

Green Public Procurement as an Instrument of Environmental and Innovation Policy: Getting the arguments right*

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Work in progress – please do not quote

Abstract

In this paper the potential of GPP as an environmental policy instrument is analyzed. Using the argument that GPP will contribute to achieving existing environmental objectives, it is evaluated against five criteria: effectiveness, efficiency, flexibility, equity, and political process transparency. The theoretical basis being environmental and resource economics, a general conclusion is that the complexity of environmental concerns in public procurement cannot be overstated. No matter what problem is to be solved, the prerequisites for effective policy through public procurement are weak and the arguments of cost- and objective-effectiveness lack scientific support. Instead, the arguments in favor of GPP as a policy instrument are about flexibility and equity. Finally, innovation procurement in terms of procuring already existing products may be a relevant motive for GPP. For instance, procuring organic foods may contribute to increased organic farming, by stimulating diffusion of technologies and processes.

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1. Introduction

Where GPP leads to the purchase of greener products, the reduced environmental impact from those products will contribute to achieving existing environmental goals – and could do so more cheaply than other available policy instruments (European Commission, 2008, p. 6).¹

As illustrated by the EC quote above, it is argued that GPP as an environmental policy instrument have considerable impact and being cost-effective, i.e., it contributes to the achievement of environmental objectives at the lowest possible cost to society. The argumentation builds on the purchasing power of the public sector and, according to the United Nation's Environment Program: *Public procurement wields enormous purchasing power, [...]. Leveraging this purchasing power by buying more sustainable goods and services can help drive markets in the direction of sustainability, reduce the negative impacts of an organization, and also produce benefits for the environment and society.* (UNEP, 2017, p. VIII).

However, according to the OECD, strategic procurement² is also about governments using *...public procurement to pursue secondary policy objectives while delivering goods and services necessary to accomplish their missions in a timely, economical and efficient manner.* (OECD, 2017, p 174). The ambition to achieve *secondary* objectives through procurement indicates that procurement is an indirect way of achieving these objectives.

It follows that a motivated question is how well does public procurement perform as an environmental policy instrument? As will be illustrated in this paper, the answer depends on the reference by which the instrument is evaluated. From an environmental policy perspective, Hanley, Shogren, and White (2007) suggest four criteria to be considered when evaluating or comparing policy instruments: (i) Effectiveness, which concerns the environmental impact. Here we will refer to this as objective effectiveness, meaning that a policy instrument has predicable environmental impact. (ii) Efficiency, which refers to the lowest possible cost at which environmental impact can be achieved, i.e., cost-effec-

¹ According to the European Commission (2008), there is great scope for cost-effective policy through GPP, which the Commission bases on Rüdenauer et al. (2007).

² Strategic public procurement refers to the use of public procurement for the purpose of achieving additional economic, environmental, and social objectives according to a country's priorities (OECD, 2017).

tiveness. (iii) Flexibility refers to the instrument being easy to adapt to changes in markets, technology, environmental conditions, etc. (iv) Equity, relates to distribution policy aspects of implementing a policy instrument, e.g., who pays for it and who it benefits. Benneer and Stavins (2007) suggest an additional criterion: (v) Political process transparency.

Generally, an instrument may fulfill more than one criterion or fail them all. For example, an environmental policy instrument that is cost-effective is not necessarily objective-effective, and vice versa. Since public procurement is considered to be a policy instrument it therefore seems reasonable to analyze its potential on these five criteria – which is the overall aim of this paper.

More specifically, based on the five criteria presented above, our purpose is to evaluate GPP primarily as an instrument of environmental policy. As illustrated by the quotes, it is argued that GPP have considerable impact and that it is cost-effective. Are these the right arguments? Our analysis is largely based on previous studies of GPP, essential principles of environmental and resource economics, and EU procurement legislation (Directive, 2014/24/EU; Directive, 2014/25/EU). It will result in recommendations regarding if, why, and how it is appropriate to implement GPP. The analysis includes a classification of what type of policy instrument GPP is, and how it functions in a first-best and second-best scenario, respectively. Note that the findings and recommendations are not limited to the European Union area. They are indicative for procurements carried out in other parts of the world using similar procurement processes with similar ambitions, i.e., allocation of public contracts using competitive bidding to achieve secondary objectives.

In contrast to the political argumentation in favor of GPP, previous research with a socio-economic perspective proves it is not objective-effective. GPP can, at best, have a positive impact on the environment (Marron, 1997; Lundberg & Marklund, 2013a). It also fails the cost-effectiveness criteria (Lundberg & Marklund, 2013a).³

To our knowledge flexibility, equity, and process transparency criteria are concepts that are missing in the existing literature on GPP as an environmental policy instrument. Pub-

³ This is to be interpreted to mean that GPP will never be a “first-best solution”.

lic procurement can involve a supply chain beyond national borders or regulatory jurisdictions, meaning that, as a policy instrument, it may have an environmental impact at the regional and local level, nationally as well as in other countries. This motivates an analysis of GPP based on the flexibility and equity criteria. Further, a public sector is organized at different governmental levels, nationally, regionally (e.g., counties) or locally (e.g., municipalities), while the implementation of GPP is decentralized regardless of the level at which the public sector is organized. That is, independently of governmental level, it is the individual procurer who designs and implements the procurement process. This justifies an analysis of the fifth criterion: political process transparency, i.e., if and how the political ambitions of GPP is translated into the call for tenders is a task administered by civil servants. Bouwer et al. (2006) find that the main obstacle to implementing GPP relates to resource issues; political factors – lack of organizational resources and promotional policies of GPP, as well as cognitive factors – lack of training and competence. How the public sector is organized and how civil servants from different areas of expertise collaborate is also found to be important for the implementation of GPP (Testa, Iraldo, Frey, & Daddi, 2012; De Giacomo, Testa, Iraldo, & Formentini, 2019).

