

**FUNDECYT**

**SYMBI**

**Project Activity: A1.4**

**Guidelines on how to capitalise green procurement as  
an enabler of industrial symbiosis**



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## 1 Executive summary

This paper was prepared by the lead partner of the SYMBI project, FUNDECYT within the context of activity A1.4 of the SYMBI project. It outlines the results of an analysis of the level of development of green public procurement (also GPP hereafter) in SYMBI partnership regions, and outlines policies and measures that support the utilisation of GPP for the initialisation and advancement of industrial symbiosis and circular economy in the partnership countries. The analysis was based on data collected by the SYMBI partners from the partnership countries, i.e. (Poland, Italy, Greece, Spain, Finland, Hungary, and Slovenia).

After briefly presenting some key information about the research process (research questions, and data analysis principles), the paper proceeds in providing the answers to the research questions. Throughout the data, open coding revealed that the SYMBI countries can be categorised with respect to the level of development of GPP, according to their position along a spectrum of systematization of GPP procedures. Countries with a low level of systematisation of GPP procedures have just started the strategic planning, implementation and GPP in their territories. Countries on the other side of the spectrum have fully implemented GPP in their public procurement processes and are now starting to regulate and implement it for the advancement of specialised issues such as industrial symbiosis. Countries positioned in different positions in the spectrum are characterised by distinct level of development, enablers, inhibitors and opportunities for GPP development and, hence, different policies are recommended for the utilization of GPP as an instrument for industrial symbiosis.

And it is exactly towards developing policy recommendations & guidelines that the paper proceeds in discussing after having answered the research questions. The paper concludes with the presentation of a typology of the level of development of GPP in EU countries and of a roadmap for its development which includes and outlines different policy recommendations and guidelines for different types of GPP development.

## 2 The SYMBI project

The environmental pressures from production and consumption, the climate change, and the increasing scarcity of resources necessitate the transition to a sustainable growth model, to gradually replace the resource intensive "take-make-use-dispose" economy. Circular economy is an emerging model that keeps resources in the economy as long as possible. Resources can be reused, creating further value while relieving environmental pressures. Resource efficiency, as outlined in the circular economy model, is primarily based on: a) the "cradle to cradle" principle, focusing on eco-design and regenerative modes of consumption, and b) industrial symbiosis, which involves territorial synergies to manage waste and share services, utilities, and by-product resources. The territorial aspect of industrial symbiosis brings regions to the forefront of the transition towards circular economy. This is why new solutions depend on the absorption capacity and innovation potential of EU regions and cities.

Industrial symbiosis requires policy reforms measures at different levels. EU regions show very different levels of performance on each area relevant to industrial symbiosis, and advance at a different pace towards green growth models. There is thus a need to share and exchange practices, experiences, and knowledge within this fragmented context to: a) lift barriers by following successful examples, b) foster balanced territorial development and reduce disparities, and c) reverse the backwardness of least-favoured regions.

The "Industrial Symbiosis for Regional Sustainable Growth and a Resource Efficient Circular Economy - SYMBI" project aims to improve the provisions and support the implementation of policy instruments and measures for the diffusion of industrial symbiosis, to add value, reduce production costs, and relieve environmental pressures through increased resource efficiency and greenhouse gas emissions. The overall improvement is anticipated to positively contribute in regional sustainable development and job creation.

To this end, SYMBI will foster: a) the exchange of experiences between regional authorities and stakeholders involved in regional supply and value chains as concerns the use of resources, b) the integration of lessons learnt into regional policies and actions plans, including benchmarking indicators, and c) the development of broader synergies to support the transition to a circular economy.

### 3 SYMBI activity A1.4

SYMBI activity A1.4 "Prescribing green public procurement as an enabler of industrial symbiosis" aims to evaluate and analyse the use of green public procurement as an enabler of industrial symbiosis in partners' regions. SYMBI activity A1.4 consists of three main parts:

- The first part takes place during semester 1 and includes the preparation of a methodological framework by FUNDECYT, through which partners will be able to provide input and exchange ideas on how "green" public procurement can stimulate the proliferation of industrial symbiosis and stimulate growth at regional level.
- During the second part, SYMBI partners will conduct a research in order to provide input and peer review other partners' contributions with an emphasis on opportunities, challenges and barriers at regional level, by following the instructions of the methodological framework.
- The third part comprises the integration (by FUNDECYT) of the input provided by partners, and the development of a green public procurement strategy & roadmap to plan, evaluate, & improve the management of regional authorities procurement activities in the context of policy instruments, as an enabler for the proliferation of industrial symbiosis. This document is the final output of the activity, i.e. the "Guidelines on how to capitalise green procurement as an enabler of industrial symbiosis"

## 4 Green Public Procurement

Europe's public authorities are the most important consumer of goods and services in Europe. Hence, by using their purchasing power to choose environmentally friendly goods, services and works, European public authorities can make an important contribution to sustainable consumption and production. This process of choosing to purchase products that respect specific sustainability criteria and provisions is called Green Public Procurement (GPP) or green purchasing. Despite its voluntary character, GPP has a key role to play in the EU's efforts to become a more resource-efficient economy, since it can help increase significantly the demand for more sustainable goods and services which otherwise would be difficult to get onto the market.

To be effective, GPP requires the inclusion of clear and verifiable environmental provisions and criteria for products and services in the public procurement process. The European Commission and some of its members have developed guidelines for this issue, in the form of national GPP criteria and provisions. However, the challenge of furthering take-up by more public sector bodies so that GPP becomes common practice still remains. As does the challenge of ensuring the compatibility of green purchasing requirements among Member States - thus helping create a level playing field and a common market for environmentally sound goods and services.

## 5 Research questions

This document aims to address the following research questions, which cover all aspects related to activity A1.4 and the relation between GPP and industrial symbiosis & circular economy:

1. To what extent is green public procurement in European regions utilised to promote and support industrial symbiosis and circular economy projects?
2. Why was green public procurement chosen in European regions as a method to promote and support industrial symbiosis and circular economy projects? Did the reason have to do with:
  - a. Economic benefits?
  - b. Social benefits?
  - c. Environmental benefits?
3. In cases where green public procurement in European regions is not utilised, is there an impact on the development of industrial symbiosis and circular economy projects?
4. Which are the (administrative, legal, technical) reasons for not utilising green public procurement in European regions?

## 6 Research methodology

As described in the SYMBI A1.4a deliverable, the “Methodological framework to provide input and exchange ideas on green public procurement”, data presented and analysed in this document have been collected via three distinct iterations (two main and one complementary). The two main iterations are desk research and questionnaire based survey, whereas the complementary is the approach of semi-structured qualitative interviews. The presence of more than one iterations was due to the need to collect qualitatively distinct types of data, in order to develop a more complete picture of the impact of green public procurement in industrial symbiosis projects.

Iteration 1, namely desk research, constitutes the basal part of the investigation and will provide the first corpus of data. Desk research conducted during iteration 1 refers to a large extent to secondary data research. The reason for that is that this research aims to capitalise on existing experience found in the literature to answer the research questions presented in the previous section. The reason why desk research was chosen as the basal part of the investigation has to do with the fact that it is an easy, efficient and cost-effective way to develop an overview of the potential positive effects of the utilisation of green public procurement as an enabler of industrial symbiosis and of the factors that hinder said utilisation, without demanding much time. Furthermore, secondary data research bears the advantage of providing perspectives based on relevant themes that are based on already analysed data.

On the other hand, if researchers rely completely on secondary data, there is always the danger of developing a biased perspective of the issue at hand due to the different objectives of past research. This is the reason why Iteration 2 consists of a questionnaire based survey. In contrast to desk research, surveys supply primary and mostly quantitative data. Respondents provide a synopsis of a more personalised and less institutionalised account of their experiences related to green public procurement.

Iteration 3, i.e. the qualitative interviews, was included as a complementary method of data collection in the research to make sure that specific key aspects of green procurement are understood to a greater extent. The third iteration will address important non-clarified issues that could shed further light on the function of green public procurement as an enabler of industrial symbiosis.

## 7 Data analysis methods

Data analysis was based on the open coding method. Open coding is a type of data analysis that is not guided by researchers' theoretical assumptions, but by the data per se. Researchers do not chose to pick and code the patterns that fit their own theoretical assumptions, but on the contrary they have to identify, note and code all patterns that emerge from the data, even if they contradict the researchers' assumptions. To achieve this, they do the following:

- a) Read through the data several times
- b) Start creating tentative labels for chunks of data that summarize the phenomena described therein (not based on existing theory – just based on the meaning that emerges from the data)
- c) Step (b) leads to the development of a simple system of codification for the patterns that they found.

After collecting data up to the point of saturation, i.e. up to point where more research does not provide data with significantly different additional information, researchers have to assemble all data in the same form, i.e. as a document. After assembling all data, researchers have to read through them several times and then start to match similar data and create categories for chunks of data that summarise various policies for the support of industrial symbiosis and circular economy (or the reasons for the absence of such policies). SYMBI partners had to find and provide examples that best represent the characteristics of various policies to support industrial symbiosis and circular economy.

## **8 Research question 1: To what extent is green public procurement in European regions utilised to promote and support industrial symbiosis and circular economy projects?**

With regards to research question 1, the data, collected by the SYMBI partnership, show that, overall, the European Union undergoes a process of systematisation of green public procurement processes. What this means is that most European countries can locate themselves along an spectrum where on the one side can be found countries where the application of green criteria in procurement is mostly fragmentary, and on the other countries where GPP is mostly efficiently managed and where efforts are being made to utilise it to promote other sustainability inducing practices such as industrial symbiosis. Nevertheless, the utilisation of GPP for the initialisation and advance of industrial symbiosis and circular economy projects is not yet systematised in Europe and should be considered a target for the countries of the European Union. It is hard to say for sure, in what extent green public procurement in European regions is utilised to promote and support industrial symbiosis and circular economy projects. There isn't many academic research or studies conducted on what extent green public procurement is utilised to specifically promote industrial symbiosis and circular economy.

However, the European Commission has acknowledged green public procurement (GPP) as a way to support circular economy. The Commission is keen to reinforce the use of GPP by leading example in its own procurement and steering the application of GPP for EU funding. In "Closing the loop – An EU action plan for the circular economy" (*European Commission 2015*) public procurement is seen as key factor in creating new business opportunities, and helping to unlock the growth and jobs potential of the circular economy. Public procurement accounts for a large proportion of European consumption (nearly 20% of EU GDP). It can therefore play a key role in the circular economy, and the European Commission will encourage this role through its actions on Green Public Procurement. (*European Commission 2015*)

Criteria and guidance for green public procurement are developed at EU level and then used by public authorities on a voluntary basis. Essential aspects of circular economy in GPP are

eco-design and recyclability. By purchasing eco-design, the procurement advances circular economy in all aspects of the products life cycle. By purchasing goods that are designed to be durable and repairable and for example requiring availability of repair information and spare parts, will ensure the products are suitable for circular economy. Recyclability helps in preserving the value of the different materials in the product at the end of its life cycle.

Promoting industrial symbiosis by utilizing GPP is often done by promoting and supporting innovative industrial processes. In “Closing the loop – An EU action plan for the circular economy” (European Commission 2015) industrial symbiosis is seen as a way to promote innovative circular economy projects: industrial symbiosis allows waste or by-products of one industry to become inputs for another. In its revised proposals on waste, the Commission proposes elements to facilitate this practice, and will engage with Member States to help ensure a common understanding of the rules on by-products. The EU is supporting promising developments through its research and innovation financing programme, Horizon 2020 and through Cohesion Policy funds. (European Commission 2015).

Different practices contribute to the realization of circular economy, encompassing production, consumption and waste management, and these are being carried out at the micro (e.g. eco-design), meso (e.g. eco-industrial parks) and macro (e.g. regional industrial symbiosis networks) levels. The Commission stresses that transition to a more circular economy requires changes throughout value chains, from product design to new business and market models, from new ways of turning waste into a resource to new modes of consumer behaviour. This implies full systemic change and innovation not only in technologies, but also in organisation, society, finance methods and policies. Clever government support is key, whether in the form of the provision of guarantees to reduce risks for investors or via public procurement criteria. In the publication green criteria for public procurement is considered one of the main policy-related drivers for industrial symbiosis. However, these criteria need further development in order to work efficiently.

## **8.1 Iteration 1**

### **8.1.1 Poland**

An example of a country where the application of GPP in general is fragmentary, is Poland. In the Polish procurement system, with some exceptions, the decision to include environmental criteria in the procurement process depends on the contracting authority.

This decentralization of the public procurement system does not merely increase the difficulty of the generalisation of the application of green criteria, but even of obtaining the necessary data on how much 'green' the public procurement system is.

However, despite the fragmented character of GPP application, the level of the GPP in Poland, in 2012, evaluated on the basis of announcements in the Bulletin of GPP was 9.5%. In turn, the GPP level evaluated based on the announcements in the Official Journal of the European Union was at a level of 14.5%. Based on the above data, one can assume that the total percentage of the GPP in 2012 was 12%. The value of the Polish GPP market in 2012 was estimated on the basis of an analysis of information delivered by the contracting authorities in their annual reports. The value of public procurement reached 132.7 billion PLN (Polish zloty) in 2012, while the value of the GPP - 15.9 billion PLN. Therefore it is possible to reach the following conclusions:

- a) Despite the fragmentary character of its expansion, GPP has made headway in Poland and this is evidence of the potential for expansion of sustainability practices within developed economies.
- b) The fragmentary character however, means that GPP expansion in Poland has not yet realised its full potential. The application of green criteria is still practiced at a minority of procurement processes. Ergo, there is an evident need for a systematisation of GPP implementation. In addition, GPP's potential to support and advance industrial symbioses has not yet been explored.

### 8.1.2 Greece

The validity of the conclusions above is exacerbated by the analysis of data from Greece. The latter is among the countries with the lowest degree of application of green criteria in public procurement proceedings and, as a result, has not yet achieved an extensive use of GPP as an instrument for the initiation and advancement of industrial symbiosis projects. The main reason for that is that the adoption of GPP has been so far fragmentary and Greece has not yet developed a national action plan to standardise the use of green criteria<sup>1</sup>. The application of green criteria exists only as a suggestion and is based on the instructions given by the European Union. The absence of an action plan is one of the main reasons why GPP has not yet been used to support and advance industrial symbiosis projects.

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<sup>1</sup> <http://www.ypeka.gr/Default.aspx?tabid=533>

Beyond the fragmentary application of GPP, the latter has not been utilised in Greece to promote and support industrial symbiosis and circular economy projects, because in general these have not become common practices in Greece. Even though there have been efforts to develop industrial symbiosis related networking, even as an automated process by using online tools<sup>2</sup>, in most cases Greek industries have not taken advantage of opportunities to develop industrial symbiosis. A notable exception was the successful development of industrial symbiosis among cement and aluminium industries in the Thriasion field<sup>3</sup> which included changes in the legal and administrative framework under which industries function therein. Furthermore, it is only with changes in the National Waste Management Plan<sup>4</sup> in 2014 that industrial symbiosis was included in the sustainability targets of the Greek state and still its relation with GPP has not yet been explored.

