



MISSION

The mission of this online journal is contributing to the interdisciplinary study of public procurement and of public markets presenting high level scientific results in key areas such as:

- A. Economics of public markets;
- B. Digital e-public procurement;
- C. European Legal Framework;
- D. Multicriteria evaluation of tenders and life-cycle costing;
- E. Public management of public contracts;
- F. Innovative and sustainable public procurement;
- G. Performance assessment and evaluation of contract execution;
- H. Risk assessment and mitigation;
- I. Transparency, competition and anti-corruption policies;
- J. Competition, transparency and corruption prevention;
- K. Performance Indicators, evaluation of contracts execution and performance based contracting;
- L. Award criteria, Most Economically Advantageous Tender (MEAT), Quality/ Price ratio and Life Cycle Costing;
- M. Centralization and economies of scale in public contracting;
- N. Openness of public markets and the participation of Micro and SMEs;
- O. Risk assessment and mitigation of the risk of deficient contract execution;
- P. Contributions of new procedures and regulations for innovation, sustainability and social cohesion;
- Q. Comparative study of legal frameworks and Public Markets at the international, national and local levels;
- R. Education and training for the improvement of public markets.

SUBMISSION AND SUBSCRIPTION

See www.eupublicmarkets.com

Contacts and information: eupublicmarkets@gmail.com

CONTENTS (4th Issue – December 2022)

Research and Policy Papers:

- *Towards mandatory SPP for buildings/works* by Roberto Caranta;
- *A multicriteria model to evaluate tenders for green procurement of public works* by Luís Valadares Tavares, José Antunes Ferreira and Alexandre Ricardo;
- *The interplay between EU public procurement and human rights in global supply chains: Lessons from the Italian legal context* by Giulia Botta;
- *Promoting sustainable public procurement through economic policy tools: From moral suasion to nudging* by Désirée Klingler and Steven Schooner;
- *Sustainability public procurement using new procedures of the 2014 Directives* by François Lichère.

Case Studies

- *The criteria for establishing and maintaining an optimal governance model for public procurement* by Nikola Komšić;
- *Proposal for optimal governance model of central procurement in Slovakia* by Jozef Kubinec;
- *Environmental and economic benefits of green public procurement through the Bilan Carbone and Life Cycle Costing methodologies: a case study for Arpa Piemonte* by Arianna Sica.

EDITORIAL BOARD

Chief Editors:

Luís Valadares Tavares (University Lusíada – Portugal);

Roberto Caranta (University of Turin – Italy);

The editorial board includes 34 colleagues from several countries and is listed on www.eupublicmarkets.com.



Title:

European Journal of Public Procurement Markets – 4th Issue (December 2022)

Publisher:

APMEP – Portuguese Society of Public Markets

Chief-Editors:

Luís Valadares Tavares and Roberto Caranta

Editorial Board:

Afonso d'Oliveira Martins; Alessandro Ancarani; Andrea Appolloni; Annalisa Castelli; Bernardo Nicoletti; Christopher Bovis; Fernando Silva; François Lichère; Frank Brunetta; Giancarlo De Stefano; Gonçalo Matias; Jaime Pintos Santiago; Jakob Edler; Jan Jackholt; José Antunes Ferreira; José Ramón Arboledas; Keith White-Hunt; Manuel Ricou; Mário Aroso de Almeida; Marta Andhov; Matthias Einmahl; Miguel Assis Raimundo; Nicola Dimitri; Nuno Cunha Rodrigues; Paolo Buccirossi; Pedro Costa Gonçalves; Pedro Telles; Rajesh Shakya; Rui Dias Ferreira; Rui Medeiros; Rui Machete; Sara Castelo Ruano; Stéphane Saussier; Toshihiko Ishihara; Tünde Tátrai; Willem Janssen.

ISSN:

2184-3813

Date:

12.2022

Copyright © 2022

CONTENTS

On the 4 th Issue of the European Journal of Public Procurement Markets	6
I - RESEARCH PAPERS	8
Towards mandatory SPP for buildings/works.....	9
A multicriteria model to evaluate tenders for green procurement of public works.....	23
The interplay between EU public procurement and human rights in global supply chains: Lessons from the Italian legal context	52
Promoting sustainable public procurement through economic policy tools: From moral suasion to nudging	69
Sustainability public procurement using new procedures of the 2014 Directives.....	82
II – CASE-STUDIES	88
The criteria for establishing and maintaining an optimal governance model for public procurement	89
Proposal for optimal governance model of central procurement in Slovakia	108
Environmental and economic benefits of green public procurement through the Bilan Carbone and Life Cycle Costing methodologies: a case study for Arpa Piemonte	120
About the authors	134

On the 4th Issue of the European Journal of Public Procurement Markets

The 3rd issue of the European Journal of Public Procurement Markets was dedicated to a very specific if global challenge the World was facing at the time and to the procurement awards launched to fight the pandemics. The 4th issue is focusing on wider challenges our societies have to overcome and the role public procurements may play in the fight against climate change and more generally to foster sustainable development, including thanks to innovation.

