GREEN PUBLIC PROCUREMENT: A SMART TOOL FOR SMART CITIES

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Abstract

The potential of Green Public Procurement (GPP) firstly highlighted in 2003. Nowadays GPP is rendered as an important tool for sustainable development and for achieving environmental policy goals. Public authorities, as major consumers in Europe, hold an important role in the promotion and use of GPP. They can drive the market to greener products and services, achieving reduction of the environmental impacts. Recently recognized increasingly that using the purchasing power of GPP public authorities have financial savings and are better equipped to meet evolving environmental challenges.

To assist contracting public authorities in identifying and procuring greener products, services and works, EU has developed GPP "core" and "comprehensive" criteria for 21 product and service groups, which can be directly inserted into tender documents. These criteria are regularly reviewed and updated. New criteria are expected in 2017.

The benefits associated with GPP are not limited to the environmental performance of the products or services, but extended to social, health, economic and political benefits, while at the same time is the appropriate tool for supporting and promoting innovation. Innovation can be incorporated to GPP, achieving real progress to cities and turning them to "smart cities". Both innovation and GPP should be taking into account by public authorities to pursue their objectives and make smart cities better places to live in. Public authorities are required to highlight the innovative characteristics of the existing examples of GPP practices, enhance innovation and sustainability and ensure that GPP are in line with the smart cities investment needs.

Key words: *Green Public Procurement, Procurement Directives, Public Authorities, Environmental Performance, GPP criteria, Smart Cities, Innovation.*

Introduction

Within the EU public procurement is subject to a number of sources of Community law, such as the Procurement Directives (e.g. 2004/24/EC and 2004/25/EC), the Treaties (e.g. Treaty on the Functioning of the EU), the EU Strategies and Policies (e.g. Europe 2020, Public procurement for a better environment, Closing the loop-An EU Action Plan for the Circular Economy, Roadmap to a Resource Efficient Europe, Energy 2020, EU Ecolabel, etc.), the case law of the Court of Justice of the European Communities and the law applying to related areas such as "State Aid" and "Competition".

The potential of Green Public Procurement (GPP) firstly highlighted in the 2003 Commission Communication on Integrated Product Policy, where Member States were recommended to adopt national Action Plans for GPP by the end of 2006 (Commission of the European Communities, 2008). Since then the term "Green Public Procurement" began to enter more strongly to the field of public procurement.

The recent EU legal framework for public procurement clarifies how public purchasers can include environmental considerations in their procurement processes and procedures. According to the Communication from the Commission, GPP characterized as "…*a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured* " (Commission of the European Communities, 2008). The concepts of life-cycle analysis (LCA) and life-cycle costing (LCC) are at the heart of GPP, and require buyers and suppliers to consider not just the up-front purchase costs of a given solution, but its total economic and environmental cost from cradle to grave (Environmental Protection Agency, 2014). Taking into account this approach, GPP is rendered as an important tool for sustainable development and for achieving environmental policy goals related to climate change and greenhouse effect, resource use, sustainable consumption and production, acidification, ozone depletion, etc. (Bjørn Bauer et al., 2009).

Public authorities, as major consumers in Europe, hold an important role in the promotion and use of GPP. Each year they spend approximately 2 trillion euros, equivalent to some 14% of the EU's Gross Domestic Product on the purchase of goods, such as office equipment, building components and transport vehicles; services, such as buildings maintenance, transport services, cleaning and catering services and works (EC Public Procurement Indicators 2015). Therefore, public authorities can drive the market to greener products and services, achieving an important reduction of the environmental impacts. In addition, public authorities can use GPP as a major driver for innovation making cities "smart", providing them with sustainable solutions, increasing their economic growth and making them better places to live in (European Commission, 2016).

Recently, also, recognized increasingly that using the purchasing power of GPP public authorities have financial savings and simultaneously ensure that tax payers' money is used effectively in a way that ensures direct environmental benefits and reduces negative environmental impacts.Authorities who also implement GPP will be better equipped to meet evolving environmental challenges (e.g. reduce greenhouse gas emissions, improve their energy efficiency, reduce wastes, reduce hazardous substances, move towards a circular economy, etc.).

Today, even if the concept of GPP has been widely recognised as a useful tool, it remains a voluntary instrument. Member States should be encouraged to draw up Action Plans for greening their public procurement. Among other, the coming years should be a growing political commitment at national, EU and international level.