Nevertheless, efforts have been made during the last few years to change this situation. In 2016 the Greek government published a proposal for a National Plan for Public Procurement which, after a process of public consultation, would become part of national legislation. The proposal<sup>5</sup> outlined specific principles, actions and time-plan for the integration of GPP in Greek public procurement processes. The main principle under which this integration will take place is the incorporation of the EU Circular Economy action plan's priorities in Greek public procurement<sup>6</sup>. To achieve that target, the following measures are proposed to be implemented according to the following time-plan<sup>7</sup>:

**Table 1: Itegration of the EU Circular Economy action plan priorities in Greek public procurement**

#	Measure	Implementation time-plan
1	Formation of a monitoring process for the application of green conditions and criteria in various projects and activities in which the public sector participates.	Q1-2016 to Q4-2020

<sup>2</sup> [http://www.esymbiosis.eu/esymbiosis\\_uploads/loizidou\\_21\\_12\\_2014.pdf](http://www.esymbiosis.eu/esymbiosis_uploads/loizidou_21_12_2014.pdf)

<sup>3</sup> <http://environ.chemeng.ntua.gr/gr/Default.aspx?t=189>

<sup>4</sup> <https://dasarxeio.com/2017/01/08/1940-3/>

<sup>5</sup> <http://www.opengov.gr/aads/?p=5406>

<sup>6</sup> [http://www.opengov.gr/aads/wp-content/uploads/downloads/2016/02/01\\_STRATEGY\\_partA.pdf](http://www.opengov.gr/aads/wp-content/uploads/downloads/2016/02/01_STRATEGY_partA.pdf)

<sup>7</sup> [http://www.opengov.gr/aads/wp-content/uploads/downloads/2016/02/03\\_Action\\_Plan.pdf](http://www.opengov.gr/aads/wp-content/uploads/downloads/2016/02/03_Action_Plan.pdf)

<b>2</b>	Preparation of an action plan for the promotion and support of GPP alongside a set of green indicators to be used in public procurement processes.	Q1-2016 to Q4-2016
<b>3</b>	Conduction of market research to identify products and activities that are suitable for the application of green criteria.	Q1-2017 to Q4-2017
<b>4</b>	Drafting a manual with instructions on the conduction of GPP.	Q1-2018 to Q4-2018
<b>5</b>	Realisation of an awareness raising campaign for the promotion of GPP.	Q1-2017 to Q4-2020
<b>6</b>	Introduction of green technologies in the system of National Technical Specifications.	Q1-2017 to Q1-2018
<b>7</b>	Enrichment of the integrated pricing regulation with articles that promote green economy.	Q2-2018 to Q4-2018

If implemented, Greek authorities expect that these measures will have a positive indirect effect on industrial symbiosis. The reason is that they will encourage “green” production practices (one of which is industrial symbiosis), and they will instil a new forward-thinking mentality to public employees and businesses that are involved in public procurement processes. As a result, they will render them more friendly to the “green economy”, part of which is industrial symbiosis.

### 8.1.3 Hungary

Hungary is another country with an imperfectly systematised GPP system, as can be seen by the fact that Hungarian public authorities initialised public procurement systematisation through a new public procurement act initialised on January 1 2012. The act has put in place detailed rules for environmental sustainability and energy efficiency requirements covering all phases of the procurement process and all aspects of the management of budgetary institutions, public foundations and, in general, state owned organisations. The organisation responsible for procurement contracts of about one thousand public authorities is the

Hungarian Public Procurement and Supply Directorate General. Since 2012 9.9% of public procurement procedures included green criteria, with a total contract value of EUR 340 million. The criteria applied related, for example, to maximum energy consumption levels for personal computers and compliance with the criteria underlying green certification schemes for paper products. Hungary's capacity to apply GPP is severely hindered by the absence of the necessary information. Contracting authorities often do not know if there are any solutions that could be procured and respect the necessary sustainability and environmental protection criteria.

### 8.1.4 Italy

Moving across the spectrum of increased systematization of GPP processes, during the last years, the Italian Government has made several attempts to regulate the topic of GPP in a deeper manner, aiming to use it as a strategic leverage to push economy toward a circular model and to foster as a subsequent effect the expansion of industrial symbiosis.

The most significant measure aiming to systematise GPP was the preparation and adoption of a National Plan dedicated to the issue, called "National Action Plan for the Environmental Sustainability of Public Administration Consumptions"<sup>8</sup>. The National Plan outlines the national systematic strategy to maximise the dissemination of GPP among public bodies, through the following actions:

1. Involvement of relevant actors for GPP at national level.
2. Improving knowledge of GPP in Government Authorities and other public bodies through dissemination and training activities
3. Definition of methodological guidelines for the construction of sustainable purchase processes and of environmental criteria to be included in tender specifications.
4. Definition of national targets to be achieved and redefined every three years.
5. Periodic monitoring of GPP dissemination and analysis of the environmental benefits achieved.
6. Inclusion of Green Procurement in regional legislation by adopting specific regional plans.

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<sup>8</sup>First decree by Ministry for the Environment, Land and Sea Protection dated 11th April 2008. Revised on 10th April 2013.

Moreover, the Italian Environment Ministry moved one step further and created a "Management Committee for the implementation of the National Action Plan", composed by several experts and representatives of various Italian ministries, with important tasks such as the elaboration of proposals concerning the definition of "Minimum Environmental Criteria" (MEC hereafter) and the planning of foreseen communication, training and monitoring activities in the National Action Plan. The MEC are a set of environmental requirements for each purchase category which represent the technical reference points for Contracting Authorities in the field of green public procurement and address the following issues:

1. Material recycling and reusing.
2. Prescribing a required minimum quantity of recycled material.
3. Decreasing the amount of harmful substances use.
4. Imposing technical requirements that impact positively on the products' life
5. Introducing eco-design elements that facilitate recovery or re-use.
6. Applying verification tools to certify the content and quality of recycled goods.

A crucial action to accomplish the transition to Circular Economy was the enactment of the law 'Collegato ambientale', which entered into force on February 4th 2016 (Bill 28 December 2015 - 221). Thanks to this decree GPP was turned into a mandatory scheme for the Italian Public Administration. Specifically, MEC application in procurement processes became necessary in the case of tenders for energy related supplies (such as light bulbs and lighting fixtures, PC, energy services for buildings) and, for at least 50 % of the value of the tender, for other supply classes (such as: municipal waste management services, toner, public green management, copy paper, catering, housekeeping and hygiene products, textiles, furniture office).

The national legislator realized that, the mandatory MEC application on a large scale, a relevant step to promote Circular Economy since the minimum environmental criteria, can be a key tool to overcome the "linearity" of production and consumption models. In addition, with the coming revisions and additions of MEC, even for product and service categories that at the moment the industry is not interested, will provide a further opportunity to make GPP an increasingly effective instrument for the Circular Economy promotion in Italy. Finally, MEC application supports industrial symbiosis, as instrument of industrial policy (as well as environmental) and it outlines competitive patterns of

production in the long period, by making companies more independent of raw materials and resources. The mandatory application of MEC was highlighted again with the *Law n.50/2016* that introduced the new Code for Public Procurement. In the following image readers can see the products and services for which Italy has adopted or plans to adopt MEC:

**Table 2: Products and services procured according to MEC in Italy**

Procurement of products with existing MEC	<ul style="list-style-type: none"> <li>•furniture and textiles</li> <li>•exterior doors</li> <li>•vehicles</li> <li>•cleaning products</li> <li>•copying paper</li> <li>•IT goods</li> </ul>
Procurement of services with existing MEC	<ul style="list-style-type: none"> <li>•catering</li> <li>•energy services for buildings and public lighting</li> <li>•cleaning services</li> <li>•public green services</li> <li>•municipal waste services</li> </ul>
Procurement of services with MEC under formation	<ul style="list-style-type: none"> <li>•building and maintenance buildings</li> <li>•cleaning and sanitation services in hospitals</li> <li>•roads' construction and maintenance</li> <li>•incontinence aids</li> </ul>

Furthermore, another important legislative innovation to support further the spreading of Circular Economy, concerns the introduction of the "life cycle costing" methodology for products/services. In evaluating the best offer, the contracting authority will need to consider not only the cost of purchasing, but also other costs associated with use and maintenance, the end of life of products (collection and recycling costs) or those caused by environmental externalities (costs of greenhouse gas emissions and other pollutants). So, it is clear that by introducing a procurement assessment method based on the "life-cycle costing", this recent regulatory allows for the efficient integration Circular Economy and Industrial Symbiosis principles in GPP.

Moreover further measures establishes, for companies boasting Environmental Certifications or Eco-labels, facilitations to access to public procurement: discounts on the amount of guarantees required in the phase of the offer submission and the foreseeing of a greater assessments, in term of score, during the public tender.

In addition to the legislative measures, Italy is focusing its attention even on other instruments to promote and disseminate GPP. The main example is the Working Group on Green Procurement organized by "Coordinamento delle Agende 21 Locali Italiane" Association, that established a network of public bodies to discuss and exchange views on the green purchasing topic, called "GPPnet"<sup>9</sup>. The objectives of the Working Group are the following:

- Identifying obstacles to the adoption of ecological criteria in Public Administration
- Defining and sharing tools and solutions to overcome obstacles
- Drafting of GPP guidelines to facilitate its adoption by local authorities
- Stimulating the exchange of experiences between authorities, including through a database of "green tenders" which should facilitate their replicability.

To achieve these objectives the Working Group utilises the following tools:

- Quarterly meetings to discuss, share and devise
- The bimonthly newsletter GPPinfoNET to update, disseminate and communicate
- A Database on "green tenders" to exchange, learn and compare
- The CD-Rom Open Book to direct, support and innovate
- The Technical Positioning Documents to deepen key topics.

Another institution promoting and supporting GPP is CONSIP, i.e. a company controlled by the Italian Ministry of Finance that plays the role of central purchasing agency for the public sector. As "contracting authority" it manages MEPA (Electronic Market for Public Administration) which enables public administrations to realize procurement processes by using agreements, defined by CONSIP with suppliers on the basis of public calls for tender. Since its establishment CONSIP has set specific goals related to GPP such as 1) increased efficiency and savings in the use of resources, 2) the containment of hazardous substances, and 3) reducing the volume of waste, by spreading reusable and recyclable products. CONSIP integrates environmental criteria in its initiatives and uses a specific symbol, a green leaf, to highlight its environmentally sustainable procedures. The criteria adopted by CONSIP take into account:

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<sup>9</sup> <http://www.a21italy.it/forum-greeneconomy/acquisti-verdi/>

- MEC defined by Government
- Existing environmental labels
- Current standards of environmental management systems.

At a regional level, the Region of Molise is not at the forefront of GPP adoption in Italy. Molise is among the 10 regions out of 20 that have not yet adopted a GPP regional plan or concrete and structured initiatives for the topic, despite the efforts of the Italian governments.

In Molise the key driver of GPP is the "*Online Desk Service on New Procurement Code*" recently activated by the Regional Union of Chambers of Commerce of Molise (UNIONCAMERE) to support regional companies. It is a service of assistance and guidance for firms interested in new provisions introduced by the "*New Procurement Code*", even those concerning the Green Public Procurement. Experts are available to provide adequate answers to companies' questions and requests for clarification, by indicating the regulatory material and the administrative practice concerning the issue submitted. Companies will also have the opportunity to request to Molise Unioncamere the organization of seminars on specific issues related to the topic or to participate in meetings that will be scheduled by the expert<sup>10</sup>.

To conclude, it is possible to deduce that a great work (especially legislative) has been done to support Circular Economy and Industrial Symbiosis development, through the leverage of GPPs. However concerning their application, there is still not a full adoption at regional level. Some regions are already ahead in the implementation path and they adopted regional plans to define a structured engagement, others (like Molise Region) are still at an early stage and they still not implementing the "National Action Plan for the Environmental Sustainability of Public Administration Consumptions" provisions. In the next coming years Italy will have to do further efforts and plan more incisive measures.

### 8.1.5 Slovenia

In Slovenia, the adoption of GPP is at a similar level to the one in Italy. Slovenia managed to adopt the EC GPP criteria into national legislation relatively quickly and efficiently and is still

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<sup>10</sup>[http://www.mol.camcom.it/index.php?option=com\\_content&view=article&id=937:attivatoil-gservizio-a-sportello-online-sul-nuovo-codice-degli-appalti-a-favore-delle-impresemolisane&catid=1:ultime&Itemid=50](http://www.mol.camcom.it/index.php?option=com_content&view=article&id=937:attivatoil-gservizio-a-sportello-online-sul-nuovo-codice-degli-appalti-a-favore-delle-impresemolisane&catid=1:ultime&Itemid=50)

among few countries in EU that has entirely regulated GPP processes. However, despite this success, at the moment, Slovenia is stagnating, since it has still not renewed the Decree on GPP, which was at that time the main achievement in this field.

It has to be mentioned that also the European Commission (EC) introduced the reference to green and environmentally friendly principles only in the beginning of the 90s. In 1996 the EC released the Green Paper, *Public Procurement in the European Union: Exploring the Way Forward*. This was considered as a first step towards “greening” the European administration. In the following years, the EC made a substantial progress towards achieving this goal. In 2003, a *Communication of the Commission on Integrated Product Policy* was released, suggesting all Member States to introduce the GPP by 2006. Since the GPP soon became widespread across the EU, countries faced certain obstacles, challenges and misunderstandings (particularly on the industry side, i.e. service providers). After several court cases (once the public sector started included “green” elements in public procurement), the EC published in 2008 the *GPP Training Toolkit*, setting guidelines for Member States how to approach towards GPP and what to take into consideration when issuing the GPP.

In parallel, the EU member states started following the EC's recommendations by introducing and adopting same principles at national levels. Slovenia followed the recommendations set by the EC and adapted its principles to EC's. Slovenia translated and introduced the so called “green elements” in its public procurement regulations as well as in its framework and strategic documents. Initially, the legislation contained environmental provisions and elements, which contracting authorities could apply when issuing the public procurements.

GPP has gradually become important in Slovenia from different aspects, but mainly in order to increase the supply side of green products / services, lower the price of green products / services (and thus make them affordable to wider public), encourage producing new products and developing new solutions, ideas and technologies. In addition, GPP in Slovenia plays an important role in reducing the effects of the public sector on environment and serves as a role model for private sector.

