advantages** for the public sector, the private sector and society (Peñate and Sánchez, 2018):

- It guarantees an initial market of remarkable dimension for innovations developed by the private sector.
- Reduces risk for suppliers investing in new and expensive technologies.
- It shows the path to innovate, serving as an example (demonstration effect) due to its central role in innovation systems.
- Stimulates the market, favouring the diffusion of products and technologies.
- Provides a testing and experimentation ground and launch market for new products and technologies.
- It improves the efficiency and quality of public services and reduces costs in the medium and long term.

The **public sector** is a key economic agent that acts from the demand side as a driver of business technological innovation, promoting the improvement of public services through the incorporation of technologically innovative products or services that contribute to achieving intelligent economic growth, sustainable and inclusive as proposed by the Europe 2020 Strategy (COM (2010) 2020 final).

To achieve this, public procurement is an ideal instrument, hence the European Union:

- urge procuring entities to use strategically the public procurement to encourage and drive innovation,
- allocate funds for the implementation of the IP in less developed and innovative regions and, for the promotion of the participation of SMEs in the public market (MEC, 2015), and
- promote, through community regulations, changes in the regulatory and institutional frameworks of the member countries regarding IP (see Country Profile. The strategic use of public procurement for innovation in the digital economy smart 2016/0040).

Furthermore, as IP does not work in a similar way in all regions, it must be taken into account that "the identification of regional particularities constitutes the basis for proposing policies from a demand perspective that is more appropriate to the intrinsic characteristics of each territory", a fact that affects the design and use of IP

itself in the different Smart Specialization strategies of the regions or its effect on the evolution of regional disparities (Peñate and Sánchez, 2018).

Regarding the **water sector**, the European Union has set itself the objective of boosting the EU's competitiveness, growth and employment, thereby positioning Europe as a world market leader in innovative water-related solutions (European Commission, online b). For this reason, it has promulgated community regulations that are added to the Water Framework Directive in requiring an increase in quality in the purification, sanitation and reuse processes and has urged member countries to legislate on this matter so that they evolve from a “priority in satisfaction of demands, towards planning and management of water resources that is more attentive to environmental considerations in a context of comprehensive efficiency, improvement of the useful life of assets and their maintenance, optimization and reduction of the consumption of energy and water losses” before 2027, a situation that is causing the non-fulfilment of environmental objectives due to technical infeasibility and/or disproportionate costs, so it is advisable that “the public water administration explore alternatives through the adoption of technologically innovative products or services for the development of their skills, which conventional technologies are not able to solve” (MITECO, 2020a).

However, according to MITECO (2020a), despite the existence of tools and funds available for the development and implementation of innovative products, there is a deficit impulse on the part of the public water administration, in the search for solutions around the planning and management of water that is structured around three main axes around which the main deficiencies in terms of innovation and technology transfer in the water sector within the Public Administration are summarized, and which in turn coincide with the main stages of an R&D&I contracting procedure. Regarding the deficiencies or unmet needs regarding the governance and knowledge of the public water administration, it is worth highlighting:

“The application of innovative technology by the public water administration is based on an identification of innovation needs around the management and planning of water resources...

•In relation to the search for solutions to the problems for which it is detected that the use of R&D&I would be relevant, there is a disconnect between the diverse technological offer of the public and private sector and the real needs of the Administration, a fact that slows down the incorporation of innovative technology in the management of water resources...

•Sometimes the scarce active participation of the public water administration, or its incipient involvement in the most advanced public research organizations, universities, most advanced national and international technology centres [...], and the private sector, leads to ignorance of the actions carried out between the different agents in the field of R&D&I in the field of water...

•A fundamental element for the acquisition of innovative technology by the Public Administration are the contracting procedures [...] that encourage innovation. However, several of these procedures have not yet been developed or have an incipient development, especially in the water sector..."

In this context, the figure of **Living Labs** emerged within the framework of the TWIST project (SOE2/P1/E0506), born with the aim of strengthening the innovative ecosystem through research infrastructures that serve as a platform for the development of technologies, projects or ideas in relation to the challenges presented by the water sector.

For this reason, the beneficiary countries of the TWIST project have opted for Living Labs with the ultimate aim of promoting a change in the innovation model in the water sector, which allows (CENTA, 2021):

- Shorten the distance between technological development and the market.
- Accelerate the commercialization process.
- Drive the integration of innovation processes in the public sector.
- Promote a collaborative and specialization model in the innovation process in which all the agents involved (research centres, companies, administrations and society) are integrated and interact.

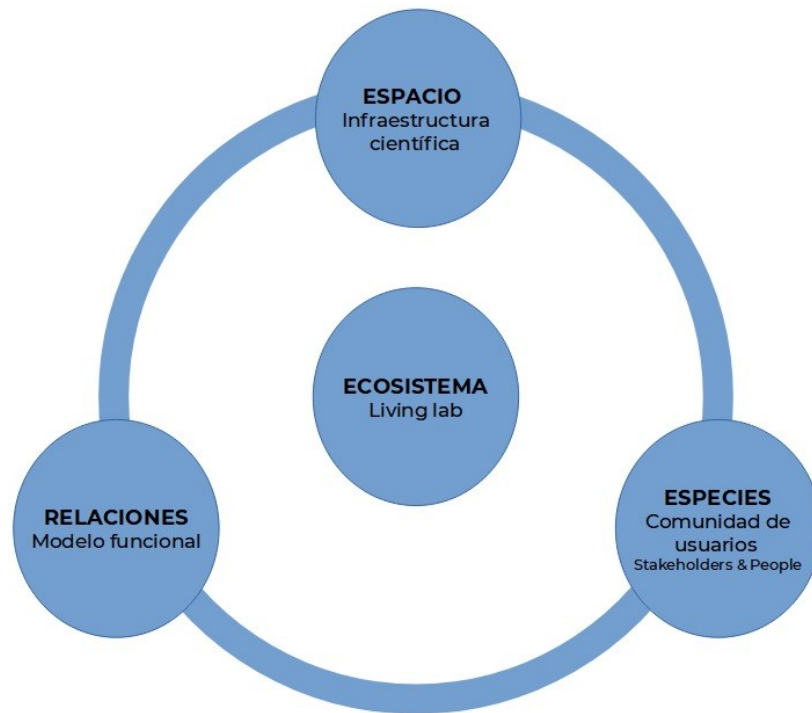


Figure 1. Concept of Living Lab in the TWIST project
Source: (CENTA, 2021)

TWIST define its Living Labs as “social innovation spaces that offer resources that help innovators to carry out their projects, with the help of driving agents and/or facilitators and favouring the development of collaboration networks for the implementation of individual projects that respond to priorities collective”, in line with:

“A Living Lab is user-driven open innovation ecosystem based on a business – citizens – government partnership which enables users to take an active part in the research, development and innovation process” (European Commission, 2009).

Although these open innovation ecosystems “do not respond to a specific, exportable and standardized model, but their configuration will depend on the context in which they are developed, the medium that supports it, the actors involved and its objectives [...], they present a set of common elements, which could be defined as the defining characteristics of the Living Lab concept:

- Multi-Stakeholder: all the different actors involved in the sector participate in the process (university, research centres, industry, governments, administrations and citizens,..) and they do so from equality.
- Multi-Context: unlike traditional validation processes in which it was sought to isolate, as far as possible, the user-product context, creating a "laboratory" experiment, in a Living Labs it is sought to capture the interrelationships between multiple contexts in a real-world environment.
- Feedback: it is not about capturing data that will be studied later to validate a service or as a result of experimentation, but about fully including users in the innovation process. Access to the information generated by the technology deployed in the Living Lab is continuous, allowing the modification of what is considered necessary to fine-tune the service or product under development.
- Interaction between research centres, companies, governments and users in a real environment. It seeks to create an environment where the representatives of the different actors interrelate and collide based on specific products and technologies. Facilitating the transfer of knowledge between the research world, the company and the administrations.

The operating process of a Living Lab is based on a spiral that simultaneously involves the participation of a multi-stakeholder team in the following four main activities:

- Co-creation: co-design of users and producers, confronting technology with a diversity of points of view, limitations and the exchange of knowledge that supports the ideation of new scenarios, concepts and related objects.
- Exploration: it is about involving all stakeholders, especially user communities, in the initial phases of the co-creation process to discover new scenarios, new social challenges, etc. in real environments.
- Experimentation: the implementation of "live" scenarios to discover emerging uses, behaviours and market opportunities and experiment in live scenarios with a large number of users, at the same time collecting data that will be analysed in context during the evaluation activity.
- Evaluation: evaluation of concepts, products and services according to social criteria. Evaluate new ideas and innovative concepts, through various dimensions beyond the merely technological".

For its part, European Union has pointed out that Living Labs are the first step towards "a new European R&D and Innovation System, entailing a major paradigm shift for the whole innovation process" as well as "allow a bottom-up policy coherence to be reached, starting from the needs and aspirations of local and regional stakeholders, creating a bridge between Horizon 2020, Smart Specialisation, the Urban Agenda, Cohesion Policy, and so forth. In this context, **Living Labs can be somehow thought of as a transversal, ICT driven, 'lead market' for "strengthening synergy between EU support policies in the area of research and innovation" and placing regions and cities as leading actors in Europe's innovation strategies"** (Smart Specialisation Platform, online).

If we add to these statements that, in terms of IP, it is demonstrated that:

- the different realities of each region should be considered "in the design of policies since pre-existing levels of development and innovation influence their effectiveness. This can be seen in the various aspects analysed, such as that the same IP modality does not work in a similar way in all regions, in the importance of financing, or in obtaining innovative services and products. This fact may affect the design and use of the IP itself in the different smart specialization strategies of the Autonomous Communities or its effect on the evolution of regional disparities" (Peñate y Sánchez, 2018).
- the public procurement applied to the transfer of knowledge through Public Research Bodies (PRB's) presents "unexplored potentialities in the context of the quadruple helix" insofar a change in the dynamics and functions of the PRB's is confirmed that pass "from having purely R&D production functions to having decision-making capacity in the allocation of funds and monitoring the development of innovations, positively transforming the relational ecosystem" (Lobera et al, 2019).

The Livings Labs are a key piece to be able to achieve a change in the innovation model in the water sector towards a collaborative and specialized model in the innovation process and, an ideal tool for "help European Regions identify and valorise their respective economic niches and competitive advantages in the perspective of Smart Specialisation" (Smart Specialisation Platform, online).

In the water sector, Livings Labs can act as catalysts for IP, constituting a technological platform and innovation ecosystem for technology transfer between the different actors in the water sector, in this case, wastewater treatment and reuse and resource recovery, a field in which great technological development is still necessary to respond to the demands of small populations.

It is important to highlight its legitimacy as a pillar of the change in governance, based on increasing the degree of trust of companies in public research organizations (in this case a Living Lab), aligning the innovation objectives of the Livings Lab with the enterprises. The social character of Livings Labs as innovation ecosystems cannot be overlooked, with a strong base in social interaction with the closest or best known environment. The effectiveness of IP instrument is favoured by the existence of prior relationships established between the different Livings Lab agents. The Livings Labs user community will facilitate the development of stable networks, facilitating transaction costs and establishing a favourable context for the exchange of innovative knowledge and the co-creation of innovative solutions. In this context, the participating enterprises would show high levels of satisfaction, especially based on the applied orientation of the IP tool and the possibility of engaging in exchanges with researchers. Additionally, IP "presents unexplored potentialities in the context of the quadruple helix (Maldonado et al., 2009), being able to promote the transfer of knowledge with third sector organizations to develop new products and services for social needs that are outside the incentives from the market." (Lobera et al, 2019).

Therefore, we can conclude by saying that **Livings Labs can play a key role in developing Innovation Procurement actions in the water sector** in so far that they can implement IP through knowledge transfer (Lobera et al, 2019) transforming in turn the innovation system of the water sector.



4. INSTRUMENTS AND INITIATIVES TO SUPPORT INNOVATION PROCUREMENT

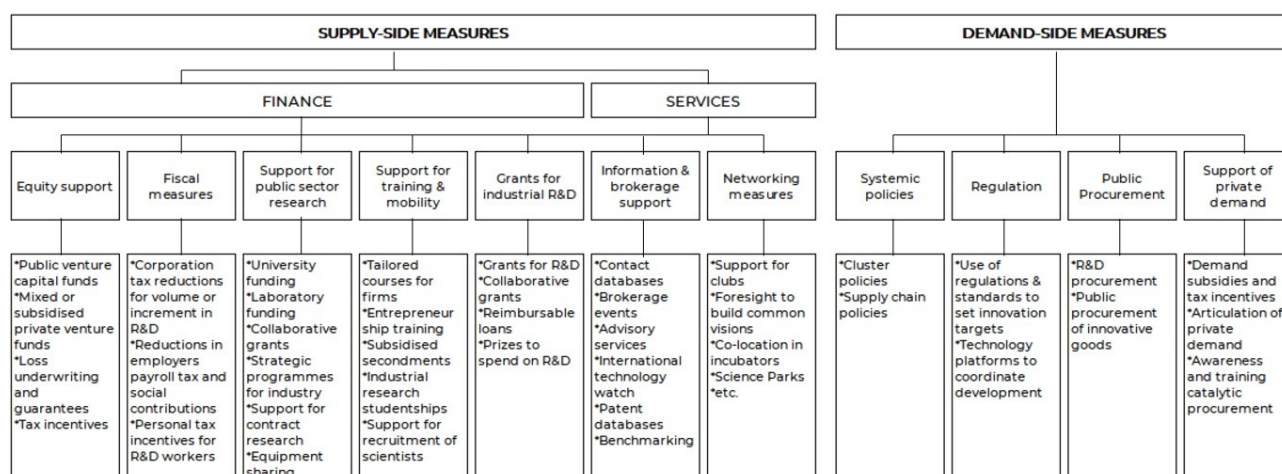
Policies and mechanisms to promote innovation “can be grouped into two large groups: those based on a boost in demand and those that affect supply [...] policies based on supply seek to increase their incentives for investment in innovation by reducing costs through, for example, direct R&D financing, tax incentives, risk and debt distribution plans, as well as technology extension services. [...] policies based on demand are oriented towards increasing the demand for innovation by generating incentives for innovation to occur [...] Public Procurement, regulation, subsidies and tax incentives for consumers who they buy certain products linked to innovation, are examples of demand-side innovation policy instruments” (Lobera et al, 2019).

Traditionally, innovation policies have focused on the supply side, however, “a sense that traditional supply-side innovation policies are insufficient to meet the challenges posed in promoting competitiveness” (Edler y Georghiou, 2007) has led to promote policies from the demand side for innovation.

In Europe, the impetus for demand-side innovation policies occurred as result of the report of the group of experts known as “Aho Report” (Aho et al., 2006), in which the experts revealed that “the reason business is failing to invest enough in R&D and innovation in Europe is the lack of an innovation-friendly market in which to launch new products and services”, from there “the need to take demand, more concretely public demand, more into the focus of innovation policy making and use it to complement existing and new supply side measures”(Edler y Georghiou, 2007).

According Edler y Georghiou (2007) the demand-side policies can be presented in four main groupings: systemic policies, regulation, public procurement and stimulation of private demand (figure 2). While the demand-side policies “rest

strongly on the use of regulation and standards and more broadly on the concept of promoting lead markets”, Innovation Procurement (IP) can be considered “a cornerstone of a co-ordinated and technology or sector specific mix of policies”. Hence, we focus in this chapter on instruments and initiatives to support IP.



*Figure 2. Taxonomy of innovation policy tools
 Source: Edler y Georghiou (2007)*

4.1. INSTRUMENTS AND INITIATIVES AT EUROPEAN LEVEL

The European Union has as a strategic objective “to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion” (European Parliament, online a) and “to create a genuine single European market for innovation, which would attract innovative companies and businesses” (European Parliament, online b), to achieve this, given that the policies and tools to promote innovation from the supply side are not enough to ensure that investment in R&D&I by European companies reaches the level necessary to make Europe a world benchmark, has opted for the combination of coordinated policies to promote innovation from both the supply side and the demand side. In particular, it has opted for the ability of Public Administrations to act on innovation through the demand for public products and services, based on the fact that public procurement in the European Union represents close to 20% of its GDP.

The instruments and initiatives developed by the European Union to promote the public procurement of innovation are based in **two pillars: European legislation and funding**.

The European Union through **European legislation** influences the legislation of the member countries and their regions. In law, there is a rule that a regulation of a lower rank must be compatible at all times with a regulation of a higher rank, not being able to go against it because it would be voidable by the higher levels. Based on this rule, the countries and regions that make up the European Union must legislate according to the guidelines that it sets, and therefore, from the community regulations, it is possible to influence and promote changes in the regulatory and institutional frameworks of the member countries.

Regarding public procurement, currently the member countries of the European Union are affected by the following three directives, which they must transpose into their national law:

- **Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts:** establishes rules on the procedures for procurement by contracting authorities and contracting entities by means of a concession, whose value is estimated to be not less than the threshold laid down in article 8.
- **Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC:** establishes rules on the procedures for procurement by contracting authorities with respect to public contracts as well as design contests, whose value is estimated to be not less than the thresholds laid down in article 4.
- **Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC:** establishes rules on the procedures for procurement by contracting entities with respect to contracts as well as design contests, whose value is estimated to be not less than the thresholds laid down in article 15.