The contributions collected in this issue have for the most part been presented at the 5th European Conference on Sustainable and Innovative Public Procurement organized by APMEP on 5-6 May 2022 in Lisbon. The contributions hail from various disciplinary backgrounds, from economic and management sciences to social sciences, including law.

According to some data that should be revised upwards, every year, over 250,000 public authorities in the EU spend around 14% of GDP on purchasing services, works and supplies. Therefore, public procurement has a key role in delivering sustainable development and innovation is a key component to this end. Sustainable Public Procurement (SPP) should become the new normal in public purchasing policies and decisions. Innovation can deliver the new technologies needed to foster Circular Economy (CE).

The 2019 European Green Deal refers to public procurement as one of the tools of choice to achieve its objectives. The Circular Economy Action Plan indicated that public authorities' purchasing power is a powerful driver of the demand for sustainable products.

Roberto Caranta focuses on the role SPP is to play with reference to buildings and more generally to works procurements, specifically in light of the reform proposals following the European Green Deal and the Circular Economy Action Plan.

Luís Valadares Tavares, José Antunes Ferreira and Alexandre Ricardo present a new multicriteria model to evaluate tenders to award design or design and build contracts for public works pursuing sustainability objectives.

Giulia Botta investigates the interplay between EU Public Procurement and Human Rights in global supply chains both generally and with specific reference to the recent Italian experience on mandatory sustainable criteria in public procurement.

Steven Schooner and Désirée Klinger advocate driving SPP through economics-inspired soft tools, including nudging, moral suasion and persuasion. More in general, they highlight the need to think in terms of the actual cost, including externalities, rather than just in terms of price.

The last article by François Lichère sheds light on how the new and innovative award procedures introduced or retrofitted on the occasion of the 2014 public procurement and concession reform, such as the innovation partnership, the competitive procedure with negotiations and the competitive dialogue.

Three in-depth case studies are also included in this issue. They highlight the challenges contracting authorities face in managing SPP and the strategies they can develop to face those challenges successfully. Nikola Komšić from Serbia discusses the criteria for an optimal model for public procurement. Tying with the topic of the 3rd issue, such a model has to be able to face emergency situations but also foster sustainable growth. Jozef Kubinec presents a second case

study from Slovakia, focusing on the potential contributions of adopting central purchasing bodies. Arianna Sica presents a third case study focused on the technicalities of SPP and investigates a case in which the environmental agency in Piedmont renovated its building having recourse to the Bilan Carbone and the Life Cycle Costing.

The different contributions collected in this issue show, from a multidisciplinary point of view, how SPP has taken centre stage in the sciences of public procurement as public purchasing activities have been enlisted to contribute to facing the enormous challenges our societies are facing.

The 6th European Conference on Sustainable and Innovative Public Procurement will focus on Construction Contracting and will be held in Torino, Italy, on the 6th of June 2023, being organized by the University of Torino and the Polytechnic of Torino. The pre-program will be announced in January, and registrations will be available.

Luís Valadares Tavares & Roberto Caranta

Chief Editors of this Special Issue

I - RESEARCH PAPERS

Towards mandatory SPP for buildings/works

Roberto Caranta

Abstract

The European Green Deal and the Circular Economy Action Plan are bringing about a tectonic shift in public procurement from the traditional market opening approach focused on ‘how to buy’ towards a framework for ‘what’ is bought. Buildings account for 40% of the EU’s energy consumption and 36% of energy-related direct and indirect greenhouse gas emissions. In the EU, heating, cooling and domestic hot water account for 80% of households’ energy. Logically, buildings are at the core of EU policy and legislation proposals aiming at fighting climate change. This article focuses on the role SPP is to play with reference to buildings and more generally to works procurements and this specifically in the light of the reform proposals following from the European Green Deal and the Circular Economy Action Plan. It highlights both the progress proposed and the limitations that may yet be corrected during the legislative process.