Before Slovenia adopted the *Decree on Green Public Procurement* in 2012, it paved the way for the GPP with different strategic documents in various areas (e. g. energy consumption, greenhouse emissions, construction, defence, water, services etc.). GPP first entered the

documents in quotation marks, meaning that the term was new in Slovenian environment, but later became well recognized. The following table presents the appearances of GPP related policy measures in these strategic documents:

**Table 3: Slovenia procurement strategic documents**

<p><b>Slovenian Development Strategy</b></p>	<p>The fifth development priority, i.e. Integration of measures to achieve sustainable development, pressing forward with the environmental tax reform and introduce green public procurement procedures is seen as a factor for integrating environmental standards with sectoral policies and consumption patterns.</p>
<p><b>Reform Programme for Achieving the Lisbon Strategy Goals 2005</b></p>	<p>The Reform Programme foresees the green public procurement as one of the elements for promotion of sustainable development. As stated as one of the priority measures, Slovenia should „apply environmental criteria in the tax legislation reform and the implementation of industrial policy, introduce green public procurements and consider environmental issues in both sectoral policies and spatial planning”. It is interesting and should be pointed out that when the GPP appears for the first time, the word „green” is literally put in quotation mark, which explains that this term was really new at that time.</p>
<p><b>Reform Programme for Achieving the Lisbon Strategy Goals 2008</b></p>	<p>If the Reform programme 2005 (listed above) introduced the term „green” public procurement, there is a significant shift in the Reform Programme 2008, where GPP are seen not only as enablers for sustainable environment, but also as drivers for financial efficiency of public sector.</p>
<p><b>Slovenian Action plan on Energy Efficiency 2008 – 2016 (available only in Slovenian)</b></p>	<p>Green public procurement for energy consumption in public sector is considered as good practice and an example for improving energy efficiency. Public sector should serve as a role model also for private sector.</p>

<p><b>Action plan for green public procurement 2009 – 2012</b></p>	<p>The Slovenian Government adopted in 2009 an Action plan for GPP for the period from 2009 till 2012 with the aim to speed up the implementation of green public procurement in Slovenia. The Action plan foresees 6 main principles of the GPP:</p> <ul style="list-style-type: none"> <li>- Reconsider the need to buy something: we do not buy the product, but we purchase the service instead, which meet our needs.</li> <li>- Reduce the quantity of products/services, its rationalization, purchase of efficient products (energy efficient products that contributes to lower energy or water consumption etc.)</li> <li>- Re-use of products: this refers to contracting authority and / or service provider.</li> <li>- Recycling: it is possible to conclude an agreement with service providers that are committed to recycling</li> <li>- Energy recovery</li> <li>- Post waste management: to agree with the service providers on waste treatment after their life cycle</li> </ul>
<p><b>Action Plan for Energy Efficiency 2014 – 2020</b></p>	<p>The present action plan foresees the GPP as one of the measures for reducing the impact of public sector on environment.</p>
<p><b>Operational Programme for Limiting Greenhouse Gas Emissions 2009 – 2012</b></p>	<p>The Operational Programme sets some direct guidelines and directives for certain governmental offices and ministries what to do in the field of GPP. Thus, it is stated that the Governmental Office for Development and European Cohesion should ensure the appropriate classification of the following products and services in GPP:</p> <ul style="list-style-type: none"> <li>• construction, reconstruction and maintenance of buildings,</li> <li>• purchase and renting of energy efficient buildings,</li> <li>• purchase of energy efficient office electronics, including</li> </ul>

	<p>lightening,</p> <ul style="list-style-type: none"> <li>• public lightening</li> <li>• cooling systems or acclimatization, heating and cooling systems.</li> </ul>
<b>Operational Programme for Reducing GHG Emissions until 2020</b>	<p>As stated at the Slovenian Government's website, the OP "is an implementation plan of measures to attain Slovenia's legally binding target of greenhouse gas reduction by 2020 in the climate energy package under Decision No 2009/406/EC. It focuses on areas or sectors that contribute the biggest share of emissions in sectors that do not form part of the European emission trading scheme, but subject to national commitments: buildings, transport, agriculture, waste and other."</p>
<b>Framework programme for a transition to a green economy and the action programme for 2015 and 2016</b>	<p>On 29 October 2015, the Government of Slovenia adopted a framework programme for a transition to a green economy and the action programme for 2015 and 2016, which follows the EU regulations and offers answers to global challenges. The green economy is seen as the only resort for the country to become sustainable in a long term.</p> <p>This framework programme sets out as one of 10 key actions the "Increasing demand for green products and services, green public procurement".</p>

Despite the importance of these planning documents, the main drivers of the adoption of GPP in the Slovenian public sector, have been the relevant legislation that set some obligatory rules for the application of green criteria in public procurement processes, i.e. the *Public Procurement Act* and *Decree on Green Public Procurement*. The Decree is currently (2016/2017) under public consultation, since amendments will be shortly introduced, making the Decree even "greener". What follows is a presentation of both the Public Procurement Act and the Decree:

1. *Public Procurement Act*

The Public Procurement Act (PPA) entered into force on 1 April 2016. It was adopted by the Government of Slovenia on 18 November 2015.

The PPA defines in several articles how environmental and technical specifications might be taken into consideration in public procurement processes. The PPA includes provisions about GPP and environmental requirements in the following articles:

- *Article 37, paragraph 3, point b* states that technical specifications ought to include provisions for the protection of environment. In *Paragraph 6*, the contracting authority may require from products to have different environmental or eco labels, congruent with the valid (multi-national and/or EU regulations. In *paragraph 7*, the contracting authority may accept also other products or services if the provider proves to be in line with technical specifications.
- *Article 39* states that the Government or any other public contracting authority can demand from service provider to take into consideration environmental provisions.
- *Article 40* states that the contracting authority has to list the bodies, where service providers can obtain eco-friendly certificates (e. g. on environment friendly product / service).
- In *Article 45, paragraph 2, point f*, it is stated that the contracting authority, when applying GPP, has to set measures for environmental management.
- In *Article 47*, it is stated that contracting authorities that requires from independent bodies to issue an environmental certificate, have to refer to EMAS.
- *Article 48* defines that the contracting authority may issue the tender on the basis of most economically advantageous tender in combination with respecting the environmental provisions.

It should be noticed that despite these provisions, the Public Procurement Act does not contain in any article a direct link to GPP or directly emphasizes the need for GPP. This is something that should be taken into account when the next Public Procurement Act will be in preparation.

## 2. *Decree on green public procurement*

In 2010 the Government of Slovenia took a *resolution (n° 00712-4/2010/18)* where it was stated that the ministry, responsible for environment, should assess the adequacy of environmental criteria in the Decree every two years and suggest the novelties. The implementation has shown that the resolution was not respected and thus the novelties were not introduced. To tackle this challenge, the Slovenian government on 8 December 2011 issued a Decree that entered into force on 14 March 2012, following the expiration of

the Action plan on GPP 2009–2012. The Decree was prepared on the basis of EC's “*Green Public Procurement (GPP) Training Toolkit*” and the corresponding environmental criteria for ten areas, published by the EC. With this decree, three EU directives were directly or partially translated into Slovenian regulation, namely:

- *Directive 2009/33/EC* of the European Parliament and Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles
- *Directive 2006/32/EC* of the European Parliament and Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC
- *Directive 2010/30/EU* of the European Parliament and Council of 19 May 2010 on the indication through labelling and the provision of standard product information about the consumption of energy and other resources by energy-related products

As stated in the Article 2, the purpose of the decree is to reduce the negative impact on environment through public procurement of environmentally less burdensome products, services and construction and as well as to set a role model for private sector.

This decree is valid in all cases, except when it is about the public procurement for humanitarian purposes (article 4.a). The Decree defines which products and services (for which basic and additional environmental requirements apply) should be subject to GPP. According to article 5, these are:

- electricity,
- food, beverages, agriculture products and foodstuff for food and catering,
- office paper and hygiene paper products,
- electronic office equipment,
- audiovisual equipment,
- refrigerators, freezers and its variations, washing machines, dishwashers, driers, hoovers and air-conditioning appliances,
- buildings,
- furniture,
- detergents, cleaning services and laundry services,
- cars, light goods vehicles, heavy goods vehicles and buses,

- tires,
- electric lamps and lights.

The Decree is drafted so as to foster the implementation of environmental measures, but in a complicated administrative way. Therefore when it comes to implementation, the contracting authorities usually do not want to impose more stringent environmental measures that foreseen by Decree.

The fact that the Decree on Green Public Procurement has not been amended or renewed since 2012 demanded an urgent consideration for doing so. Therefore the Decree was put in public discussion in autumn 2016, where relevant stakeholders could suggest improvements and / or comment the current situation. An impetus to amend the Decree originated in the fact that the EC had amended its GPP criteria for many areas from 2012 (e. g. Computer and monitors, Electrical and Electronic Equipment used in the Health Care Sector, Imaging Equipment, Office Building Design, Construction and Management, Road Design, Construction and Maintenance etc.). Environmental criteria have drastically changed and improved from 2012 when the Decree entered into force. A renovation of the Decree is needed, because processes, technology and materials have significantly improved in certain areas during the past 6 years. As a result, insisting in respecting an outdated Decree might even be harmful for the environment. In addition, the amendment of the Decree must be done if the public sector still intends to be seen as driver and promoter of green sustainable development.

Hence, it is possible to conclude that GPP regulations in Slovenia have been progressing, though this process could be faster. The aforementioned good practices show that Slovenia is committed to the GPP more than it is currently set by regulations.

### **8.1.6 Spain**

#### **GPP in Spain**

The first conclusion which can be drawn from desk research is that Green Public Procurement (GPP) is an increasingly important issue for policy-makers in Spain and its 17 Autonomous Communities. The provision of mechanisms to include social and environmental clauses in public procurement, as special conditions for the execution of the contract or as criteria for tender assessments, was incorporated into the Spanish legal system by the repealed *Law 30/2007* of 30 October 2004, i.e. the Spanish public

procurement law. This law transposed the *2004/18/EC Directive*, by including substantial innovations in the preparation and awarding stages, in order to provide the appropriate framework to meet ethical and social requirements. This regulation is still in the recast text of the Spanish public procurement law, approved by *Royal Legislative Decree No 3/2011* of 14 November, and is reinforced by new Procurement Directives, approved by the European Parliament on 15 January 2014 and published in OJEU on 28 March, to replace some Directives, particularly *Directive 2014/24*.

Spain has moved towards GPP development, but green procurement processes need to be further explored and diffused. The level of commitment to GPP was still very low in 2014 among public authorities, probably due to a lack of awareness and the voluntary nature of most initiatives. In general, although most public authorities implement some form of GPP, recent studies suggest that GPP is at an early stage of implementation in Spain. However, there is a niche market for green products and services.

Government expenditure on works, goods and services represents around 14% of EU and 16% of Spanish GPP, according to the *European Commission (2016) Public Procurement Indicators report (2014)*. Therefore, by using their purchasing power to choose goods, services and works with a reduced environmental impact, they can make an important contribution towards circular economy projects and sustainability goals. Spain's public authorities at national, regional and local level are major consumers which can make an important contribution to sustainable consumption. However, as it happens in other policy fields, in GPP matters there is also a high level of decentralization which gives regional and local authorities broad scope to tailor their policies to regional and local needs. What that means is, that some Spanish regions, such as the Basque Country, are one step ahead of some others in terms of GPP criteria inclusion in public tendering and therefore, its contribution to industrial symbiosis and circular economy projects.

The main GPP instrument in Spain is the *Green Public Procurement Plan (Plan de Compra Pública Verde)* for General Government Administration and Public Bodies and institutions operating Social Security Schemes in Spain. It was adopted in 2008. Its main objective is the implementation of environmentally friendly practices in public tendering in order to ensure certain goals are attained for some groups of products and services according to European Commission's priorities. It supports the implementation of State policies aiming at protecting the environment and climate as well as energy savings and efficiency. Products

and services addressed by the *Green Public Procurement Plan* are all those pertaining to construction, transport, energy, office equipment, paper and publications, furniture, cleaning and events.

Two reports on the state of implementation of the procurement plan have been produced, in 2011 and 2015. The latest report concludes that progress achieved in the aforementioned products and services represents a valuable experience which makes it possible to deal with updating and extending the groups of products and services to be considered in GPP planning. Other conclusions of the 2<sup>nd</sup> progress report on GPP in Spain are:

- Regular exchanges of information with GPP experts should be promoted and information handbooks produced for groups of products and services.
- A cleaner, more resource efficient and more competitive supply of products and services should be reinforced.
- GPP is a key instrument for facilitating economic growth under a circular economy approach, that is, low carbon, resource efficient, zero waste, non-polluting and eco-innovative.

### **GPP in Andalusia**

In addition to the provisions of the Spanish Public Procurement Law (basic legislation) other provisions of the Regional Government cover requirements regarding social and environmental criteria in public procurement. Traditionally, sustainable development policies have been associated with production and waste management. However, consumption patterns were not taken into account to solve environmental and social problems. Within this framework, Andalusia has become heavily involved in protecting the environment and promoting social policies and innovation through public procurement. Andalusia utilises an inclusive process that balances principles and objectives inherent in public procurement, such as employment, employment rights, quality of public services and some others related to sustainability of employment and social inclusion, environmental and gender equality policies.

Besides the normative background, different departments of the regional government have produced documents and handbooks that are worth mentioning, such as the *“Guía para la Contratación Pública Responsable en Andalucía”* (*Guide to Responsible Public Contracting in*

Andalusia) and EU-funded projects like ECOEDICION (LIFE project) to support sustainable management of publications in public administrations.

The result of this approach has been the recent (October 2016) adoption of a resolution to include contract clauses that address social and environmental considerations in public tendering in Andalusia. A Handbook to facilitate the inclusion of these criteria with practical recommendations depending on the chosen procedure will be approved shortly. Green criteria have to be considered at different stages:

- Subject matter and technical specifications
- Selection and exclusion criteria (e.g. compliance with environmental laws, technical and professional ability)
- Award criteria

#### **GPP in Extremadura**

Extremadura does not have yet a specific regulation on Green Public Procurement, although a draft version for the development of a Regional Framework to Boost the Green Economy and the Circular Economy in Extremadura has been developed. Nevertheless, at national level, all Spanish regions are directly affected by national legislation on *Law 14/2011*, 1 June, on Science, Technology and Innovation and *Order PRE / 116/2008*, 21 January, published by the Council of Ministers which approves the Green Public Procurement Plan of National General Administration, Public Bodies, and the Social Security Managing Entities.

Order PRE / 116/2008 aims to articulate the link between public procurement and the development of environmentally friendly practices, in order to achieve the goals of the European Community in its revised Strategy for Sustainable Development, as well as develop guidelines for incorporating environmental criteria into different stages of procurement applied to the following group of products:

- Construction and maintenance.
- Transport.
- Energy.
- Office equipment.
- Paper and publications.
- Furniture.
- Cleaning.