According to Cheng et al. (2018), there is gap in the literature calling for more research on GPP from a socio-economic perspective. Specifically, they find that there is a general lack of studies in economics and that GPP as a policy instrument is undertheorized. In this comprehensive and well conducted review of the “...state-of-the-art research into GPP (p. 771)”, they categorize previous studies on cost-effectiveness (Lundberg & Marklund, 2013a) and objective-effectiveness (Lundberg, Marklund, & Strömbäck, 2015) in the category “Effects and effectiveness”. This category can be said to apply for the current paper as well. As such, the paper adds to the existing literature on related topics. Just to give a few examples, previous research describes GPP initiatives at the national level (Swanson, Weissman, Davis, Leet Socolof, & Davis, 2005; Geng & Doberstein, 2008; Stage & Arvidsson, 2012) or provides guidelines on how to implement GPP (Parikka-Alhola, 2008; Tarantini, Dominici Loprieno, & Porta, 2011), or analyze GPP uptake (Palmujoki, Parikka-Alhola, & Ekroos, 2010; Testa, Iraldo, Frey, & Daddi, 2012; Liu, Shi, Xue, & Wang, 2019).

In this paper, we primarily focus on GPP as a situation in which contracting authorities use a competitive tendering process to allocate public contracts and, at the same time, as

an environmental policy instrument. The reason for introducing environmental policy instruments is to correct for market failures, i.e., primarily negative environmental, climate and health externalities, and overuse of public goods.

Another type of market failure is positive externalities, e.g., learning combined with spillover effects that cause socio-economically levels of innovation that are too low. However, this calls for innovation objectives and policies, not environmental objectives and policies. Hence, innovation and environmental concerns in procurement are two different policies that address two different types of market failures.

Existing economics literature focuses mainly on GPP as a single policy instrument that can be used to address a single environmental objective, and that it can also be used as a substitute for another policy instrument, e.g., an emissions tax. This means that in a first-best setting, it is possible to form an idea of the environmental impact and the cost-effectiveness of GPP compared to tax – one instrument compared to another. However, in a “second-best” world, in which, e.g., interacting multiple externalities exist, a mix of instruments might be motivated (Bennea & Stavins, 2007). This also includes the positive externalities of innovation. We will briefly discuss procurement in this context.

A general conclusion in this paper is that the complexity of environmental and innovation concerns in public procurement cannot be overstated. No matter what problem is to be solved, the prerequisites for effective policy through public procurement are weak and the arguments in favor of GPP lack scientific support, the main reason being that public procurement is primarily neither an environmental nor an innovation policy instrument. Arguments in favor of GPP as an environmental policy instrument are found in flexibility and equity rather than cost- and objective-effectiveness. The flexibility argument builds on the importance of the correct design of the procurement process and the horizontal coordination of procurement auctions and control of its effects, so that all procurements together make an effective contribution to local or regional environmental problems. Another flexibility feature of GPP makes it possible to redistribute resources and equalize welfare if the green requirements target upstream production nodes in other geographical areas, beyond national borders and regulatory jurisdictions. This will require vertical coordination and control of the supply chain.

The structure of this paper is as follows: Since an understanding of GPP as an environmental policy instrument requires knowledge of what motivates environmental policy,

this is presented in the following section. GPP and objective- and cost-effectiveness are discussed in Section 3, followed by a discussion in Section 4 about flexibility and equity. The transparency of GPP – process, design and practice – is presented in Section 5 and Section 6 discusses the role of GPP under existing multiple policy objectives, and its role in internalizing innovation failures in a second-best world. Section 7 concludes the paper with policy implications and concluding remarks.

2. What type of environmental policy instrument is GPP?

In October 2017, the EU adopted a public procurement strategy to improve public procurement practices (European Commission, 2017) and it has been stated that public procurement matters more than ever. Public expenditure accounts for 14 percent of the EU GDP, and the Commission finds the sector to have considerable market power – particularly in creating sustainable growth and jobs. The strategy focuses on six priorities⁴, one of which is *Ensuring wider uptake of innovative, green, and social procurement*. In this section, we discuss what motivates environmental policy and what defines such a policy as being socio-economically efficient. We then discuss different types of environmental policy instruments and how GPP should be considered in this context.

The literature on environmental economics teaches us to distinguish between the revenue from and the cost of environmental policy. Revenues are generated by externalities being internalized (reduced) and costs are related to measures taken to internalize the externalities. Hence, environmental objectives establish the revenues and measures undertaken to achieve the objectives establish the costs. Given a specific environmental objective (fixed revenue), cost-effectiveness should be the guiding principle for the design of policy measures. Regardless of the environmental objective set, the aim should be to achieve the objective at the lowest possible cost to society. This means that the market participants with the lowest costs in reducing emissions are those who should reduce emissions.

Formally, the condition of cost-effective environmental policy is that costs at the margin of the measures that are taken to reduce emissions are the same for all sources of emissions. Thus, for the condition to be met some market participants must reduce emissions

⁴ https://ec.europa.eu/growth/single-market/public-procurement_en, accessed 21 October, 2019.

more – and others less. Depending on the type of policy instrument chosen, the prerequisites for fulfilling the condition for cost-effectiveness will vary. A relevant discussion is then to determine what type of policy instrument GPP is.

According to the European Commission (2008, p. 4), GPP is defined 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.*⁵ Note that this definition does not include the auctions of nature conservation contracts (Latacz-Lohmann & Van der Hamsvoort, 1997; Stoneham, Chaudhri, Ha, & Strappazzon, 2003; Juutinen, Reunanen, Mönkönen, Tikkanen, & Kouki, 2012).

The EU procurement directives states that (Directive, 2014/24/EU, p. 65): *Public procurement plays a key role [...], as one of the market-based instruments to be used to achieve smart, sustainable and inclusive growth while ensuring the most efficient use of public funds.* The notion of “market-based instruments” should not be confused with market-based instruments as defined in economics theory, i.e., economic instruments. In economics theory (Hanley, Shogren, & White, 2007), environmental policy instruments are commonly divided into three categories: (i) economic, (ii) command and control, and (iii) informative. A more detailed explanation of these categories follows below.

Economic policy instruments are incentive based and rely on the assumption that market actors are cost minimizing at all points in time, which makes the instruments cost-effective in both a static and a dynamic sense. Examples include taxes, charges, subsidies, tradable permits and deposit systems. What they all have in common is that they work by changing relative prices and, in doing so, create incentives to cut costs by reducing pollution without regulating how to reduce pollution. For instance, it is up to firms to decide on whether or not to invest in less polluting technologies and processes or to simply reduce production. *Command-and-control regulation*, on the other hand, affects market behavior more specifically. This type of regulation is either quantitative or administrative.

