



FUNDECYT

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

Project Activity: A1.4

Document Version: 01

March 2017



Project acronym: SYMBI

Project name: Industrial Symbiosis for Regional Sustainable Growth and a Resource Efficient Circular Economy

Project code: PGI00291

Document Information

Document Identification Name: SYMBI_A1.4_FUNDECYT_GPP_2017-03-31_v.1

Document title: Guidelines on how to capitalise green procurement as an enabler of industrial symbiosis

Type: Report

Date of Delivery: 31-03-2017

Activity: A1.4

Activity Leader: Fundecyt-pctex

Dissemination level: Restricted

Document History

Versions	Date	Changes	Type of change	Delivered by
Version 1.0	31/03/2017	Interim Document		Fundecyt

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1 Research questions

Following the requirements listed above, the two topics of activity A1.4 can lead to the development of the following research questions, which address all aspects related to activity A1.4:

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?

2 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.

3 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.

3.1 Iteration 1

3.1.1 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 render difficult just the generalisation of the application of green criteria, but also increases the difficulty in obtaining the necessary data on the average level of “greening” of the public procurement system.

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.

3.1.2 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 for standardising the use of green criteria¹. 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.

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

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

online tools², 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 field³ 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 Plan⁴ 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 proposal⁵ 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 procurement⁶. To achieve that target, the following measures are proposed to be implemented according to the following time-plan⁷:

#	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
2	Preparation of an action plan for the promotion and support of GPP alongside a set of green indicators to be	Q1-2016 to Q4-2016

² http://www.esymbiosis.eu/esymbiosis_uploads/loizidou_21_12_2014.pdf

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

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

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

⁶ http://www.opengov.gr/aads/wp-content/uploads/downloads/2016/02/01_STRATEGY_partA.pdf

⁷ http://www.opengov.gr/aads/wp-content/uploads/downloads/2016/02/03_Action_Plan.pdf

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

These measures are expected to impact positively industrial symbiosis. Beyond the immediate effect of encouraging “green” production practices (one of which is industrial symbiosis), they will instill a new forward-thinking mentality to public employees and businesses that are involved in public procurement processes and hence, render them more friendly to the “green economy”.

3.1.3 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 National Plan dedicated to the issue, called “National Action Plan for the Environmental Sustainability of Public Administration Consumptions”⁸. 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.

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

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



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 Law 221/2015 (28th December 2015). 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, by imposing the mandatory MEC application, a relevant step to promote Circular Economy since the minimum environmental criteria, if adopted on a large scale, they are key tools to overcoming the "linearity" of production and consumption models. In addition, with the coming revisions and additions of MEC, even for other product and service categories still not interested, it 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:

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

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 to well integrate 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"⁹.

Objectives of the Working Group are: – Identifying and sharing 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;

Tools used by the Working Group are: – 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.

Today only some Italian public authorities joined the network, taking part to the Working Group activities.

We have to report even the role of CONSIP in favor GGP. CONSIP is a company controlled by the Italian Ministry of Finance and it 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) efficiency and savings in the use of resources; 2) the containment of hazardous substances; 3) reducing the volume of waste, by spreading reusable and recyclable products. Consip integrates environmental criteria in its initiatives and it uses a specific symbol, a green leaf, to highlight its environmentally sustainable procedures. Criteria adopted by Consip consider:

– MEC defined by Government; – Environmental labels; – Standards of environmental management systems.

At a regional level, the Region of Molise Region 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

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



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) in favor of 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. An expert will be 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 expert¹⁰.

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.

3.1.4 Slovenia

In Slovenia, the adoption of GPP is at a similar level to the one in Italy. The difference however, is that in Slovenia the adoption of green criteria was triggered by the need to integrate EU legislation. Slovenia managed to adopt the EC GPP criteria into national

¹⁰http://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



legislation relatively quickly and efficiently and is still among few countries in EU that has entirely regulated GPP processes.

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, defense, 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:

<p>Slovenian Development Strategy</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. (page 43)</p>
<p>Reform Programme for Achieving the Lisbon Strategy Goals 2005</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” (page 46). 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>Reform Programme for Achieving the Lisbon Strategy Goals 2008</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>Slovenian Action plan on Energy Efficiency 2008 – 2016 (available only in Slovenian)</p>	<p>Green public procurement for energy consumption in public sector is considered as good practice and an example for improving energy efficiency (page 8 and page 40). Public sector should serve as a role model also for private sector.</p>
<p>Action plan for green public procurement 2009 – 2012</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 (page 22):</p> <ul style="list-style-type: none"> - Reconsider the need to buy something: we do not buy the product, but we purchase the service instead, which meet our needs. - Reduce the quantity of products/services, its rationalization, purchase of efficient products (energy efficient products that contributes to lower energy or water consumption etc.) - Re-use of products: this refers to contracting authority and / or service provider. - Recycling: it is possible to conclude an agreement with service providers that are committed to recycling - Energy recovery - Post waste management: to agree with the service providers on waste treatment after their life cycle
<p>Action Plan for Energy Efficiency 2014 – 2020</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>Operational Programme for Limiting Greenhouse Gas Emissions 2009 – 2012</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 (page 138):</p> <ul style="list-style-type: none"> • construction, reconstruction and maintenance of buildings, • purchase and renting of energy efficient buildings, • purchase of energy efficient office electronics, including lightening, • public lightening • cooling systems or acclimatization, heating and cooling systems.
<p>Operational Programme for Reducing GHG Emissions until 2020</p>	<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>
<p>Framework programme for a transition to a green economy and the action programme for 2015 and 2016</p>	<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</p>

procurement”.