### 8.1.7 Finland

The Finnish government has set a target of making Finland a global leader in the circular economy by 2025. To this aim, the Finnish innovation fund SITRA has created the publication “*Finland’s circular economy road map*”. SITRA operates directly under the Finnish Parliament so its decision-making processes are tied to Finnish parliamentary processes. SITRA’s circular economy road map describes the concrete actions that can accelerate the transfer to a competitive circular economy in Finland. The road map highlights best practices and pilots that can be easily replicated and provide added value on a national scale. The roadmap includes public procurement as a way to make circular economy a strong part of the Finnish economy in a way that it can be also replicated to international level. According to the publication, the aspects where circular economy and GPP meet are:

1. Developing a sustainable food system focus area: Public procurement can be used to encourage the use of sustainable food and to prepare sustainable food that saves natural resources and reduces climate emissions. Through green criteria, public authorities can a) investigate suitable producers and their offerings as well as the special quality criteria and opportunities for co-operation, and b) develop co-operations, for example, regarding recipes between kitchens and producers. Such co-operation and sharing of information can also encourage industrial symbiosis projects.
2. Utilising wood-based products and those made from other renewable raw materials when life cycle analysis demonstrates that they are more sustainable overall. The actions include increasing awareness and changing attitudes in the units responsible for procurement in national and local organisations. Compile manuals about green public procurement that support the national targets on a procurement sector basis.
3. Promoting the use of secondary raw materials, including waste act interpretation and streamlining the environmental permit procedure. The goal is to utilise secondary raw materials, such as industrial side streams, as effectively as possible. This will be achieved by actively seeking uses for side streams instead of allowing them to become waste. Cooperation with industry, the authorities and experts will be developed in order to enable new, innovative solutions and methods of

utilisation. The use of secondary materials will be promoted by means of public procurement and public infrastructure construction in particular.

4. Include eco-design requirements in product design and construction and in the material development phase.

The Finnish Government Programme has five strategic priorities which are materialised in the form of 26 key projects. The first key project “Employment and competitiveness” contains an objective that the level of innovative procurement be 5 per cent of all public procurement. Public procurement will also be used as an active tool for promoting experiments and reforms. Setting up an experiment fund will be explored. The experiment fund would be a facility with funding for instance of EUR 15 million from a variety of funding providers. All in all, innovative, sustainable and green public procurement seem to be in a crucial role in promoting circular economy and industrial symbiosis in many publications and action plans.

## 8.2 Iteration 2

Iteration 2 consisted of a questionnaire based survey. Each partner had to find 12 respondents to the survey’s questions. More precisely, partners had to collect responses from 10 representatives of the demand side and 2 representatives of the supply side of a green public procurement process. The former are the people working within organisations (usually public) that procure/buy green products or sustainable services to use and apply them in their production and consumption processes. This group mostly consists of public sector employees involved in public procurement processes at a national, regional and local level. This group is the one in which partners can have the easiest access, since they often belong to the same organisation as they do. The latter consists on those who are found on the supply side of a green public procurement process, namely producers of various green products and suppliers of sustainable services. This group consists of people working in various private organisations, public agencies, as well as mixed formations such as public-private partnerships. These people can point to potential opportunities for green public procurement that public sector procurers might overlook. In addition, they are an ideal source of information for administrative and legal barriers to green public procurement because they are the main group that is affected by these problems.

The analysis of the data from iteration 2 revealed a more nuanced image about the application of GPP in the partnership countries. Even though the spectrum of

systematisation of GPP procedures exists, the differences between countries become less pronounced as one moves towards the core of the public sector. In fact, it could be argued that the closer to the core of the public sector a survey respondent worked, the more likely he or she was to ignore the issues of GPP, industrial symbiosis and circular economy. Among the factors that are cited as significant causes of this image, one can find the lack of information and training among staff and the ineffective communication of the link between GPP and sustainability practices like circular economy. In addition, GPP requires effective co-operation between different departments and staff members within an organisation and this is not always certain within large organisations of the public sector.

This effect was less pronounced in Finland and more significant in Greece, in agreement with the results from iteration 1. On the one side of the spectrum, the low rate of application of GPP to promote and support industrial symbiosis and circular economy projects in the public sector of Greece is obvious from the low level of awareness characterising territorial public sector employees with regards to both GPP and industrial symbiosis. It is notable that from questions 1 and 2 of the survey questionnaire, only two persons from the demand side of GPP are more than averagely familiar with GPP and only one with industrial symbiosis. The low rate of application of GPP is also obvious from the answers of the survey participants to questions 3 and 4, where the majority of respondents attributed a small rate of use of green criteria in their procurement processes in general and in procurement for industrial symbiosis projects.

In countries with more systematised GPP procedures, regional public administration personnel in Malopolska are aware about the benefits of using green public procurements. An average answer to the question about the familiarity with the concept of green procurement (in 1-5 scale) reached 3.2 (averagely+) which is a satisfying result especially when taking into account wide range of institutions covered by this survey. A similar image appears in Slovenia. Based on the survey's results, Slovenian stakeholders are averagely to quite familiar with the concept of the GPP. Still however, in such countries there are public organisations that lag behind in terms of familiarisation with GPP. For example, in Italy, there is not a very well knowledge and confidence with the term of Green Public Procurement by the local Public Authority personnel interviewed in the local area of Molise Region. As it's possible to see from the survey analysis only the 20% of the interviewed is really familiar with GPP, all the others have just heard of it but they have not working

knowledge with all the connections related to the processes of Green Public Procurement. Only two public authorities (CONSIP and Agenzia delle Entrate) out of 14 public bodies interviewed are really confident with the topic and applied GPP in their procurement processes.

This is also true for Spanish public authorities. Despite the fact that Spain has attempted to thoroughly establish a GPP policy, the results of the survey reveal that the application of green criteria in procurement processes differs substantially across public authorities. Therefore, although policy-makers have identified Green Public Procurement as a key component of the circular economy, the need to address issues such as staff training, awareness raising, larger political support, cooperation, durability and reparability in GPP criteria is clear.

Only in the region of Häme in Finland are public procurers more than averagely familiar with GPP. This is evidence of the importance of the timely and centralised preparation of GPP plans that has led to a change in the competences' profile of Finnish public sector employees of the region. It also points to the fact that, despite the more nuanced image generated from the survey results; the analysis based on a spectrum of systematisation is still valid.

The aforementioned conclusion is exacerbated in the case of the concepts of industrial symbiosis and circular economy. In the majority of countries (with the exception of Slovenia), public sector employees are unfamiliar with the concept of industrial symbiosis and circular economy and have an incomplete understanding of the fact that GPP can be used as a lever to promote, initiate and advance industrial symbiosis and circular economy projects.

For example, in Extremadura, there is a lack of awareness of the concepts of circular economy, industrial symbiosis and the Green Public Procurement instrument, mainly among Public Administrations. Related to the circular economy concept, 50% of the answers collected among the Public Administration declare not to know rarely or nothing about this concept and to a lesser extent still the concept of industrial symbiosis, unknown for 66.7% of the respondents.

Even in Finland, public procurers are not as familiar with the concept of industrial symbiosis as they were with GPP. Only one of the respondents was very familiar with industrial symbiosis and most of the respondents said to be poorly familiar with the concept. Most of the public procurers at the Häme region do not consider industrial symbiosis to have a

relation with GPP. Most of the public procurers and the organization they represented at the Häme region had never used green public procurement to initiate and advance industrial symbiosis projects, but all of them (except one) had used green criteria in the procurement processes they had been involved in (question 3).

Businesses on the other hand, and in general organisations on the supply side of green public procurement, had a much better knowledge of the concepts and practices of GPP, industrial symbiosis and circular economy. This was equally true for all countries and regions that delivered data from the supply side of procurement processes. For example, in Extremadura 85.7% of such respondents said they knew enough or a lot of circular economy and 57.1% were familiar with the concept of industrial symbiosis. Nevertheless, even people from the private sector had a hard time understanding the potential of GPP as leverage for industrial symbiosis.

The observed divergence in the responses of people from the demand and supply side of GPP is indicative of the differences in the profile of public and private institutions. Public institutions tend to be larger and less specialised. Change in these institutions takes time and it is usually induced via a top down process, as pointed out by the observations of the respondents who highlighted the need for political support for GPP, industrial symbiosis and circular economy. On the other hand, institutions on the supply side of GPP, i.e. private institutions that provide green products and services are more flexible and respond faster to changes in the market. Finding the best practices to utilise GPP as an enabler of industrial symbiosis and circular economy projects depends on understanding how to ameliorate the “interface” between these two types of institutions, i.e. help them understand each others’ characteristics.

However, despite these difficulties, survey respondents from all regions claimed that they were optimistic about the future of the expansion of GPP. This is evidence of the impetus in this domain that has been achieved through the adoption of planning methods under the guidance of the European Union.

## 9 Research question 2: reasons for applying green public procurement to promote and support industrial symbiosis

SYMBI partners argued that the application of GPP to promote and support industrial symbiosis and circular economy was incentivised by its economic, environmental and social benefits. The following table summarises the economic, environmental and social benefits acknowledged by SYMBI partners:

Table 4: Benefits for industrial symbiosis from GPP application

Malopolska - Poland
<p><b>Environmental benefits</b></p> <p>Public procurement can be instrumental in addressing environmental problems such as:</p> <ul style="list-style-type: none"> <li>• Deforestation, (e.g. through the purchase of wood and wood products from legally harvested and sustainably managed forests)</li> <li>• Greenhouse gas emissions (e.g. through the purchase of products and services with a lower CO2 footprint throughout their life-cycle)</li> <li>• Water use (e.g. through choosing more water-efficient fittings)</li> <li>• Energy efficiency and resource use (by choosing products which are more efficient and implementing environmentally conscious design principles, e.g. cradle-to-cradle)</li> <li>• Air, water and soil pollution (by controlling chemicals and limiting the use of hazardous substances)</li> <li>• Waste (by specifying processes or packaging which generate less waste or encouraging reuse and recycling of materials)</li> <li>• Sustainable agriculture (e.g. by purchasing organically produced food)</li> </ul> <p><b>Social benefits</b></p> <ul style="list-style-type: none"> <li>• GPP improves quality of life</li> <li>• Policies on GPP can improve services to the public and thus enhance quality of life. Cleaner public transport, for example, improves air quality. Reduced use of toxic chemicals in cleaning products provides a healthier working environment.</li> </ul>

- GPP helps establish high environmental performance standards for products and services
- GPP can help drive higher quality standards for products and services, delivering better performance for public authorities and ultimately citizens. New products and services which have been developed to meet the requirements of GPP may also become popular with private consumers, improving overall standards.

#### **Economic benefits**

- GPP saves money and resources when life-cycle costs are considered and provides incentives to industry to innovate.
- GPP can reduce prices for environmental technologies
- Introducing 'green' tendering criteria can influence the marketplace and result in new entrants in the field of environmental technologies and products - potentially resulting in increased competition and reduced prices.

#### **Political benefits**

- GPP is an effective way to demonstrate the public sector's commitment to environmental protection and to sustainable consumption and production
- A clear majority of the EU's citizens perceive environment protection as one of the Union's key priorities. A visible focus on 'greening' in the purchase of products and services will therefore likely result in a positive perception of the administration and/or government in charge.

#### **Benefits to industrial symbiosis and circular economy**

- Development and dissemination of environmental technologies
- Stimulating market innovation
- Encouraging the creation of eco-friendly products
- Provide financial savings throughout the life cycle of product
- Increase the financial savings of public administrations

Kozani- Greece
<p><b>Environmental benefits</b></p> <ul style="list-style-type: none"> <li>• Reducing the ecological and energy footprint of procurement, thus contributing to confronting climate change.</li> <li>• Reducing the negative effects of public procurement to the environment</li> <li>• Contributing to the sustainable use of natural resources</li> </ul> <p><b>Social benefits</b></p> <ul style="list-style-type: none"> <li>• Save public resources by taking into account life-cycle costing</li> </ul> <p><b>Economic benefits</b></p> <ul style="list-style-type: none"> <li>• Utilise green public procurement to promote innovation and competitiveness in the economy</li> <li>• Utilise GPP to create an example for the private sector.</li> </ul>
SVRK-Slovenia
<p><b>Environmental benefits</b></p> <ul style="list-style-type: none"> <li>• Reduction of greenhouse emissions</li> <li>• Energy saving</li> <li>• Reducing pollution etc.</li> </ul> <p><b>Social benefits</b></p> <ul style="list-style-type: none"> <li>• Raised awareness about the need to protect the environment (it has an educative aspect).</li> <li>• The GPP in public sector served as a role model of how this area should be regulated. Launch of the initiative “Traditional Slovenian breakfast”, where schools are recommended to buy the locally produced food (which is administratively carried out through the public procurement process – which can be seen as one of the enabler of the GPP).</li> </ul> <p><b>Economic benefits</b></p>

- Certain companies and industries adapted their business model and production processes in order to be able to provide cleaner and environmentally friendly products and services (e. g. energy from renewables, ecological production of food etc.).

### Andalusia - Spain

#### Environmental benefits

- Efficiency and optimisation of resources
- Development of a market for green products and processes
- Improving the environmental standards

#### Social benefits

- Better quality of life
- Transparency and exemplarity in procurement processes

#### Economic benefits

- Increased competitiveness of businesses
- More innovative businesses
- Improved corporate image

#### Political benefits

- Improved policy-makers image
- Improved economic savings for public authorities

### Extremadura (FUNDECYT) - Spain

#### Environmental benefits:

- The development of the circular economy should help to reduce the use of resources, reduce waste production and limit energy consumption. It must also participate in the productive reorientation of the countries.
- The implementation of a system based on the circular economy is a set of benefits that contribute to create a more sustainable societal model, characterized by a decrease in the use of resources, by the reduction of production and by the limitation in the energy consumption.

- Promotion of green businesses and jobs.

**Economic benefits:**

- Development of green economy as a competitive advantage in the context of globalization.
- The European Commission has adopted resource efficiency as a central pillar of its Europe 2020 structural economic strategy.
- Economic savings.

**Social benefits:**

- Socially responsible public administration.

**Molise - Italy**

**Environmental benefits:**

- The reduction in environmental impacts of public administration consumptions.
- Reducing environmental impacts along the chain producers-consumers.
- Strengthening some crucial environmental policies (waste reduction, resource recycling and reusing).
- Technological innovation by encouraging the replacement of existing technologies with other more environmentally sustainable.

**Social benefits:**

- Orienting the market on the demand side, in fact through Public Administration example the GPP will facilitate the acquisition of a greater environmental awareness by consumers and the change of their behavioural models into more sustainable ones.
- Greater awareness of waste value if recycled.

**Economic benefits:**

- The rationalization and reduction of public spending thanks to a better efficiency of products/services purchased and their lower costs along life cycle.