⁵ Within the framework of the 2030 Agenda, the UN uses an umbrella term: Sustainable Public Procurement (SPP), which covers the three dimensions of sustainable development; the economic, social, and environmental dimension. In UNEP (2017, p. 1) it is defined as a: *... process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life-cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment.*

Quantitative regulation stipulates, e.g., emission limits that firms must fulfill without dictating how to achieve such limits. An administrative or technical regulation stipulates that firms must use, e.g., a certain technology, production technique, or that their products must have certain characteristics.

The aim of *informative instruments* is to create awareness of any environmental problems associated with market behavior. A typical example is ecolabels, e.g., the Nordic Swan⁶ and the Blue Angel⁷. The idea is that the information will result in the market taking more account of the environment and nature when making production and consumption decisions. The objective is also to raise people's valuation of environmental and natural resources in general.

GPP is primarily a command and control instrument. Further, as the public sector is to lead the way for private consumers to follow, the idea is that good practices from the public sector is an information signal. The administrative (or quantitative) classification originates from the nature of the procurement auction since it includes green mandatory and optional criteria related to the production process, the product, and the supplier.

The implementation and classification of GPP as an environmental policy instrument can be illustrated, as in Figure 1. GPP (1) targets environmental problems by focusing on the procuring authorities' own consumption (2), or the suppliers' production (3). The targets can relate to externalities (4 and 6) or use of resources (5 and 7), both on the consumption and production side.

⁶ <http://www.svanen.se/en/>, accessed 21 October, 2019.

⁷ <https://www.blauer-engel.de/en>, accessed 21 October, 2019.

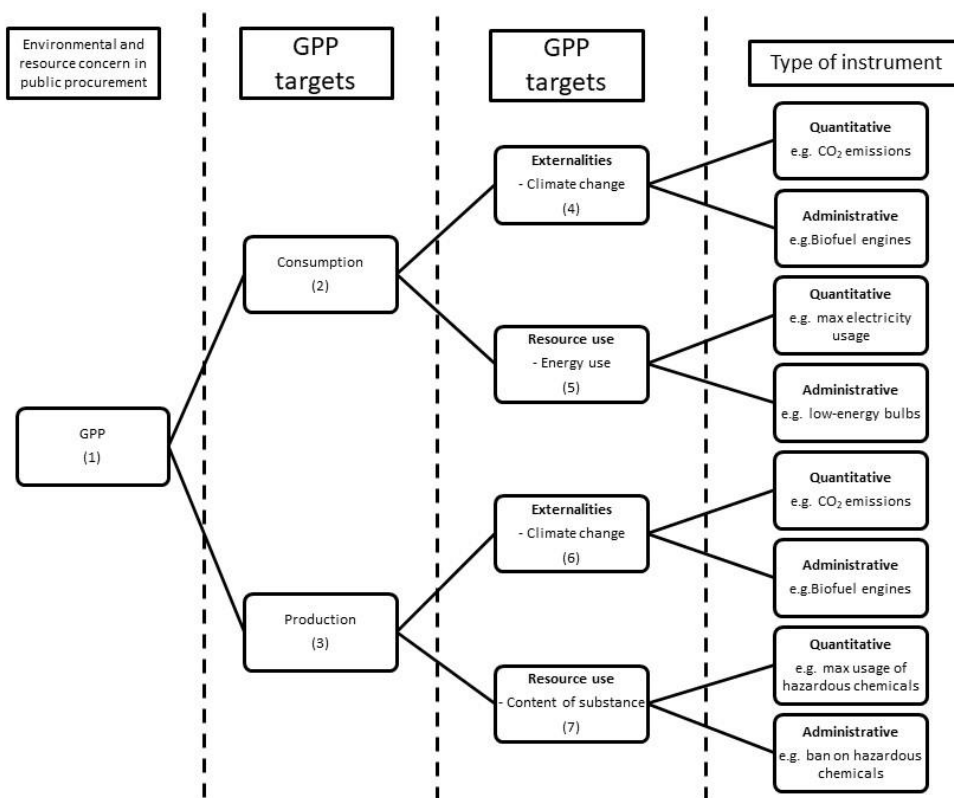


Figure 1. Green public procurement (Lundberg & Marklund, 2013a).

In designing the procurement auction and choosing what criteria to use for supplier selection, it should be a matter of course that the contracting authority always considers its own business' life-cycle costs, LCC (European Commission, 2016), e.g., minimizing energy costs over time. However, addressing external environmental effects that extend beyond the authority's own business requires a life-cycle assessment, LCA, approach, since it includes a product's total impact on the environment, from raw material extraction through the product's manufacturing process, transportation, the authority's consumption of the product, to disposal of the product. This is a complex task and sparsely described in the literature. How procuring authorities can use LCA in supplier selection is an area where more research is needed (Jenssen & de Boer, 2019).

An LCA approach includes all emissions in the interim stages, to be quantified, costed, and added to the LCC. Overall, this means that the contracting authority essentially conducts a socio-economic cost-benefit analysis (CBA), which should also include the cost

of conducting the analysis.⁸ The task of calculating all the costs is extensive and complex but, nevertheless, is an important aspect of analyzing the function of GPP as an environmental policy instrument. For example, when procuring organic foods, it is important to possess knowledge of the differences in external effects compared to conventional foods. From a policy instrument perspective, the decision to buy organic foods should be preceded by a CBA in which the two options are compared. A CBA can also be justified when comparing two organically-produced foods, e.g., when one is locally produced and the other is not (Lundberg & Marklund, 2013b).

Figure 1 and the related discussion give a hint of the indirect nature of procurement as an environmental policy instrument, i.e., GPP governs far from the source of the environmental problem which, in turn, may be a source of ineffective environmental policy. This is discussed in more detail in Lundberg and Marklund (2018).

In the next section we review the economics literature on GPP from a cost- and objective-effective perspective.

3. GPP – Cost- and objective-effectiveness

In designing consistent policies, Mundell (1968) suggests three guiding principles, which we relate here to GPP: (i) The policy must be effective, which means that it must be implemented in such a way that it achieves the environmental impact that is necessary. (ii) The policy must encompass one policy instrument for each objective – the Tinbergen Rule (Tinbergen, 1952; Lundberg & Marklund, 2018). (iii) Objectives and policy instruments must be mutually independent. Thus far, the scarce economics literature on GPP has essentially focused on the first principle by evaluating GPP with respect to its effectiveness (Marron, 1997; Lundberg, Marklund, & Strömbäck, 2015), but also cost effectiveness (Lundberg & Marklund, 2013a).