These Directives encourage “companies to develop their capacity for innovation, while maintaining the basic requirements of competition, transparency and equal treatment” as well as facilitate “procurement approaches which have been found to be innovation friendly” (European Commission, 2015) “maintaining however the basic requirements of competition, transparency, equal treatment and compliance with EU state aid rules” (Water PiPP, 2015).

The guidebook “Public procurement as a driver of innovation in SMEs and public services” (European Commission, 2015) summarizes the provisions **on Innovation Procurement**, which are contemplated by these Directives:

- “1. Streamlining of documentation requirements at selection stage: to encourage participation of SMEs in public tenders.
2. Clarifying the exemption for R&D services or what is called Pre-Commercial Procurement (already existing in the 2004 legal framework): to encourage public procurers to stimulate the development of new/innovative solutions.
3. Clarifying rules on preliminary market consultations: to allow a better market consultation and stimulation of the market.
4. Encouraging functional and performance-based specifications: to better stimulate the development of innovation in avoiding technical specifications.
5. Encouraging competitive procedure with negotiation: to allow a better market consultation and stimulation.
6. Greater availability of competitive dialogue: to better stimulate the development of innovative solutions.
7. Ability to apply environmental and social criteria and take life-cycle costs into account: to better stimulate the development of innovative solutions.
8. Possibility to introduce award criteria referring to innovative characteristics (article 67 of the revised directive).
9. Clarifying rules on joint (cross-border) procurement: to enable larger market pull and spread the individual procurement risk for early innovative projects implying uncertain outcomes.

10. Organising the annual reporting by Member States on public procurement of innovative solutions and SME involvement: to have a better qualitative and quantitative idea on the nature of procurement”.

Likewise, the European Commission has strengthened its political framework to boost innovation from a demand point of view by providing abundant aid material to facilitate the implementation of public procurement of innovation for member countries in their regions. We highlight:

- Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe** (COM(2007) 799 final): draw the attention of Member States to the existing but underutilised opportunity of pre-commercial procurement.
- Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe. Example of a possible approach for procuring R&D services applying risk-benefit sharing at market conditions, i.e. pre-commercial procurement** (SEC(2007) 1668): provides, by way of example, one possible implementation of the pre-commercial procurement in line with the existing legal framework.
- Guide on dealing with innovative solutions in public procurement. 10 elements of good practice.** (Commission staff working document SEC(2007) 280): guide on the uptake of commercially available innovative products, works and services in the public sector that identifies ten elements of good practice to promote the potential of public procurement for stimulating innovation.
- Guidebook Public Procurement as a Driver of Innovation in SMEs and Public Services** (2015): shows to policymakers in the regions and at national level what they can do to support innovation procurement as well as potential tools to unlock the "power of the purse" of public procurement that can be used by regions.
- Making Public Procurement work in and for Europe** (COM(2017) 572 final): presents a public procurement strategy which sets out the overall policy framework and defines clear priorities to improve procurement in practice and support investment within the EU.

- **Guidance on Innovation Procurement** (C(2018) 3051 final): presents in a concise manner the fundamental aspects of innovation procurement (why it is important, who has interest in it and how it can be done).
- **Guidance on the participation of third country bidders and goods in the EU procurement market** (C(2019) 5494 final): offer assistance to public buyers by improving understanding of certain practical aspects of the public procurement procedures laid down in the relevant EU legislation when dealing with third country participation in tenders.
- **Policies on Public procurement** (online): information about European policies on public procurement.
- **EU policy initiatives on Innovation Procurement** (online): show EU policy initiatives on IP.
- **Innovation procurement** (online): show EU policy initiatives on IP as well as the co-financing funding opportunities and networking.
- **Benchmarking of national innovation procurement investments and policy frameworks across Europe** (online): study SMART 016/0040 about benchmarking of the national policy frameworks and the national investments on innovation procurement across Europe.
- **European Assistance For Innovation Procurement – EAFIP** (online): initiative financed by the European Commission for providing local assistance to public procurers for starting new innovation procurement and for promoting good practices and reinforcing the evidence base on completed innovation procurements.

Finally, in **water matters**, currently the member countries of the European Union are affected by the following community legislation:

- **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** (Water Framework Directive): establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater.

This Water Framework Directive (WFD) “was created in response to the need to unify actions in the field of water management in the European Union. Due to the fact that

the waters of the European Community are subjected to the increasing pressure that supposes the continuous growth of its demand, of good quality and in sufficient quantities for all uses, the need arises to take measures to protect the waters both in qualitative terms as quantitative and thus guarantee their sustainability. In addition, the WFD will make it possible to establish homogeneous environmental objectives among the Member States for water bodies and to advance together in their achievement, sharing experiences” (MITECO, online).

The European Commission, through **European funding**, has promoted the implementation of public procurement of innovation in member countries:

- Framework Programs R&D&I:** the EU's research and innovation programs¹ have been funding projects in which groups of procurers from different countries around Europe are jointly implementing Pre-Commercial Procurement (PCP) or Public Procurement of Innovative Solutions (PPI), as well as coordination and networking projects that prepare the ground for future PCP and PPI (European Commission, c, e y g).

- European Structural and Investment Funds (ESIF):** EU Member States and their regions can also co-finance innovation procurements, including pre-commercial procurements, from the ESIF in the context of their smart specialisation strategies (C2018, 3051 final). The ESIF are five:

1. European Regional Development Fund (ERDF).
2. European Social Fund (ESF).
3. European Agricultural Fund for Rural Development (EAFRD).
4. European Maritime and Fisheries Fund (EMFF).
5. Cohesion Fund.

Synergies between Framework Programs R&D&I and ESIF funds can also be used to co-fund IP projects (PCP and/or PPI) (European Commission, e).

Likewise, the European Commission has financed a multitude of projects related to public procurement of innovation. We highlight for their interest in IP matters:

¹ First, through the 7th Framework Programme (FP7) and the Competitiveness and Innovation Programme (CIP) and, later with their successors, the Horizon 2020 Programme (currently awaiting the launch of the Horizon Europe Programme) and, the Competitiveness of Enterprises and SMEs Programme (COSME).

•**Procure2Innovative**: coordinate and implement strategies in IP and promote the exchange of good practices and successful experiences among its participants through entities in charge of promoting and fostering IP in each country called Centres of National Competence in IP. Spain and Portugal participate in this project.

More information: <https://procure2innovate.eu>

•**PROCURA+**: runs in parallel to Procure2Innovate and aims to organise, annually, the Procura+ Awards to highlight sustainable and innovation procurement and tender procedures and give visibility to the most dynamic, forward-looking and innovative public authorities and their initiatives. Spain, France and Portugal participate in this network.

More information: <https://procuraplus.org/awards>

•**Procurement of Innovation Platform**: help public authorities, procurers, policy makers, researchers and other stakeholders harness the power of IP; as well as provides a central database for IP knowledge, gathering useful resources in one place (national and European policy and strategy documents, tools, case studies, details of projects and initiatives, and reports).

More information: <https://innovation-procurement.org>

•**iBuy**: develop innovative models suitable to mobilise public and private stakeholders on the basis of the 'entrepreneurial discovery process' linked to the research and innovation strategies for smart specialisation in the area of innovation procurement, while promoting a European perspective and ensuring the durability and transferability of the achieved results. Spain and Portugal participate in this project.

More information: <https://www.interregeurope.eu/ibuy>

•**Big Buyers**: promote collaboration between big public buyers in implementing strategic public procurement for sustainable solutions.

More information: <https://bigbuyers.eu/>

•**Learning Technology Accelerator**: accelerate knowledge transfer, dialogue and awareness raising of innovative procurement within the learning technology sector by creating a European wide learn tech procurers' network. Spain, France and Portugal participate in this project.

More information: <http://www.learntechaccelerator.org/>

•**PRONTO**: support public buyers to implement Public Procurement of Innovative solutions (PPI). Spain and Portugal participate in this project.

More information: <https://www.pronto-ppi.eu/about/pronto-in-a-nutshell>

•**Innovation Procurement Brokers** (InnoBrokers): facilitate the procurement of innovative goods and services by strengthening the links between public buyers on the demand side and innovative companies on the supply side. Spain participates in this project.

More information: <https://innovation-procurement.org/innobrokers>

•**Smart.Met**: drive the development of new technologies to deal with the collection and management of smart metering data, through a joint Pre-Commercial Procurement (PCP). Spain, France and Portugal participate in this project.

More information: <http://www.smart-met.eu>

•**Water PiPP**: mobilise the procurement power of public and private actors in order to speed up innovation and contribute to solve water related societal challenges and to improve the competitiveness of the European Water Industry in a global market. Spain and France participate in this project.

More information: <http://waterpipp.eu/about/objectives>

The European Commission provides three links to the list of ongoing and/or completed IP projects that it has financed:

•<https://ec.europa.eu/digital-single-market/en/eu-funded-projects-implementing-pre-commercial-procurements-pcp-or-public-procurement-innovative>

•<https://cosme.easme-web.eu> (selecting “Public procurement” in the filter “Topic”)

•<https://innovation-procurement.org/resources>

4.2. INSTRUMENTS AND INITIATIVES AT THE NATIONAL LEVEL

As we saw in chapter 3, public procurement is an ideal instrument to promote business technological innovation from the demand side, hence European Union

promotes, through community regulations, changes in the regulatory and institutional frameworks of the Member States in the area of IP.

This fact, together with the rule that exists in law that a regulation of a lower rank must be compatible at all times with a regulation of a higher rank, not being able to go against it because it would be voidable by the higher levels, leads to the countries and regions that make up the European Union must legislate in accordance with the guidelines that it sets.

The study SMART 016/0040 on benchmarking of national policy frameworks and national public investments in IP in Europe shows how countries have been or are adapting their legislation to the EU legislation (European Commission, 2020), however we will focus on the countries participating in the TWIST project (Spain, France and Portugal), although for the rest of European countries this study can be consulted, which provides detailed and comparable information for 30² countries on:

- Governance and legal framework.
- Innovation Procurement Policy Framework Benchmarking based on the following indicators:
 - Indicator 1 – Official definition
 - Indicator 2 – Horizontal policies
 - Indicator 3 – ICT policies
 - Indicator 4 – Sectorial policies
 - Indicator 5 – Action plan
 - Indicator 6 – Spending target
 - Indicator 7 – Monitoring system
 - Indicator 8 – Incentives
 - Indicator 9 – Capacity building and assistance measures
 - Indicator 10 – Innovation friendly public procurement market
- Investments on public procurement of innovative solutions.

2 Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom.

Following, we will see the instruments and initiatives that have been developed in Spain, France and Portugal to promote the public procurement of innovation, focusing, as in section 4.1., on their legislation and sources of financing.

4.2.1. Spain at the national level

Spain, like the European Union, influences and promotes changes in the country regarding IP through **legislation**.

Regarding public procurement, the **Law 9/2017 of Public Sector Contracts** is the law that transposes the European Directives 2014/23/UE, 2014/24/UE and 2014/25/UE, in the national legal framework with the peculiarity that, the Spanish public procurement system is decentralised and, the Autonomous Communities – CCAA (regional level) and with the Local Entities (local level) can develop issues in accordance with their own competencies (European Commission, 2020 and MITECO, 2020b).

Regarding Innovation Procurement, the **Law 14/2011, of June 1, on Science, Technology and Innovation** introduce and regulates fundamental aspects around the IP establishing the principles, priorities, objectives and mechanisms of Spain in matters of R&D&I (article 6) as well as the priority axes of the State Innovation Plan (article 44.3), among the which is to promote public procurement of innovative activities, in order to align the private technological offer and public demand, through actions in cooperation with the Autonomous Communities and with Local Entities, in accordance with the aforementioned by the **Law 2/2011, of March 4, on Sustainable Economy**. Likewise, the legislation that establishes in the first instance the definition of Research, Development and Innovation (R&D&I) and whose differentiation is essential when correctly establishing specific contracting procedures for the promotion of technological innovation within the Administration public, is the **Law 27/2014, of November 27, on Corporation Tax** (MITECO, 2020b).

Likewise, **Royal Decree 404/2020, of February 25, which develops the basic organic structure of the Ministry of Science and Innovation**, entrusts the promotion of innovation procurement in Spain (article 4.1.i) to the Secretaría General de Innovación (in English, General Secretariat for Innovation) through the Subdirección General de Fomento de la Innovación (in English, General Sub-Directorate for the Promotion of Innovation) (CDTI, online a).

Regarding water, the Law 10/2001, of July 5, of the National Hydrological Plan establishes that the research, development and knowledge program in the field of water resources (article 34.1) must be prepared and executed at the state level, without prejudice to the powers of the Autonomous Communities in matters of water and research. In addition, **Royal Legislative Decree 1/2001, of July 20, approving the Consolidated Text of the Water Law** establishes that the National Water Council (article 20) may propose to the Public Administrations and Public Bodies the lines of study and research for the development of technical innovations with regard to obtaining, employment, conservation, recovery, comprehensive treatment and economy of the Water (MITECO, 2020b).

Likewise, Spain has strengthened its political framework to promote innovation from the point of view of demand by providing aid material to facilitate the implementation of public procurement of innovation for regions:

- **Guía 2.0 para la compra pública de innovación:** provides basic and general guidelines to organize public tenders in such a way as to encourage the presentation of offers that incorporate innovative solutions (MEC, 2015). This guide is the update of the “Guía de la compra pública innovadora” (MICINN, 2011).
- **Compra pública innovadora. Fundamentos e instrumentación:** provides fundamentals and instruments for Public Administrations to guide their purchases not only to the fulfillment of their purposes, but also to the promotion of the technological development of organizations, encouraging those that make more innovative proposals in their offer with the ultimate aim of promoting the technological development of companies generating business opportunities in innovative organizations (INAP, 2013).

• **Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua:** respond to the challenge of promoting, incentivize and speed up innovative contracting using existing procedures that may a priori be complex or not very favourable to the promotion of innovation and technology transfer, and that respond to the real needs of the public water administration (MITECO, 2020b).

Spain, through **state funding**, has promoted the implementation of public procurement of innovation in the country through the Centro para el Desarrollo Tecnológico Industrial – CDTI (in English, Centre for the Development of Industrial Technology), which is the public entity that represents Spain in the European network of Competence Centres for Innovation Procurement, emerged as a result of the Procure2Innovate project, and whose purpose is to be the entity in charge of promoting and fostering the IP in the country (<https://procure2innovate.eu/spain>):

• **Innocompra:** financing instrument for the public buyer that provides financial incentives to promote the development of innovative products or services through the IP mechanism co-financed with ESIF funds (ERDF) through the FID – Fostering Innovation through Demand (INNAP, 2013 y Comisión Europea, 2020).

Public buyers must be public sector bodies and entities that have the status of contracting authority and provide a public service of which they are holders, provided that due to the nature of both the provider and the service, the aid does not entail market distortion (MICINN, online).

• **Innodemanda:** financing instrument for suppliers that synchronizes financial instruments to support business R&D (supply side) with public sector tenders (demand side) using existing financial incentives that cover only and exclusively R&D&I activities that turn should not be part of the object of the public tender (INNAP, 2013 y Comisión Europea, 2020).

It is possible that the actions financed with Innocompra are synchronized, through an action protocol between the public buyer and the innovation financing agency, with the provision of financing for the suppliers through the Innodemanda mechanism (INNAP, 2013).

- **Call for expressions of interest for innovative solutions aimed at public demand:** collect proposals from potential R&D service providers, preferably companies that can constitute a repository of ideas for future tenders (CDTI, online b).

Other instruments have also been launched to promote the IP from an integral approach. The main ones are:

- **IP window:** specific communication channel for IP inquiries and proposals whose main objectives are to contribute to the identification of IP opportunities, provide technical assistance in R&D matters to contracting bodies and promote IP actions (INAP, 2013).
- **IP awards:** the National Innovation and Design Awards (calls 2011, 2013, 2015 and 2016) have had a modality focused on the innovation procurement aimed at “entities belonging to the public sector, including those governed by private law, who have carried out actions that promote innovation from the demand side through public procurement” (Observatorio de Contratación Pública, online).
- **Promotion activities.**

4.2.2. France at the national level

France, like the European Union, influences and promotes changes in the country regarding IP through **legislation**.

Regarding public procurement, the **Order n° 2015-899 of 23 July 2015** on public procurement and the **Order n° 2016-360 of 25 Mars 2016** transpose the European Directives 2014/23/UE, 2014/24/UE and 2014/25/UE, in the national legal framework with the peculiarity that, as the French public procurement system is semi-decentralized, they operate at the national level through the L’Union des Groupements d’Achats Publics (UGAP, in English Union of Public Purchasing Groups) and at the regional level through the Regional PlateForme Régionale des Achats (PFRA, in English Regional Procuring Platforms) in accordance with their competencies (European Commission, 2020).

Regarding Innovation Procurement, the National Pact for Growth, Competitiveness and Employment (2012) which set a spending target for innovation procurement awarded to innovative SMEs and MSBs (Small and Medium Enterprises and Mid-Size Businesses) at 2% of the procurement budget of national State level contracting authorities to be achieved by 2020, and the **Prime Minister's Circular 5681/SG (2013)** introduces a description of the scope and ambition level for innovation procurements by national State level contracting authorities that are addressed by the national innovation procurement target and road mapping exercise (European Commission, 2020).