Despite the importance of these planning documents, the main drivers of the adoption of GPP in the Slovenian public sector, has been the relevant legislation that set some obligatory rules for the application of green criteria in public procurement processes. The main law covering the issue of GPP adoption has been the Decree on green public procurement, which is obligatory for the public sector and can be seen as an amendment to Public Procurement Act. Decree on GPP elaborates the procedures for GPP and which products and services falls under the GPP. 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 (available only in Slovenian)

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 when it is about public procurement. As stated in article 116, paragraph 3, the Decree on Green Public Procurement from 2011 still applies. The PPA suggest in technical specifications (article 2, paragraph 23, point a and point b) to take the LCC methods into consideration when issuing the procurement.

The PPA includes the environmental aspects in the following articles:

Article 37, paragraph 3, point b defines that technical specifications might be drafted in the way that they can include elements, referring to the protection of environment. In Paragraph 6, the contracting authority may require from products to have different environmental or eco labels, according to 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 defines that the Government or any other public contracting authority can demand from service provider to take into consideration the environmental aspects.

Article 40 defines that the contracting authority may list the bodies, where service providers can obtain certificate (e. g. on environment friendly product / service).

In Article 45, paragraph 2, point f, it is defined that the contracting authority, when using the GPP, may set measures for environmental management.

Article 47 defines if the contracting authority requires from independent bodies that issue the environmental certificate, they to need 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 environmental aspects.

It has to be mentioned that 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 (available only in Slovenian)

In 2010 the Government of Slovenia took a resolution (n° 00712-4/2010/18) where it was stated 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.

Decree, adopted by the Government of Slovenia on 8 December 2011, entered into force on 14 March 2012, following the expiration of the Action plan on GPP 2009–2012. Decree was prepared on the basis of EC's "Green Public Procurement (GPP) Training Toolkit" and environmental criteria for ten areas, published by the EC. With this decree, three EU directives were directly or partially translated into Slovenian acquis, namely:

- Directive 2009/33/EC of the European Parliament and of the 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 of the 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 of the Council of 19 May 2010 on the indication by labelling and standard product information of 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 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).

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 in a way that environmental measures can be strengthened, 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 originates in the fact that the EC has 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. We need a renovation of the Decree, because processes, technology and materials have significantly improved in certain areas during the past 6 years, therefore insisting in respecting an outdated Decree might even be harmful for the environment. In addition, the amendment of Decree must be done if the public sector still intends to be seen as driver and promoter of green sustainable development.

Another Decree regulating GPP is in use in Slovenia: the Decree on joint public procurement, which was adopted by Slovenian Government in 2013. The aim of this decree, as defined in Article 1, is to determine the subjects of joint public procurement by the Slovenian Government, rules, exceptions from joint public procurement and procedures for implementing joint public procurements. Article 3 defines that joint public procurement can be implemented if certain products / services are needed for different contracting authorities (e. g. ministries). In addition, under paragraph 2, there is a list of services / products that can be subject to joint public procurement:

- purchase, configuration and installation of computer equipment,
- purchase and maintenance of photo-copy machines,
- purchase and maintenance licensed software programmes of different technologies,
- maintenance of computer's hardware,
- IT support for users,



- mobile network services and purchase of new cell phones, transfer data services, using the mobile network operator and purchase of equipment for data transfer
- stationary phone services
- assets' insurance
- purchase of vehicle fleet, specialized vehicles and vehicles upon special order,
- purchase of energy products,
- printing paper,
- office material,
- photo services,
- business aviation rental,
- flight ticket purchase,
- procurement of medical products, medical devices and medical equipment.

The main contracting authority for joint public procurements is the ministry, responsible for public procurement.

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

3.1.5 Spain

The 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 our legal system by the repealed Law 30/2007 of 30 October 2004, Spanish public procurement law, which transposed the 2004/18/EC Directive, including substantial innovations in the preparation and awarding stages, 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, but further exploration, extension and strengthened is required. The level of commitment to GPP was still very low in 2014 among public authorities according to the research work carried out by the Foundation of the University of Alcalá, probably due to a lack of awareness and the voluntary nature of most initiatives.

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 GDP and 16% in Spain, 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.

It means 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.

National Green Public Procurement Plan 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 should support the implementation of State policies aiming at protecting the environment and climate as well as energy savings and efficiency.

Products and services groups are related to construction, transport, energy, office equipment, paper and publications, furniture, cleaning and events.

Two reports on the state of implementation of the Spanish Plan have been produced, in 2011 and 2015. The latest report concludes that progress achieved in the eight groups



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 2nd 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 criteria.
- 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. All of this on an inclusive process that balance 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” 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 has 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

Contract performance clauses

Extremadura region does not have a specific regulation on Green Public Procurement, although there is a draft version, for the development of a Regional Framework to Boost the Green Economy and the Circular Economy in Extremadura.

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, that publishes the Agreement of Council of Ministers by which approves the Plan of



Green Public Procurement of National General Administration, Public Bodies, and the Social Security Managing Entities, which does not have rank of compulsory in Regional and local Public Administrations.

Order PRE / 116/2008 is aimed to articulate connexion between public procurement and the development of environmentally friendly practices, in order to get the established goal by European Community in the revised Strategy for Sustainable Development, as well as 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.