The necessary condition for cost-effective environmental policy states that cost minimizing firms must adapt to the policy so that they all end up with the same adaption cost at the margin (Lundberg & Marklund, 2013a). Economic instruments, if properly designed, are generally considered to be capable of achieving this. An emissions tax, e.g., also creates a constantly ongoing incentive for all firms in the economy to seek out and invest in

⁸ For an introduction to cost-benefit analyses, see, e.g., Hanley and Barbier (2009).

less polluting processes, thereby reducing pollution on their own. Thus, from the perspective of having an environmental effect, and being a serious substitute for economic instruments, it is crucial for GPP that as many potential suppliers as possible adapt to the environmental standards implemented by GPP, not just the supplier who wins the contract.

A complicating issue is the administrative/quantitative controlling feature of GPP which, by definition, eliminates the prerequisites for GPP to be cost-effective in practice. To be cost-effective, the procuring authorities must have full information about the bidders' cost functions. This is in order to differentiate the requirements between bidders so that their marginal costs of adapting coincide. Differentiation means that the authorities must tailor a unique set of requirements for each potential supplier in the call for tender, which is resource demanding. Also, it is probably not permitted, taking into account the EU's fundamental principles of public procurement, e.g., "equal treatment". Thus, GPP will not be a cost-effective environmental policy instrument, not even in theory (Lundberg & Marklund, 2013a).

Although economic policy instruments are cost-effective, they may be difficult to pass politically and other arguments may potentially work in favor of command-and-control measures, e.g., implementing GPP. Unfortunately, previous research (Marron, 1997; Lundberg, Marklund, & Strömbäck, 2015) proves that GPP is not objective-effective, i.e., it is difficult to predict its environmental impact. One of the reasons for this is that GPP has a unique property – it is optional. Potential bidders can choose to avoid regulation via GPP and the cost of adapting to environmental requirements by not participating in the procurement auction and, instead, choosing to deliver to market segments that have lower green requirements (Lundberg, Marklund, & Strömbäck, 2015; Lundberg, Marklund, Strömbäck, & Sundström, 2015).

Additionally, the more ambitious the regulation via GPP, the higher the cost of adapting to the regulation is. This may reduce entry. Thus, a more ambitious environmental policy via GPP does not necessarily mean that it will be more effective. Even if it were, GPP obviously creates a conflict between the objective of competitive tendering for public contracts to achieve lower prices and higher quality, and the idea of using it as an instrument to fulfill environmental objectives. This is illustrated in Figure 2.

Suppose four potential bidders are competing for a public contract and that the environmental standard required by the procuring authority is e_1 . This standard only extends beyond the standard of the product and/or technology only for suppliers B and C. For the procurement to have an environmental impact, at least one of the suppliers must make investments in order to adapt to the required standard. In this example, the investment cost for suppliers B and C is C_B^1 and C_C^1 , respectively, where $C_B^1 > C_C^1$.

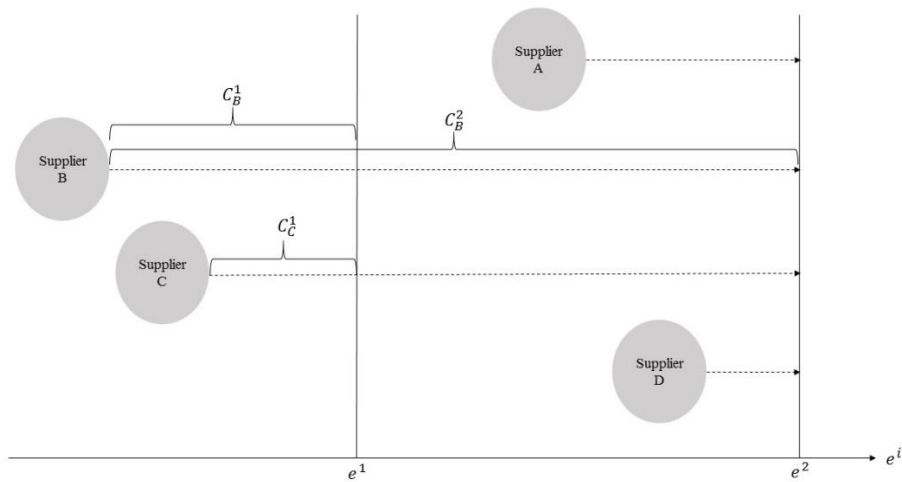


Figure 2. GPP and the ambition level.

If the authority requires a higher standard, e_2 , assuming that it does not violate the EU’s fundamental principle of “proportionality”, it extends beyond the standard of all potential bidders’ products and/or technologies. However, this does not necessarily mean that the e_2 standard will have more of an environmental impact. It is possible that both supplier B and C would adapt to the e_1 standard, but not adapt at all if the e_2 standard is implemented instead, the reason being that the necessary investments become too costly. The adaptations made by suppliers B and C in order to comply with the e_1 standard may actually have a greater positive environmental impact than the adaptations made by suppliers A and D in order to comply with the e_2 standard.

The adaptations made to e_1 by bidders B and C are likely to give more value for money compared to the adaptations to e_2 made by bidders A and D, since adaption costs are rising

at an increasing rate in response to more stringent criteria. This illustrates the cost-effectiveness principle in environmental and natural resource economics – emission reductions should first be made where the cost of making them is the least. Consequently, more stringent green criteria are not necessarily better, neither from the perspective of environmental impact nor the perspective of cost-effectiveness. The common argumentation in favor of GPP, with reference to environmental impact and cost-effectiveness is incorrect. Another practical issue is the decentralized implementation of GPP at the authority level, or even within an authority. Procurements across (or within) procuring authorities are implemented more or less independently of each other and, at a decentralized governmental level, executed by civil servants requiring them to be experts on environmental problems and policy (Gains, 2004). In order to achieve national environmental quality objectives, the achievement of local or regional objectives require coordination of all the policy measures taken, GPP included. This is further complicated by the fact that individual EU member states should also relate their policies to EU regulations and objectives set at the EU level.

According to previous research, under certain conditions GPP may contribute to reduced environmental impact. Whether such impact occurs, and the extent to which it occurs, is conditional upon the contracting authorities having significant purchasing powers, producers being price sensitive and consumers not (Marron, 1997; Lundberg, Marklund, & Strömbäck, 2015). With significant purchasing powers, the green purchasing policy will increase the price of green products and lower the price of conventional ones. If the price sensitive conditions are not met, the policy may have counterproductive effects. Private producers will continue to produce conventional products and consumers will switch from green products to conventional ones – the exact opposite of the intentions of GPP.