- Orienting the market on supply side: creating a virtuous cycle in which suppliers and manufacturers are encouraged to redevelop their production processes and products in an environmentally friendly manner, in order to gain a competitive advantage towards the public contracting. This influence will bring to a scenario where waste are reduced and material recycling is increased, leading back into circulation the greatest possible amount of "secondary raw material".
- Promoting the development of a market for secondary raw materials.

### Hame - Finland

#### **Environmental benefits:**

- Circular economy will save energy and help avoid the irreversible damages caused by using up resources at a rate that exceeds the Earth's capacity to renew them in terms of climate and biodiversity, air, soil and water pollution. A recent report also points at the wider benefits of the circular economy, including in lowering current carbon dioxide emissions levels. (Closing the loop – An EU action plan for the circular economy - European Commission 2015)
- For instance, it is estimated that if all public authorities in the European Union demanded green electricity, this would save the equivalent of roughly one-fifth of the EU's greenhouse gas reduction commitment under the Kyoto Protocol. (UN 2008)
- Green public procurement one of the green growth initiatives to contribute to tackling the world's major environmental and climate challenges (Nordic Council of Ministers 2016)

#### **Social benefits:**

- Increasing employment: Circular economy will create local jobs at all skills levels and opportunities for social integration and cohesion. (Closing the loop – An EU action plan for the circular economy - European Commission 2015)

#### **Economic benefits:**

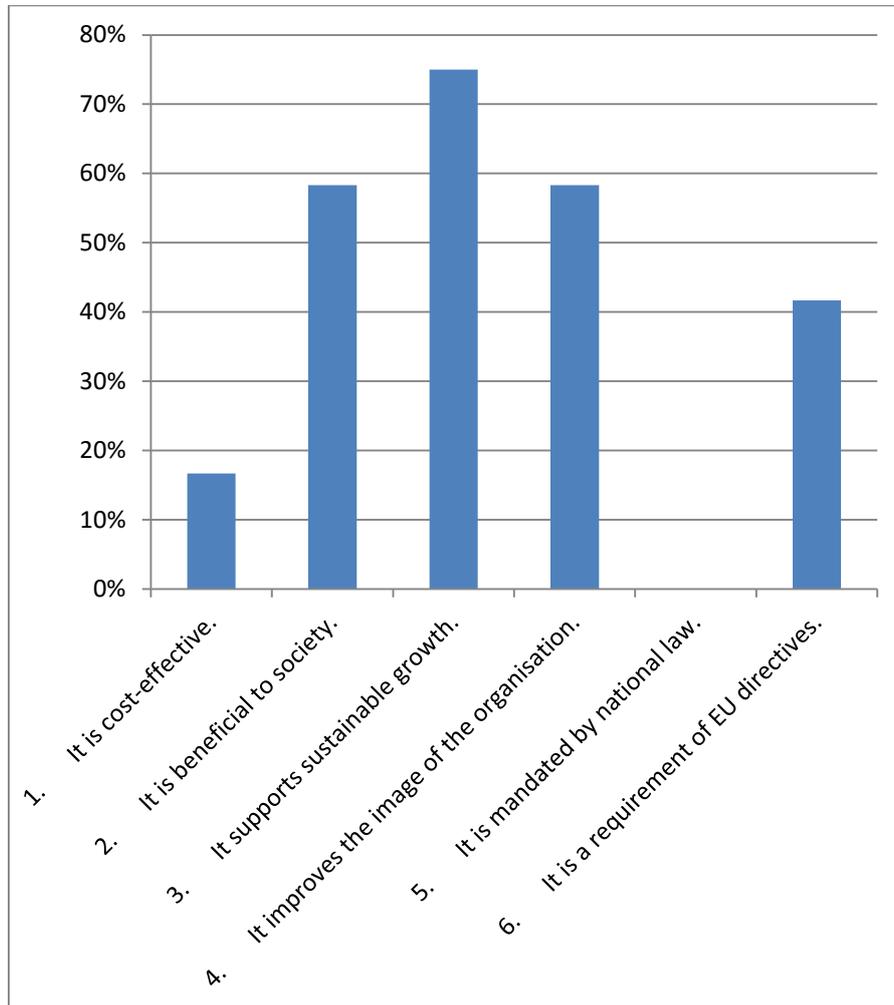
- According to cautious estimates, the circular economy is expected to provide Finland's national economy with 2 to 3 billion Euros in added value potential by

2030 in the following areas: the machinery and equipment and forest industries, food waste reduction, altering the use of real estate, private consumption and second hand trade, and nutrient recycling. (Sitra)

- The Club of Rome estimates that circular economy would generate over 75,000 new jobs.
- For the European economy, the net benefit of the circular economy has been estimated at up to 1800 billion Euros by 2030
- Green public procurement is one of the green growth initiatives to help the Nordic countries improve their market positions. (Nordic Council of Ministers 2016)

Furthermore, data collected from the survey showed that the regions of the SYMBI project have applied green public procurement for all of its environmental, economic and social benefits. However, the data collected during this process managed to add several conclusions that do not correspond to the institutionalised account that was produced during iteration 1. These conclusions had to do with the emphasis the respondents gave to specific benefits derived from the application of GPP. Hence, while during iteration 1 the data emphasised the importance of all environmental, economic and social benefits, the results of iteration 2 produce a more nuanced picture that is more related to the priorities and constraints of public and private institutions. Hence, on the one side of the spectrum of systematisation of green public procurement, Greek and Polish respondents cited the environmental benefits as most important for the application of green criteria in the procurement processes. Indicatively, Polish respondents stressed the importance of inducing sustainable growth, and in general of social and environmental issues as incentives for the implementation of GPP, especially with regards industrial symbiosis. Similarly, in Greece, the most significant factors for the application of GPP can be seen in the following image:

Image 1: Factors affecting the application of GPP in Greece



Readers of this document can see that the primarily environmental benefit of supporting sustainable growth is the most cited incentive for the implementation of GPP. Certainly, this observation could be due to the fact that public sector employees do not recognize the financial benefits of using industrial symbiosis and circular economy solutions due to the small amount of existing examples in the region. However, had that been a sufficient understanding of the data, the relatively larger significance of environmental factors would not have been mentioned in other regions which are closer to the middle of the spectrum of systematisation. For example, in Slovenia, following the respondents' feedback, we can conclude that the GPP was chosen primarily to address the environmental benefits and second the social benefits. Of course Slovenian respondents acknowledge economic benefits relatively more and understand that they come at later stage when industrial symbiosis and circular economy are already established. Based on their answers, the industrial symbiosis in Slovenia is still not developed to an extent that would allow for more economic benefits. As

the results from the survey in Italy reveal, decision-makers in private enterprises and policymakers at radically different scales, ranging from the city to the regional level and macro-regional scale, need more clarity on how circular economy and industrial symbiosis is relevant for each type of economic actor and sector of economic activities. Spanish SYMBI partners were surprised by this result that justified the need to use more than one iteration during data collection. It is surprising that economic benefits are not seen as one of the main reasons for promoting GPP, from public administrations because the concept of green procurement is associated with a higher acquisition cost, while from companies, the public administration economic reticence of the cost of more environmentally sustainable goods and services is a handicap for the effective development of a circular economy and therefore the development of a highly profitable sector from an economic point of view.

The results of the analysis of the data from Finland, confirmed the hypothesis of the spectrum of systematisation of GPP procedures in the SYMBI territorial authorities. The most common reason among the public procurers at the Häme region to use GPP as a method to promote and support industrial symbiosis and circular economy projects was to gain economic benefit by improving the image of the organisation. Hence, public organisations begin to acknowledge the significance of economic benefits from the implementation of GPP to induce industrial symbiosis, after industrial symbiosis has matured to a certain level. The most common economic benefits were creating and supporting new business and service activities and innovations, enabling pilots for new technologies, and waste reduction & creating more use for secondary raw materials. Of course, in Finland, the two other most common reasons were the benefits to society and supporting sustainable growth. These two can be considered to be economical benefits as benefits to the surrounding society and sustainable growth often reflects to the whole area. They are also socially beneficial as the whole society benefits from sustainable growth. Sustainable growth can also be seen as an environmental benefit.

Furthermore, the more nuanced nature of data from iteration 2 allowed for the identification of another very important incentive for the implementation of GPP to initiate and advance industrial symbiosis and circular economy projects. This incentive was improving the image of public organisations through GPP. It is an important signalling effect that serves as proof that public organisations are efficient and innovative. This incentive was

present in all locations across the spectrum of systematisation (e.g. in Greece and Finland), thereby confirming its importance.

## **10 Research question 3: In cases where green public procurement in European regions is not utilised, is there an impact on the development of industrial symbiosis and circular economy projects?**

### **10.1 Iteration 1**

Desk research results point out the fact that it is not an accident that in a country with no organised green public procurement processes such as Greece, there are only limited examples of organised industrial symbiosis projects. Nevertheless, the absence of personnel in the public sector that is familiarised with the priorities and principles of green economy, functions as a major inhibitor for both GPP and industrial symbiosis development.

Similarly in Poland, GPP is an important factor of the development of industrial symbiosis and circular economy but it is not the only one. The situation in the region of Malopolska reveals that the biggest incentive to invest in circular economy solutions or industrial symbiosis are realistic financial benefits, and GPP can be a source for such benefits. Nevertheless, private companies cannot only depend on green procurements from public administration. The idea of industrial symbiosis is to gain benefits from mutual cooperation by lowering the production costs, but needless to say, GPP might be an important support factor.

However, in Spain, desk research reveals that GPP and industrial symbiosis development have a reciprocal relation. Taking into account an analysis of good practices in different Spanish regions, it is evident that in those in which there is a specific regulation in the matter of circular economy and industrial symbiosis, there is also a greater practice of administrative actions of green public procurement. Therefore, it can be confirmed that the frequent use of the Green Public Procurement instrument is a consequence of the green economy and the circular economy at the regional level. Although those Spanish regions with more public and private initiatives related to industrial symbiosis and circular economy have also shown a greater use of Green Public Procurement, there is also large evidence of industrial synergies, exchanges and re-use of resources and sharing of facilities between companies in Andalusia without GPP mediation.

Italy and Molise have produced similar results to Greece and Poland, abiding by their positions on the spectrum of systematisation of GPP. According to the EU Public Procurement Directive (2014), the procurer has to award a contract to the tender (i.e. select a supplier) that is the most advantageous economically. Depending on the choice of the contracting organisation, this could imply the tender offering:

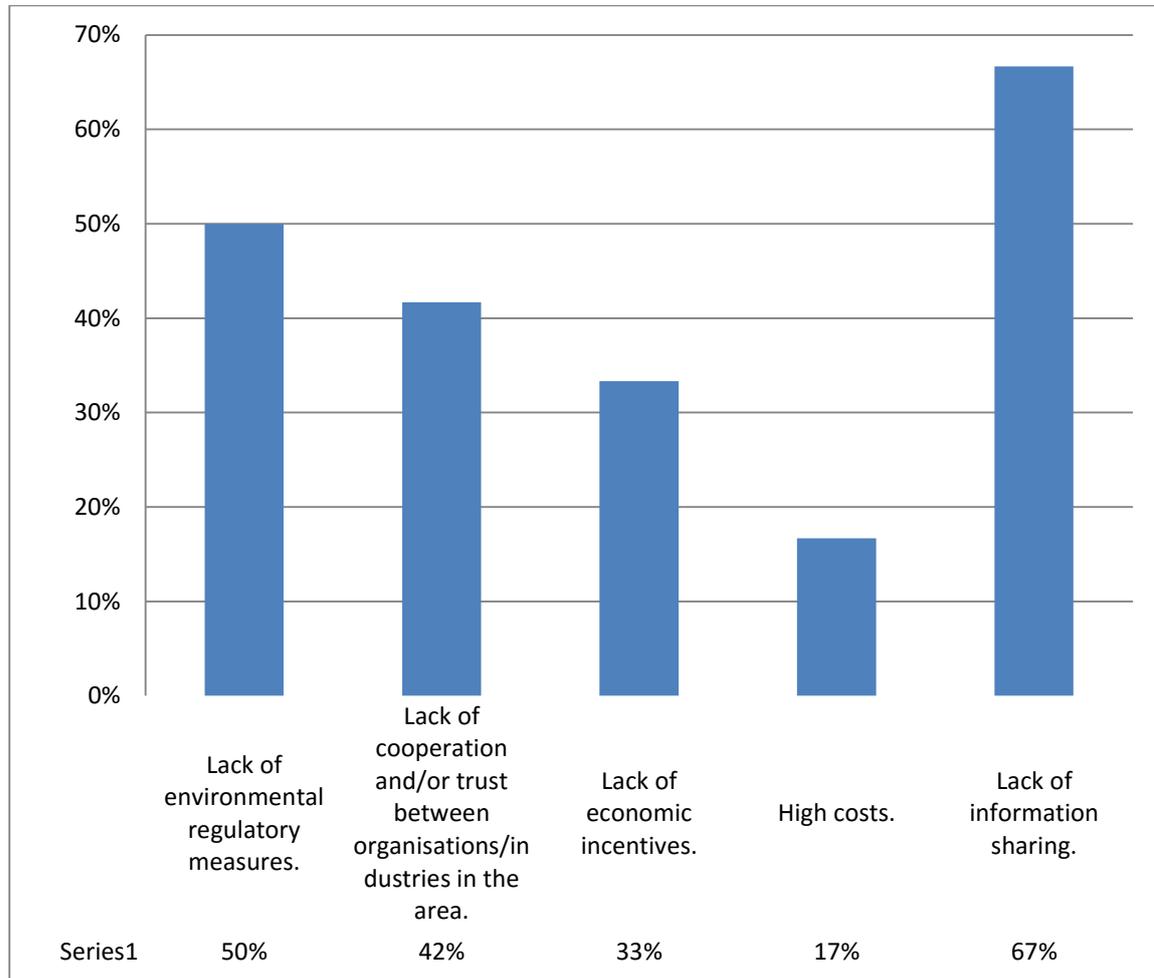
1. the lowest price
2. the lowest overall cost
3. the most value for money based on its price-quality criteria ratio.

In the latter, the quality criteria could also include environmentally or socially oriented criteria into the product specifications. Incorporating social, environmental and economic (i.e. sustainability) specifications into the PP process can have indirect effects on product development and on consumer demand for more sustainable products, which results in the promotion of improvement in the impact products or services have on society. The incorporation of sustainability criteria into the tender and, therefore, into the procurement process embodies sustainable and green public procurement (GPP). Given the purchasing power of public organisations, considerable demand for sustainable products and services can be promoted and can set a trend for other organisations, and thereby enlarge the market for green, sustainable products or services. For example, if all public authorities in the European Union switched to green electricity, they would save more than 60 billion tonnes of carbon dioxide (CO<sub>2</sub>), and if they used energy-efficient desktop computers, another 830,000 t of CO<sub>2</sub>. Several countries have started using the potential of their purchasing power and have included GPP into their public policies.