At this point, we can conclude that it is really difficult to develop Industrial Symbiosis without the implementation of development models based on Circular Economy, since we can consider it as an effect from the development of Circular Economy

3.1.6 Finland

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, for example European commission sees 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 use GPP in 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, 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 product is more likely 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)

The potential of industrial symbiosis as a key driver of green growth in Nordic regions (Nordregio 2015): Also in the Nordregio report, circular economy and Industrial symbiosis is seen as a driver for green growth and GPP as a way to achieve it:



Different practices contribute to the realization of CE, 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 IS networks) levels (Su et al. 2013). The EC 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” (European Commission 2014a, p. 2). Clever government support is key, whether in the form of the provision of guarantees to reduce risks for investors or via public procurement criteria (European Commission 2014b).

In the publication green criteria for public procurement is one of the main policy-related drivers for industrial symbiosis. However, these criteria need further development in order to work efficiently. (p.15, p.39).

The publication Policies and Practices for Eco-Innovation Up-take and Circular Economy Transition (2016) by eco-innovation observatory:

Making things last – A Circular economy strategy for Scotland: publication of a new circular economy strategy that promises to slash food waste levels, nurture the country's remanufacturing sector, and promote eco-design principles:

The strategy recognises the potential for public procurement to support the development of a more circular economy building on the statutory guidance on the sustainable procurement duty under the Procurement Reform (Scotland) Act 2014 and the extensive training on circular economy principles of the procurement professionals.

All in all, the strategy sets the well-defined ambitions, priority actions in such areas as waste prevention, design, reuse, repair, remanufacture, recycling, producer responsibility for reuse and recycling, recovering value from biological resources, energy recovery, landfill. It also defines as cope of action for communications and engagement of wide groups of actors, building skills for a circular economy, and measuring progress in achieving circular economy targets and activities (Scottish Government 2016).



GPP as a way to promote and support industrial symbiosis and circular economy projects in national level in Finland:

Finnish innovation fund SITRA has created a publication “Finland’s circular economy road map”. SITRA operates directly under the Finnish Parliament so its decision-making processes are tied to parliamentary systems. The Finnish government has set a target of making Finland a global leader in the circular economy by 2025. Finland’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 is:

sustainable food system focus area:

- Public procurements: encourage the use of sustainable food. Make sustainable food that saves natural resources and reduces climate emissions a target in municipal public food procurement. Survey suitable producers and their offering as well as the special quality criteria and opportunities for co-operation. Develop co-operation, for example, regarding recipes, between kitchens and producers.
 - o The co-operation and sharing of information can also encourage industrial symbiosis projects

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.

Promote 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.

Include ecodesign requirements in product design and construction and in the material development phase.

- planning, design, repairability, recyclability, low-carbon and zero-waste loop
(Sitra studies 121, 2016).

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.

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.

3.2 Iteration 2

The analysis of the data from iteration 2 reveal 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 is 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 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 an 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 a 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.

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

The following table shows that 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 reveals the economic, environmental and social benefits acknowledged by SYMBI partners:

Malopolska - Poland
<p>Environmental benefits</p> <p>Public procurement can be instrumental in addressing environmental problems such as:</p> <ul style="list-style-type: none">• Deforestation, (e.g. through the purchase of wood and wood products from legally harvested and sustainably managed forests)• Greenhouse gas emissions (e.g. through the purchase of products and services with a lower CO2 footprint throughout their life-cycle)• Water use (e.g. through choosing more water-efficient fittings)• Energy efficiency and resource use (by choosing products which are more efficient and implementing environmentally conscious design principles, e.g. cradle-to-cradle)• Air, water and soil pollution (by controlling chemicals and limiting the use of hazardous substances)• Waste (by specifying processes or packaging which generate less

waste or encouraging reuse and recycling of materials)

- Sustainable agriculture (e.g. by purchasing organically produced food)

Social benefits

- GPP improves quality of life
- 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.
- 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

Environmental benefits

- Reducing the ecological and energy footprint of procurement, thus contributing to confronting climate change.
- Reducing the negative effects of public procurement to the environment
- Contributing to the sustainable use of natural resources

Social benefits

- Save public resources by taking into account life-cycle costing

Economic benefits

- Utilise green public procurement to promote innovation and competitiveness in the economy

- Utilise GPP to create an example for the private sector.

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 behavioral 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:

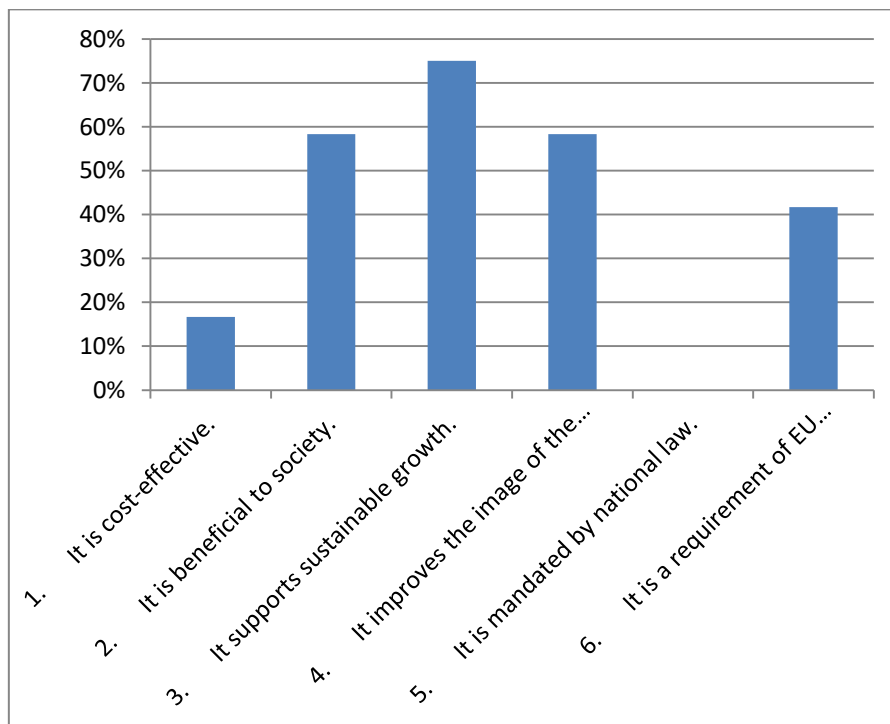
- Increasing employment: Circular economy will create local jobs at all skills levels and opportunities for social integration and cohesion. (Closing the loop – An EU action plan for the circular economy - European Commission 2015)