In the next section, we discuss whether flexibility or equity (Hanley, Shogren, & White, 2007) may be used as arguments in support of GPP as an instrument of environmental policy.

4. GPP – Flexibility and equity

As mentioned in the introduction, *Flexibility* refers to it being easy to adapt the instrument to changes in markets, technology, environmental conditions, etc. This means, e.g., that it can be implemented for local/regional environmental problems relatively easily. In environmental economics, *Equity* is generally related to the income-distribution effects of

environmental policy, e.g., who wins, who loses, and how the winners can compensate the losers. To highlight the potential of public procurement as a policy instrument, we choose to consider equity from a somewhat different angle in order to illustrate circumstances in which GPP could make a difference.

A public sector organized on different levels, nationally, regionally, or locally, and the decentralized implementation of GPP, raises the question if it can contribute to solving environmental problems at the most decentralized level, a point also made by Nijaki and Worrel (2012). Its actual implementation is at the level at which the call for tender is formulated and the process is designed. Here it is argued that GPP should primarily focus on local environmental problems since, e.g., taxes are generally designed at the national level and do not account for local variations in marginal environmental damage. However, the implementation of GPP from a flexibility perspective will require green mandatory and evaluation criteria to be tailored to the local environmental problem, a potentially complex task related to cognitive factors such as lack of training and competence (Testa, Iraldo, Frey, & Daddi, 2012; De Giacomo, Testa, Iraldo, & Formentini, 2019).

In this context, an important aspect is the need for *horizontal* coordination of procurement auctions and control of their effects so that they mutually contribute to solving the local or regional problem. It follows that although is neither cost- nor objective-effective, flexibility may motivate the use of GPP if it targets environmental problems unique to a specific local area that cannot be governed by taxes or other instruments implemented at the EU or national level.

Another flexibility feature of GPP makes it possible to redistribute resources and equalize welfare if green requirements target upstream production nodes in other geographical areas, beyond national and EU borders and regulatory jurisdictions. This will require the need for *vertical* coordination and control, which is the bridge to equity, i.e., supply chain management (Preuss, 2009; Boström & Karlsson, 2013). With the equity argument in mind, GPP may also be said to include socially responsible procurement objectives, see, e.g., McCrudden (2004).

Equity here relates to the practice of GPP within the environmental policy landscape in a broader sense. Examples include criteria related to food production in other countries (i.e., imported food) or the production of clothing including, e.g., the coloring. In brief, the criteria can be tailored with the ambition of contributing to local environmental and health

issues in developing countries. Regarding equity, arguments in favor of GPP strongly relate to sustainable public procurement and social concerns. For successful GPP tailored to addressing equity, unannounced monitoring of the supply chain is crucial to avoid moral hazard and adverse selection issues. This is resource demanding, particularly for smaller communities and contracting authorities. The risk of moral hazard is always present in contracting, but more significantly so when focusing on equity due to the even longer distance to, and decreased control over, the supplier. Further, as noted in previous literature (Isaksson, Blomqvist, & Winblad, 2018), specific and measurable contract criteria facilitate the monitoring of the contract.

To summarize, although GPP is neither cost- nor objective-effective, it can contribute to reduced environmental problems at the local level and be motivated based on flexibility and equity. However, to have environmental impact, there are some practical issues related to process design and practice, i.e., transparency.

5. GPP – Process design and practice – Transparency

In addition to the above discussion there are some other issues to be considered related to the design of GPP as an environmental policy instrument, i.e., identification of the problem, matching the criteria to the problem, the choice of supplier selection model, and the necessary competence.

Identification of the problem: In simple terms, a procurement process is an auction in which competitive bidding is used to allocate public contracts. It comprises three phases: preparation, procurement, and contract duration (SOU, 2011:73). The preparatory phase is initiated when the authority identifies a purchasing need under its mandate. This phase can include, e.g., stages in which the authority investigates the market for the product in question, identifies potential environmental and climate problems associated with the production or consumption of the product (referred to hereinafter as environmental quality), and obtaining information about the extent to which environmental concerns could contribute to an improvement in environmental quality.

Matching the criteria to the problem: In the second phase of the procurement process, in which the authority formulates requirements and criteria for the product to be procured, a proper socio-economical starting point is to organize the procurement auction with the aim of achieving an outcome that matches the preferences the authority represents. In this context there must be a correct balance between the price and quality of the subject matter.

This is expressed in the call for tender, which includes the characteristics of the subject matter, contract conditions, technical specifications, environmental and other criteria, as well as the supplier selection model, i.e., the principle of how the bids will be evaluated.

Supplier selection model: In brief, the supplier can be selected based on lowest price in combination with mandatory criteria or a combination of price and quality according to the Most Economically Advantageous Tender (MEAT). Supplier selection based on MEAT requires a scoring rule to account for both price and quality, including environmental characteristics (Lundberg & Marklund, 2011; Bergman & Lundberg, 2013). In the EU procurement directives from 2014 (Directive, 2014/24/EU; Directive, 2014/25/EU), revised *inter alia* to facilitate GPP, the acronym MEAT is an overriding concept that includes three bases for bid evaluation from which contract assignments can be made: (i) Best price-quality ratio, (ii) Cost, or (iii) Price. Best price-quality ratio and price correspond to MEAT and lowest price, respectively, according to the previous directives (Directive, 2004/17/EC; Directive, 2004/18/EC).

Although the EU directives implicitly stipulate the use of scoring rules, they leave the procuring authorities a lot of freedom in how to design the specific rule. Lundberg and Marklund (2011) and Bergman and Lundberg (2013) identify that, from a socio-economic perspective, the scoring rules that are practiced are often poorly designed. Some of the most frequently used scoring rules can lead to an arbitrary selection of suppliers and, consequently, add to the ineffectiveness of GPP as an environmental policy instrument (Lundberg & Marklund, 2013a).

The new EU directives promote MEAT and the use of a scoring rules to encourage higher quality. However, the lowest price in combination with stringent mandatory criteria can actually result in equally high, or even higher, quality. Thus, from a socio-economic perspective, the lowest price can be the preferred method for selecting supplier (Lundberg and Marklund, 2011). The guiding principles for the choice between lowest price or some scoring rule relate to uncertainty about producing quality, uncertainty about production costs, and budget preferences (Bergman and Lundberg, 2013).