Regarding water, the Law on Water and Aquatic Environments of 30 December 2006 (LEMA) is a French law whose function is to transpose into French law the European Water Framework Directive (WFD). LEMA brings two major conceptual advances to French legislation:

- the recognition of the right to water for all, in line with France's international action in this field,
- the adaptation to climate change in the management of water resources.

“According to the WFD principles, the French water policy is now defined on a partnership basis involving the State, all the local Communities and the users associated at each level, since it aims at providing a global management of the resources, by optimizing the needs fulfilment and preserving the aquatic ecosystems” (Nion, 2009).

The law renovates the institutional organisation, in particular the Water Agencies and the Office Français de la Biodiversité (OFB, in English French Biodiversity Office), with a view to greater efficiency.

“The Water agencies’ role consists in supporting actions at the river basin level by granting incentives to the local owners who carry out activities complying with the objectives set by the agencies. To achieve this purpose, the agencies rely on the links established with the local stakeholders and look for support by consortia to promote the Schéma d'Aménagement et de Gestion de l'Eau (SAGE, in English Water Development and Management Plan) or the environment contracts” (Nion, 2009).

The OFB is a public institution dedicated to the protection of biodiversity. One of its priorities is to respond urgently to the challenges of preserving life.

The OFB has replaced the Agence Française pour la Biodiversité (AFB, in English French Agency for Biodiversity) and the Office National de la Chasse et de la Faune Sauvage (ONCFS, in English National Office for Hunting and Wildlife). Uniting these two institutions through the creation of the OFB allow, in the fight to protect nature makes it possible to pool expertise on aquatic, terrestrial and marine environments and to present a common front against the threats to biodiversity in France.

Likewise, France has strengthened its political framework to promote innovation from the point of view of demand by providing aid material to facilitate the implementation of public procurement of innovation for regions:

- **Guide pratique Achat Public Innovant:** contributes to the long-term diffusion of innovation in public procurement, while helping buyers to take advantage of the new potentialities offered by regulation (OECP, 2018).

France does not have specific **state funding** to encourage public procurers across the whole country at all levels (national, regional, and/or local) to undertake more innovation procurements because it is mandatory for central government entities to implement innovation procurement roadmaps and on the national target to direct 2% of public procurement spending to innovation procurement (European Commission, 2020).

4.2.3. Portugal at the national level

Portugal, like the European Union, influences and promotes changes in the country regarding IP through **legislation**.

Regarding public procurement, the **Public Contracting Code** (composed by a complex normative corpus) and the **Decree-Law n° 111-B/2017**, transpose the EU

directives 2014/23/EU, 2014/24/EU 2014/25/EU in the national legal framework (European Commission, 2020).

The Instituto dos Mercados Públicos, do Imobiliário e da Construção - IMPIC (in English, Institute of Public Markets, Real Estate and Construction) is the national regulator for Public Procurement and has formalised a collaboration protocol for IP with the Agência Nacional de Inovação S. A. - ANI (in English, National Innovation Agency) that have as goal promote a strategic framework for IP, to contribute to the development of a competence centre in this area, as well as to explore financial instruments to support the sector.

Regarding Innovation Procurement, the **RCM n° 25/2018** (legal document that approves the national Technological and Business Innovation Strategy 2018-2030) mandates ANI to deepen purchasing procedures that promote innovation, in conjunction with other entities of Public Administration. ANI represents Portugal in the European Network of Competence Centres for Innovation Procurement, emerged as a result of the Procure2Innovate project, and whose purpose is to be the entity in charge of promoting and fostering the IP in the country (<https://procure2innovate.eu/portugal>):

- Dissemination of European IP calls.
- Legal support.
- Cultivation of co-operation with buyers' and sellers' networks community in order to facilitate the adoption of innovative and sustainable solutions.

Regarding water, the **Law n° 58/2005, of 29 December** is a Portuguese diploma whose function is to transpose into Portuguese law the European Water Framework Directive (WFD) and serves as a big umbrella to the subsequent diplomas published with a view to protect national waters and associated biodiversity. Likewise the **Decree law n° 119/2019 of 21st August of 2019**, establish the legal regime for the production of water for reuse (ApR), obtained from the treatment of waste water, in order to promote its correct use and to avoid harmful effects on health and on the environment.

This regime applies to the reuse, for non-potable uses, of water from domestic, urban and industrial wastewater treatment plants (WWTP), intended for uses compatible with its quality, namely for irrigation, landscape uses and for urban and industrial uses. Overall, it contributes to improving the state of the environment, ensures the sustainable use of water resources, allowing to reduce the consumption of natural water and promotes the hygiene of public spaces treated with reused water and safety in the consumption of agricultural products watered with reused water.

The **Law nº 54/2005, of 15 November 2005**, establishes and regulates the ownership of water resources. The **Decree Law nº 82/2010 of 2th July of 2010** proceeds to the fifth change to the law regulating water use, which currently follows what was established in its sixth modification published in 2012, in the **Law nº 44/2012 of 29th August of 2012**.

Moreover, Portugal not only has three water management plans in force:

- Strategic Plan for Water Supply and Water Sanitation Residuals (PEAASAR II),
- National Program for the Efficient Use of Water (PNUEA) - 2012-2020, and
- National Strategy for Integrated Coastal Zone Management,

but also has an organization that plays an important role in water matters: the *Parceira Portuguesa para a Água* (PPA, in English Portuguese Association for Water) that is part of a network of entities with the objective of enhancing the optimization of synergies and partnerships between national and internationally relevant entities that are involved in the sustainable use of water resources. It also seeks to contribute to promote innovation in the water sector, facilitating coordination between research centres research and business.

Likewise, Portugal has strengthened its political framework to promote innovation from the point of view of demand by providing aid material to facilitate the implementation of public procurement of innovation across the country:

- **Compras públicas de inovação em geral**: frequently asked questions and answers on IP matters (ANI, 2020).

Portugal does not have specific **state funding** to encourage public procurers across the whole country at any level (national, regional, and/or local) to undertake more

innovation procurement, but it is preparing to use ESIF funds to incentivize the use of innovation procurement (European Commission, 2020).

4.3. INSTRUMENTS AND INITIATIVES AT THE REGIONAL LEVEL

As we saw in chapter 3, IP does not work in a similar way in all regions, it must be taken into account that “the identification of regional particularities constitutes the basis for proposing policies from a demand perspective that is more appropriate to the intrinsic characteristics of each territory”, a fact that affects the design and use of IP itself in the different Smart Specialization Strategies of the regions or its effect on the evolution of regional disparities (Peñate y Sánchez, 2018). It is therefore important to take into account the different realities of each region "in the design of policies, since pre-existing levels of development and innovation influence their effectiveness."

Following, we will see the instruments and initiatives that have been developed at regional level in Spain, France and Portugal to promote the public procurement of innovation, focusing in the TWIST regions.

4.3.1. Spain at the regional level

As we saw in section 4.2.1. the Spanish public procurement system is decentralised and the Autonomous Communities – CCAA (regional level) and with the Local Entities (local level) can develop issues in accordance with their own competencies.

In the field of regional policy, the Spanish 2014-2020 ERDF Operational Programme on Smart Growth and the Regional Smart Specialization Strategies (RIS3) foresee innovation procurement among their instruments (European Commission, 2020).

The Regional Smart Specialization Strategies (RIS3) foresee innovation procurement among its instruments and, in the Spanish case, there are regions (CCAA) that have developed their own regional policy for innovation procurement as well as local entities (city councils) that have opted for the IP to address the challenges of the

public sector that cannot be solved through products or services available in the market:

• **Instruments and/or initiatives at regional level:**

• **Belonging to TWIST project regions:**

• **Andalusia:**

*Agreement of February 6, 2018, of the Governing Council, which approves the formulation of the 2020 Strategy for the promotion and consolidation of the Innovation Procurement in the Administration of the Junta de Andalucía (in Spanish, Andalusian Government) <https://juntadeandalucia.es/boja/2018/30/1>

*Agreement of September 4, 2018, of the Governing Council, approving the Strategy for the Promotion and Consolidation of the Innovation Procurement in the Public Administration of the Junta de Andalucía (in Spanish, Andalusian Government) <https://juntadeandalucia.es/boja/2018/175/2>

*Strategy for the Promotion and Consolidation of the Innovation Procurement (IP) in the Public Administration of the Junta de Andalucía (in Spanish, Andalusian Government) <https://juntadeandalucia.es/organismos/sobre-junta/planes/detalle/153948.html>

*Andalusia Innovation Procurement Unit
<https://juntadeandalucia.es/organismos/transformacioneconomicaindustriacoinnovacionyuniversidades/aac/areas/compra-publica-innovacion.html>

*Projects to meet the demand for public services by IP:
<https://juntadeandalucia.es/organismos/transformacioneconomicaindustriacoinnovacionyuniversidades/actualidad/noticias/detalle/233139.html>

*RECUPERA 2020 projects by IP: <http://www.recupera2020.csic.es>

• **Murcia:**

*Agreement between the Centro para el Desarrollo Tecnológico Industrial, E.P.E. (in English, Center for Industrial Technological Development), and the Región de Murcia (in English, Murcia Government), through the Consejería de Empleo, Investigación y Universidades (in English, Ministry of Employment, Research and Universities), concerning the pre-commercial procurement of I+D+I services <https://www.boe.es/boe/dias/2020/04/28/pdfs/BOE-A-2020-4701.pdf>

*Regional public procurement regulations (support and promotion to IP):

<https://www.borm.es/services/anuncio/ano/2019/numero/1540/pdf?id=775504>

<https://www.borm.es/services/anuncio/ano/2013/numero/10789/pdf?id=586588>

*RIS3MUR Strategy for promoting pilot experiences in IP:

<http://www.ris3mur.es/wp-content/uploads/2019/04/INFSC-RIS3MUR-IPAD-WEB-comprimido-2.pdf>

-Belonging to other regions with IP Instruments and/or initiatives:

•<https://www.crisisycontratacionpublica.org/archives/9274> and,

•<https://www.cdti.es/?MP=100&MS=899&MN=3>

•Instruments and/or initiatives at local level:

-Belonging to TWIST project regions:

•Red Innpulso: network of city councils with the distinction of "City of Science and Innovation" that has the commitment to dedicate at least 3% of the city council's investments to IP <https://redinnpulso.net/que-es-la-red>

•Red Andaluza de Compra Pública Sostenible (RACPS, in English Andalusian Network of Innovation Procurement): promotes the creation and expansion of regional networks, made up of Public Administrations that want to implement processes of Green Public Procurement and Public Procurement of Innovation <http://www.famp.es/es/redes-observatorios/racps>

•Hercules project from Universidad de Murcia (in English, University of Murcia): <https://www.um.es/web/hercules>

•Entidad Regional de Saneamiento y Depuración de Aguas Residuales (ESAMUR, in English Regional Entity for Sanitation and Wastewater Treatment): includes criteria related with innovation in the clauses of the procurement document in its tender documents.

-Belonging to other regions with IP Instruments and initiatives:

•<https://www.cdti.es/?MP=100&MS=899&MN=3>

4.3.2. France at the regional level

As we saw in section 4.3.1. the French public procurement system is semi-decentralised and there are no incentives because the French approach is based on the fact that it is mandatory for central government entities to implement innovation procurement roadmaps and on the national target to direct 2% of public procurement spending to innovation procurement (European Commission, 2020).

In France, innovation procurement has been recognised within different horizontal policies, namely public procurement policy (both at central and local level), innovation policy, economic policy and regional policy (European Commission, 2020).

At regional level, the prefects are in charge of the implementation of public procurement policy and they manage the procurement of the State in the regions. The prefects act through PlateForme Régionale des Achats (PFRA, in English Regional Procuring Platforms). In addition, there is a responsible contact point in charge of raising procurers' know-how in the field and supporting sourcing activities within the Direction Régionale de l'Economie, de l'Emploi, du Travail et des Solidarités (DREETS, in English Regional Directorate for the Economy, Employment, Labour and Solidarity), which have an operational link to the Direction des Achats de l'État (DAE, in English Directorate of Public Procurement) and the Direction Générale des Entreprises (DGE, in English Directorate General for Enterprise) (European Commission, 2020).

Under Regional policy, a network of Innovation procurement officers has been created in several regions in order to raise awareness of public stakeholders and SMEs on innovation procurement issues. Some regions, specifically, organise events so that administrations and start-ups can meet and find market opportunities for innovative solutions.

•Instruments and/or initiatives at regional level:

-Belonging to TWIST project regions:

- Agence de Développement et d'Innovation de la Nouvelle-Aquitaine (ADI-NA, in English Nouvelle-Aquitaine development and innovation Agency): regional agency for major transitions. It focuses its actions at the crossroads of business

competitiveness issues, the emergence of new sectors and the acceleration of projects in the territories of Nouvelle Aquitaine <https://www.adi-na.fr>

- WATER Environment Resources Societies (WATERS): strengthens the structure and level of excellence of the “Water” community and increases the international visibility of the WATER theme around the research - training - business continuum, attracting so the best scientists and the best students <https://muse.edu.umontpellier.fr/key-initiatives-muse/waters>

- Groupement d'intérêt scientifique EAU (GIS EAU, in English WATER scientific interest Group): research group with a systemic approach, where the teams intervene from upstream to downstream of the territories, on the scale of small and large cycles, in a desire for a transdisciplinary approach <https://www.sri-occitanie.fr/la-specialisation-intelligente/petit-et-grand-cycle-de-leau>

-Belonging to other regions with IP Instruments and/or initiatives:

- France Water Team: competitiveness cluster for the water sector supports stakeholders in the water sector (companies, research laboratories and communities) in the preparation, labeling and implementation of their innovation projects. Its federative structure not only ensures relations with regional players, otherwise what makes it possible to better support the innovation and growth objectives of water SMEs in France, Europe and the world <https://france-water-team.com>

•**Instruments and/or initiatives at local level:** the region is the responsible level for innovation but you can find local partnerships between representatives of the quadruple helix at the level of big local authorities in each region.

4.3.3. Portugal at the regional level

In Portugal, innovation procurement is explicitly recognised as a tool of strategic importance to foster the competitiveness of the economy in only one horizontal policy: regional policy although there is no formal political mandate for the establishment of innovation procurement demand financial support (European Commission, 2020).

In the field on of regional/urban policy the *Estratégia Nacional de Investigação e Inovação para uma Especialização Inteligente* (ENEI, in English National Smart Specialization Strategy) refers to public procurement as a demand-side instrument to foster the competitiveness of the economy and support the modernisation of public sector. Portuguese public procurement policy focuses especially on GPP (Green Public Procurement) but not on innovation procurement (European Commission, 2020).

Although growing, Public Procurement of Innovation still has a low expression in the country. Nonetheless, there are some interesting initiatives in place.

•**Instruments and/or initiatives at regional level:** non-existing at this moment, Portugal is focusing on building a solid network of skills centres that facilitate the sharing of knowledge and experience through ANI, its competence centre for innovation procurement.

•**Instruments and/or initiatives at local level** via Procure2Innovate project:

-**Belonging to TWIST project regions:** Câmara Municipal of Almada and Câmara Municipal of Torres Vedras (local authorities from the Region of Lisbon), and Laboratório Nacional de Energia e Geologia (LNEG, in English National Laboratory of Energy and Geology) located in Lisbon, the largest public sector research and development institution in Portugal.

-**Belonging to other regions with IP Instruments and/or initiatives:** Serviço Intermunicipalizado de Gestão de Resíduos do Grande Porto (LIPOR, in English Greater Porto Intermunicipal Waste Management Service) the entity responsible for the management, valorisation and treatment of municipal solid waste in the North Region.



5. EXAMPLES OF CASES DEVELOPED OF INNOVATION PROCUREMENT

As we have seen throughout chapter 4, along these years many initiatives related to public procurement of innovation (IP) have been developed both at the European level and regional and national level.

In this chapter we will show some examples of needs addressed through IP in the field of water, highlighting those in which the TWIST regions participate.

5.1. INNOVATION PROCUREMENT CASES FINISHED

Smart-met: PCP for Water Smart Metering

The aim of the PCP for Water Smart Metering (Smart-met) project is to drive the development of new technologies to deal with the collection and management of smart metering data, through a joint Pre-Commercial Procurement (PCP).

Smart water metering presents itself as an effective solution to the challenges faced by the majority of European water utilities today, from extreme events induced by climate change to the need to replace an ageing infrastructure. Indeed, providing access to accurate data in real-time can help decrease operating costs and prioritize infrastructure investments, while also improving the daily management of networks and customer services.

By launching a Pre-Commercial Procurement (PCP) procedure, the utilities involved seek to promote demand-driven research into new innovative smart meter solutions that fully cater to the needs of utilities (in terms of readability, battery lifetime, interoperability). The partners are currently preparing the call for tender, which should be published at the end of the year. It is foreseen that at least two of the

solutions presented will be carried forward to the trial stage and be tested in pilot sites.