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:



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 macroregional 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.

5 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?

5.1 Iteration 1

Desk research results about the impact of GPP on industrial symbiosis and circular economy is inconclusive. On the one hand, 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. In general, 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 Malopolska Region 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 is an outcome of industrial symbiosis and circular economy and not vice versa. 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 affirmed 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, as a conclusion drawn from the first Andalusian Stakeholder Group meeting.

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 (European Union, 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:

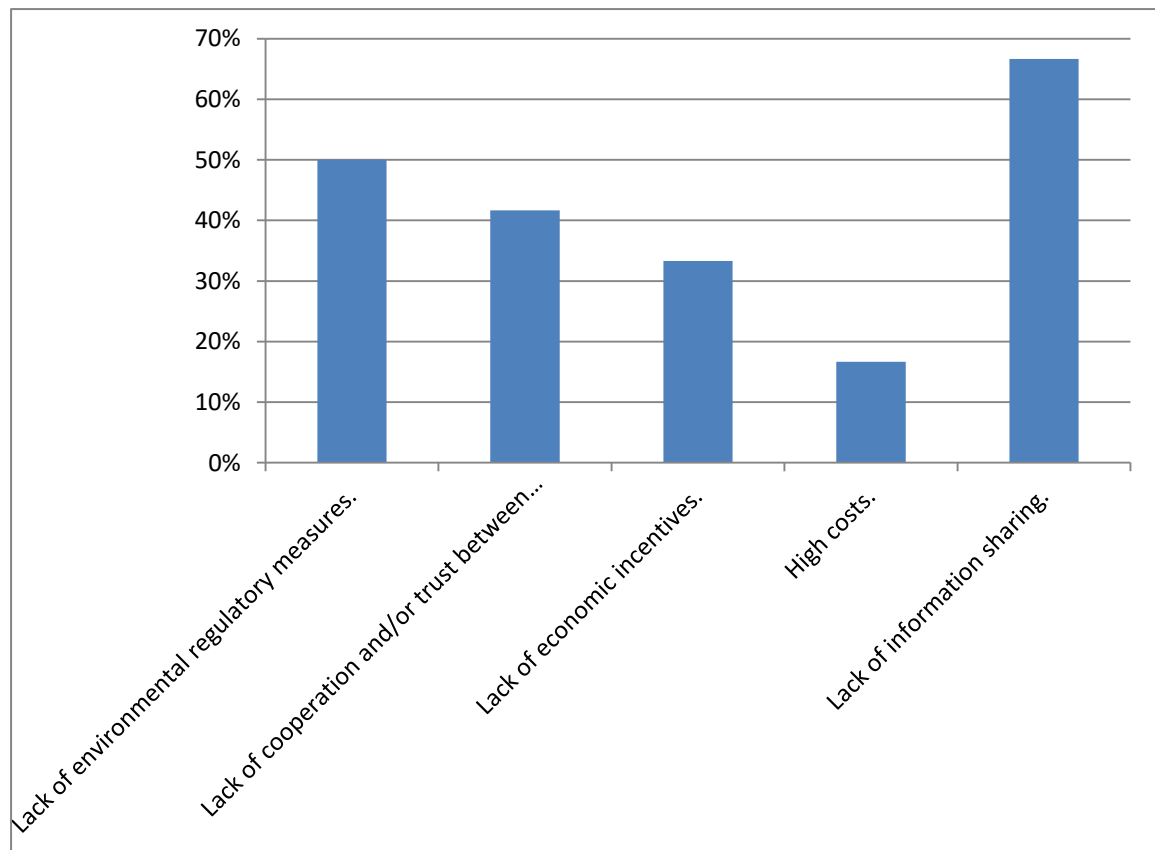
1. the lowest price
2. the lowest overall cost
3. the most value for money based on its price-quality criteria ratio.

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 (CO₂), and if they used energy-efficient desktop computers, another 830,000 t of CO₂. Several countries have started using the potential of their purchasing power and have included GPP into their public policies. Finally, desk research has not produced definitive results in Finland.

5.2 Iteration 2

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



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, despite the inconclusive character of much of the data, 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.