As was emphasized in Section 2, environmental concerns in public procurement require an LCA approach. The new directives introduce cost as the basis of supplier selection and

it refers to LCC, which is equated with cost-effectiveness in the directives.⁹ The costs can be associated with acquisition, consumption of energy and other resources, maintenance, as well as the cost of collecting and recycling. This simply means that the application of LCC is synonymous with a public authority awarding the contract to the offer that cost minimizes the authority's own operations, and not with respect to the cost of externalities, i.e. the socio-economic perspective. Thus, GPP based on LCC does not relate to environmental policy.

The LCA approach also includes the society's costs in the form of negative external effects associated with the contracted product's life cycle which, according to the directives, should be adopted provided the monetary value of the externalities can be determined and verified.¹⁰ Thus, LCA is a necessary condition for public procurement to be defined as GPP, i.e., as an instrument of environmental policy.

Having the necessary competence: In comparison with traditional environmental policy instruments, public procurement is quite decentralized in its execution. While politicians on various levels express a desire to use procurement as a policy instrument, it is the individual procurer who designs and implements the procurement process. The International Agreement on Government Procurement (GPA) is an agreement between the World Trade Organization (WTO) and the EU. This agreement regulates the political ambitions to reduce environmental impact around the world through public purchasing. The political ambitions are also expressed at the EU level in the form of directives, communications, and handbooks, which are then translated at a national level by the member states. Political declarations of intent for public procurement as a policy instrument are also expressed at county council and municipal levels. In reality, a county council or a municipality is a node between the national political level and the specific authority conducting the procurement process, e.g., an administration or a school.

Those who must ultimately translate the overarching objective of using public procurement as an environment policy instrument are the civil servants responsible for the practical implementation of the procurement process. Depending on the size of the authority, these people could be staff in a procurement department, a head of administration or, e.g.,

⁹ For example, no. 90, p. 82 in Dir. 2014/24/EU.

¹⁰ For example, Article 68, p. 134 in Dir. 2014/24/EU.

the head teacher of a compulsory school. Thus, it is these civil servants who must formulate environmental requirements and criteria in contract documents based on a more centralized environmental policy ambition. They must also select the basis for evaluation and scoring rules in accordance with the above discussion.

In practice, environmental management takes place during the second phase of the procurement process, in which civil servants stipulate environmental requirements and criteria, define the balance between price and quality, how tenders are to be evaluated, contract terms and procedures of following up. This places great demands on those who actually carry out the procurement process. Their competence should not only cover the legislation on public procurement, but also the incentive structures within the framework of contract structure and follow-up, identification of environmental problems with which the subject matter of the contract is associated, and potential solutions for this. The latter should also take place with reference to defined environmental objectives.

However, civil servants must also be familiar with environmental policies at different spatial levels, particularly policies that concern global environmental problems such as the climate. This is because policy decisions at different levels may interact. If this is the case, the environmental concern of the procurement process must be adapted accordingly. An additional reason to be knowledgeable about environmental policy is that policies that have already been implemented may address and fully internalize the same environmental problems that the individual procurement process intends to handle. If this is the case GPP is from a socio-economic perspective not motivated. All in all, this is a complex task that demands competence.

Based on Italian data, Testa et al. (2012) identify civil servants' competence and awareness of procurement support as being key components in determining the extent to which environmental concerns apply to various procurement processes. Thus, the actual implementation of environmental policy is carried out relatively far away from the decision-making politicians, by a relatively high number of practitioners, at something that might almost be considered to be *street level*. Lipsky (2010) defines policy, or bureaucracy, at street level as civil servants at the administrative level who actually implement the policy itself. These bureaucrats are autonomous in relation to the politicians who have set the tone. Thus, in practice, there is a relatively large distance between the political ambition

and its actual implementation. According to Lipsky, this brings a certain risk of discretionary interpretations of political ambitions, with implementation that deviates from the objective defined by politicians. One of the problems that Lipsky identified with this kind of policy is that staff often work with insufficient resources in relation to their task.

The above discussion indicates that using public procurement as an environmental policy instrument creates a very complex task for civil servants. One of the main reasons for this complexity is obviously that public procurement is not primarily an environmental policy instrument. However, there are even more factors that add to the complexity. A few of these are discussed in the next section.

6. Multiple policy objectives, second-best setting and innovation

What underscores the ineffectiveness of GPP is that environmental policy is not the primary reason for procurement. The primary objective of a procuring authority is to run its operations, i.e., to achieve environmental objectives is a secondary objective, at best. In this respect, GPP is an indirect environmental policy instrument and, by definition, is inefficient. However, this inefficiency has additional dimensions.

For instance, the fact that the procuring authority in the implementation of GPP has at least two objectives in mind leads us to the discussion of the principle of “one policy instrument and one objective”, which was initiated by Tinbergen (1952) – *The Tinbergen Rule* (see Section 3).¹¹

At first glance, it could be perceived that GPP is a system of multiple policy instruments. There is no limit to the number of environmental criteria a procuring authority can stipulate in call for tenders when procuring goods or services, and the criteria may address multiple types of environmental externalities. Thus, the relevant question is whether GPP could be regarded as one policy instrument, or a system of multiple policy instruments, to internalize several negative externalities with the purpose of contributing to the achievement of different environmental quality objectives.

6.1 Mutual independence

The answer becomes evident by addressing another question related to the third of Mundell’s guiding principles; If GPP is a system of multiple policy instruments, are each of

¹¹ See also Mundell (1968).

the instruments and the environmental objectives they individually aim at mutually independent (see Section 3)? The answer is no, which is underscored by Lundberg and Marklund (2018, p. 47) as follows: *For instance, a procuring authority can buy food for schoolchildren without stipulating it to be organic, but the authority cannot stipulate food to be organic without buying it*, i.e., no procurement no environmental policy. Thus, procurement is a single instrument aimed at the subject matter of the procurement. Given this, environmental objectives are added, which means that Mundell's second principle of consistent policy, "one policy instrument and one objective", is not met. GPP satisfies none of the guiding principles of consistent policy suggested by Mundell (1968).