The consortium is led by a French association and is made up of 7 public water service operators and 6 expert entities. The public water service operators are:

- *Belgium: Compagnie Intercommunale Liégeoise des Eaux (CILE) and VIVAQUA (Hydrobru)
- *Spain: Promedio
- *France: Eau de Paris and Syndicat Des Eaux et de l'Assainissement Alsace-Moselle (SDEA)
- *Hungary: Budapest Waterworks (Vizmuvek)
- *Italy: VIVERACQUA

The expert entities are:

- *Europe: Aqua Publica Europea (APE)
- *Expert person: Sara Bedin
- *France: Office International de l'Eau (OIEau) and Université de Limoges (UNILIM)
- *Italy: Aragon Partners
- *Spain: Fundación Nueva Cultura del Agua (FNCA)

More information:

<http://www.smart-met.eu/project>

<http://fnca.eu/investigacion/proyectos-de-investigacion/smart-met>

Water PiPP: Water Public innovation Procurement Policies

The main objective of the Water Public innovation Procurement Policies (Water PiPP) project is to mobilise the procurement power of public and private actors in order to speed up innovation and contribute to solve water related societal challenges and to improve the competitiveness of the European Water Industry in a global market.

The ambition of the project is to go beyond networking, addressing barriers to innovation in the water sector and building an operational collaborative platform where a critical mass of stakeholders (public authorities, public and private

purchasers, water utilities, the RD&I community, networks of cities and regions) can explore and test innovation procurement methodologies.

WaterPiPP also aim to develop analytical and operational tools to support both regulatory and contracting authorities to overcome current difficulties and to take the most of the opportunities offered by the new legal framework, when it enters into force.

The consortium is made up of 12 partners:

- *Spain: Universidad de Zaragoza (UniZar)
- *Europe: Water supply and sanitation Technology Platform (WssTP) and Aqua Publica Europea (APE)
- *France: Office International de l'Eau (OIEau)
- *Finland: Technical Research Centre (VTT)
- *International: ICLEI European Secretariat GmbH (ICLEI Europe)
- *Italy: Central Procurement Company (ARCA), Agenzia Regionale per la Tecnologia e l'Innovazione - Regione Puglia (ARTI) and The European House – Ambrosetti SpA (TEHA)
- *Netherland: Stichting Deltares (Deltares) and city of Rotterdam
- *United Kingdom: Knowledge Transfer Network (KTN)

More information: <http://waterpipp.eu/about/objectives>

RECUPERA 2020

RECUPERA 2020 project, co-financed by FEDER funds, has as main objective that the centres of Consejo Superior de Investigaciones Científicas (CSIC, in English Spanish National Research Council) in Andalusia share with companies the knowledge and development and, ultimately, the risks and benefits to create innovative solutions that exceed those currently on the market through the formula of the Pre-Commercial Procurement (PCP).

The project is divided into two different stages:

- Development: result of the research activity carried out by the CSIC institutions and other research bodies and centres, on technologies and strategic techniques to improve the competitiveness of the Andalusian farming sector, there is the need to develop different products and services that respond to the needs of the farming industry and help in its modernisation, and boost the participation of Andalusian SMEs and micro-SMEs to provide the region with a diversified industrial fabric of high technological content and added value.
- Innovation: companies representing the Andalusian agro-industry, producers and transformers, will undertake the work of characterising, specifying and validating the technologies developed to ensure their functionality and use in improving the sector.

More information: <http://www.recupera2020.csic.es/en/project>

Regarding water, among the 26 projects of RECUPERA 2020, we find among others:

1. Innovative prototypes based on natural or modified clays for water purification and nano-formulations for intelligent pesticide release

Through this PCP, the Instituto de Recursos Naturales y Agrobiología de Sevilla (IRNAS, in English Institute of Natural Resources and Agrobiology of Seville) of the CSIC hopes to develop technologies for the preparation and use of absorbent materials (natural and/or biomodified clays) of low cost, preferably of Andalusian origin. in different types of possible designs:

- Filter for decontamination of water containing pesticides, at the level of rural homes and / or small-medium size agri-food farms.
- Barriers to confine in points of accumulation of phytosanitary products (preparation for application, collection of containers or accidental spills) or soil amendments to retain the pesticide in its place of absorption by the plant (localized root application of systemic pesticides) minimizing its arrival at the waters.
- Carriers of pesticides in slow-release formulations that would allow localized dosing (injections, subsoil, in sowing or as seed covers), minimizing doses and losses that cause contamination.

More information: <http://www.recupera2020.csic.es/es/investigador/m-carmen-hermosin>

2. Development of a microalgae prototype to measure the amount of arsenic in irrigation waters and agricultural products

Through this PCP, the Estación Experimental del Zaidín (EZZ, in English Zaidín Experimental Station) of the CSIC expects the detection of arsenic in plants of agricultural interest through analysis of biomarkers that are induced in plants in response to this metalloid, thus being a preventive analysis before the product goes to consumption of animals and / or humans.

More information: <http://www.recupera2020.csic.es/es/investigador/javier-corpas>

5.2. INNOVATION PROCUREMENT CASES ON GOING

MITLOP: New integrated model for sewage sludge and other waste

Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA, in English Metropolitan Water Supply and Sanitation Company of Seville) carried out a market consultation as part of this innovation procurement process.

EMASESA needs a new integrated model to manage sewage sludge and other organic wastes in order to address operational limitations and to adapt the system to new regional regulation about the use of sewage sludge for agricultural application.

EMASESA's new sewage sludge management system must be suitable for the long term, sustainable in its three dimensions (social, economic and environmental) and must facilitate a correct closure of the urban water cycle and, preferably, it must be based on circuits of circular economy that allow the creation of value in the environment from the waste generated by the public water supply and purification service to the population.

More information: <https://www.emasesa.com/idi/compra-publica-de-innovacion>

RIMAAS: Reduction of the impact on water bodies due to sanitation reliefs*

Empresa Metropolitana de Abastecimiento y Saneamiento de Aguas de Sevilla, S.A. (EMASESA, in English Metropolitan Water Supply and Sanitation Company of Seville) carried out a market consultation as part of this innovation procurement process.

The process is part of EMASESA's need to reduce the high levels of solid waste dumped into the network, as well as the impact that its presence causes on the sanitation and purification system.

EMASESA needs a new waste treatment system that surpasses the benefits of those currently on the market and must be accompanied by an information and environmental awareness campaign with high social impact. Thus, the projects will have the purpose of measuring, monitoring, automation, social awareness and reducing the impact that the presence of solid and floating waste, such as hygiene wipes, among others, causes in the sanitation network and, finally, in the purification process and in the environment, especially during the first episodes of rain, after a prolonged dry period, during which sediment pollutant matter has accumulated, the strong flows caused by rainfall suddenly enter into circulation.

More information: <https://www.emasesa.com/idi/compra-publica-de-innovacion>

Development of future sewage treatment facilities

Bergen municipality has launched a dialogue with relevant industries and interested parties as part of a pre-commercial procurement process.

Bergen municipality and many other municipalities will need to construct new secondary treatment facilities in the coming years due to stricter environmental requirements. Such facilities must be able to handle major climate related variations. The vision is to produce flexible and scalable solutions that can be standardized and industrialized for use in several places – both nationally and internationally.



More information:

<https://permalink.mercell.com/109520972.aspx>

<https://ted.europa.eu/TED/notice/udl?uri=TED:NOTICE:317811-2019:TEXT:EN:HTML>

Computer systems to support decision-making in water management

The Centro para el Desarrollo Tecnológico Industrial (CDTI, in English Centre for the Development of Industrial Technology) is interested in hiring innovative solutions, non-existent in the market, that can solve the public need detected by the Confederación Hidrográfica del Segura (in English, Segura Hydrographic Confederation) to develop a platform for efficient water management, with an advanced simulation and optimization tool, that can help in the future to the manager in making decisions, such as those required for ordinary exploitation and anticipated drought management. The technological tool that meets these needs should integrate meteorological predictions, distributed hydrological models, hydro-economic management models and agro-hydrological models.

More information: <https://www.cdti.es/index.asp?>

[MP=100&MS=920&MN=3&TR=C&IDR=2987&r=1920*1080](https://www.cdti.es/index.asp?MP=100&MS=920&MN=3&TR=C&IDR=2987&r=1920*1080)

Energy optimization and circular economy for purification in medium-sized centres

The Consejería de Agricultura, Ganadería, Pesca y Desarrollo Sostenible (in English, Ministry of Agriculture, Livestock, Fisheries and Sustainable Development) of the Junta de Andalucía (in English, Andalusian Government), intends to carry out adaptation and improvement actions in medium-sized Wastewater Treatment Plants (WWTP), through a technological platform focused on promoting the circular economy and energy efficiency. The project will be based on five axes: comprehensive diagnosis of needs, digital transformation, energy efficiency, use of renewable energies and waste recovery as by-products and energy.

More information: pending publication of the project website

6. STAGES OF INNOVATION PROCUREMENT PROCESSES AND ACTORS INVOLVED

The innovation procurement processes, regardless of the choice of the modality of innovation procurement and the award procedure of public procurement, follow the same general scheme:

- Stage 1: Detection of needs.
- Stage 2: Search for solutions.
- Stage 3: Writing and processing of the procurement document.
- Stage 4: Monitoring and evaluation of the contract.

Throughout this chapter we will dedicate a section to each of these stages but, previously we will discuss:

- the Decalogue of good practices, that provides supportive elements for decision makers who want to develop and implement a public procurement policy that promotes innovation;
- the types of public procurement in which innovation intervenes because, depending on the situation from which we start and the result we want to obtain, one type of procurement will be more appropriate than another at the time of meeting our needs; and,
- the degree of maturity of the innovation at the beginning of the procurement because, depending on the proximity to the market of what you want to contract, it determined what type of innovation procurement will satisfy better the needs to be covered.

Lastly, with a view to facilitate competitive market demand for innovation, at the end of the chapter we will dedicate a section to provide the main support tools and guidance at the time of promoting the use of award procedures of public procurement.

6.1. DECALOGUE OF THE EUROPEAN UNION ABOUT INNOVATION PROCUREMENT

The Aho Report on "Creating an Innovative Europe" suggested that if Europe cannot offer innovation-friendly markets for the creative outputs of its business, then these will go elsewhere, for this reason the experts called upon governments used "public procurement to drive demand for innovative goods, while at the same time improving the level of public services" (European Commission, 2007).

In this context and taking account that "procurement policy alone is not sufficient to encourage a wider uptake of innovation and other framework conditions need to be in place", the European Union published the 'Guide on dealing with innovative solutions in public procurement. 10 elements of good practice' that, although "should be considered only as a first step towards more favourable conditions for innovation through public procurement", "explains how public procurement can motivate innovation" and "provides supportive elements for decision makers who want to develop and implement a public procurement policy that promotes innovation" through 10 key points representative of a set of good practices that facilitate the successful implementation of an innovation procurement (European Commission, 2007):

1. Act as an 'intelligent' customer.

- Inform the market of your plans as early as possible: "this will allow give time to react and develop innovative solutions that respond to the defined need" (MICINN, 2011).
- Create a professional public procurement function capable of handling innovation: "have a well-trained contracting staff capable of managing the procurement of innovative solutions" (MICINN, 2011).

2. Consult the market before tendering.

- Identify innovative solutions on the market "consulting potential suppliers provided that transparency is respected and competition is not impeded" (MICINN, 2011).
- Inform market players of your needs and discuss ways of meeting them, "provided that transparency is respected and competition is not impeded" (MICINN, 2011).

3. Involve key stakeholders throughout the process.

- Identify key internal stakeholders, “in particular, service users, technical experts and legal advisers” (MICINN, 2011).
- Secure their involvement and participation: “it will help to define more clearly the requirements and technical specifications of the contract” (MICINN, 2011).

4. Let the market propose creative solutions.

- Give companies room to propose ideas and be open for alternatives.
- Ask for a solution, do not prescribe it, “specifying the need to cover in terms of performance or functional requirements and accepting improvements in the offers. The way in which the technical specifications are written will determine the variety and quality of the offers” (MICINN, 2011).

5. Seek value for money, not just the lowest price.

- Decide which cost and quality aspects to take into account: “apply the criterion of the most economically advantageous offer combining the costs of the entire life of the contract and other important aspects such as the quality and technical merits of the offer” (MICINN, 2011).
- Decide on criteria to reflect these aspects: “in particular, evaluation criteria that depend on a value judgment, which will usually require the participation of a committee of experts for their evaluation” (MICINN, 2011).

6. Take advantage of electronic means.

- Use electronic means to inform and be informed and enhance efficiency.
- Ensure the electronic means you use are well-adapted to your specific needs “that the public buyer intends to satisfy” (MICINN, 2011).

7. Decide how to manage risks

- Identify and plan for risks: risks “are inherent in the procurement of innovative solutions and it is very important to assess their potential impact on the project” (MICINN, 2011).
- Designate the risk owner “between the Administration and the contractor” (MICINN, 2011).

8. Use contractual arrangements to encourage innovation.

- Include in the contract incentives for further innovative solutions.
- Establish a policy on how to handle intellectual property rights.

9. Develop an implementation plan.

- Provide for an implementation structure and resources: “have a contract management regime planned and included in the Technical Contracting Specifications published in the call for competition, so that the parties clearly know their respective obligations” (MICINN, 2011).
- Monitor and learn from implementation: “it can help support future innovations” (MICINN, 2011).

10. Learn for the future.

- Become a learning organization on innovation: “documenting and sharing the experiences obtained between the contracting administrations” (MICINN, 2011).
- Establish evaluation and review procedures to improve knowledge of innovation in procurement procedure.

6.2. TYPES OF PROCUREMENT IN WHICH INNOVATION INTERVENES

As we saw at chapter 2, “any public purchase, if admitted and properly valued in the award criteria, may end up being an Innovation Procurement” (INAP, 2013), therefore, public procurement is refers, from the **point of view of the proximity to the market of what is going to be contracted and the degree of maturity of the innovation at the beginning of the contracting**, public procurement can be (see figure 3):

1. **Public Procurement with Innovation criteria:** “occurs when public sector organisations buy ready made products for which no R&D is required, can incorporate innovation-related criteria in the tender specifications and in the assessment of tender documents, for instance” (Innovation Policy Platform, online).
2. **Public Procurement of Innovative solutions:** “public procurement can strategically create a demand for technologies or services that do not yet exist. This procurement involves purchasing a not-yet-existing product or systems” (Innovation Policy Platform, online).
3. **Pre-Commercial Procurement:** “public procurement can target the purchase of research and development services to support the activities and decisions of government and public authorities. This is the case for pre-commercial

procurement of R&D (with no guarantee that the public sector will buy the goods or services developed)” (Innovation Policy Platform, online).

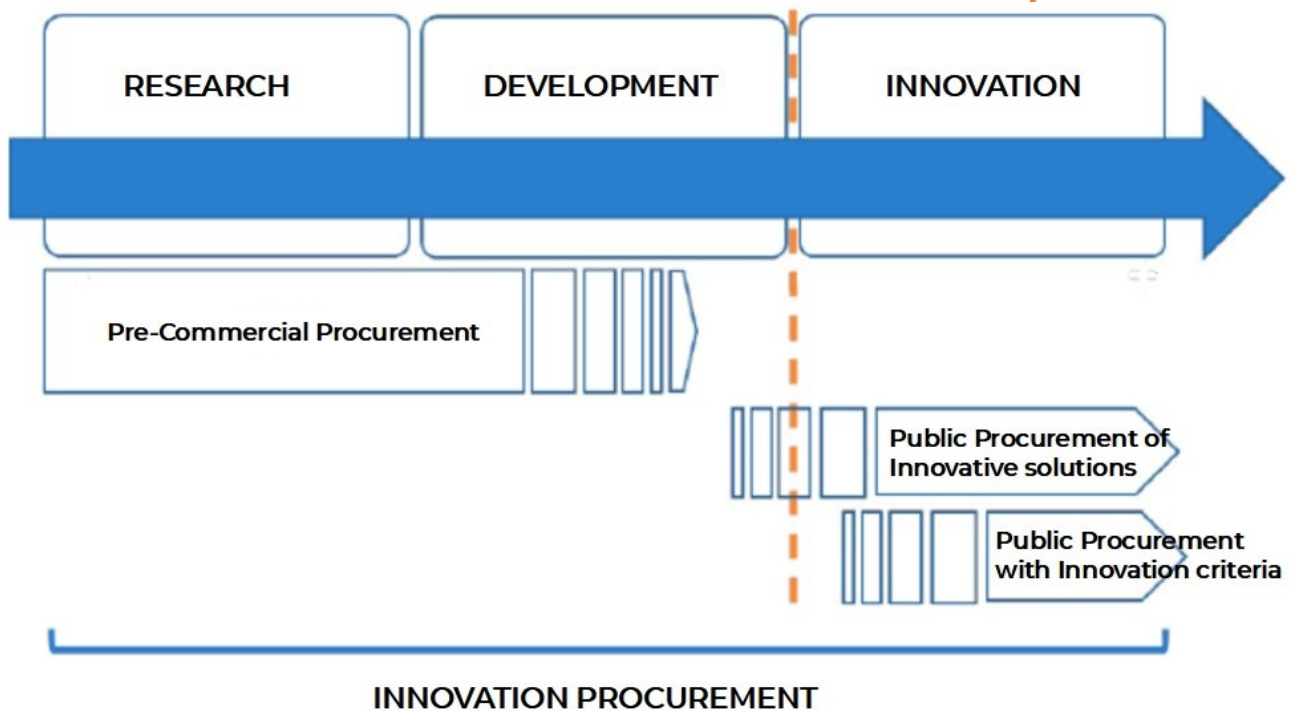


Figure 3. Type of IP according to its proximity to the market
Source: Ayuntamiento de Madrid (2018) and own elaboration

Likewise, from the point of view of the degree of maturity of the innovation at the beginning of the contracting, these three types of procurement “consecutive since the result of each type 'corresponds' to the starting point of the next way” are characterized by (see table 1):

Table 1. Starting points and Results according to the type of IP

Type of public procurement	Starting point (starting situation)	Result (what is hired)
Public Procurement with Innovation criteria	Existing solutions on the market, characterized by their degree of innovation compared to others already implemented	The solution, providing innovative aspects to public services
Public Procurement of Innovative solutions (PPI)	Already developed solutions that have either been tested in a real operating environment at the prototype level, or their production level is small without reaching large-scale market volumes. They may require an initial design or adaptation phase.	Deployment of commercial volumes of the solution, providing innovative aspects to public services
Pre-Commercial Procurement (PCP)	Product to a greater or lesser degree of development, but in the R&D phase	Development of a prototype of the solution and its validation in a real operating environment

Source: Ayuntamiento de Madrid (2018) and own elaboration

6.3. LEVELS OF TECHNOLOGICAL INNOVATION IN THE IP

Determining the degree of maturity of the innovation at the beginning of the contracting is essential to determine "in what type of CPI the project should be framed that responds to the needs of the Public Administration to achieve the desired objective or, in other words, of the proximity to the market of what is being contracted" (MITECO, 2020b).