6 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 discuss this issue during the qualitative interview. 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:

7 Opportunities 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. It means that by creating demand for greener goods and services, GPP also provides incentives to industry to innovate, that is, to produce and supply environmentally sustainable and socially responsible products in order to be more competitive and lays 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:

The table shows the distribution of GPP in relation to subject of the contract (for 2015):

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%

Public procurements, 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	3	63.857	0,03%	0,00%

	variations, acclimatization, heating and cooling systems				
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:

Recognising opportunities to use green public procurement to enable industrial symbiosis projects	
Region - Country	Opportunities
Hame - Finland	<ul style="list-style-type: none"> • The new European Union procurement directive is on its way of being implemented all over EU. • Applying further education on the utilisation of the EU directive in practice. • Connecting circular economy and industrial symbiosis, so that when promoting one with GPP the promotion of the other often follows.
Andalusia - Spain	<ul style="list-style-type: none"> • Efforts by public authorities to include environmental criteria in public procurement. • The application of criteria like the Product environmental footprint (PEF), water footprint, and energy audits or the application of ICT to smart networks.
Extremadura - Spain	<ul style="list-style-type: none"> • 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.
Kozani - Greece	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:

- Formation of a monitoring process for the application of green conditions and criteria in various projects and activities in which the public sector participates.
- 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.
- Conduction of market research to identify products and activities that are suitable for the application of green criteria.
- Drafting a manual with instructions on the conduction of GPP.
- Realisation of an awareness raising campaign for the promotion of GPP.
- Introduction of green technologies in the system of National Technical Specifications.
- Enrichment of the integrated pricing regulation with articles that promote green economy.

SVRK - Slovenia

- Utilisation of GPP in the construction sector in which one can observe the most economically efficient application of GPP

Malopolska - Poland

- 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).

CoC Molise - Italy

- The inclusion of environmental preference criteria in purchasing



procedures by Public Administration

- The opportunity to consider the environmental labeling systems as evidence for the verification of environmental requirement
- The opportunity to consider the certification of environmental management systems (EMAS - ISO 14001) as evidence to verify 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.

8 Overcoming the barriers to the use of green public procurement as an enabler of industrial symbiosis

The following table summarises the methods to overcome the barriers for the use of GPP as an enabler of industrial symbiosis in each of the partner regions.

<p>Kozani Greece</p>	<p>- The main barriers to the use of GPP as an enabler of industrial symbiosis that encompassed all the three iterations of the analysis had to do with the lack of personnel in the public sector that is aware/informed/educated about the issues of GPP and industrial symbiosis. As a result, a key action for overcoming the barriers to use GPP would be the creation of seminars or even VET programs designed to inform public sector employees about green public procurement processes.</p> <p>On the other hand, this could be supplemented by adopting a more flexible approach in public administrations where employees could take their own initiatives to find information about sustainability strategies such as GPP.</p>
<p>Molise - Italy</p>	<p>Listed below actions to overcome barriers to the GPP use as enabler of Industrial Symbiosis:</p> <ul style="list-style-type: none"> • definition of an adequate monitoring system and sanctions to be applied in case of default; • investing 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; • re-organize structures and skills according to a specialization perspective; • networking between public administrations that adopt the GPP; • promoting the use of tools for the analysis and the evaluation of costs in products life cycle; • develop incentives for the adoption of GPP standards; • Increasing dialogue with the market (among public bodies, suppliers and associations).
<p>SVRK Slovenia</p>	<p>- A set of recommendations can be drafted on how to improve the implementation of GPP and to overcome the existing barriers (obstacles). These recommendations are prepared on the basis of overview of Slovenian's regulations and experience. Following sets of recommendations can be drawn:</p> <ul style="list-style-type: none"> ❖ <u>Legislative</u> <p>a) GPP should be included in Public Procurement Act</p> <p>Slovenian PPA does not contain the term “GPP”, but rather points out that</p>

public procurement may contain elements that contribute to reduce the negative effects on environment. Instead, the GPP should be clearly written in the PPA as one of the promoter of sustainable development. The new or renewed PPA should be “greener” in all its aspects.

b) Automatic update of the Decree on GPP

Currently, the Decree on GPP dates back to 2012, which means that it is outdated. There should be an automatic mechanism on ministry level that when the EC issues new GPP criteria for certain area, the government / ministry should adopt and include them in the Decree. By doing this, we would assure that the Decree always complies with the latest GPP criteria and environmental standards.

c) Price is not the only indicator that matters

Contracting authorities should not consider price the most important indicator when issuing the GPP tender (lower price, higher possibilities to get funded). Price should be one of indicators, along with those that correspond to green and sustainable products and services. This means that award criteria for green requirements should prevail over price.

d) System of sanctions

The Decree on GPP and the PPA do not foresee the sanctions if the regulations or criteria are not respected or violated. If the contracting authority finds that the regulations were breached, the only foreseen sanction is the termination of the contract (between the contracting authority and the service provider). Therefore stricter should be foreseen.

e) Monitoring & evaluation system

Currently, the Ministry of Administration has a monitoring system by which it can get data on how many GPP tenders were released and for which areas (services, products, construction) – along with administrative data. But the current monitoring system could be enhanced and upgraded. The public sector should have the leverage and power to monitor the service providers (e. g. if they really have certificates, if their products are produced on environmentally friendly way etc.).