EU Green Public Procurement Criteria

To assist contracting public authorities in identifying and procuring greener products, services and works, EU has developed GPP criteria for a number of product and service groups, which can be directly inserted into tender documents. These criteria are regularly reviewed and updated, so as to take account the latest scientific product data, new technologies, market developments and changes in legislation. Most of them are available in all official EU languages and can be downloaded from the official website of EU.

It is mentioned that GPP criteria include two levels for each sector covered. The first level is the "core" criteria, which are designed to allow the easy application of the GPP. These criteria focus mainly on the environmental performance of a product or service, aiming to keep low administrative costs for the companies. The second level is the "comprehensive" criteria, which are designed to take into account more aspects of environmental performance. This level

is to be used by public authorities that plan to go further in supporting environmental and innovation goals.

Since 2011, head of the process of developing criteria for a wider number of product and service groups is the Commission's Joint Research Centre (JRC)- Institute for Prospective Technological Studies in Seville (Spain).

At time of writing the present paper, the abovementioned criteria address 21 product and service groups:

• Cleaning products and services
• Combined heat and power (CHP)
• Computer and monitors
• Copying and graphic paper
• Electrical and electronic equipment in the health care sector
• Electricity
• Food and catering services
• Furniture
• Gardening products and services
• Imaging equipment
• Indoor lighting
• Office Building Design, Construction and Management
• Road Design, Construction and Maintenance
• Sanitary tapware
• Street lighting and traffic signals
• Textiles
• Toilets and urinals
• Transport
• Wall panels
• Waste water infrastructure
• Water-based heaters

Based on the GPP Work Programme (2016-2017) Joint Research Centre (JRC) and Oeko-Institut/ICLEI are working for the development of new GPP criteria for the following product developments:

• Indoor/ outdoor paints, varnishes and road markings (JRC, 1st quarter 2017)
• Textiles (JRC, 1st quarter 2017)
• Cleaning services (JRC, end of 2017)
• Renewable Electricity (Oeko-Institut/ICLEI, 1st quarter 2017)
• Food and catering services (JRC, end of 2017)
• Transport (JRC, end of 2017)
• Street Lighting (JRC, end of 2017)

The benefits of Green Public Procurement

The benefits associated with GPP are not limited to the environmental performance of the products or services, but extended to social, health, economic and political benefits, while at the same time is the appropriate tool for supporting innovation. More specific:

• Environmental benefits

GPP has a key role to play in the EU's efforts to protect nature and urban environment. GPP can be instrumental in addressing environmental problems such as: deforestation (e.g. through the purchase of timber from legally harvested and sustainably managed forests, through the use of eco-friendly print paper, etc.), greenhouse gas emissions (e.g. through the

purchase of products and services with a lower CO_2 footprint), water use (e.g. through more water-efficient fittings), energy efficiency and resource use (e.g. through renewable energy sources and energy efficiency technologies to all sectors), waste (e.g. through products with less wastes and hazardous substances), air/ water/ soil pollution (e.g. through controlling and limiting all the hazardous substances) and conventional agriculture (e.g. through limiting fertilizers and pesticides and providing organic food).

In addition of the above mentioned it is important to refer that the environmental impact of the GPP can only be estimated, since these impacts vary significantly between product groups and countries. For example, a study in seven EU countries has investigated the achieved results of GPP and showed that GPP within transport may give rise to 3-4% cost savings and 10-15% reduction in CO_2 emission. For office IT in general the study showed similar cost level and a CO_2 reduction of 20%. For cleaning products the result depends on how specific the requirements are. Basic GPP requirements mean similar price level and CO_2 emission, whereas ambitious GPP criteria lead to around 9% decrease in costs and almost 100% CO_2 reduction (as these cleaning agents function with use of cold water). The study, also, documents that GPP has led to considerable reductions in CO_2 emission in parallel with (minimal) cost savings. This punctures the myth that GPP is much more expensive than traditional PP (Pricewaterhouse Coopers, 2009*)*.

Based on the above, it is obviously that GPP can help stimulate a critical mass of demand for more sustainable goods and services, with better environmental performance, which otherwise would be difficult to get onto the market. These products and services can contribute directly or indirectly to the protection of the environment.