The application of the Technology Readiness Levels (TRLs) "expands to any type of project to measure the degree of maturity of a technology, and they serve to condition the minimum required starting point of the proposal submitted by tenderers, which can contribute to reducing uncertainty in order to obtain results" (MITECO, 2020b).

The table 2 shows the TRL types, their description, the result obtained and their cataloguing applying the definitions of the Communication from the Commission

about Framework for State aid for research and development and innovation (2014/C 198/01).

“The TRL levels 1, 2, 3 and 4 (in red) corresponds to the research phase (R&D) and use to occur in a laboratory environment. The TRL levels 5 and 6 (in yellow) corresponds to the development phase and use to occur in a simulation environment that ends with the generation of a prototype. The TRL levels 7, 8 and 9 (in green) corresponds to the innovation or implementation phase and occur in real environments where the prototype is adapted with technical specifications in order to be transferred to the market. While the TRL 8 corresponds to a product prepared for its manufacture, the TRL 9 corresponds to a product prepared for its commercialization” (MITECO, 2020b).

Table 2. Types of TRL or Technology Readiness Levels

Level	Description	Results	Cataloguing	
TRL 1	Implementation, often summarized or incomplete, of a method or idea that can be exploited in a useful way	Basic idea	Fundamental research	
TRL 2	The basic principles of the idea have been qualitatively postulated and observed.	Basic principles of the idea postulated or observed qualitatively		
TRL 3	The activities carried out are strongly research and development. They include analytical studies and physical experiments to validate predictions about the characteristics of separate elements of technology.	Physical experiments to validate the predictions of the elements		
TRL 4	The components of the technology have been identified and built in the laboratory. They have not yet been integrated into a complete system. Modeling and simulation can be techniques used to complement physical experiments.	Components built in laboratory	Industrial research	Applied research
TRL 5	Technology components are validated in a conditioned operating environment.	Components validated in conditioned environment	Industrial research	Applied research

TRL 6	Development and testing in a conditioned operating environment of a basic prototype that integrates the different technological components so that the system configuration is similar in its characteristics to that of its application.	Basic prototype with all components validated in a conditioned environment	Experimental development	Applied research
TRL 7	Testing the prototype with all its functionality in a real environment or that simulates the real environment. Minor technology issues and manufacturing issues are identified.	Prototype with all its functionality validated in a real environment or that simulates the real operating environment	Experimental development	Applied research
TRL 8	All operational and manufacturing issues have been resolved and there are documents for the use and maintenance of the system. The technology has been shown to work commercially through large-scale application.	Operational and manufacturing issues resolved and there is documentation for the use and maintenance of the system	Product ready for manufacturing	
TRL 9	System fully developed and available for commercialization	Product available for commercialization	Product ready for commercialization	

Source: Ayuntamiento de Madrid (2018) and own elaboration

“From here, it is a question of identifying which TRL is started from at the beginning of the contracting and up to which TRL it is intended to reach at the end of the execution of the contract. Sometimes, the degree of maturity of certain developments is between different levels and, therefore, at the borders, the same TRL could be identified in different types of IP. The TRLs also serve to condition the minimum required starting point of the proposal submitted by the tenderers, which can contribute to reducing uncertainty regarding the obtaining of results [...]. Regarding the result obtained in each type of IP, although with certain flexibility, it is already established as a general rule by the definition of the different types:” (Ayuntamiento de Madrid, 2018)

- Pre-Commercial Procurement (PCP): “prototype (s) of the solution and its validation in a real operating environment (TRL7), since the objective of the

procurement is to develop a solution applicable to a real problem of the public buyer".

- Public Procurement of Innovative solutions (PPI): "procurement of a solution on a commercial scale volume".

- Public Procurement with Innovation criteria: "contribution of innovative aspects to a project by a commercial solution.

In this way, the desirable TRLs would be:" (Ayuntamiento de Madrid, 2018)

Table 3. Correspondence between types of public procurements and TRLs

Type of public procurements	TRL at the beginning of the procurement	TRL at the end of the execution
Pre-Commercial Procurement (PCP)	TRL 5 – TRL 6	TRL 7 – TRL 8
Public Procurement of Innovative solutions (PPI)	TR 7 – TRL 8	TRL 9
Public Procurement with Innovation criteria	TRL 9	TRL 9

Source: Ayuntamiento de Madrid (2018) and own elaboration

6.4. STAGES OF THE IP PROCUREMENTS

The Innovation Procurement process, regardless of the competitive procedure chosen based on the contract requirements, follows the following four phases/stages:



Figure 4. Stages of the Innovation Procurement
Source: MITECO (2020b)

6.4.1. Stages of the IP procurements

How we treat, in the **deliverable E 3.3.2 “Guideline for the early identification of the needs of the public sector in the scope of water management”** (TWIST, online), one of the main characteristics of innovation procurement is its potential to address challenges of the public sector that cannot be solved by means of products or services available in the market. Therefore, innovation procurement is not about replacing equipment with the same or renewing expired service contracts but about address unmet needs. In this context, an unmet need can be defined as a requirement that a public buyer has at the present time, or (preferably) one that he will have in the future, that current products, services or arrangements cannot meet, or the cost is excessive or it has an unacceptable risk.

Likewise, an unmet need may be originated from several causes, some of them are the following (EAFIP Toolkit, online):

- A problem that negatively impacts the delivery of the service of public interest (e.g. technical issue, budgetary/fiscal change, change in behavioural pattern of citizens that is creating a serious problem to provide the service of public interest with the expected quality and/or efficiency).
- A need/desire of a public procurer to improve the quality and/or efficiency of the service of public interest in the future or a new emerging operational requirement to provide new features in the future. Such needs result from regular internal analysis of the procurer about how to improve its daily operations on the mid-to-long term (e.g. desire of hospitals to provide mobile patient monitoring and treatment to save more lives, improve the efficiency of doctor's appointments and reduce hospital admission costs).
- Policy objectives to address mid-to-long term societal challenges (e.g. need for procurers to look for greener or more energy efficient solutions to meet the objectives of reducing the carbon footprint of the public sector by a specific percentage in a specific target date in the future).
- Legislative/regulatory requirements to provide high quality and efficiency services of public interest in the future (e.g. national legislation requiring that a specific

percentage of a specific public service offering is made more accessible to citizens with visual/hearing or other physical impairments by a specific date in the future). The identification of needs is a key previous step to conduct an innovation procurement and allows procurers to guide their procurement strategy at mid and long term.

The TWIST project (see deliverable E 3.3.2) has developed a methodology based on semi-structured interviews and discussions with managers from public bodies involved in water management, which can act as potential buyers of innovations in the field of wastewater and water reuse, and aims to help public bodies in an initial identification of needs that potentially could be met by means of the innovation procurement:

- Stage 1. Preparing the interview and preliminary analysis: aim to prepare the interviews and to identify and analyse information about the topics that will be addressed in the next step. The preparation of the interviews will enable the identification of suitable organizations (potential buyers) and engage them to participate in the application of the methodology.
- Stage 2. Semi-structured interviews: interviews will be conducted with members of each of the organizations identified in stage 1. This stage is the core of the methodology and is designed to explore, by means of different questions, about potential needs from the public water sector.
- Stage 3. Needs definition and prioritisation: aims to define and contextualise the needs identified and to prioritise them with the interviewed on the basis of information and results from Stage 2.

Also, taking into account that, according to Annex VII of Directive 2014/24/EU, “technical specification” means one of the following:

“(a) in the case of public works contracts the totality of the technical prescriptions contained in particular in the procurement documents, defining the characteristics required of a material, product or supply, so that it fulfils the use for which it is intended by the contracting authority; those characteristics include levels of environmental and climate performance, design for all requirements (including

accessibility for disabled persons) and conformity assessment, performance, safety or dimensions, including the procedures concerning quality assurance, terminology, symbols, testing and test methods, packaging, marking and labelling, user instructions and production processes and methods at any stage of the life cycle of the works; those characteristics also include rules relating to design and costing, the test, inspection and acceptance conditions for works and methods or techniques of construction and all other technical conditions which the contracting authority is in a position to prescribe, under general or specific regulations, in relation to the finished works and to the materials or parts which they involve;

(b) in the case of public supply or service contracts a specification in a document defining the required characteristics of a product or a service, such as quality levels, environmental and climate performance levels, design for all requirements (including accessibility for disabled persons) and conformity assessment, performance, use of the product, safety or dimensions, including requirements relevant to the product as regards the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking and labelling, user instructions, production processes and methods at any stage of the life cycle of the supply or service and conformity assessment procedures;”

And, that according to C(2018) 3051 final “before drafting technical specifications, public buyers should perform a wide-ranging needs assessment in order to define the problem to solve. This step may seem superfluous, [...] In fact, this is the crucial moment when innovation uptake may originate [...] This analysis will reveal whether the equipment and services used until now are (still) the most appropriate ones”, however “the definition of needs requires sufficient distance from the current solution to assess it with maximum impartiality. It is important to keep an open mind about introducing modifications or replacing the existing solutions altogether. In some cases, a deep organisational change may be required, especially if workflows have been automated”.

Once the needs have been identified, they should be defined by describing the main functions and performance specifications sought, rather than by simply describing a product or service. Therefore, it is very important:

- differentiate between the definition of needs (what you want to solve) and the definition of the solution (how you want to solve) and,
- define the most relevant requirements to be fulfilled that the possible solutions to these needs must fulfil as functional performance specifications: “in no case must the solution (or the part of the solution that does not exist on the market) be defined in detail since it would limit the possible degree of innovation that tenderers could provide”(Ayuntamiento de Madrid, 2018).

By way, we show a comparative between simple and functional performance specification for a same service (BMW, 2017):

Table 4. Simple descriptions vs Functional performance specifications

Simple description	Functional performance specification
"Delivery and installation of X streetlights with X bulbs with an output of X watts."	"X streets must be lit over a period of X hours a day at an illuminative strength of X. The minimum life of the lighting elements must be X days."

Source: Bundesministerium für Wirtschaft und Energie - BMW (2017)

Finally, note that "if there are standards related to the solution, it is recommended to include in the definition of the functional performance specification the reference to their compliance, among other reasons, to facilitate interoperability and/or interchangeability between the developments carried out, avoiding possible dependency from a single supplier" (Ayuntamiento de Madrid, 2018).

6.4.1.1. Early Demand Map

The identification of needs is the basis for preparing the future Early Demand Map (EDM), a living document “that anticipates the planned contracting intentions, thus providing an advance to the operator on the technological needs detected by the public water administration. In them, the list of identified needs must be considered as clearly as possible, without a solution in the market, which are likely to be Innovation Procurement projects, since they meet the technical, economic, financing

and impact requirements. All this information required for the creation of the EDM will come, on occasions, from consultations made to the market "(MITECO, 2020b).

The creation of an EDM requires information that can be obtained through:

- bilateral working meetings between all possible actors (Public Administration bodies and/or departments at the state, regional and / or local level, experts in the sector, civil society, etc.): with the aim not only of detecting real needs of the Public Administration but to know its weaknesses, threats, strengths and opportunities (SWOT analysis).
- public consultations or active participation processes, workshops, conferences, forms, etc. specifically designed.

"To do this, the first thing the Public Administration must do is announce by the means it deems appropriate (digital media, communication via email, posters, etc.) or in any public medium, an informative note in which it is officially communicated about the intention of making an Early Demand Map for which it will be necessary to define in advance the needs around the management and planning of water resources" (MITECO, 2020b).

The Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua by MITECO (2020b) provides a **model of information note for the definition of the EDM** (annex I) as well as a **model document/online form to help define the EDM** (annex II), to be published together with the information note, to define the degree of development of the prior needs identified by the Public Administration and the possible areas for improvement in the provision of services.

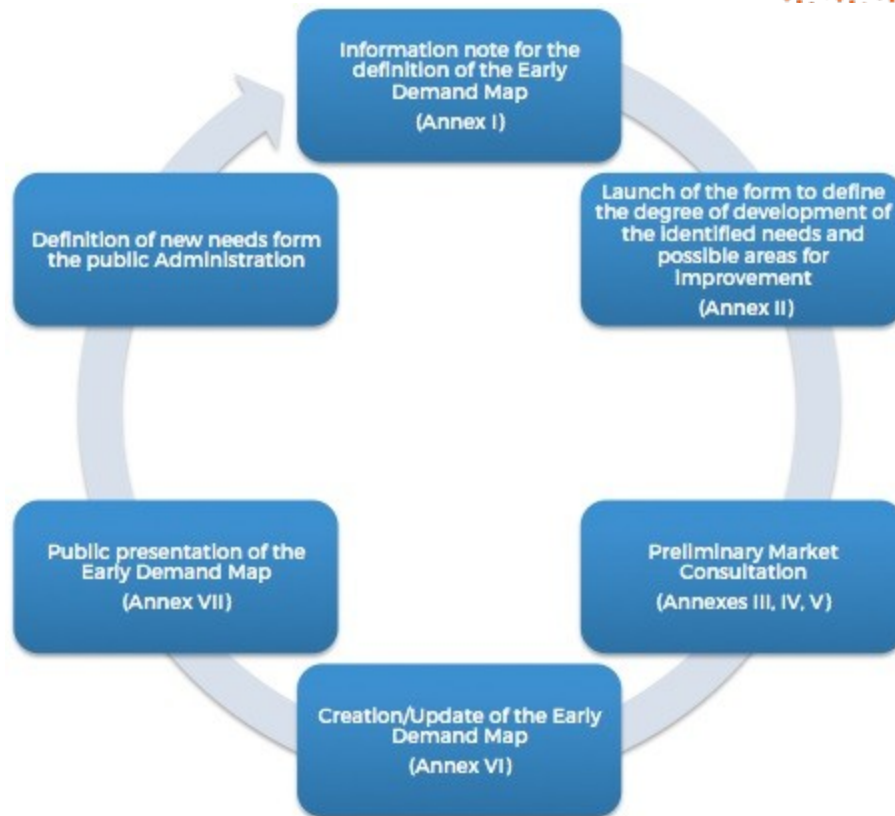


Figure 5. Process of creating and/or updating the Early Demand Map
Source: MITECO (2020b)

6.4.1.2. Choice of modality of Innovation Procurement

Once your needs have been defined based on the requirements and/or functional performance specification that the solution and/or solutions that future tenderers could provide, the Public Administration will initiate a decision-making process that will determine the type of Innovation Procurement in which the project to be tackled would be framed and if it would be necessary to carry out a preliminary consultation of the market.

The flow diagram in figure 6 shows the decision process when choosing the modality of Innovation Procurement, depending on the degree of maturity of the innovation at the beginning of the contracting, more in line with the characteristics of the project to be addressed to meet the needs of the Public Administration.