❖ Capacity building

a) Capacity building on GPP

Public sector should work more on capacity building of its sectors and companies (service providers) by empowering them, introducing good practices, sharing knowledge, supporting them with information etc. To this end, the e-portal with public procurements could be enriched with case studies as well as templates for GPP. This would lead towards facilitation of GPP procedures.

b) Companies and green strategies

With the GPP tenders, containing additional sets of criteria, the public sector should encourage 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”. The GPP tenders should pursue the goal that the companies will decide for green strategy.

c) Encouraging industrial symbiosis

The GPP is a strong leverage for industrial symbiosis. One of the criteria in GPP tenders should be linked to industrial symbiosis – if the service provider is part of the industrial symbiosis (and this can prove by contract among stakeholders), it should have priority (higher points) in selection process. By having such award criteria, the public sector would encourage intensifying relations among industries and services providers.

❖ Dialogue

a) Integrated approach

The GPP should be seen and treated as an integrated approach, meaning that products / services should be produced in a way that the whole processes are environmentally friendly.

b) Cooperation industry-policy makers

There is a shortage of a strong link between the industry and policy-making / decision-making bodies. Both sectors should cooperate hand in hand in order to accelerate the sustainable development process.

c) Information-promotion activities

There should be an emphasis on information and promotion aspect of the GPP, meaning to disseminate information about the GPP, good practices,

	<p>how to start and implement the GPP, what are the benefits etc.</p> <p>d) Introduction of Circular Public Procurement</p> <p>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). Circular economy should become a new economic paradigm. Therefore new legislation should already address the next step in GPP, which is circular public procurement (CPP). Since the CPP is a new trend across the Europe and will be sooner or later translated into national legislation, it is wise to pave the way already now. We should strive to amend the PPA and the Decree with the latest environmental trends.</p>
<p>Extremadura - Spain</p>	<p>Some of the main proposals to overcome the GPP barriers are:</p> <ul style="list-style-type: none"> - 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. - Define clearly alternatives to price, for example, towards products with longer life cycle and, therefore, would prove to be more price efficient. - Define how to insert sustainability criteria in the specifications of public tenders. - Training of employees and public civil servants on environmental criteria, as well as legal aspects of the GPP process. - Reduce legal barriers, simplifying procurement processes and the inclusion of these sustainability criteria. - Encourage green certification of products and services in companies, as a technical solvency requirement to participate in the contracting of GPP. - Development of a catalog of sustainable products and services in the local and regional market, to facilitate contact with potential suppliers in market consultations.
<p>Andalusia - Spain</p>	<p>Some of the main proposals identified to remove GPP barriers are:</p> <ul style="list-style-type: none"> - Capacity building. A lack of knowledge and the fear of complexity is the first barrier to overcome. Different capacity building activities

	<p>can be organised, such as workshops to enable procurement staff to work on real tenders, events where the procurers could exchange experiences, deal with challenges and try out possibilities.</p> <ul style="list-style-type: none"> - Networking, knowledge transfer and cooperation among different departments and public authorities. GPP requires strong cooperation of the procurement department with other departments, especially with energy-environmental. - Market research. 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 create innovative solutions. - Monitoring GPP process. - Improving communication of benefits and results at all levels.
<p>Hame Finland</p>	<ul style="list-style-type: none"> - A common approach is needed at the practical level if public procurement is to be an effective tool in achieving green growth. The legal framework on public procurement represents an important aspect of procurement practices. Guidelines on how to implement the directive in needed in national level. 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. The implementation of these criteria and guidance need incentives. The sharing of information and good practises is a key driver of developing practical ways to utilize GPP in industrial symbiosis projects.

9 Fostering the impact of GPP

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.

<p>Kozani Greece</p>	<p>–</p> <ol style="list-style-type: none"> 1. Development of green technical criteria for products or services acquired through public procurement. 2. Informing, training and educating public sector personnel. <p>Integration of GPP in the regulatory and management systems of the public sector.</p>
<p>Malopolska – Poland</p>	<p>A promising area in which authorities might foster the use of GPP as an enabler of industrial symbiosis is the construction sector.</p> <p>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.</p> <p>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)</p>
<p>Molise Italy</p>	<p>–</p> <p>Considerable solutions to promote the use and impact of GPP as an enabler of industrial symbiosis are:</p> <ul style="list-style-type: none"> • 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.
<p>SVRK Slovenia</p>	<p>-</p> <p>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</p>

can be done on two levels: strategic and legislation.

Strategic documents

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, defense, 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.

1. [Slovenian Development Strategy](#)

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. (page 43)

2. [Reform Programme for Achieving the Lisbon Strategy Goals 2005](#)

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” (page 46). 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.

3. [Reform Programme for Achieving the Lisbon Strategy Goals 2008](#)

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. We can read the following:

“Greening of public procurement. In making improvements to the public procurement system, we will take into account the principle of qualitative criteria (value for money) for products and services subject to a public procurement procedure. Accordingly, the Working Group for the Greening of Public Procurement, which was set up within the Sustainable Development Council, will formulate a proposal of the Action Plan for Green Public

Procurement by the end of 2008, based on the recommendations and criteria drawn up by the European Commission. These include product lifecycle costing. The Action Plan will define the priority areas in which we can make a start on introducing this approach. This document will also promote innovation, in accordance with the European Commission's Lead Market Initiative. In this way we will use the public procurement system as a lever for innovations in the environment-friendly products and services segment. The aim is to achieve the level recommended by the European Commission, which is at least 50% of all public contracts to be implemented in accordance with the minimum criteria applying to green public procurement. New green public procurement criteria for cars are being drawn up in 2008." (page 87–88)

4. [Slovenian Action plan on Energy Efficiency 2008 – 2016](#) (available only in Slovenian)

Green public procurement for energy consumption in public sector is considered as good practice and an example for improving energy efficiency (*page 8 and page 40*). Public sector should serve as a role model also for private sector.