• Health and social benefits

GPP is rendered as an important tool for sustainable development and for achieving environmental policy goals. Adding sustainable criteria to the procurement processes improves the environmental performance of the products and services and thus enhances the quality of life. For example, supplying of "green" electricity (renewable energy sources) results in savings of CO_2 emissions and improves air quality. Reducing the use of toxic chemicals in cleaning products provides a healthier working environment. Purchasing timber from forests that have sustainable forest management practices preserves the forest vegetation and the biodiversity provides a healthier environment (Brilhante and Skinner, 2015).

In addition, GPP can drive to 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 often leads to savings over the whole life-cycle of a purchase, both for public authorities and society. For example, purchasing more energy-efficient IT equipment can save money from the lower electricity use, the easier recycle/re-use, etc. In this context, GPP can also reduce prices by increasing the competition. More specific, 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.

Based on the abovementioned, it is important to refer that in certain areas GPP may imply higher upfront costs, mainly for the SMEs, due to the need to invest in innovative materials and production and management processes (Environmental Protection Agency, 2014). The up-front costs also concerns and the public authorities as the "green" products or services may cost more up-front (but will save money in the long run).

• Political benefits

GPP can lead public authorities to commit for a better environmental protection by purchasing products and services with less environmental impacts. Moreover, 95% of the EU citizens consider that the protection of the environment is important to them personally (Special Eurobarometer Report, 2014). So, a visible focus on "greening" the purchase of products and services will therefore result in a positive perception of the administration in charge.

Green Public Procurement and good practices for smart cities

Another important benefit of the GPP, than the environmental, health, social and economic illustrated above, includes the supporting and promotion of the innovation. The Finnish Ministry of Environment believes that public procurement can promote environmental innovations. In line with this, the EU Commission also believes that GPP is a powerful instrument for stimulating innovation and encourage companies to develop new products with enhanced environmental performance.

GPP has a good potential for developing innovative solutions and products, closing the "innovative gap", as it is often difficult getting new innovative products on the market, because the developing SMEs are awaiting the demand while at the same time the potential buyers are awaiting market introduction of the products (Bjørn Bauer et al., 2009).

The innovative nature of products and services can be incorporated to GPP, achieving real progress to cities and turning them to "smart cities". The innovative character of the GPP should be taking into account by public authorities to pursue their objectives and make smart cities better places to live in (European Commission, 2013). These public authorities are required to highlight the innovative characteristics of the GPP and ensure that are in line with the smart cities investment needs.

Today, there are several existing examples of good GPP practices. Some of them are analyzed below trying to highlight the capabilities of smart cities to adopt green public procurement measures/ policies and enhance innovation and sustainability. The examples are based on the review of the existing bibliography a brief overview of the most important benefits of GPP is presented below. These benefits come from the most interesting examples collected over the years by EU and related to the implementation of GPP throughout different Member States. More specifically:

• The Norwegian Directorate of Public Roads decided to procure a new ferry that was 15 - 20% more energy efficient than the one in operation. As part of a two-stage procurement procedure the Directorate entered into a competitive dialogue to explore innovative solutions for energy efficient ferries. An advisory group was established and tender documentation and evaluation criteria developed. The tender didn't require any specific technologies. The winning tender was an electrically powered ferry. The new ferry came into operation in 2015, bringing a 70% reduction in fuel costs and 89% reduction in CO_2 emissions per year.

• In 2013 the Procurement Agency of the Germany Federal Ministry of the Interior, published a tender for 50.000 thin client computer systems to the value of 15m €. The open tender specified technical standards, including a warrantee of compliance with environmental aspects for components, noise and waste management. The framework agreement was for 24 months with an optional extension of 12 months. The five-year energy savings were calculated to be 58.750.000 kWh of electricity, equivalent to 29.000 tonnes of CO_2.

• A joint procurement of 296 organisations led in 2011 by City of Stockholm for electric vehicles was started. The joint procurement approach was applied to: reduce administrative costs for the participating organisations; achieve price reductions; send a strong signal of demand to the market; ensure that smaller municipalities would have access to such vehicles. The partners undertook a joint contribution to vehicle specification, including criteria for CO_2

emissions and LCC. The first purchase in 2012 resulted in 34 tonnes CO_2 saved, a 95% reduction, compared with equivalent petrol vehicles.

• In 2011, the City of Vantaa contracted an Energy Service Company (ESCO) to improve the energy efficiency of 14 municipal buildings. Using an Energy Performance Contract ensured that the energy saving measures and associated cost savings would be realised more quickly than would otherwise be possible using investment from the City's budget. Technical specifications included a guarantee from the ESCO on energy saving and repayment periods. The 8 year contract period will see a total of 7,500 tonnes of CO_2 emissions cut and annual savings in energy costs of 200.000 € for the city.