## 10.2 Iteration 2

In Greece, survey respondents rated the most important barriers to the further development of industrial symbiosis projects according to the following image:

Image 2: Barriers to the application of GPP for the support of industrial symbiosis in Greece



Taking into account this result, GPP definitely has an impact on industrial symbiosis development since it can help reduce the negative effects of the following barriers for the development of industrial symbiosis:

- The lack of environmental regulatory measures (the application of GPP can induce the adoption environmental regulatory measures such as green product criteria).
- The lack of economic incentives (GPP is by definition an important economic incentive for organisations in the supply side of procurement processes).

Hence, despite the fact that many respondents claimed that they are unaware about the potential impact of GPP to the development of industrial symbiosis, it is safe to assume that GPP does have a positive impact on industrial symbiosis development. This conclusion is further strengthened by the fact that the respondents who claimed to be somewhat

knowledgeable for the issue of industrial symbiosis and its relation to GPP argued that GPP could help significantly in overcoming these problems.

On the other side of the spectrum of systematisation of GPP processes, in Finland, there could be a connection between lack of utilising GPP and the development of industrial symbiosis projects. The majority, i.e. 5/9 of public procurers at the Häme region who answered never to have used green public procurement to initiate and advance industrial symbiosis projects (question 4), were (apart from one exception), the ones who thought that industrial symbiosis had developed a little or averagely in their region (question 9). The only exceptions was one respondent whose organization had never used green public procurement to initiate and advance industrial symbiosis projects but still thought that industrial symbiosis had developed substantially in their region and one respondent that stated to have rarely used green public procurement to initiate and advance industrial symbiosis projects but still thought that industrial symbiosis has developed significantly in the region.

Hence, the emergence of data showing that there is an impact of GPP on industrial symbiosis on all positions on the spectrum of systematisation and in both desk research and survey, points to the fact that the existence of an impact is more probable than not. Further research will be necessary to consolidate this result.

## **11 Research question 4: Which are the (administrative, legal, technical) reasons for not utilising green public procurement in European regions?**

Developing a comprehensive list of the administrative, legal and technical reasons for not utilising GPP in the regions of the partnership was hindered by the fact that several partners did not manage to deliver sufficient amounts of data.

In general, the analysis of the data follows the conclusions of the previous questions. Countries with a low level of systematisation of GPP procedures point to administrative, legal and technical barriers that have so far hindered a non-fragmentary application of GPP. Countries with highly systematised GPP procedures cite administrative legal and technical barriers that affect more specialised aspects of GPP processes, such as the multi-polar character of GPP conduction which does not allow for an integrated approach to GPP utilisation.

The following table summarises the administrative, legal and technical reasons for not utilising GPP in the partnership regions utilising data from iterations 1, 2 and the interview (iteration 3) where available:

Table 5: Reasons for not utilising GPP in EU regions

## Administrative, legal and technical reasons for not utilising green public procurement in European regions

Region - Country	Reasons for not utilising GPP
Kozani Greece	<p><b>- Administrative reasons:</b></p> <ul style="list-style-type: none"> <li>• The main reason why Greek public authorities have not so far applied extensively green criteria in their public procurement, is the absence of planning for the integration of GPP in the public sector and the voluntary character of the application of GPP</li> <li>• Public sector employees do not have adequate information about green public procurement.</li> <li>• Public sector employees have not received the necessary training to be able to apply green public procurement.</li> <li>• There is no co-operation between authorities to effectively implement green public procurement.</li> <li>• Absence of the necessary awareness and education with respect to these issues.</li> <li>• The process of awareness raising and of educating public sector employees should be conducted through a top-down process and coordinated centrally, but so far this is missing</li> <li>• There are not sufficient VET procedures about sustainable practices in the public sector.</li> <li>• The bureaucratic system of local public authorities in Greece is not flexible in terms of providing its higher-ranked employees the necessary space to take the necessary initiatives for implementing sustainable development practices.</li> </ul>

**Legal reasons:**

- There are not any / enough people with the necessary legal expertise in applying environmental criteria.

**Technical reasons:**

- Limited established environmental criteria for products and/or services.
- Insufficient development of eco-labels.
- Lack of research for the identification of opportunities for the development of industrial symbiosis projects.
- Lack of personnel capable of constructing the infrastructure of industrial symbiosis projects.

**Malopolska**

**Administrative reasons:**

**- Poland**

- Lack of integration of the life cycle cost method in public procurement processes
- Public entities' personnel have not received the necessary training to be able to apply green public procurement.
- Lack of co-operation between authorities to effectively implement green public procurement.
- lack of political support

**Legal reasons:**

- There are not any / enough people with the necessary legal expertise in applying environmental criteria

**Technical reasons:**

- Lack of knowledge about industrial symbiosis and circular economy

**CoC Molise -**

**Administrative reasons:**

**Italy**

- Provision of only generic and not detailed targets in the GPP National Action Plan for Italian regions

- Lack of information able to guide contracting administrations toward appropriate procurement decisions
- Public Administration personnel's insufficient knowledge about the Life Cycle Assessment concept. Many cited that their staff do not always have skills, or are not provided with the appropriate training. Training is generally required for procurers on the legal and technical aspects of GPP implementation, on the concept of life-cycle costing and for end-users on the sustainable use of products.
- Lack of adequate resources for a proper training of employees to be involved in public procurement activities
- MEC often are not able to satisfy needs of public administration and to guarantee the market responsiveness, moreover they often do not contain specific references to Circular Economy and Industrial Symbiosis principles.
- Lack of political support - A high percentage of public authorities cited lack of management support as a barrier to broader implementation of GPP. This indicates that senior officials within the public sector across our region do not have a high awareness of the importance of the GPP.
- Lack of co-operation between authorities - There is still little in terms of systematic implementation of GPP in Molise Region, with the majority of public authorities acting alone, often on their own initiative. Both informal and formal cooperation needs to grow to enhance GPP.

Lastly the lack of coordinated exchange of best practice and networking between authorities has been identified as an obstacle to greater GPP implementation.

**Legal reasons:**

- Absence of technical and legal expertise on how to apply the minimum environmental criteria in the tender documents. Many purchasers within public authorities do not and should not be expected to know all the environmental and social impacts of

purchasing particular products or services. In some cases purchasers still struggle to define what an “environmentally and/or socially preferable” product or service is, and how to include appropriate criteria to identify these in tendering.

- Existing legal and technical difficulties in drafting tender documents;

**Technical reasons:**

- Absence of a clear methodology to calculate the products life cycle cost;
- Fragmentary and insufficient information for a proper calculation of the products cost over the entire life cycle
- Lack of practical tools and information - Many public authorities stated that a lack of practical tools and information is one of the main reasons to not move versus a Green Public Procurement.

**SVRK - Administrative reasons:**

**Slovenia**

- Lack of good practices on GPP in order to better understand and know how to make a tender with GPP criteria.
- Insufficient political support (political support in terms of both, local and national frame) to encourage the use of the GPP.
- Evidence identification and verification of green goods, services and work (lack of monitoring system).
- Systematic market analysis (there are no data which companies are offering which products that comply with the GPP criteria). There is a lack of dialogue between the government (public sector) and producers / suppliers, which would allow the government to map and identify what is currently possible and available at the market, what are the latest trends in green field etc.
- Lack of education and awareness about the green public procurement (in public and particularly private sector). To this end, more information and raising awareness activities should be organized.

**Legal reasons:**

- Public administration should facilitate procedures for GPP.
- Decree on GPP should have more elaborated criteria for green products, services and construction.
- Absence/insufficient monitoring system to evaluate the effects and impact of the GPP.
- Absence of stricter GPP criteria for certain areas (the market is not yet ready for stricter criteria, therefore the interest groups are advocating less stricter criteria).
- Due to lack of mapping, market analysis and dialogue among relevant stakeholders, the contracting authority does not have a mechanism to communicate with suppliers.
- The current Decree on GPP to certain extent hinders the implementation of GPP, since it is already outdated. Having an outdated Decree means that the suppliers do not need to stick the latest criteria or are even legally bound by these criteria (though they would like to use more recent ones).
- Absence of good practices in the area of the GPP generates the fear that the tenders might not encompass all regulations and criteria set by Decree and the Public Procurement Act. In fact, it is about the fear against the National Review Commission for Reviewing Public Procurement Award Procedures – for this reason, the contracting authorities rather decides for a simpler public procurement instead of green public procurement.
- Related to above mentioned absence of good practices in the field of GPP (e. g. which tenders were carried out, what criteria were used etc.), the price should not be treated as the ultimate and most valuable element among award criteria. The price

should be one of award criteria, but the most important one. We should better communicate the good practices.

**Technical reasons:**

- Lack of cooperation and trust between the contracting authorities and suppliers.
- The state should make more supportive environment by introducing financial support, tax reliefs for green products etc.
- Green products are still considered most costly. Since the price is still the most important award criteria, green products are usually left out. In order to tackle this issue, the GPP should be drafted in a way that the price would have less importance in award criteria.
- Absence of market mapping (as a result of insufficient information flows).
- Lack of research on how industrial symbiosis and GPP are inter-connected.
- The perception of service, goods and construction providers and contracting authority is different – each side has its own view of the GPP, what this means and how it should be implemented.
- In order to assure that the suppliers do follow and are in accordance with the criteria, a “probation system” should be set up, which would allow the contracting authority to verify if products/services/constructions are in line with criteria.

**Extremadura Administrative reasons:**

**- Spain**

- Failure to integrate the life cycle cost method.
- Sustainability criteria have not yet been integrated in the internal procurement system of public entities.
- Lack of an effective training in environmental criteria of citizens/ employees and public civil servants
- There is a widespread belief that the acquisition of sustainable products and services entails higher costs, to the detriment of

institutional benefits.

- Lack of implementation and integration of Green Public Procurement in management systems
- Lack of cooperation between authorities to the successful development of this administrative action

**Legal reasons:**

- Legal barriers. Often public institutions legal regulations constitute a brake on the procurement process because it is too complicated or bureaucratic, which makes it difficult to insert these sustainability criteria.

**Technical reasons:**

- Lack of clear definitions: In GPP processes, there is often technical confusion in the identification of whether or not a product is environmentally sustainable or socially responsible.
- Lack of sustainable products and services in the local and regional market. Local and regional markets may not have enough variety of green-certified products or do not meet sustainability criteria.
- Insufficient monitoring of environmental impact of green procurement processes
- Insufficient development of green technical criteria for products or services acquired through public procurement.
- Lack of knowledge about the use of tools to determine the Life Cycle Cost of products and services
- Lack of research for the identification of opportunities for the development of industrial symbiosis projects, which limits in an important way the development of GPP and Industrial Symbiosis.
- Lack of personnel capable of constructing the infrastructure of industrial symbiosis projects is also a technical barrier, being this a factor of low impact for the companies.

**Andalusia - Administrative reasons:**

**Spain**

- Lack of consideration of the full life-cycle costs of a contract by public procurement authorities.
- Green products are perceived to cost more by consumers
- Lack of political support. It is important to raise awareness among decision-makers in politics and technology about the need for GPP criteria in public authorities' management.
- Lack of implementation and integration of green public procurement into management systems.
- Lack of training, tools and experience. Organising appropriate training for staff is necessary to successfully implement GPP. Assessing and meeting training needs will also help ensure the commitment of all those involved in areas such as:
  - how to integrate environmental considerations into tender procedures
  - where to find assistance in developing environmental criteria
  - how to assess and verify tenderers' environmental claims
  - how to evaluate life-cycle costs in tendering
- Lack of cooperation. Most public authorities are acting independently when implementing GPP, with neither cooperation nor exchange of experience between. Cooperation is also necessary between public authorities and companies in order to better match the market needs.

**Legal reasons:**

- Lack of legal expertise and qualifications of staff in applying environmental criteria in public procurement.

- Lack of environmental regulatory measures
- Lack of regulation providing economic incentives for participation in GPP procedures

**Technical reasons:**

- Limited established environmental criteria. Public authorities do not have access to clear and verifiable criteria for most products and services. Therefore, they cannot use environmental criteria in tendering.
- Insufficient monitoring of environmental impact of green procurement processes.

**Hame**

**Administrative reasons:**

**Finland**

- The main administrative reason for not utilizing GPP is often considered to be the shortages in the organisation of GPP policy.
- Lack of information and know-how in most of the public procurers and lack of personnel training in GPP processes.
- Lack of political support was seen as an obstacle.
- Insufficient strategic leading and target-setting
- Multipolar GPP processes conducted by more than one responsible authorities
- Absence of environmental and social criteria in public procurement processes.

**Legal reasons:**

- Finland has not yet completed the implementation of the 2014 EU Procurement Directive that enables public authorities to take environmental considerations into account. In Finland its implementation is happening now in the beginning of year 2017.
- Regarding the processing of waste, there is still a lack of an appropriate incentive structure for waste minimization and



management. There is thus a need for stricter requirements regarding the use of recycled material and recyclability, e.g. in criteria for public procurement or in taxes related to pollution

**Technical reasons:**

- Lack of a comprehensive monitoring system for public procurement processes.

## **12 Guidelines: How to enable industrial symbiosis projects via the use of green public procurement**

Two important features of GPP can be seen as advantages that can help make the move of firms towards industrial symbiosis:

- GPP is very flexible and dynamic compared to other regulatory instruments.
- GPP works on market conditions, particularly on the demand side, which is much better accepted by firms than taxes and legislation.

GPP helps public authorities to achieve environmental targets but at the same time it provides social, political and economic benefits. What that means is that, by creating demand for greener goods and services, GPP also provides incentives to industry to innovate, i.e. to produce and supply environmentally sustainable and socially responsible products in order to be more competitive and lay the foundations for industrial symbiosis projects.

The greatest opportunities to utilise green procurement to enable industrial symbiosis projects are the following:

For countries that have poorly systematised the implementation of green criteria in the procurement processes, planning is of primary importance. For example, in Greece, the greatest opportunity to use GPP to enable industrial symbiosis projects is the creation of the National Plan for Public Procurement. If industrial symbiosis and circular economy could be included in its priorities, then such projects could receive a significant push. The significance of the National Plan for Public Procurement is exacerbated by the fact that higher ranked public sector employees in Greece are accustomed to work in a less flexible environment in which changes take place through a top down process.