5. [Action plan for green public procurement 2009 – 2012](#) (only summary is available in English, while the action plan per se only in Slovenian)

Slovenian Government adopted in 2009 an Action plan for GPP for the period from 2009 till 2012 with the aim „to decrease the negative effects of the public sector on the environment, encourage the development of products and services which are easier on the environment, ensure more efficient use of public finances, and provide a good model to the business sector and consumers. The primary aim of the action plan is to speed up the implementation of green public procurement in Slovenia by introducing fourteen measures.”

The Action plan foresees 6 main principles of the GPP (*page 22*):

- Reconsider the need to buy something: we do not buy the product, but we purchase the service instead, which meet our needs.
- Reduce the quantity of products/services, its rationalization, purchase of efficient products (energy efficient products that contributes to lower energy or water consumption etc.)
- Re-use of products: this refers to contracting authority and / or service provider.
- Recycling: it is possible to conclude an agreement with service providers that are committed to recycling
- Energy recovery

- Post waste management: to agree with the service providers on waste treatment after their life cycle

In addition to the six main principles, 8 system actions/measures are foreseen (*page 23*):

- Adoption of the Green Public Procurement Act
 - To organize trainings for trainers
 - To begin with the preparation and implementation of information day and education programmes
 - In the period 2010 – 2012 preparation and implantation of a permanent education module.
 - To begin the dialogue with business sector on cooperation in introducing the environmental labels for products and services
 - Promotion and raising awareness, e. g. Green Public Procurement Act
 - Introducing the environment management system in the public sector (EMAS, ISO 14000 and similar schemes)
 - Carry out pilot projects in 2009 to implement procedures on GPP with interested service providers
6. [Action Plan for Energy Efficiency 2014 – 2020](#) (available only in Slovenian)

The present action plan foresees the GPP as one of the measures for reducing the impact of public sector on environment. As stated in point 6.1 (*page 126*):

“Energy efficiency is economic-wise very important segment of the GPP from both, the quantity of procurements and saving point of view. Decree on GPP, adopted in 2011, was foreseen to be amended with new products and services. /.../ In the period until 2012, plans related to GPP were partially implemented. By 2016, it was planned that the GPP should have been amended in the way to further regulate the procurement on lightening in buildings, air-condition, cooling and heating, office equipment, to lesser extent the reconstruction of buildings, mobile phone etc. With PURES (i. e. related technical requirements and guidelines), stricter energy consumption regulations for public sector are applied.”

7. [Operational Programme for Limiting Greenhouse Gas Emissions 2009 – 2012](#) (available only in English)

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 (*page 138*):

- Ensure appropriate classification of following products and services in GPP:
 - construction, reconstruction and maintenance of buildings,
 - purchase and renting of energy efficient buildings,
 - purchase of energy efficient office electronics, including lightening,
 - public lightening
 - cooling systems or acclimatization, heating and cooling systems.

- By the end of 2009 prepared the regulation on green public procurement and at the same time begin drafting the measures and technical specifications for certain areas of GPP.
- Ensure the requirements for energy efficiency that are stricter those minimal requirements for certain categories of products that are included in GPP.
- Estimate the costs and savings already during the drafting of the GPP or even Action Plan for GPP (savings of energy, greenhouse emissions).
- Include in GPP besides environmental label also energy label that are in line with the EU Directives for energy labels and for the building the energy performance certificate (Directive 2002/91/ES).

More about the report on implementation of the Operative Programme (for certain aspects) can be found in the [Environmental report on a strategic environmental assessment for the transport development strategy in the Republic of Slovenia](#).

8. [Operational Programme for Reducing GHG Emissions until 2020](#)
(document is available only in Slovenia)

In 2014, the Government of Slovenia adopted the Operational Programme for reducing GHG Emissions until 2020.

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.”

The OP points out the GPP as an important instrument for achieving the

goals, set by the OP as well as other environmental agreements and criteria:

“The GPP is markedly horizontal measure that demands multiple line ministry cooperation. The Ministry of Finance is responsible only to place the measures and criteria for GPP in the system of public procurement, while other ministries are responsible for setting the content of criteria and measures (in the field of environment, energy, agriculture etc.). Effects of the GPP are essential in achieving the goals of the present Operational Programme as well as other goals within the environmental-energy package such as efficient use of energy and renewables. The task of the Ministry of Administration is to provide the training on implementation of the GPP, whereas all ministries have to cooperate.” (page 77)

In the [first report \(for 2016\)](#) about the implementation of the operational Programme for reducing GHG Emissions in Slovenia, we can read that significant progress has been made and criteria met. We can initially read that *“Slovenia fulfills its obligations and significantly surpasses its yearly objectives. Also the latest projection indicates that binding national objectives based on Decision 406/2009/EC will be met and even surpassed during entire period 2013-2020.”* (page 3).

Since the OP is only in its initial phase, many of the strategic documents and objectives are still being defined. But Slovenia is doing hard in this direction, therefore we should point out the development and adoption of national strategic documents, namely Transport development strategy, Long-term strategy for encouraging energy building renovation and Smart Specialisation Strategy. The main setback in the implementation of policies and measures is seen in the field of transport, where the Operational Programme plans the highest reduction of emissions.

9. [Framework programme for a transition to a green economy and the action programme for 2015 and 2016 \(available only in Slovenian\)](#)

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.