Thus far, we have analyzed GPP in a first-best setting, and the conclusion is unambiguous: GPP is a poor environmental policy instrument. However, if more than one market failure exists, e.g., two externalities that are jointly ameliorating or jointly reinforcing, then policy coordination using a mix of policy instruments could be justified (Bennear & Stavins, 2007). This is the case when there are market failures that relate to innovation. Does GPP have any role to play in this context?

6.2 Innovation procurement

GPP is a highly under-researched field in the literature on strategic public procurement as a driver of environmental innovation (Zipper, 2017). Based on a review of research, Rainville (2017) conducted a conceptual analysis covering various areas of the environmental aspects of public procurement, e.g., GPP and innovation. A general conclusion was that (Rainville 2017, p. 1035): *...all forms of GPP have the potential to promote secondary policy goals of environmental improvement*. There are also a few empirical papers of relevance in this case and the results are inconclusive. Horbach, Rammer, and Rennings (2012) analyze potential drivers of environmental innovation and note that customer requirements are important. This does not contradict supporting public procurement as a driver of environmental innovation. Based on firm-level data in the EU member states, Switzerland and the USA, Ghisetti (2017) analyzes whether public procurement as a policy instrument stimulates environmental innovations involving R&D. The conclusion reached is that public innovation procurement has a role to play in stimulating the uptake of such innovations. Zipper (2017) provides a first analysis of the relationship between GPP and the probability of German firms being engaged in environmental innovation activities from 2006 to 2016. This was achieved by using a binary response model.

The results show no significant relationship, neither for product innovation nor for process innovation.

However, before implementing an innovation policy, it is important to ask why an innovation policy is needed. The basic reason for such a need arises when the return on investment is higher for society than it is for the individual firm making the investment. This is the case when investments engender positive external effects, which should be seen as public goods. Public goods can be consumed by everyone in society, and if the investing firms do not account for this utility then investment levels will be too low from society's perspective. Here we consider two types of public goods resulting from innovation:

- (i) *Positive environmental effects*: Although firms/authorities optimize green investments for their own ends, it is not necessarily optimal from a socio-economic perspective. Positive environmental/climate effects may justify a larger proportion of the budget being invested in green innovation
- (ii) *Knowledge spillovers*: Innovation creates knowledge (technologies and processes) that spill over to other firms. Consequently, they benefit considerably from the investment at no cost. Firms then refrain from investing in green innovation due to, e.g., competitive disadvantages.

There is a distinction between environmental policy and innovation policy, which is important to bear in mind. These policies are implemented for different reasons. Thus, green innovation procurement should be seen as an innovation policy instrument, not as an environmental policy instrument. The OECD defines innovation procurement as follows (OECD, 2017, p 174):

Strategic use of public procurement for innovation is defined as any kind of public procurement practice that is intended to stimulate innovation through research and development and the market uptake of innovative products and services.

The purpose of innovation policy is to somehow influence different stages of the innovation process, from R&D through to commercialization and diffusion (Rainville, 2017). Zipper (2017) identifies three main rationales for using public procurement as a demand-

side innovation policy instrument¹² The public sector can use: (i) its purchasing power to create lead markets, (ii) procurement to internalize market externalities that cause under-supply of innovation, (iii) procurement as an innovation policy for achieving other policy objectives that those related to innovation.

6.2.1 Innovation procurement to create lead markets

According to Beise (2004, p. 998) a lead market denotes ... *the country where a globally successful innovation first took off.*¹³ This primarily relates to early stages of the innovation process, e.g., basic R&D research. This is mainly about procurement procedures aimed at contracting R&D services in cases in which there are no solutions for the needs of public buyers in the market, e.g., pre-commercial procurement (PCP) and innovation partnerships (IPS). The subject matter of the PCP only applies to the R&D phase prior to commercialization and is not covered by EU Directives (European Commission 2007).¹⁴ Thus, PCP is a practical application of the exception to the public procurement directives for R&D. IPS was introduced in conjunction with the directives introduced in 2014, and was incorporated into many of the EU member states' procurement legislation as late as 2016. It enables the awarding of a single contract that covers both the development and purchase of the product. A supplier who is part of a partnership may also sell the final product on the market after the contract has been completed (European Commission, 2018b).

However, PCP and IPS are procurement processes that do not characterize the typical procuring authority, e.g., a municipality, in its every-day work. According to the Swedish National Agency for Public Procurement, PCP should instead be used for the most important strategic needs in which the contracting authority is prepared to invest a large sum, as well as extensive time and work.¹⁵ This contradicts the use of PCP and IPS as innovation policy instruments because these procurement processes also risk being faced with the same problem as the problem they are aiming to eliminate, namely an innovation

¹² This means that, in this case, innovation policy is regarded as a factor that spurs innovation and the diffusion of innovations through a demand-pull effect (Zipper, 2017).

¹³ Beise (2004) describes countries that subsequently adopt the innovation as 'lag markets'.

¹⁴ EU 2014/24/EU (Article 14), EU 2014/25/EU (Article 32) and EU 2014/23/EU (Article 25).

¹⁵ <https://www.upphandlingsmyndigheten.se/omraden/dialog-och-innovation/innovation-i-upphandling/innovationsupphandling-steg-for-steg/upphandlingsstrategin/val-av-forfarande-eller-metod/for-kommersiell-upphandling/>.

failure. Regardless of positive public goods being generated, they accrue to all in society. The innovation cost, however, only accrues to the contracting authority.¹⁶

Generally, public procurement as a demand-side innovation policy instrument should be motivated by the second and third rationales described above. Zipper (2017) suggests that the third rationale could be related to, e.g., transition towards a low carbon economy. However, we argue that from a socio-economic perspective the second rationale cannot be distinguished from the third. They are about the same thing, i.e., internalizing market externalities related to innovation.

6.2.2 Diffusion of innovations through public procurement

To most authorities, e.g., municipalities, innovation procurement in terms of “off-the-shelf” procurement may be the only option. This could be related to later stages of the innovation life cycle process, i.e., diffusion. If this leads to further market diffusion of less emission-intensive products, technologies, and processes procurement may, as an innovation policy, complement existing environmental or climate policy. In the analysis below, the procurement process is the same as described in previous sections, with the difference that the political motive must now rest on the identification of an innovation failure.