As one moves along the spectrum of improved systematisation, the greatest opportunity to use GPP as a driver for industrial symbiosis is to identify those waste-generating industrial sectors where the application of symbioses can be the most economically efficient. For example, in Slovenia, the best opportunity to use GPP to enable industrial symbiosis is to exploit the waste generated in the construction sector. The latter is already the sector with the most successful integration of green criteria in the procurement processes, as can be seen from the following two tables:

Table 6: the distribution of GPP in relation to subject of the contract (for 2015) in Slovenia

Subject	N° of lots	Contractual value without VAT	% in terms of lots	% of value of total public procurements
Goods	860	76.202.195	9,24%	4,80%
Services	324	41.719.688	3,48%	2,63%
Construction	344	157.982.063	3,70%	9,96%
Total	1.528	275.903.947	12,72%	7,43%

Table 7: Public procurements in Slovenia, awarded in 2015, complying with the provisions set by the Decree on GPP

Annex to Decree on GPP	Subject according to Decree on GPP	N° of lots	Contractual value without VAT	% in terms of lots	% of value of total public procurements
1	Electricity	21	1.413.627	0,23%	0,09%
2	Food and catering services	82	1.337.803	0,88%	0,08%
3	Office paper and sanitary tapware	1	18.885	0,01%	0,00%
4	Electronic office equipment	75	2.682.358	0,81%	0,17%
5	Audio-visual equipment	5	181.315	0,05%	0,01%
6	Coolers, freezers and its variations, acclimatization, heating and cooling systems	3	63.857	0,03%	0,00%
7	Construction	132	20.189.732	1,42%	1,27%
8	Furniture	39	1.952.790	0,42%	0,12%

9	Cleaning products and services, laundry	104	9.667.660	1,12%	0,61%
10	Vehicles	71	4.109.300	0,76%	0,26%
11	Tires	9	458.772	0,10%	0,03%
13	Lightening	0	0	0,00%	0,00%
Total		542	42.076.099	5,82%	2,65%

Similarly in Andalusia, Spain, the best opportunities for the application of GPP can be found in domains where GPP can lead to improvements in efficiency and cost savings for both the public authorities and the industry, such as the application of the product environmental footprint (PEF), water footprint, energy audits or the application of ICT to smart networks. Furthermore, in Italy, the greatest opportunities are found in sectors where public purchasers represent a large share of the market (e.g. construction, health services or transport).

On the contrary, in countries with more systematised green public procurement processes, the best opportunities to use the latter to promote industrial symbiosis are the impetus of the new directive of the European Union, the opportunity to improve the education of public sector employees with regards to these issues and the domains where industrial symbiosis can be linked to overall circular economy processes. There is a connection between circular economy and industrial symbiosis, and when promoting one with GPP the promotion of the other often follows. The aim in circular economy is to close the loop and industrial symbiosis is one of the ways to do so.

The following table provides a summary of the opportunities to utilise GPP to enable industrial symbiosis in each of the regions of the partnership:

**Table 8: Opportunities to expand GPP in partnership regions**

Recognising opportunities to use green public procurement to enable industrial symbiosis projects	
Region - Country	Opportunities

<p><b>Hame - Finland</b></p>	<ul style="list-style-type: none"> <li>• Applying further education on the utilisation of the EU directive in practice.</li> <li>• Connecting circular economy and industrial symbiosis, so that when promoting one with GPP the promotion of the other often follows.</li> </ul>
<p><b>Andalusia - Spain</b></p>	<ul style="list-style-type: none"> <li>• Efforts by public authorities to include environmental criteria in public procurement.</li> <li>• The application of criteria like the Product environmental footprint (PEF), water footprint, and energy audits or the application of ICT to smart networks.</li> </ul>
<p><b>Extremadura - Spain</b></p>	<ul style="list-style-type: none"> <li>• From the analysis of the different information sources reviewed and the surveys carried out, within the framework of the Extremadura region, where circular economy and industrial symbiosis is scarcely a germ in development, there is no visible possibility of exploiting opportunities through the GPP to promote industrial symbiosis, neither in the short term nor in the medium term.</li> </ul>
<p><b>Kozani - Greece</b></p>	<p>The greatest opportunity to use GPP to enable industrial symbiosis projects is the creation of the National Plan for Public Procurement. The following key measures within the national plan should be carried out successfully:</p> <ul style="list-style-type: none"> <li>• Formation of a monitoring process for the application of green conditions and criteria in various projects and activities in which the public sector participates.</li> <li>• Preparation of an action plan for the promotion and support of GPP alongside a set of green indicators to be used in public procurement processes.</li> <li>• Conduction of market research to identify products and activities that are suitable for the application of green criteria.</li> </ul>

	<ul style="list-style-type: none"> <li>• Drafting a manual with instructions on the conduction of GPP.</li> <li>• Realisation of an awareness raising campaign for the promotion of GPP.</li> <li>• Introduction of green technologies in the system of National Technical Specifications.</li> <li>• Enrichment of the integrated pricing regulation with articles that promote green economy.</li> </ul>
<b>SVRK - Slovenia</b>	<ul style="list-style-type: none"> <li>• Utilisation of GPP in the construction sector in which one can observe the most economically efficient application of GPP</li> </ul>
<b>PANNON HUNGARY</b> <b>NOVUM-</b>	<ul style="list-style-type: none"> <li>• Clarify the regulation of in-house procurement by including environmental protection provisions</li> <li>• Improve the implementation of circular economy processes in the public sector through public procurement</li> <li>• Greater emphasis should be given to green and sustainable public procurement</li> <li>• Simplification of green public procurement processes, including expansion of the opportunities of the procedural deadlines abbreviations</li> </ul>
<b>Malopolska - Poland</b>	<ul style="list-style-type: none"> <li>• Utilising GPP as a major driver for innovation, thereby providing industry with real incentives for developing green products and services, in sectors where public purchasers represent a large share of the market (e.g. construction, health services, or transport).</li> </ul>
<b>CoC Molise - Italy</b>	<ul style="list-style-type: none"> <li>• The inclusion of environmental preference criteria in purchasing procedures by Public Administration</li> <li>• The opportunity to consider the environmental labelling systems as evidence for the verification of environmental requirement</li> <li>• The opportunity to consider the certification of environmental management systems (EMAS - ISO 14001) as evidence to verify</li> </ul>

suppliers' technical capacity for a proper performance.

- Foreseen criteria concerning the recovery of products or recycled materials are able to stimulate new business models based on symbiotic material exchange between companies and even to develop a market of secondary raw materials.

The table above can be summarised in the following overarching ways to utilise GPP to advance industrial symbiosis development:

- Apply further education & training for public sector employees on the utilisation of EU directives relevant to industrial symbiosis and GPP in practice.
- Widen the application of green criteria like the Product environmental footprint (PEF), water footprint, and energy audits or the application of ICT to smart networks.
- Conduct market research to identify products and activities that promote and support industrial symbioses.
- Introduce green technologies in national systems of technical specifications.
- Utilise GPP as a major driver for innovation in sectors where public purchasers represent a large share of the market (e.g. construction, health services, or transport).
- Develop environmental labelling systems for procurement that promotes and supports industrial symbiosis
- Include criteria concerning the recovery of products or recycled materials that stimulate symbiotic material exchange between companies and develop a market of secondary raw materials.

## **13 Guidelines: how to overcome the barriers to the use of GPP as an enabler of industrial symbiosis**

European regional authorities could help overcome the barriers to the use of GPP as an enabler of industrial symbiosis through a wide range of measures. Certainly, there are differences in the measures proposed by each of the partners depending on their position on the spectrum of systematisation of GPP. Countries like Finland make proposals for optimising the utilisation of GPP as an instrument for advancing industrial symbiosis projects. On the other side of the spectrum countries like Greece, where GPP is less developed propose measures for initialising the process of regulating GPP and overcoming the barriers for its implementation.

More precisely, in Greece, the greatest obstacle for the utilisation of GPP is the lack of personnel in the public sector that is familiar with the implementation of GPP procedures. This training deficit of public sector employees was present in other SYMBI partnership countries, but was definitely quite pronounced in Greece. Two types of measures were proposed: either a top-down process in which public authorities provide vocational education and training, or a more flexible bottom-up approach in which public sector employees obtain themselves the necessary training.

Countries closer to the 'centre' of the spectrum, propose a wide range of measures designed to tackle administrative, legal and technical barriers to the use of GPP. Italian, Slovenian and Spanish public authorities could improve the administration of GPP procedures by measures such as re-organising structures and skills according to their specialisation, enhancing networking between public administrations that adopt the GPP, promoting the use of tools for the analysis and the evaluation of life cycle cost, and developing incentivisation methods for the adoption of GPP standards. Beyond administrative measures, Slovenian authorities highlight the integration of GPP measures in legislative, regulatory and planning documents.

At the other side of the spectrum, Finnish public authorities have moved beyond simply overcoming the barriers for GPP and have proceeded to proposing measures concerning the concretisation and optimisation of GPP processes depending on the needs and characteristics of each territory or sector, such as the use of incentivisation methods. Implementing these proposals will contribute to developing a specialised practical GPP advancement process based on the current European Union regulation. The following table

presents the proposals to overcome the barriers for GPP adoption made by each of the SYMBI partners.

**Table 9: Recommendations on how to overcome barriers to the use of GPP as an enabler of industrial symbiosis**

Proposals for overcoming the barriers to the use of green public procurement as an enabler of industrial symbiosis	
Kozani Greece	<ul style="list-style-type: none"> <li>• Formation of seminars or even VET programs designed to inform public sector employees about green public procurement processes, in order to overcome the lack of personnel in the public sector that is aware/informed/educated about the issues of GPP and industrial symbiosis.</li> <li>• Adoption of a more flexible approach in public administrations where employees could take their own initiatives to find information about sustainability strategies such as GPP.</li> </ul>
Molise - Italy	<ul style="list-style-type: none"> <li>• Definition of an adequate monitoring system and sanctions to be applied in case of not respecting environmental requirements</li> <li>• Investments in staff training, so that employees in charge for public procurement procedures can be able to evaluate the best solution considering the quality/price/environmental performance ratio</li> <li>• Re-organisation of structures and skills according to a specialization perspective</li> <li>• Networking between public administrations that adopt the GPP</li> <li>• Promoting the use of tools for the analysis and the evaluation of life-cycle costs of products</li> <li>• Development of incentives for the adoption of GPP standards</li> <li>• Increasing dialogue with the market (among public bodies, suppliers and associations) to gather information and adopt green solutions.</li> </ul>
SVRK Slovenia	<ul style="list-style-type: none"> <li>• Inclusion of GPP in Slovenian Public Procurement Act</li> <li>• Automatic updating of the Decree on GPP every time the EU issues new GPP criteria in each sector.</li> <li>• Inclusion of more indicators than price in GPP processes, so that criteria akin to sustainability prevail in awards</li> <li>• Put in place of a system of sanctions in the Public Procurement Act and the Decree on GPP</li> <li>• Upgrading of the monitoring and evaluation system used by the Ministry of Administration so that it can improve the collection of data about how many GPP tenders were released and for which areas (services, products, construction).</li> <li>• Enrichment of the e-portal with public procurement cases with case</li> </ul>

	<p>studies as well as templates for GPP.</p> <ul style="list-style-type: none"> <li>• Encouragement of companies to have certain (eco, environmental etc.) certificates. By emphasizing these criteria (e. g. EMAS/ISO standards), the public sector would encourage service providers to start thinking “green”. Inclusion of criteria for industrial symbiosis in public procurement tenders</li> <li>• Production of products / services in a way that the whole processes are environmentally friendly.</li> <li>• Advancement of cooperation between the industry and policy makers</li> <li>• Increased emphasis on information and promotion aspect of the GPP, meaning to disseminate information about the GPP, good practices, how to start and implement the GPP, what are the benefits etc.</li> <li>• Introduction of Circular Public Procurement meaning that public sector should strive to encourage companies and enterprises to start producing and offering “green” products on a voluntary basis (without being forced by laws and regulations).</li> </ul>
<p><b>PANNON-NOVUM</b> - Hungary</p>	<ul style="list-style-type: none"> <li>• Develop an ordered internal set of rules (e.g. Green Public Procurement regulations)</li> <li>• Adapt GPP to the needs of Hungarian SMEs</li> <li>• Develop GPP protocols at a national level</li> </ul>
<p><b>Extremadura</b> - Spain</p>	<ul style="list-style-type: none"> <li>• Development of a glossary with clear definitions in GPP, to avoid mistakes and technical discrepancies in the identification of the features that makes an environmentally sustainable or socially responsible product or service.</li> <li>• Definition of clear alternatives to price, for example, towards products with longer life cycle and, therefore, would prove to be more price efficient.</li> <li>• Integration of sustainability criteria in the specifications of public tenders.</li> <li>• Training of employees and public civil servants on environmental criteria, as well as legal aspects of the GPP process.</li> <li>• Reduction of legal barriers, simplifying procurement processes and the inclusion of these sustainability criteria.</li> <li>• Encouragement of green certification of products and services in companies, as a technical solvency requirement to participate in the contracting of GPP.</li> <li>• Development of a catalogue of sustainable products and services in the local and regional market, to facilitate contact with potential suppliers in market consultations.</li> </ul>
<p><b>Andalusia</b> - Spain</p>	<ul style="list-style-type: none"> <li>• Capacity building to overcome the lack of knowledge and the fear of complexity with regards to GPP (e.g. workshops to enable procurement staff to work on real tenders, events where the procurers could exchange experiences, deal with challenges and try out possibilities).</li> <li>• Networking, knowledge transfer and cooperation among different departments and public authorities.</li> <li>• Consultations with market players or potential suppliers (industries) can remove many uncertainties as they provide information on market capability, remove misleading assumptions of the potential costs and</li> </ul>

<b>Hame Finland</b>	<p>create innovative solutions.</p> <ul style="list-style-type: none"> <li>• Monitoring GPP process.</li> <li>• Improving communication of benefits and results at all levels.</li> </ul> <ul style="list-style-type: none"> <li>• Development of a common practical approach to GPP</li> <li>• Improvement of the legal framework on public procurement</li> <li>• Development of guidelines and incentives at a national level on how to implement the EU GPP directive. Most of the criteria and guidance for green public procurement are developed at EU level and then used by public authorities on a voluntary basis.</li> <li>• Sharing of information and good practises as a key driver of developing practical ways to utilize GPP in industrial symbiosis projects.</li> </ul>
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The table above can be summarised in the following guidelines for overcoming the barriers to the utilisation of GPP as an enabler of industrial symbiosis:

1. Capacity building through workshops, seminars and even VET programs so as to a) firstly inform public sector employees about green public procurement processes, b) secondly develop the necessary skills in public sector personnel, and c) train the latter on the issue of utilising GPP as an instrument for the advancement of industrial symbiosis.
2. Integration of a flexible and specialised approach in GPP procedures allowing public administrations to customise GPP regulation to the needs of industrial symbiosis advancement, and public sector employees to find their own sources of information on carrying out successfully GPP aimed at promoting industrial symbiosis.
3. Development of an efficient monitoring and sanctions' system for the advancement of GPP.
4. Advancement of cooperation between the industry, SMEs and policy makers to gather information and adopt green solutions.
5. Introduction of Circular Public Procurement to encourage companies and enterprises to start producing and offering "green" products on a voluntary basis.
6. Development of tools to facilitate GPP (e.g. e-portals with cases of successful GPP that enabled industrial symbiosis, systems of indicators to facilitate GPP implementation, green certification mechanisms)

7. Development of standardised GPP regulation at a national level, adapted to the specific needs of each country (e.g. through national GPP protocols).