This framework programme sets out as one of 10 key actions the “Increasing demand for green products and services, green public procurement”. The documents urge to update and upgrade the current Slovenian Decree on GPP, since the present one does not encourage the development of the market anymore. As a weak point of the current Decree on GPP, it points out the absence of analysis of implementation of the current Decree. We need to add a remark at this point that this is a consequence of the absence of monitoring and evaluation processes. Moreover, the Framework programme urges for more dialogue between the green service/products providers and

contracting authorities.

Legislation

Strategic documents listed above paved the way and set the frame for the legislation on the GPP. In 2012, Slovenian Government adopted the Decree on green public procurement, which is obligatory for the public sector and can be seen as an amendment to Public Procurement Act. Decree on GPP elaborates the procedures for GPP and which products and services falls under the GPP. The Decree is currently (2016/2017) under public consultation, since amendments will be shortly introduced, making the Decree even “greener”.

1. [Public Procurement Act](#) (available only in Slovenian)

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 when it is about public procurement. As stated in article 116, paragraph 3, the Decree on Green Public Procurement from 2011 still applies. The PPA suggest in technical specifications (article 2, paragraph 23, point a and point b) to take the LCC methods into consideration when issuing the procurement.

We are listing further on all articles where the PPA includes the environmental aspects:

Article 37, paragraph 3, point b defines that technical specifications might be drafted in the way that they can include elements, referring to the protection of environment. In Paragraph 6, the contracting authority may require from products to have different environmental or eco labels, according to 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 defines that the Government or any other public contracting authority can demand from service provider to take into consideration the environmental aspects.

Article 40 defines that the contracting authority may list the bodies, where service providers can obtain certificate (e. g. on environment friendly product / service).

In Article 45, paragraph 2, point f, it is defined that the contracting authority, when using the GPP, may set measures for environmental management.

Article 47 defines if the contracting authority requires from independent bodies that issue the environmental certificate, they to need 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 environmental aspects.

It has to be mentioned that 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](#) (available only in Slovenian)

In 2010 the Government of Slovenia took a resolution (n° 00712-4/2010/18) where it was stated 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.

Decree, adopted by the Government of Slovenia on 8 December 2011, entered into force on 14 March 2012, following the expiration of the Action plan on GPP 2009–2012. Decree was prepared on the basis of EC's "Green Public Procurement (GPP) Training Toolkit" and environmental criteria for ten areas, published by the EC. With this decree, three EU directives were directly or partially translated into Slovenian *acquis*, namely:

- [Directive 2009/33/EC of the European Parliament and of the 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 of the 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 of the Council of 19 May 2010 on the indication by labelling and standard product information of 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 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).

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.

Decree is drafted in a way that environmental measures can be strengthened, 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 originates in the fact that the EC has 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. We need a renovation of the Decree, because processes, technology and materials have significantly improved in certain areas during the past 6 years, therefore insisting in respecting an outdated Decree might even be harmful for the environment. In addition, the amendment of Decree must be done if the public sector still intends to be seen as driver and promoter of green sustainable development.

In terms of public procurement, Slovenia has further on several other acts, where GPP applies:

3. [Act Amending the Public Procurement in the Defense and Security Sector Act](#) (available only in Slovenian)

	<p>The aim of this act is defined in the article 1, which is to define the obligatory conduct of contracting authorities and service providers in public procurement of products, services and construction in the area of defense and security. Article 30 defines that the contracting authority may include such technical specifications that comply with the provisions on protection of environment.</p> <p>Though the Act as such does not mention the GPP, it shows that the GPP is or can be applied also in the field of defense and security.</p> <p>4. Act Regulating Public Procurement in the Water, Energy, Transport and Postal Services Sectors (available only in Slovenian)</p> <p>This is another Act, where contracting authorities may use provisions and technical specifications with intention to order or purchase the environmentally friendly services and / or products. The same provisions are used in this Act as they are in Public Procurement Act. Thus we can read in articles 41, 43, 44, 46 and 49.</p> <p>In both cases, Act on Defense and Water and Energy, the term GPP is not directly used, since the GPP is further regulated in the Decree.</p>
<p>Extremadura - Spain</p>	<p>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.</p> <p>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.</p> <p>The industrial symbiosis arises from the inertia of the private sector from 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 economy.</p>
<p>Andalusia - Spain</p>	<ul style="list-style-type: none"> • 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

	<p>the integration of GPP into regular procurement training programmes.</p> <ul style="list-style-type: none"> • 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.
<p>Hame Finland</p>	<p>- Administrative requirements: Public procurements should focus on purchasing new solutions and products that support the circular economy; An education and research policy that enables the circular economy; Dismantling regulation barriers and creating incentives; Changing the focus of taxation; Guidelines and synergies with initiatives in other parts of administration; A digital and service-centred circular economy; Circular economy indicators. (Sitra studies 121, 2016)</p> <p>Towns will include goals and principles to promote circular economy solutions in their local, service or procurement strategies. To support those responsible for procurements, a set of circular economy criteria and guidelines will be developed 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 121, 2016)</p> <p>To foster the use and impact of green public procurement as an enabler of industrial symbiosis, play administrative actions 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.</p> <p>Innovative procurements from the public sector are needed to foster the creation of pilots and new sustainable technical solutions.</p> <p>European commission’s guidance on how to foster the use of GPP in general: http://ec.europa.eu/environment/gpp/faq_en.htm#policy4</p>