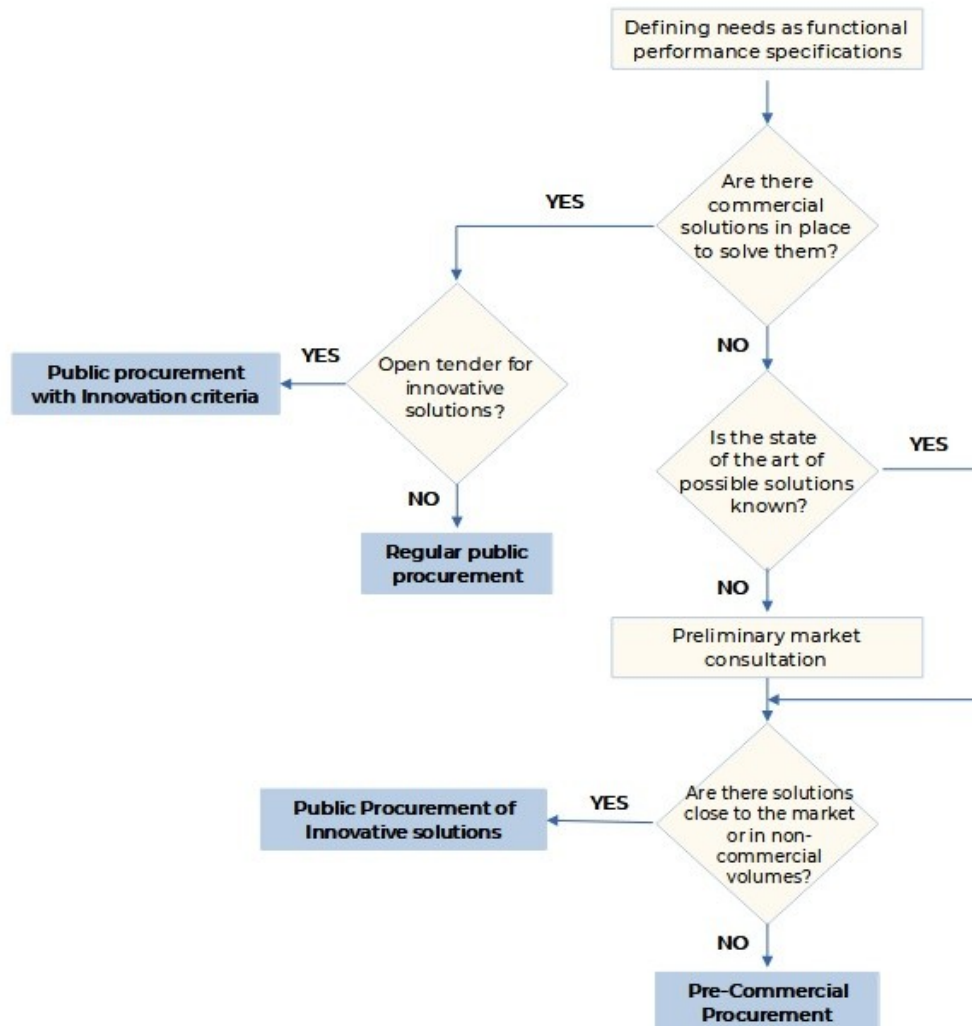


Figure 6. Flowchart for choosing the most appropriate modality of Public Procurement
Source: Ayuntamiento de Madrid (2018) and own elaboration

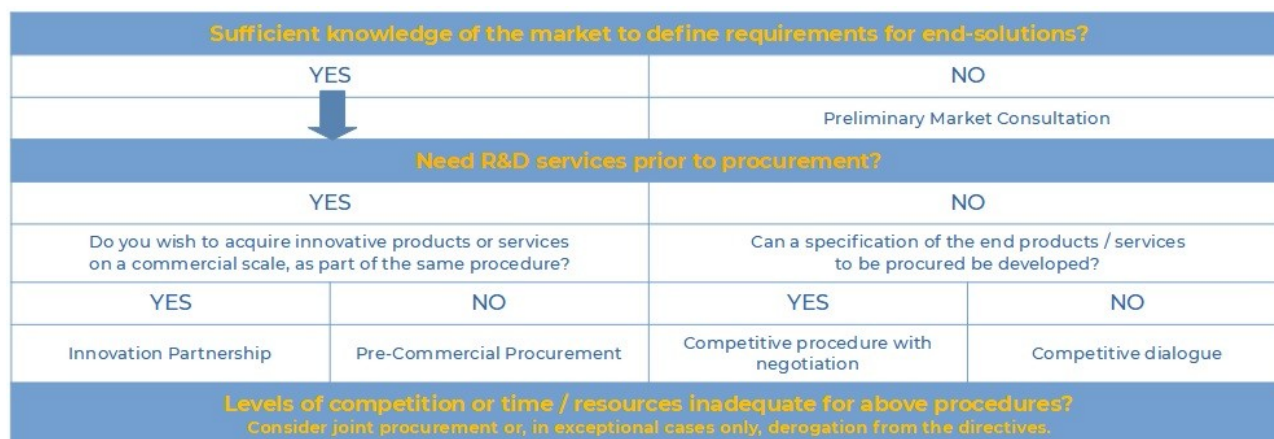
6.4.1.3. Choice of award procedure of Innovation Procurement

Once the most appropriate Innovation Procurement modality has been chosen to cover the technological need of the public buyer, the next step to take would be the choice of the most appropriate public procurement procedure.

The choice of one procedure or another (see figure 7) will depend on the public buyer's knowledge of the market as well as on his:

- need to develop R&D,

- need for information to develop technical instructions,
- availability of resources at the time of contracting, etc.



*Figure 7. Process for choosing the most appropriate IP procedure
Source: Procurement Innovation Platform (2011)*

6.4.2. Stage 2: Search for solutions

After identifying innovation needs, defining them based on functional performance specification and prioritizing them, the public buyer will be in a position to define the Early Demand Map, which will be the basis for future tenders and the search for solutions.

According to the Guidance on Innovation Procurement of the European Commission “suitable innovative solutions may already exist or could result from adapting or combining the existing ones. The market may also be able to develop an innovative solution on time provided it has the opportunity to do so” (C(2018) 3051 final).

However, “in the case of that sufficient technical information is not available for its definition, the Public Administration must delve deeper into the market before publishing the Early Demand Map and, consequently, before starting a specific competitive procedure that responds to a specific challenge or need” (MITECO, 2020b).

This identification of the existing technological offer, with a view to verifying the state of the art, can be carried out by means of a preliminary market consultation (see

figure 5) in case the Public Administration does not have sufficient knowledge of the market to define the technical prescriptions of the final solution (see figure 7).

6.4.2.1. Preliminary Market Consultation

The Preliminary Market Consultation (PMC) is a technical dialogue to obtain market information with a view to subsequent contracting, and to inform potential suppliers about the needs of the public authority (see figure 5).

Such is the importance of making well the PMC that both the Guidance on Innovation Procurement of the European Commission (C(2018) 3051 final) and the Directive 2014/24/EU make precise reference to how to carry it out:

- C(2018) 3051 final: “the main purpose of the preliminary market consultation is thus to check the state of the art. [...] This market consultation can take various forms, such as physical and online meetings or questionnaires. Presentations and testing of samples allowing end-users to verify the suitability of the proposed solutions in real-life conditions can complement these meetings. Less conventional methods, such as competitions, hackathons, idea markets or category innovation roadmaps can be considered [...] Under any circumstances, the consultation has to be transparent and non-discriminatory, i.e. without privileging one product, technology or process over others”.

- Directive 2014/24/UE: “before launching a procurement procedure, contracting authorities may conduct market consultations with a view to preparing the procurement and informing economic operators of their procurement plans and requirements. For this purpose, contracting authorities may for example seek or accept advice from independent experts or authorities or from market participants. That advice may be used in the planning and conduct of the procurement procedure, provided that such advice does not have the effect of distorting competition and does not result in a violation of the principles of non-discrimination and transparency” (article 40).

In addition, they recommend advertising an upcoming PMC and disseminate essential related information and conclusions:

- C(2018) 3051 final: the use of an “electronic platform with EU-wide or nation-wide publication of notices”, and the
- Directive 2014/24/UE: dedicates a whole chapter to “Techniques and instruments for electronic and aggregated procurement (chapter II).

Additionally, the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua by MITECO (2020b) provides a **template model for the preparation of the announcement of the beginning of the Preliminary Market Consultation** (annex III) that “attaches, on the one hand, the information from the PMC regarding a certain **technological challenge** (appendix 1) and, on the other, the reasons that motivate the choice of the external consultants that are selected, which will be assessed using a **form** (appendix 2). This form is mandatory in all its sections (not being able to refer to confidential annexes). It is aimed at knowing at what level the market and technology are, as well as the characteristics of the different economic operators, and adjusting it to the proposal, determining those clauses of future procurement documents (solvency, applicable criteria, etc.) In this sense, there is no better or worse answer in the different sections of the form, but a realistic answer that optimally adjusts the functional requirements of the tender”.

After conducting and closing the PMC, the public buyer will record the results and conclusions obtained from said consultation by means of a reasoned report, with which to guide future hiring and which will be part of the tender dossier, as well as being subject to the same publicity obligations as the specifications, so it must be published in any case in the profile of the contractor of the contracting body.

Once again, the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua by MITECO (2020b) provides a **model of the report of the results** of the consultations carried out on the market (annex IV) as well as an **example of a computer note closing the Preliminary Market Consultation** (annex V).

However, it is important to clarify that the Preliminary Market Consultations are not always linked only to the creation or update of the Early Demand Map, but also serve to contextualize the market and obtain the most important information for the activation of technological solutions. In this sense, the objectives are the following (MITECO, 2020b):

- Define the functional requirements that will constitute the object of the contract.
- Estimate the minimum solvency levels to guarantee the object of the contract by the tenderers.
- Determine the key variables that will guarantee the optimal choice (award criteria).
- Estimate an appropriate and realistic budget, as well as the adequate term that guarantees the fulfilment of the object and scope of the contract.
- Establish management models for Intellectual Property Rights resulting from the tender.

6.4.2.2. Publication and update of the early demand map

After the PMC, if the public buyer has needed it to know the state of the art, the public authority has at its disposal all the updated technical information that it may require when defining the projects or specific needs that make up the Early Demand Map (EDM).

The MDT generated (see figure 5) must be published and accessible to all potential suppliers, whether or not they participated in its creation, at least through the electronic platform in which advertisements are published at the EU, national and/or local level.

The Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua by MITECO (2020b) provides a **EDM's model** (annex VI) and a **model of invitation to participate in the EDM's presentation** (annex VII).

However, since the EDM is a living document, it must be borne in mind that "it must be modified periodically as more information is obtained from the market or new needs arise from the public water administration. In this way, on many occasions the Preliminary Market Consultations are kept open permanently, so that the Early Demand Map is later updated after said consultations, since it is considered that innovative solutions introduce significant changes with respect to preliminary technological demand" (MITECO, 2020b).

6.4.3. Stage 3: Writing and processing of the procurement document

After the detection of needs (stage 1) and the search for solutions (stage 2), the public buyer has up-to-date technological information (Early Demand Map - MDT) with which to design the files or procurement documents for the Innovation Procurement.

Each of the stages that must be developed during the competitive procedure by the public buyer for which a work, service or supply will be awarded are shown below:

6.4.3.1. Types of contract

The first step to take in the public competitive procedure is the choice of the type of contract. The contracts entered into by entities belonging to the public sector will be classified according to the following classification:

•Public works contract: "means public contracts having as their object one of the following: (a) the execution, or both the design and execution, of works related to one of the activities within the meaning of Annex II; (b) the execution, or both the design and execution, of a work; (c) the realisation, by whatever means, of a work corresponding to the requirements specified by the contracting authority exercising a decisive" (article 2.1.6) of the Directive 2014/24/UE).

•Public service contract: "means public contracts having as their object the provision of services other than those referred to in point 6" (article 2.1.9) of the Directive 2014/24/UE).

•Public supply contracts: “means public contracts having as their object the purchase, lease, rental or hire-purchase, with or without an option to buy, of products. A public supply contract may include, as an incidental matter, siting and installation operations” (article 2.1.8) of the Directive 2014/24/UE).

•Mixed contract: “contracts which have as their subject two or more types of procurement (works, services or supplies) shall be awarded in accordance with the provisions applicable to the type of procurement that characterises the main subject of the contract in question” (article 3.2. of the Directive 2014/24/UE). Likewise, “where the different parts of a given contract are objectively not separable, the applicable legal regime shall be determined on the basis of the main subject-matter of that contract” (article 3.6. of the Directive 2014/24/UE).

One time selected the type of contract, the next step in the tender process is the election of the procedure for the Innovation Procurement (IP):

6.4.3.2. Main award procedures in IP

Before to begin with the writing of the procurement document, firstly it is necessary to choice the competitive procedure to follow as well as the mechanisms that must govern the Innovation Procurement (evaluation criteria, industrial and intellectual property clauses, writing of procurement documents, etc.).

The Guidance for public authorities on Innovation Procurement edited by the Procurement of Innovation Platform outlines four procedures which are particularly relevant for innovation procurement (see figure 7):

1. Public procurements don't require R&D:

- Competitive dialogue
- Competitive procedure with negotiation

2. Public procurements require R&D:

- Pre-Commercial Procurement
- Innovation Partnership

While the common feature of these four procedures is they allow greater scope for interaction and dialogue with the market, when compared to the open or restricted

procedures, it's important to underline that national implementing legislation should be consulted to determine how each of them have been adopted in each country. For this reason, the Directive 2014/24/UE determines that "when awarding public contracts, contracting authorities shall apply the national procedures adjusted to be in conformity with this Directive, provided that, without prejudice to article 32, a call for competition has been published in accordance with this Directive" (article 26.1).

Concerning the public procurements don't require R&D, the Guidance on Innovation Procurement (C(2018) 3051 final) underlines that, "one of the novelties of the modernised EU rules is the possibility to use a negotiated procedure for public contracts calling for adaptation of readily available solutions (including designs or innovative solutions) that are of particularly complex nature, or where technical specifications cannot be established with sufficient precision. In these circumstances, the modernised EU rules give the public buyers a choice between two procedures: competitive procedure with negotiation and competitive dialogue. The main difference between the competitive procedure with negotiation and competitive dialogue lies in the degree of clarity the public buyer has about the project. In the former, the public buyer has a more precise idea of the nature and the subject matter of the public procurement contract, whereas in the latter more upstream choices are still to be made".

Concerning the public procurements require R&D, according to the guide, the difference lies in whether the public buyer, as part of the same procedure, wants or not acquire innovative products and/or services on a commercial scale.

The choice of the right procurement to implement an Innovation Procurement will largely condition the success of the achievement of the expected results of the contract (see figure 7), thus bellow, we dedicate a section to each one of the four procurements on IP:

6.4.3.2.1. Competitive dialogue

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011) the aim of the competitive dialogue is “to award a contract for supplies, services or works following dialogue with selected participants. Each tenderer submits an offer based on their own solution to the needs the authority has outlined, rather than responding to a common specification. Supplier expertise can be accessed in the dialogue stage. Competitive dialogue is often used for large or complex projects where the technical specifications cannot be adequately defined in advance”.

In this matter, the Directive 2014/24/UE determines in its article 26.4 that the Member States “may apply a competitive procedure with negotiation or a competitive dialogue in the following situations:

- (a) with regard to works, supplies or services fulfilling one or more of the following criteria:
 - (i) the needs of the contracting authority cannot be met without adaptation of readily available solutions;
 - (ii) they include design or innovative solutions;
 - (iii) the contract cannot be awarded without prior negotiations because of specific circumstances related to the nature, the complexity or the legal and financial make- up or because of the risks attaching to them;
 - (iv) the technical specifications cannot be established with sufficient precision by the contracting authority with reference to a standard, European Technical Assessment, common technical specification or technical reference within the meaning of points 2 to 5 of Annex VII;
- (b) with regard to works, supplies or services where, in response to an open or a restricted procedure, only irregular or unacceptable tenders are submitted...”.

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011), the competitive dialogue consists in three stages (see figure 8):

1. Selection stage:

- Call for competition identifying nature of intended procurement and criteria for selection of operators.
- Assessment of requests to participate against selection criteria.
- Minimum of three operators invited to dialogue stage, provided a sufficient number of qualified operators apply.

2. Dialogue stage:

- A descriptive document is issued to the selected operators, setting out the authority's needs and requirements, the award criteria to be applied and an indicative time frame.
- Dialogue is opened with the operators, often involving submission of outline solutions which are progressively refined. Equality of treatment must be ensured and the confidentiality of solutions maintained unless operators agree otherwise.
- The number of operators may be reduced by application of the award criteria. The number participating in the final stage must make for genuine competition insofar as there are enough solutions.

3. Award stage:

- Dialogue closed and submission of final tenders invited based on the solution or solutions discussed with each operator.
- Tenders may be 'clarified, specified or optimised' but no changes to essential aspects which would distort competition.
- Application of award criteria to determine preferred tenderer. Negotiations may be carried out with preferred tenderer to confirm financial commitments or other terms.