• Ten municipalities of the Dutch region Rivierenland (215.000 inhabitants) renew their contracts for the supply of electricity. The municipalities buy now "green" electricity, based on specific renewable energy sources: hydropower, wind, and biomass. The Rivierland region purchases 12.5 GWh per year, and result in around 5.500 tonnes savings of CO_2 emissions, equivalent to the annual emissions of 600 EU citizens.

• In 2008, an architectural competition was carried out for considering sustainability criteria in the planning and the construction of the Vienna North Hospital. The criteria used included: protecting/restoring areas of unspoiled nature; building structures as part of the landscape; use of potable water and rainwater; good transportation connections; thermal comfort; indoor air quality; flexibility of use; accessibility; user control (ventilation, shading, lighting); minimising overall energy demand; facilitating energy management(meters); ecological energy (district heating and cooling; photovoltaic and renewable sources); environmental protection on site; reducing waste, dust, noise and vibrations, etc. By considering these sustainability criteria, the construction and use of the Vienna North Hospital were responsible for the reduction of the EU's CO_2 emissions and the use of natural resources.

• In 2005, the city of Esbjerg wanted to purchase cleaning products. Esbjerg asked for cleaning products that meet the underlying environmental specifications of recognized ecolabelled products. The public procurement Directives explicitly allow this by putting the ecolabel criteria in the technical specifications. Most of the received offers proposed cleaning products labelled with one of the ecolabels (EU Ecolabel, Scandinavian "Swan", German "Blauer Engel" or Swedish "Bra Miljöval").Now the cleaning products don't have serious effects on the environment. Negative impacts have been reduced by excluding certain hazardous substances from the products and by minimising the amount of products/chemicals used in carrying out cleaning services (CSR Europe, 2009).

• Malmö's schools participated in a pilot project (2004-2007) whose purpose was to serve 100% organic food in school restaurants. The future goal was to serve 100% organic food in all of its public catering services by 2020. By the end of the pilot project (in 2007), 97% of food purchased by schools was organic. Although there were often price premiums for organic food items, the new restaurant menus made it possible to purchase organic food with largely unchanged budgets. It is important to note that the City of Malmö's Service Division and Environment Department calculated and measured the impact on greenhouse gas emissions from different menus. It was difficult to measure carbon dioxide emissions generated from transporting food. However, reducing the amount of meat served, in combination with serving vegetables not grown in heated greenhouses, was found to be the most environmentally preferable approach to adopt.

A similar example is that of the East Ayrshire Council, which is responsible for a large number of primary and secondary schools, offering approximately 1.3 m school meals per year. A contract was advertised in 2008 to cover the supply of food and beverages to 30 schools for a period of up to three years. The objectives were to transform the menus on offer to reduce reliance on processed food and ensure good nutritional standards. At the same time, reductions

in packaging and a switch to organic produce were intended to reduce the environmental impact of school meals (European Commission, 2012).

• The City of Barcelona has increasingly included sustainability considerations in its purchasing practices since 2001. These practices have been driven by and form a part of the City's Local Agenda 21 policy and goals. According to Barcelona's Timber Policy (from 2004), timber must originate from forests that have sustainable forest management procedures in place, such as preservation of biodiversity, control of tree diameters and harvest control. These requirements were applied in the Award stage, but could also be included as Technical Specifications. According to the information received from the different municipal departments, the main impacts on forests – such as biodiversity and ecosystems, but also on local communities - were curtailed.

• VASO is a non-profit company procuring social housing on behalf of a number of municipalities in southwest Finland. In January 2010 an expert team was appointed for the design of 31 houses in Naantali, to be built to passive house standard. The use of renewable energy sources allowed further reduction in the carbon footprint of housing. In the future additional environmental impacts should be taken into account in the construction process, including waste generation and the sourcing and transportation of materials to the building site.

• In 2009 the decision was taken in Ljubljana to completely change the entire city fleet in order to rationalise its management. The idea was to sell all cars belonging to the current fleet and take 60 cars on operational leasing for five years instead. A target was set for atleast 10% of these vehicles to be hybrids. Due to the very specific tender conditions involving the purchase and lease of vehicles, only two suppliers met the specified demands. At that time only two hybrid vehicles of the type required were available on the market. The choice of Toyota Prius was based on compliance with the specification and the award criteria. The new hybrid cars reduce the environmental impact associated with fossil fuel consumption. So there is a corresponding reduction in CO_2 and particulate matter emissions.