If it can be determined that there is a non-internalized positive external effect, e.g., spillovers from innovation (Edler & Georghiou, 2007), and that this effect interacts with a negative external effect from emissions, a specific policy that targets one of the externalities will indirectly affect the other externality. The theory of “second-best solutions” indicates that there may then be a need to coordinate the two different policy areas and, in line with “one policy instrument and one objective” discussed above, there are mixes of different policy instruments that are socio-economically optimal (Bennear & Stavins, 2007). Purchasing organic food is an example of “off-the-shelf” procurement that may be motivated as innovation policy (if a not fully internalized innovation failure first can be established). This is further discussed in the next section.

6.3 Innovation procurement – diffusion of organic technologies and products

¹⁶ PCP and IPS are described in more detail in the European Commission (2018b).

An example of innovation procurement is a decision by the Swedish Government in 2006. In this year, the government decided on an indicative target for organic purchases in the public sector to be 25 percent in order to contribute to an indicative national environmental goal of 20 percent organic farmland by 2010 (Government Communication, 2006). None of the goals was achieved within the stipulated time frame. In 2017, it was decided that the organic share of public sector food consumption would be 60 percent and the share of organic farmland should reach 30 percent by 2030 (The Swedish Government, 2017). The policy is self-regulated, and if and how it is implemented is determined by the individual authority.

To a large extent, Swedish public authorities have implemented targets for the procurement of organic foods and the policy has had an effect on the share of organic farmland (Lindström, Lundberg, & Marklund, 2019). However, this does not necessarily mean that this type of procurement is best suited for internalizing the positive externalities of innovation. For instance, a policy in the form of a targeted subsidy may be a more direct policy. In Sweden the subsidization of organic farming is used in parallel with self-regulated food procurement policies. Lindström et al. (2019) established that the increase in the share of organic farmland is also due to direct subsidies. Hence, even though innovation procurement is a complement in a mix of policy instruments, it may still be a substitute for another policy instrument. In which case, the analysis in previous sections applies.¹⁷

7. Policy implications and concluding remarks

In this paper, we have analyzed the question of how well public procurement performs as an environmental policy instrument. The answer to that question depends on the criterion the instrument is compared to: (i) Effectiveness; (ii) Efficiency; (iii) Flexibility; (iv) Equity; or (v) Political process transparency.

¹⁷ Rainville (2017) does not compare innovation procurement with economic innovation policy instruments and, as far as we can see, tends to discuss innovation procurement from a “the more the better” perspective.

In contrast to the political argumentation in favor of GPP, previous research proves it is not an objective-effective environmental policy instrument. That is, its environmental impact is far from predictable. However, this does not exclude the possibility that GPP may have an impact.

GPP also fails the cost-effectiveness criterion, i.e., as a substitute to a correct designed economic environmental policy instrument, it can never contribute to an environmental quality objective at lowest cost to society. Note that the use of green criteria can still be motivated from the perspective of the authority considering its own business' life-cycle costs, LCC.

Flexibility and equity are more convincing arguments in favor of using public procurement as an instrument of environmental policy. The flexible nature of the GPP may provide advantages with respect to local and regional environmental problems. This also applies to local and regional environmental problems in other countries. The latter makes it possible to concern equity issues. For instance, by stipulating green requirements that target upstream production nodes, e.g., in developing countries. Equity arguments in favor of GPP strongly relate to sustainable public procurement and social concerns. For successful GPP, tailored to addressing equity, vertical coordination and the unannounced monitoring of the supply chain is crucial to avoiding moral hazard and adverse selection issues. The actual impact is in turn, dependent on the design of the procurement, how many and which bidders participate in the specific procurement, and the contract conditions.

Political process transparency relates to GPP being a self-regulating and, in practice, a decentralized process. The ambitions of GPP at various political decision-making levels are ultimately realized by local civil servants. This is a complex task related to the coordination issues described above but also to, e.g., the identification of the environmental problem, matching the mandatory- and evaluation criteria to the problem, and the choice of supplier selection model.

To sum up, our recommendation is that if public procurement is to be used as an environmental policy instrument, it should aim at reducing local or regional environmental problems, nationally as well as in other countries. This if cost-effective policy instruments for some reason have not already been implemented to handle the environmental problems or, if implemented, not fully handle the problem.

Another recommendation is to consider whether public procurement can be used as an innovation policy instrument. In this case it is about establishing whether there are innovations with positive external effects that have not already been internalized through cost-effective innovation policy measures, or that the measures have not been properly designed. If a positive externality from innovation interacts with a negative externality (e.g., an environmental problem) then an innovation policy instrument can contribute to reduce environmental problems at lower costs to society.

Innovation procurement in terms of purchasing already existing products, e.g., giving priority to organic food with the ambition of contributing to organic farming, may be a motive for GPP. This relates to later stages of the innovation life cycle process, i.e., diffusion. If the procurement leads to further market diffusion of less emission-intensive products, technologies, and processes it may, as an innovation policy, complement existing environmental or climate policy that concerns agriculture's environmental and climate impacts. Again, it is about getting the arguments right regarding the potential positive effects of the legitimacy of GPP as an instrument of innovation policy.

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Appendix

Criteria for awarding the EU Ecolabel to the indoor cleaning services product group:

Mandatory criteria

Criterion M1: Use of cleaning products with low environmental impact

Criterion M2: Cleaning product dosing

Criterion M3: Use of microfibre products

Criterion M4: Staff training

Criterion M5: Basics of an environmental management system

Criterion M6: Solid waste sorting at the applicant's premises

Criterion M7: Information appearing on the EU Ecolabel

Optional criteria

Criterion O1: High use of cleaning products with low environmental impact (up to 3 points)

Criterion O2: Use of concentrated undiluted cleaning products (up to 3 points)

Criterion O3: High use of microfibre products (up to 3 points)

Criterion O4: Use of cleaning accessories with low environmental impact (up to 4 points)

Criterion O5: Energy efficiency for vacuum cleaners (3 points)

Criterion O6: EMAS registration or ISO 14001 certification of the service provider (up to 5 points)

Criterion O7: Solid waste management at the cleaning sites (2 points)

Criterion O8: Quality of the service (up to 3 points)

Criterion O9: Vehicle fleet owned or leased by the applicant (up to 5 points)

Criterion O10: Efficiency of laundry washing machines owned or leased by the applicant (up to 4 points)

Criterion O11: Ecolabelled services and other ecolabelled products (up to 5 points)

Criterion O12: Consumable goods and electric hand air-dryers supplied to the client (up to 3 points)

Source: EU 2018/680