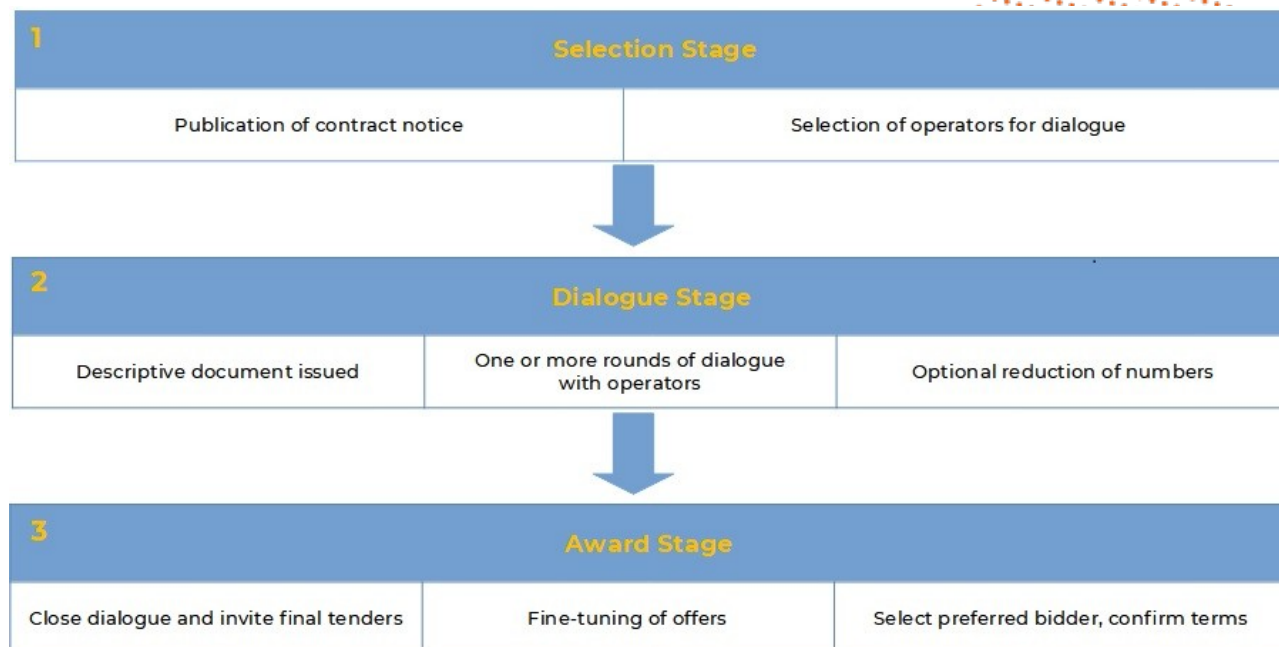


Figure 8. Steps of competitive dialogue
Source: Procurement Innovation Platform (2011)

Likewise, according to the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua (MITECO, 2020b), the competitive dialogue in terms of TRL supposes a jump from TRL 7 to TRL 9.

6.4.3.2.2. Competitive procedure with negotiation

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011) the aim of the competitive procedure with negotiation is "to procure goods, services or works which include an element of adaptation, design or innovation, or other features which make the award of a contract without prior negotiations unsuitable. Unlike the competitive dialogue, it requires that the authority can specify the required characteristics of the goods or services in advance of the competition".

The competitive procedure with negotiation is characterized by being a new procedure, that replace the negotiated procedure with prior publication of a notice,

and that can be used in the same situations as the competitive dialogue (article 26.4 of the Directive 2014/24/UE).

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011), the competitive procedure with negotiation consists in three stages (see figure 9):

1. Selection stage:

- Call for competition identifying the nature of intended procurement and criteria for selection of operators. Procurement documents must specify the characteristics of the goods, services or works, the minimum requirements and award criteria.
- Assessment of requests to participate against selection criteria.
- Minimum of three operators invited to tender stage, provided a sufficient number of qualified operators apply.

2. Negotiation stage:

- Selected operators invited to submit initial tenders which are then subject to negotiation. Minimum requirements and award criteria cannot be negotiated.
- Successive rounds of tenders and negotiations may take place. Equal treatment of operators must be ensured, with all tenderers being informed of changes to the technical specifications or other procurement documents and given adequate time to modify their tenders. Confidential information can only be disclosed with explicit permission of the tenderer.
- The number of operators may be reduced by application of the award criteria. The number participating in the final stage must make for genuine competition insofar as there are enough solutions.

3. Award stage:

- Inform remaining tenderers of intention to close negotiations and set common deadline for receipt of final offers.
- Award contract based on the specified award criteria (without further negotiation).

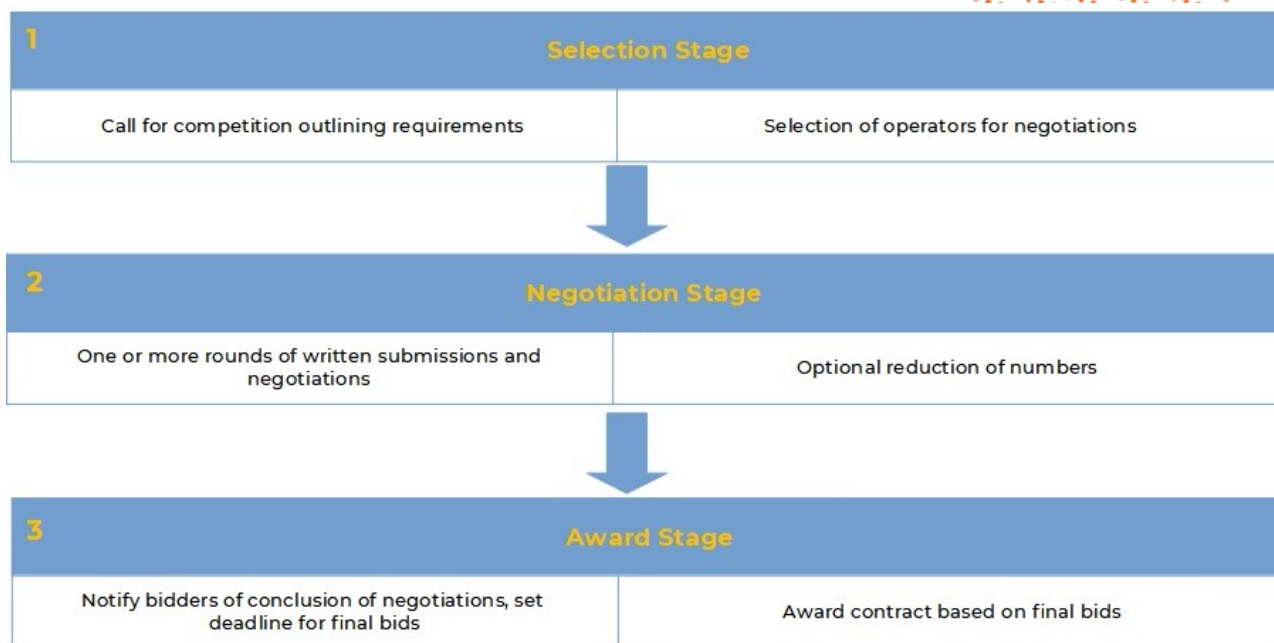


Figure 9. Steps of competitive procedure with negotiation
Source: Procurement Innovation Platform (2011)

Likewise, according to the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua (MITECO, 2020b), the competitive procedure with negotiation in terms of TRL supposes a jump from TRL 7 to TRL 9.

6.4.3.2.3. Pre-Commercial Procurement

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011) the aim of the Pre-Commercial Procurement (PCP) is “to procure research and development services, up to the prototyping or first test production stages. PCP may include the acquisition of the limited prototypes and/or test products developed, but does not include the acquisition of larger volumes of resulting end-solutions on a commercial scale and must not constitute state aid”.

The PCP not falling within the scope of the Directive 2014/24/UE but, in its ‘consideration (47)’, redirects to the Commission Communication entitled “Pre-

commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe” (COM(2007) 799 final), where a series of procurement models have been outlined and "deals with the procurement of those R&D services not falling within the scope of this Directive. Those models would continue to be available, but this Directive should also contribute to facilitating Innovation Procurement and help Member States in achieving the Innovation Union targets”.

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011), the Pre-Commercial Procurement consists in three phases (see figure 10):

1. Preparing for PCP and call for tenders:

- Identify a challenge which cannot be solved by application of existing products and services but could benefit from dedicated research and development work.
- Establish the state-of-the-art in the field, who the active parties are and whether PCP could be conducted jointly with other potential purchasers.
- Consider the approach to risk and benefit sharing to be taken (e.g. payment of costs, licensing of intellectual property rights) and develop terms and conditions to cover the services to be carried out.
- Launch a PCP call for tender to invite proposals for the exploration of solutions, prototyping and test production phases. PCP contracts should be awarded to more than one operator for each phase. The PCP competition will not be covered by the procurement directives but the Treaty rules on transparency, non discrimination and competition rules apply. PCP contracts can be awarded to cover solution exploration, prototyping and original development and testing of first products.

2. Solution exploration:

- Research and development work commences in line with the proposal(s) from the successful operator(s).
- Reporting and information sharing as provided under the contract terms.
- Payment for exploratory phase and decision on whether to proceed to prototype.

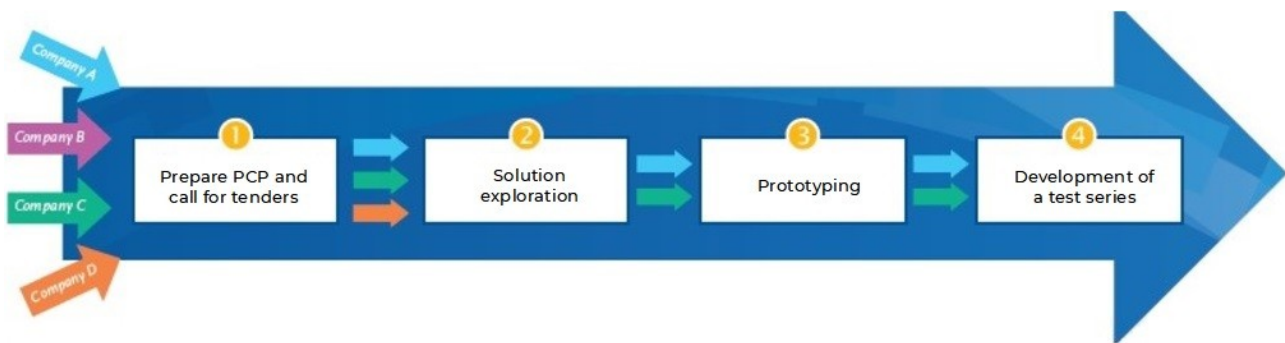
3. Prototyping:

- Selection of operator(s) to produce a prototype.
- Production of prototype and decision on whether to proceed to test series.

- Payment for prototyping phase.

4. Test series:

- Limited production of newly developed product or service.
- Assessment of test series, publication and standardisation (if appropriate).
- Payment for final phase. Further acquisition on a commercial scale will require a new competition under the procurement directives.



*Figure 10. Steps of Pre-Commercial Procurement (PCP)
Source: Procurement Innovation Platform (2011)*

Likewise, according to the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua (MITECO, 2020b), the Pre-Commercial Procurement in terms of TRL supposes a jump from TRL 1 to TRL 7.

6.4.3.2.4. Innovation partnership

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011) the aim of innovation partnership is “to research, develop and procure on a commercial scale new products and services. The innovation partnership allows for the award of a phased contract covering all stages from R&D through to acquisition of commercial volumes of finished products or services, with the involvement of one or more economic operators in each phase”.

The innovation partnership operates under competitive procedure with negotiation before “the need for an innovative product, service or works that cannot be met by

purchasing products, services or works already available on the market” (article 31 of the Directive 2014/24/UE).

According to the Guidance for public authorities on Innovation Procurement (Procurement of Innovation Platform, 2011), the innovation partnership consists in three phases (see figure 11):

1. Competitive procedure with negotiation:

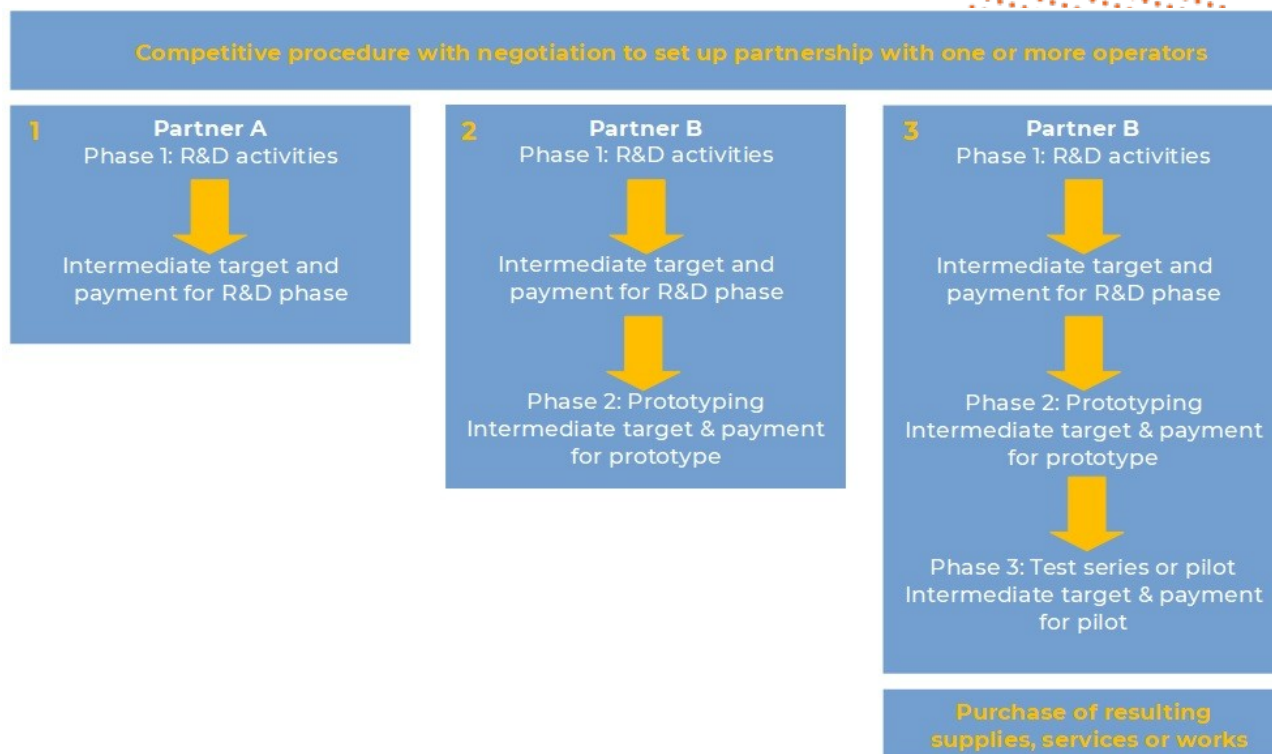
- Procedure as outlined above, with the need for an innovative product, service or work outlined in the procurement documents.
- Selection criteria must relate to candidates' capacity to carry out R&D and develop and implement innovative solutions.
- Award of one or more phased contracts for R&D services, prototyping, manufacture of a test series, pilot and acquisition of end-products/services. Contracts must include intellectual property provisions.

2. Development stage:

- Execution of phased contract(s). Intermediate targets and remuneration in instalments must be provided for.
- Contracting authority may decide after each phase to terminate partnership or reduce the number of operators involved.

3. Commercial acquisition phase:

- Purchase of the resulting supplies, services or works from the partner(s) not eliminated, provided that they correspond to the agreed performance levels and maximum costs.



*Figure 11. Steps of the innovation partnership
 Source: Procurement Innovation Platform (2011)*

Likewise, according to the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua (MITECO, 2020b), the innovation partnership in terms of TRL supposes a jump from TRL 1 to TRL 9.

6.4.3.3. Writing of the procurement document or descriptive document for contract tender

According to the Directive 2014/24/UE a procurement document “means any document produced or referred to by the contracting authority to describe or determine elements of the procurement or the procedure, including the contract notice, the prior information notice where it is used as a means of calling for competition, the technical specifications, the descriptive document, proposed conditions of contract, formats for the presentation of documents by candidates and

tenderers, information on generally applicable obligations and any additional documents” (article 2.1.(13)).

In addition, according to the Guidance on Innovation Procurement (C(2018) 3051 final), is important take into account that nothing done so far (stage 1 and stage 2) will work unless the contract terms reflect the relevant - innovation-friendly - aspects:

“If the public contract is awarded based on quality or performance criteria but cannot be enforced by contractual penalties, such as price indexation or early termination of the contract, the public buyer may miss an opportunity to achieve an innovative solution. This could lead also to various forms of redress.

Contract performance clauses should have at least the following aspects:

- contract performance criteria, measurable indicators of quality and performance targets;
- exit clauses in case of underperformance or in case that the market brings even more suitable solution than the one currently under development (with fair exit conditions for the supplier);
- contract modification clauses, due to volatility and high potential of further innovation ascertained during the contract performance.

Contract performance clauses can also contain the co-called value-engineering clauses. The latter encourage suppliers not only to deliver solutions that meet the performance requirements, but also to continue to improve the quality and cost of delivered solutions during the implementation phase. These clauses may provide for the payment of bonuses to suppliers for improving the quality of the solutions; they may share with suppliers extra cost savings that they realise for the public buyer during the implementation of the contract. For more information about value engineering, see European Assistance for Innovation Procurement toolkit module 3 (<http://eafip.eu/toolkit>)”.

Finally, according to the Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua del MITECO (2020b), once the most appropriate procedure to carry out the Innovation Procurement has been chosen, the next step to take is to draft the required documentation for the chosen

procedure, "depending on which procedure, one starting information or another will be required, and the similarly, the documentation generated will also be different. In general, in any of the contracting modalities used, aspects and contractual clauses that promote innovation must be introduced throughout the writing of the procurement document. These aspects can be included in:" (MITECO, 2020b)

1. the purpose and needs of the contract,
2. the award criteria applicable for the evaluation of tenders,
3. the special conditions of execution,
4. the management of Intellectual Property Rights.

6.4.3.3.1. Object and needs of the contract

The object of the contract, as we saw at points 6.4.1. and 6.4.2., must be defined taking into account the needs or functionalities that pretend to be satisfied, as well as the compliance of the European directives on public procurement and, the rules that transpose these at the national level.