## 14 Guidelines: how to foster the impact of GPP

After overcoming the barriers to implementation of GPP, it is time to provide guidance for measures pertaining to GPP implementation that specifically foster the development of industrial symbiosis and circular economy projects. The analysis reveals that within the spectrum of different systematisation levels of GPP in EU territories, there are some common factors that have significant positive impact on industrial symbiosis and circular economy. One such factor is the development of green criteria for products or services that pertain to specific key sectors of the economy. Such sectors have a) great potential in integrating the industrial symbiosis model due to the nature of their waste and resources, and b) great potential in terms of rapidly expanding and applying industrial symbiosis processes. Examples include the construction and energy sectors in Poland and the water, energy and transport sectors in Slovenia.

Furthermore, an even more important factor is the continuous amelioration of green criteria applied in public procurement processes so as to include provisions for promoting industrial symbiosis and circular economy. Combined with adequately structured capacity building and communication campaigns, green criteria that promote industrial symbiosis and circular economy can prove to be the key factor between the successful realisation of industrial symbioses in the partnership countries. One example of such improvements in the green criteria applied in GPP, is the inclusion of a measures in Spain that make a market forecast for green products and services and encourage entrepreneurs to invest in green companies and to create green jobs, thereby generating an ecosystem of companies for the Circular Economy. Another example

The following table summarises the proposals on how to foster the impact of GPP as an enabler of industrial symbiosis in each of the partner regions.

Table 10: Proposals for fostering the impact of GPP

Proposals for fostering the impact of Green Public Procurement	
Kozani Greece	<ul style="list-style-type: none"> <li>• Development of green technical criteria for products or services acquired through public procurement.</li> <li>• Informing, training and educating public sector personnel.</li> <li>• Integration of GPP in the regulatory and management systems of the public sector.</li> </ul>

Malopolska  
– Poland

- A promising area in which authorities might foster the use of GPP as an enabler of industrial symbiosis is the construction sector.
- Institutions need to consider that from 1st January 2019, all new buildings occupied and owned by public authorities must be “nearly zero-energy buildings” (Directive 2010/31/EU on the energy performance of buildings). The Energy Efficiency Directive also sets mandatory requirements regarding renovation of public buildings and purchase or new rental agreements meeting minimum energy-efficiency standards.
- Usually after building new facilities authorities need to buy new equipment. Currently obligations require that IT products purchased by central government authorities must meet the latest minimum energy efficiency requirements prescribed by the EU Energy Star Regulation (Regulation No 106/2008 on a Community energy-efficiency labelling programme for office equipment)

Molise  
Italy

Considerable solutions to promote the use and impact of GPP as an enabler of industrial symbiosis are:

- Starting a review of MEC in order to identify which aspects can be integrated according to the principles of Circular Economy and Industrial Symbiosis.
- Introducing of reward mechanisms into MEC for operators able to offer the most virtuous or innovative solutions than the minimum requirements foreseen.
- Establishing guidelines for a unique and common GPP monitoring for all contracting authorities.
- Promoting the development of a national platform and of IT communication tools that enable best practices and operational tools sharing;
- Defining common methodologies for the assessment of products/services environmental impacts.
- The development of communication campaigns.

SVRK  
Slovenia

Fostering the GPP and raising impact can be most efficiently done by setting up regulatory and legislative frames. This is how we could incentivize and encourage relevant stakeholders to start recognizing and using the GPP. This can be done on two levels: strategic and legislation. At the strategic level, Slovenia has included GPP in a number of strategic planning documents such as:

- [Slovenian Development Strategy](#)
- [Reform Programme for Achieving the Lisbon Strategy Goals 2005](#)
- [Reform Programme for Achieving the Lisbon Strategy Goals 2008](#)
- [Slovenian Action plan on Energy Efficiency 2008 – 2016](#) (available only in Slovenian)
- [Action plan for green public procurement 2009 – 2012](#) (only

summary is available in English, while the action plan per se only in Slovenian)

- [Action Plan for Energy Efficiency 2014 – 2020](#) (available only in Slovenian)
- [Operational Programme for Limiting Greenhouse Gas Emissions 2009 – 2012](#) (available only in English)
- [Operational Programme for Reducing GHG Emissions until 2020](#) (document is available only in Slovenia)
- [Framework programme for a transition to a green economy and the action programme for 2015 and 2016](#) (**available only in Slovenian**)

At the legislation level, Slovenia has included GPP in legislative documents such as:

- [Public Procurement Act](#) (available only in Slovenian)
- [Decree on green public procurement](#) (available only in Slovenian)
- [Act Amending the Public Procurement in the Defence and Security Sector Act](#) (available only in Slovenian)
- [Act Regulating Public Procurement in the Water, Energy, Transport and Postal Services Sectors](#) (available only in Slovenian)

PANNON-  
NOVUM  
-  
Hungary

- Provide economic incentives for public procurement that fosters industrial symbiosis

Extremadura  
-  
Spain

- Creation of regional regulatory frameworks for green economy and circular economy. From the analysis of good practices in the different Spanish regions, we can conclude that those regions that have a regulatory framework and political objectives for the procurement of products and services that are environmentally sustainable and socially responsible have a higher index of GPP administrative actions.
- The existence of a regulatory framework and political objectives of procurement of supplies through GPP, mean that there is a potential market forecast, which encourages entrepreneurs to invest in green companies and to create green jobs, generating an ecosystem of companies for the Circular Economy. The industrial symbiosis arises from the inertia of the private sector form the Circular Economy, as an effect of taking advantage of the opportunities that the residues or by-products of a company suppose to generate new products or services within the circular

**Andalusia -  
Spain**

economy.

- Building capacity amongst public authorities' staff for the implementation of GPP for energy related products, services and works procurement.
- Building capacity amongst procurement training providers, to enable the integration of GPP into regular procurement training programmes.
- Achieving CO2 reductions through supporting the implementation of GPP tenders.
- Promoting knowledge transfer of GPP approaches, and innovative technologies and services between purchasing bodies and GPP support bodies.
- Enhancing permanent GPP support structures.
- Setting common EU GPP criteria
- Providing information on the costing of a product over its life cycle,
- Legal and operational guidance
- Political support linked to indicators and future monitoring.
- Improving communication and awareness rising.

**Hame -  
Finland**

- According to Sitra, public procurement should integrate a strategy that reorientates its focus on purchasing new solutions and products that support industrial symbiosis and circular economy. Such a strategy would include:
  - Dismantling regulation barriers and creating incentives for the success of such purchases (e.g. changing the focus of taxation)
  - An education and research policy that fosters the circular economy
  - Developing circular economy indicators
  - Developing digital and service-centred circular economy projects
  - Promotion of circular economy solutions in local procurement strategies.
  - Development of guidelines for including the circular economy and material efficiency in public procurements. Estimating life cycle costs is one example of things that will be included in the guidelines. (Sitra studies, 2016)
- To foster the use and impact of green public procurement as an enabler of industrial symbiosis, administrative actions play a key role. Soft regulatory instruments such as education, guidelines, action plans, advisory services, information provisioning, strategies and the implementation of GPP criteria in practise into the organisations procurement process are the main tools.
- Innovative procurements from the public sector are needed to foster the creation of pilots and new sustainable technical solutions.

## 15 Guidelines: a typology & roadmap for GPP development

The fact that the SYMBI partners are based in territories that occupy different positions on the spectrum of systematisation of green public procurement procedures is beneficial for the development of a typology of GPP development that can be easily utilised by organisations and territorial authorities beyond the SYMBI partnership. Territorial authorities and/or organisations can use the typology developed in this paper to recognise their location on the spectrum of systematisation of GPP procedures and to focus on policy measures that correspond to facing the problems of utilising GPP for industrial symbiosis that appear in their type. Certainly, SYMBI partners will be the first to utilise this typology for the preparation of their action plans, since the results of the typology are hereafter presented in the form of roadmap for GPP development.

The following table presents this typology which is based on the analysis of the previous pages:

Table 11: GPP development typology in EU regions

Typology of Green Public Procurement Development in EU regions		
Type	Characteristics of GPP development	Proposed measures
<b>Type 01: Underdeveloped GPP procedures</b>	<ul style="list-style-type: none"> <li>• Very low level of adoption of GPP</li> <li>• Absence of public procurement regulation and strategic planning</li> <li>• Significant lack of awareness and training about GPP in public sector personnel</li> <li>• Industrial symbiosis non-existent or in its infancy</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness raising about GPP, especially at top level public sector personnel</li> <li>• Development of public procurement regulation and strategic planning</li> <li>• Initiation of collaborations with private sector organisations familiar with GPP.</li> </ul>

**Type 02: Low level of development of GPP procedures**

- Low level of fragmentary adoption of GPP.
- Lack of provisions for GPP in regulatory and strategic planning documents
- Awareness about GPP in the public sector exists but no training
- Isolated developments of industrial symbiosis

- Awareness raising and training about GPP at all levels of the public sector.
- Integration of provisions for GPP in public procurement regulatory and strategic planning documents.
- Identification of specific sectors where GPP could be used to support industrial symbiosis

**Type 03: Average level of development of GPP procedures**

- Fragmentary adoption of GPP
- Training for GPP exists but could be enhanced by greater specialisation
- There are provisions for GPP in regulatory and strategic planning documents, but no specialised documents for GPP.
- Industrial symbiosis is common but not included in the priorities of territorial authorities.

- Development of specialised strategy and regulation for GPP.
- Introduction of life-cycle cost methods in public sector training
- Initialisation of an efficient monitoring and management system of GPP
- Defining common methodologies for the assessment of products/services environmental impacts.
- Identification of green technologies through collaborations with the private sector and prioritising their integration

		<p>in the public sector.</p> <ul style="list-style-type: none"> <li>• Preparation of a permanent framework for the collaboration between demand and supply sides of green public procurement</li> </ul>
<p><b>Type 04: High level of development of GPP procedures</b></p>	<ul style="list-style-type: none"> <li>• Widespread adoption of GPP in general without however, considering specialised issues like industrial symbiosis</li> <li>• The implementation of specialised strategies and regulations for GPP has been initialised</li> <li>• Mostly trained public sector personnel in GPP procedures, including some degree of awareness about issues such as GPP.</li> <li>• Institutionalised knowledge transfer procedures and processes of collaboration with the supply side of GPP.</li> <li>• Permanent structures for the support of GPP, without however the use of specialised criteria.</li> <li>• Industrial symbiosis is one of the development priorities of public</li> </ul>	<ul style="list-style-type: none"> <li>• Building capacity amongst public authorities' staff for the implementation of GPP for specialised issues such as energy related products, industrial symbiosis.</li> <li>• Building capacity amongst procurement training providers, to enable the integration of GPP into regular procurement training programmes.</li> <li>• Improving the implementation of GPP tenders.</li> <li>• Promoting knowledge transfer of GPP approaches, and innovative technologies and services between purchasing bodies and GPP support bodies.</li> <li>• Enhancing permanent GPP support structures.</li> </ul>

authorities	
<p><b>Type 05: Fully developed GPP procedures</b></p>	<ul style="list-style-type: none"> <li>• GPP is canon, including its utilisation for promoting specialised issues such as industrial symbiosis</li> <li>• Fully trained in GPP public sector personnel with widespread knowledge about specialised issues like the utilisation of GPP for promoting and supporting industrial symbiosis.</li> <li>• Institutionalised and specialised knowledge transfer procedures and processes of collaboration with the supply side of GPP.</li> <li>• Industrial symbiosis is a priority for public authorities and is systematically pursued.</li> <li>• Advanced permanent structures for the support of GPP using specialised criteria for various issues</li> </ul>

The following figure presents the roadmap for the development of GPP. During the implementation phase of SYMBI, partners should concentrate on setting a realistic timeplan for the implementation of as much measures as possible that correspond to their types

Table 11: Guidelines for GPP development roadmap

Roadmap for Green Public Procurement Development in EU regions		
Type	Steps	
Type 01: Underdeveloped GPP procedures	• <b>Step 1</b>	Awareness raising about GPP, especially at top level public sector personnel
	• <b>Step 2</b>	Development of public procurement regulation and strategic planning
	• <b>Step 3</b>	Initiation of collaborations with private sector organisations familiar with GPP.
Type 02: Low level of development of GPP procedures	• <b>Step 1</b>	Awareness raising and training about GPP at all levels of the public sector.
	• <b>Step 2</b>	Integration of provisions for GPP in public procurement regulatory and strategic planning documents.
	• <b>Step 3</b>	Identification of specific sectors where GPP could be used to support industrial symbiosis
Type 03: Average level of development of GPP procedures	• <b>Step 1</b>	Introduction of life-cycle cost methods in public sector training
	• <b>Step 2</b>	Defining common methodologies for the assessment of products/services

	<p>environmental impacts</p> <ul style="list-style-type: none"> <li>• <b>Step 3</b> Development of specialised strategy and regulation for GPP.</li> <li>• <b>Step 4</b> Initialisation of an efficient monitoring and management system of GPP</li> <li>• <b>Step 5</b> Identification of green technologies through collaborations with the private sector and prioritising their integration in the public sector.</li> <li>• <b>Step 6</b> Preparation of a permanent framework for the collaboration between demand and supply sides of green public procurement</li> </ul>
<p><b>Type 04: High level of development of GPP procedures</b></p>	<ul style="list-style-type: none"> <li>• <b>Step 1</b> Building capacity amongst procurement training providers, to enable the integration of GPP into regular procurement training programmes.</li> <li>• <b>Step 2</b> Building capacity amongst public authorities' staff for the implementation of GPP for specialised issues such as energy related products, industrial symbiosis.</li> <li>• <b>Step 3</b> Improving the implementation of GPP tenders.</li> <li>• <b>Step 4</b> Promoting knowledge transfer of GPP approaches, and innovative technologies and services between purchasing bodies and GPP support bodies.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Step 5</b> Enhancing permanent GPP support structures.</li> </ul>
<b>Type 05: Fully developed GPP procedures</b>	<ul style="list-style-type: none"> <li>• <b>Step 1</b> Provide training to public sector personnel for specialised aspects of GPP and industrial symbiosis development</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Step 2</b> Integrate GPP in strategic planning and regulation of industrial symbiosis</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Step 3</b> Development of specialised standards for GPP</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Step 4</b> Addressing the issue of multiple governing authorities of GPP specialised processes</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Step 5</b> Improving the structure and management of specialised institutions for the promotion of GPP</li> </ul>