• In 2009, the Ministry of Environment and Water (MEW) of Bulgaria announced its intention to award a fully green public contract. Paper was chosen as a product group suitable for greening due to its clear environmental impact and the possibility of switching to greener alternatives without increasing purchase costs. Sustainability criteria were used(i.e. 100% recycled copy paper, at least elemental chlorine-free (ECF) bleached or totally chlorine free (TCF) bleached, etc.). Apart from the environmental benefits, the public contract awarded for supply of recycled paper entailed financial benefits. The Ministry conducted a pre-procurement analysis of market prices of recycled and non-recycled paper for printers which revealed that comparable prices applied, and the recycled paper met the required technical characteristics.

• In 2008 Dunkerque (France) established a framework agreement for the purchase of IT equipment and software. One of the lots tendered was for the supply of desktop computers, laptops, workstations and monitors. According to the technical specifications all equipment should meet the criteria of the Energy Star label (4.0); flat screens laptops, work stations and monitors. According to the technical specifications all equipment should meet the requirements of TCO 99 03 or equivalent; all equipment laptops, workstations and monitors. According to the technical specifications all equipment should meet the standards set out in Directives 2002/95/EC (on the restriction of the use of certain hazardous substances in electrical and electronic equipment) and 2002/96/EC (on waste electrical and electronic equipment).

• Amaroussion was the first municipality in Greece to be registered under the EMAS scheme in 2006; and under ISO 14001:2004 in 2010. It also received the National EMAS Award (2009) for applying green criteria in its purchasing practices. Public procurement criteria are amended by the Municipality to purchase goods and services that are environmentally friendly. Amendments are made based on the results of regular market

research carried out to identify "green" products available on the Greek market; information is then used to develop technical specifications.

• The Foundation for Tomorrow's Schools (FTS) is the national body in Malta responsible for schools. The primary school in Pembroke was a new build project and the goal was to construct the first energy self-sufficient school in Malta that relied only on solar and wind energy produced on site for electricity and warm water. The school, which is two storeys high, is fully accessible for students with special needs. The FTS included sustainable criteria in the open public tendering process. The construction design of the school provided an opportunity for the Maltese Government to minimise the impacts of future construction projects. Design and execution ensured that high environmental standards were met. This also facilitated transparency in procurement procedures.

Conclusions

Resources in EU are consumed in a way causing environmental degradation at a rate that cannot be sustained. This increasing consumption raised many concerns, both internationally and at the European level. Apart from the resulting environmental problems, this trend could threaten economic growth due to decreasing natural resources and the cost of addressing these issues. Social and health problems are also possible to be raised.

GPP has a key role to the above mentioned need for environmental protection and sustainability. Although it is a voluntary instrument, the concept of GPP has been widely recognised in recent years as a useful tool for driving the market for greener products and services and reducing the environmental impacts of public authorities' activities. EU developed GPP criteria for priority products and services that have been identified as most suitable for "greening" through public procurement. These criteria can be used by the public authorities and can be incorporated into a public procurement procedure for goods, services or works in order to reduce the environmental impacts and increase financial savings. At time of writing the present paper, criteria for implementing GPP address 21 product and service groups. Based on the GPP Work Programme Joint Research Centre (JRC) and Oeko-Institut/ ICLEI are working for the development of new GPP criteria in 2017.

The benefits associated with GPP are not limited only to the environmental performance of the products or services, but extended to social, health, economic and political benefits, while at the same time is the appropriate tool for supporting innovation.The innovative nature of products and services can be incorporated to GPP, achieving real progress to cities and turning them to "smart cities". Moreover, the innovative character of the GPP should be taking into account by public authorities to pursue their objectives and make "smart cities" tempting places.

Today, there are several existing examples of good GPP practices. These examples collected over the years by EU and related to the implementation of GPP throughout different Member States. Public authorities should highlight the good results of these examples and reclaim them to adopt green public procurement measures/ policies, enhance innovation and sustainability.

Member States should be encouraged to draw up Action Plans for greening their public procurement and providing sustainable solutions to cities so as to make them better places to live in. Among other, the coming years should be a growing political commitment at national, EU and international level.

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