The Directive 2014/24/UE establishes the “rules on the procedures for procurement by contracting authorities with respect to public contracts as well as design contests” (article 1) among which are the following general rules (chapter II):

The principles of procurement (article 18):

- “1. Contracting authorities shall treat economic operators equally and without discrimination and shall act in a transparent and proportionate manner. The design of the procurement shall not be made with the intention of excluding it from the scope of this Directive or of artificially narrowing competition. Competition shall be considered to be artificially narrowed where the design of the procurement is made with the intention of unduly favouring or disadvantaging certain economic operators.
2. Member States shall take appropriate measures to ensure that in the performance of public contracts economic operators comply with applicable obligations in the fields of environmental, social and labour law established by

Union law, national law, collective agreements or by the international environmental, social and labour law provisions listed in Annex X".

The confidentiality of information (article 21):

"1. Unless otherwise provided in this Directive or in the national law to which the contracting authority is subject, in particular legislation concerning access to information, and without prejudice to the obligations relating to the advertising of awarded contracts and to the information to candidates and tenderers set out in articles 50 and 55, the contracting authority shall not disclose information forwarded to it by economic operators which they have designated as confidential, including, but not limited to, technical or trade secrets and the confidential aspects of tenders.

2. Contracting authorities may impose on economic operators requirements aimed at protecting the confidential nature of information which the contracting authorities make available throughout the procurement procedure".

Likewise, whenever the nature or the object of the contract allows it, the independent realization of each of its parts must be foreseen by the division of contracts into lots, regulated for entities operating in the water in article 46 of Directive 2014/24/EU:

"1. Contracting authorities may decide to award a contract in the form of separate lots and may determine the size and subject-matter of such lots.

Contracting authorities shall, except in respect of contracts whose division has been made mandatory pursuant to paragraph 4 of this article, provide an indication of the main reasons for their decision not to subdivide into lots, which shall be included in the procurement documents or the individual report referred to in article 84.

2. Contracting authorities shall indicate, in the contract notice or in the invitation to confirm interest, whether tenders may be submitted for one, for several or for all of the lots.

Contracting authorities may, even where tenders may be submitted for several or all lots, limit the number of lots that may be awarded to one tenderer, provided that the maximum number of lots per tenderer is stated in the contract notice or in the invitation to confirm interest. Contracting authorities shall indicate in the

procurement documents the objective and non- discriminatory criteria or rules they intend to apply for determining which lots will be awarded where the application of the award criteria would result in one tenderer being awarded more lots than the maximum number.

3. Member States may provide that, where more than one lot may be awarded to the same tenderer, contracting authorities may award contracts combining several or all lots where they have specified in the contract notice or in the invitation to confirm interest that they reserve the possibility of doing so and indicate the lots or groups of lots that may be combined.

4. Member States may implement the second subparagraph of paragraph 1 by rendering it obligatory to award contracts in the form of separate lots under conditions to be specified in accordance with their national law and having regard for Union law. In such circumstances the first subparagraph of paragraph 2 and, where appropriate, paragraph 3 shall apply".

In addition, in order to promote innovation, it is important that:

- the procurement document does not express what is wanted but what is needed (functional performance specifications) "so that each tenderer can propose the way in which to solve said need. To do this, a clear idea of what is being sought must be given, and in this sense the technical specifications formulated in terms of performance or functional requirements are particularly suitable in Innovation Procurement" (MITECO, 2020b).

- allow tenders with variants, so suppliers can propose, alongside a traditional "safe" solution, a more innovative solution and, in case of the more innovative variants not work, an economic operator still has a fair chance of winning the contract with the more conservative tender (C(2018) 3051 final). The variants are regulated in article 45 of Directive 2014/24/EU:

"1. Contracting authorities may authorise or require tenderers to submit variants. They shall indicate in the contract notice or, where a prior information notice is used as a means of calling for competition, in the invitation to confirm interest whether or not they authorise or require variants. Variants shall not be

authorised without such indication. Variants shall be linked to the subject-matter of the contract.

2. Contracting authorities authorising or requiring variants shall state in the procurement documents the minimum requirements to be met by the variants and any specific requirements for their presentation, in particular whether variants may be submitted only where a tender, which is not a variant, has also been submitted. They shall also ensure that the chosen award criteria can be applied to variants meeting those minimum requirements as well as to conforming tenders which are not variants.

3. Only variants meeting the minimum requirements laid down by the contracting authorities shall be taken into consideration.

In procedures for awarding public supply or service contracts, contracting authorities that have authorised or required variants shall not reject a variant on the sole ground that it would, where successful, lead to either a service contract rather than a public supply contract or a supply contract rather than a public service contract”.

6.4.3.3.2. Award criteria

The article 67 of the Directive 2014/24/UE regulates the contract award criteria:

“1. Without prejudice to national laws, regulations or administrative provisions concerning the price of certain supplies or the remuneration of certain services, contracting authorities shall base the award of public contracts on the most economically advantageous tender.

2. The most economically advantageous tender from the point of view of the contracting authority shall be identified on the basis of the price or cost, using a cost-effectiveness approach, such as life-cycle costing in accordance with article 68, and may include the best price-quality ratio, which shall be assessed on the basis of criteria, including qualitative, environmental and/or social aspects, linked to the subject-matter of the public contract in question. Such criteria may comprise, for instance:

- (a) quality, including technical merit, aesthetic and functional characteristics, accessibility, design for all users, social, environmental and innovative characteristics and trading and its conditions;
- (b) organisation, qualification and experience of staff assigned to performing the contract, where the quality of the staff assigned can have a significant impact on the level of performance of the contract; or
- (c) after-sales service and technical assistance, delivery conditions such as delivery date, delivery process and delivery period or period of completion.

The cost element may also take the form of a fixed price or cost on the basis of which economic operators will compete on quality criteria only.

Member States may provide that contracting authorities may not use price only or cost only as the sole award criterion or restrict their use to certain categories of contracting authorities or certain types of contracts.

3. Award criteria shall be considered to be linked to the subject-matter of the public contract where they relate to the works, supplies or services to be provided under that contract in any respect and at any stage of their life cycle, including factors involved in:

- (a) the specific process of production, provision or trading of those works, supplies or services; or
- (b) a specific process for another stage of their life cycle,

even where such factors do not form part of their material substance.

4. Award criteria shall not have the effect of conferring an unrestricted freedom of choice on the contracting authority. They shall ensure the possibility of effective competition and shall be accompanied by specifications that allow the information provided by the tenderers to be effectively verified in order to assess how well the tenders meet the award criteria. In case of doubt, contracting authorities shall verify effectively the accuracy of the information and proof provided by the tenderers.

5. The contracting authority shall specify, in the procurement documents, the relative weighting which it gives to each of the criteria chosen to determine the most economically advantageous tender, except where this is identified on the basis of price alone.

Those weightings may be expressed by providing for a range with an appropriate maximum spread.

Where weighting is not possible for objective reasons, the contracting authority shall indicate the criteria in decreasing order of importance".

All this taking into account that regarding public procurement, as we saw in sections 4.2.1, 4.2.2 and 4.2.3, exists laws that transposes the European Directives 2014/23/UE, 2014/24/UE and 2014/25/UE, to the national legal framework of each countries.

6.4.3.3.3. Management of the Intellectual Property Rights

Recently, on November 2020, the European Commission adopted a new IPR action plan for to support the EU's recovery and resilience Europe (COM(2020) 760 final) that recommends Member States to “improve the conditions for companies to protect and use IP in public procurement with a view to stimulating innovation and boosting the economy”, as well as, to “consider leaving IP ownership to the contractors where appropriate, unless there are overriding public interests at stake or incompatible open licensing strategies in place”.

This communication reinforces the Guidance on Innovation Procurement (C(2018) 3051 final) that indicates that “the contracts should however set out the rules on access to pre-existing intellectual property rights necessary to complete the innovation process and access to the new intellectual property rights created by the innovation process”, highlighting the importance of that “public buyers clearly define upfront, in the tender documents, the allocation of intellectual property rights linked to the public contract”.

However, both at European and state level, freedom is left open the choice to allocate intellectual property rights. There are two main options:

1st main option: the public buyer obtains all new intellectual property rights resulting from the project.

2nd main option: the supplier obtains all new intellectual property rights resulting from the project.

Between these two options there are multiple intermediate options, as for example can be assign to the provider the intellectual property rights but free of royalties, that is, keeping the right to use the intellectual property at no cost.

Although the first option is the one that has traditionally been used, the European Commission recommends that “in cases where there is no overriding public interest in the public buyers’ retaining all or some of the intellectual property rights, these rights may be left with the suppliers. [...] in those cases, however, it may be necessary for public buyers to retain – royalty-free – rights to use the innovative solutions. Public buyers may also require the suppliers to license the rights to certain third parties under fair and reasonable market conditions [...] Leaving intellectual property rights ownership with suppliers can fuel industrial commercialisation of innovative solutions and reduces the procurement cost for the public sector. Therefore Member States could therefore consider leaving by default intellectual property ownership to the participating suppliers under the conditions described above and ensuring that incentives for enterprises to innovate are not distorted and that access to markets is not foreclosed”.

The option chosen regarding transfer of intellectual property right will be included, according with the article 42 of the Directive 2014/24/UE, in the section technical specifications of the procurement documents.

Regarding managing Intellectual Property Rights (IPR), the guide for implementation of Innovation Oriented Public Procurement (IOPP) procedures of the Water PiPP Consortium (2015) indicates that IPR are a matter of concern for public procurers to the extent that issues associated with the inaccurate management (ownership and administration) of IPR prevent industry from participating in IOPP.

It also indicates that “it shall be noted that all activities oriented to identify needs and create technical dialogue [...] shall be accompanied by specific confidentiality clauses [...] furthermore, the dissemination of useful information shall be done in a way which does not imply disclosure, the loss of trade secrets or novelty”. Also, in case of successful IOPP it “gives rise to outcomes in form of new technical solutions and/or innovative knowledge. Such outcomes can be protected by means of IPR (e.g.,

copyrights and neighbouring rights, trade secrets, including know-how, design rights, patents). It shall be determined in an early stage of IOPP procedure who is going to own and commercially exploit such rights, including the regulation of both Background and Foreground IPR”.

Given that both public procurer and supplier(s) are interested in using IPR, but in a different way, the Water PiPP Consortium guide (2015) advises combining:

- “•Licensing. If suppliers are owners of IPR, they act as licensors and the public procurer acts as licensee. The regulatory framework of IPR licence agreements is flexible.

This allows to adapt the conditions of the license (i.e., timeframe of validity, renewal, geographic area or industry in which it applies) to the particular needs of the case.

- Royalties. They are payments from the licensee to the licensor for the use of IPR”.

because “combining these patterns, free non exclusive licences for the own use of the public procurer (free of royalties) or open licences (to the public procurer and to third parties) under payment of royalties are accurate IPR management scenarios”. Also, it contemplates “the option of sharing ownership on IPR, too. In such cases, some risks related to IPR may arise. E.g., vendor lock-in due to lack in competence in future procurements because of advantageous position of the supplier co-owner of IPR. In that case, public procurer shall keep the right to grant sublicenses to third parties for implementation or development purposes. Or the case of absence of exploitation of IPR by supplier, which can be faced including a call-back clause in favour of the public procurer”.

6.4.4. Stage 4: Monitoring and evaluation of the contract

This stage is after the award of the IP contract and “consists of the control and monitoring of its execution and subsequent evaluation, to ensure compliance with the objectives of the Innovation Procurement. It is about validating whether or not the defined technological solution is reaching its degree of development and implementation and, if not, this non-compliance is justified” so this “must be

continuous, allowing to prevail before possible risk situations, and redefine the role model” (MITECO, 2020b).

The monitoring and evaluation of the contract can be carried out in three phases:

- 1º. Control of the execution of the contract
- 2º. Evaluation and analysis of the impact of the contract results
- 3º. Preparation of results reports

6.4.4.1. Control of the execution of the contract

According to MITECO (2020b), the control phase of contract execution consists of “monitoring the execution of the contract by the person responsible for the Public Administration contract, and its communication with the person in charge of the awarded body, which will be the responsible for managing the demands of the project and acting as an interlocutor with the responsible Public Administration”.

This monitoring must be clearly defined in the procurement documents, being able to subcontract an "external project technical office service that supports and carries out this task of controlling the execution of the contract in the different stages of this" (MITECO, 2020b).

6.4.4.2. Evaluation and analysis of the impact of the contract results

The Guidance on Innovation Procurement (C(2018) 3051 final) warns of the importance that the contract terms reflect the relevant – innovation-friendly – aspects, for this reason it recommends including among the minimum requirements of the contract performance clauses “measurable indicators of quality and performance targets” and remember that “technical specifications set in terms of functional requirements shift the responsibility for achieving better results to the market. The public buyer sets minimum requirements in order to avoid an abusively low-performing tender, but is not overly prescriptive as regards the means of achieving a desired outcome. Economic operators enjoy openness and flexibility to reach the optimal performance”.

For this reason, MITECO (2020b) indicates in its guide that the Public Administration must ensure that the project resulting from the execution of the contract does not lose the innovation component throughout its execution, so that the Innovation Procurement is justified. So that it must define indicators that guarantee and justify compliance with the innovation taking into account that:

- it is necessary to carry out a prior identification of the project milestones and the expected results of each of them, being essential that the milestones are defined at the beginning of the process of Innovation Procurement, both in the development of the Preliminary Market Consultations and in the functional program that accompanies the descriptive document of the contract tender.
- it must be selected the Key Performance Indicators (KPI), which must be defined in the procurement documents of each one modalities of the Innovation Procurement, thus serving as a basis for scoring the minimum degree of innovation required to validate the Innovation Procurement process. In this way, it will be possible to make a comparison between the real data and those expected prior to the start of the project and the results will indicate not only if the project milestone has been met, but in how long and what amount of resources have been employees for its achievement.

6.4.4.3. Preparation of results reports

Once the contract has ended, it is important to carry out an evaluation of the results of the project that, according to the MITECO's guide (2020b), reflects:

- whether the innovation satisfies or not the need formulated at the beginning of the entire IP process,
- whether the social and environmental criteria established in the description of the need or justification are met or not,
- the added value of the innovative component of the contract, both in terms of safety, functionality, costs and social efficiency,
- the adequacy of the innovative technology developed in other fields of application,

- the assigned costs and the expected timeline, the setbacks that have arisen throughout its development and the way in which these have had an impact not only on the expected innovative objectives, but also on the total cost of the project and the achievement of milestones scheduled,
- actions that have obtained a result higher than expected, having as a consequence positive effects on terms and costs estimated for the same,
- the good practices and lessons learned, so that it serves as a reference for the application of future processes in the same or different contexts, thus reinforcing the message of added value of the innovative technological application.

6.5. SUPPORT TOOLS AND GUIDANCE FROM OFFICIAL ORGANISMS

As we saw in chapter 3, the IP is an R&D&I policy instrument that has considerable potential and represents advantages for the public sector, the private sector and society. For that, from European Commission it's offered support tools and guidelines to promote the use of award process of public procurement (see sections 6.4.1.2 and 6.4.1.3) in function of the degree of maturity of the innovation at the beginning of the contracting, among we highlight the following:

Table 5. Support tools and guidance from official organisms

TOOL / GUIDANCE	SOURCE	LINK
Support tools for public buyers: Contact points and portals for procurement information in EU countries.	European Commission website	https://ec.europa.eu/info/policies/public-procurement/tools-public-buyers/public-procurement-eu-countries_en
EU policy initiatives on Innovation Procurement	European Commission website	https://digital-strategy.ec.europa.eu/en/library/eu-policy-i
Major sources of the EU level Guidance on Innovation Procurement	C(2018) 3051 final: footnote n° 9	https://ec.europa.eu/transparency/regdoc/rep/3/2018/EN/C-2018-3051-F1-EN-MAIN-PART-1.PDF
Commission support tools and guidance on public procurement	C(2019) 5494 final: page 34	https://ec.europa.eu/transparency/regdoc/rep/3/2019/EN/C-2019-5494-F1-EN-MAIN-PART-1.PDF
Resources on Procurement of Innovation	Procurement of Innovation Platform	https://innovation-procurement.org/resources
Directive 2014/24/UE on public procurement (Annexes)	Official Journal of the European Union	https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32014L0024

	n° L 94/65	
Directive 2014/25/UE on procurement by entities operating in the water, energy, transport and postal services sectors (Annexes)	Official Journal of the European Union n° L 94/65	https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32014L0025
How-To Guides for implementation of IOPP procedures (English version)	Water PiPP Consortium	http://www.waterpipp.eu/outputs
Guía de Compra Pública de Innovación y procedimiento de contratación en la Administración pública del agua (Anexos)	MITECO	https://www.miteco.gob.es/es/agua/temas/planificacion-hidrologica/7_guiacpi_innovacion_1_tcm30-514164.pdf
Guía Práctica del Proceso de Compra Pública de Innovación para Organismos Públicos de la Comunitat Valenciana (Anexos)	Agència Valenciana de la Innovació	https://innoavi.es/wp-content/uploads/2019/04/GuiaCPI_AVI.pdf
Guía de contratación pública de innovación del Ayuntamiento de Madrid (Anexo A y Anexo B)	Ayuntamiento de Madrid	https://sede.madrid.es/FWProjects/tramites/contenidos/ficheros/Guia%20Contrataci%C3%B3n%20Pública%20Innovación%20Ayto%20Madrid%20ABR%2018.pdf

Source: Own elaboration

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