Keywords

Building, Energy efficiency, Green deal, Procurement.

1. Introduction

Our societies are faced with enormous challenges, starting from - but far from stopping at - climate change. Public procurement - and more specifically sustainable public procurement - SPP - has a role to play in addressing those challenges.

The 2030 Agenda for Sustainable Development Agenda lists 17 Sustainable Development Goals (SDGs). Harnessing Sustainable Public Procurement (SPP) to achieve the SDGs can significantly impact achieving these goals (Caranta, forthcoming). So much so that Target 12.7 of the SDGs expressly refers to the need to “Promote public procurement practices that are sustainable, in accordance with national policies and priorities”. SPP is potentially also relevant to the achievement of many, if not most, of the SDGs (<https://sapiensnetwork.eu/>).

In the EU, the 2019 Green Deal refers to public procurement as one of the tools of choice to achieve its objectives. The Circular Economy Action Plan indicated that public authorities’ purchasing power represents 14% of EU GDP and can serve as a powerful driver of the demand for sustainable products. To tap into this potential, the Commission will propose minimum mandatory green public procurement (GPP) criteria and targets in sectoral legislation and phase in compulsory reporting to monitor the uptake of Green Public Procurement (GPP)¹. Public procurement is a major opportunity for EU public authorities to initiate sustainable change in many markets by becoming trendsetters that pursue sustainable outcomes.

Buildings account for 40% of the EU’s energy consumption and 36% of energy-related direct and indirect greenhouse gas emissions (COM(2020) 662 final). In the EU, heating, cooling and

¹ https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf, paragraph 2.2.

domestic hot water account for 80% of households' energy. Logically, buildings are at the core of EU policy and legislation proposals aiming at fighting climate change.

This article focuses on the role SPP is to play with reference to buildings and more generally to works procurements and this specifically in the light of the reform proposals following from the European Green Deal and the Circular Economy Action Plan. The current legal framework will be briefly examined, considering both general EU public procurement and concessions law (§ 2) and building and works specific rules (§ 3). The proposals tabled by the European Commission will be analysed next (§ 4). Short conclusions will assess how these proposals might be strengthened (§ 5).

A preliminary terminological caveat is that until now the terminology - and the coverage - of public procurement rules is different from that of the rules pertaining to buildings. Under Article 2(1)(7) of Directive 2014/24/EU, the classic or general procurement directive, “a work’ means the outcome of building or civil engineering works taken as a whole which is sufficient in itself to fulfil an economic or technical function”. ‘Buildings’ is narrower than ‘works’. Under Article 2(1) of Directive 2010/31/EU, the Energy Performance of Buildings Directive (EPBD), “building’ means a roofed construction having walls, for which energy is used to condition the indoor climate;” the latter definition excludes major infrastructures, which are instead covered under ‘works’. However, the EPBD covers both public and privately owned ‘buildings’, while Directive 2014/24/EU is focused on ‘public works’. More of an interest from a public procurement point of view, the provision in the EPBD specifically applicable to the public sector (Article 9) refers to “buildings occupied and owned by public authorities”. While the use of ‘and’ would suggest that the two conditions are cumulative, Recital 21 focuses on ‘occupation’. This is at variance with the approach in the procurement directive, whose Article 10(a) excludes from the scope of application of the EU rules “the acquisition or rental, by whatever financial means, of land, existing buildings or other immovable property or concerning rights thereon”. This variance is not surprising as the EPBD focuses on both new - meaning having required works - and old buildings. Still, as it will be shown, the reform proposals tabled by the Commission seek to bridge some of the (terminological) gaps between the different bodies of EU rules.

2. The 2014 legal framework

The 2014 reform of EU public procurement and concessions law was prepared by a Commission Green paper on “The modernisation of EU public procurement policy – Towards a more efficient European Procurement Market” (COM (2011), 15 final). The Green paper begins with reference to the Europe 2020 strategy for smart, sustainable, and inclusive growth (COM (2010), 2020). Public procurement is said to play a key role in this notably by supporting the shift towards a resource-efficient and low-carbon economy, for instance, “by encouraging wider use of green public procurement”. While the actual reform proposals were not too innovative, the case law, and specifically the judgement in the *Dutch Coffee* case (Case C-368/10 *Commission v Netherlands* [2012] ECLI:EU:C:2012:284), pushed the EU legislator to firmly root SPP in the 2014 Directives. The 2014 Directives may be seen as empowering contracting authorities to engage in SPP, more specifically in GPP, and to a certain extent lowering the regulatory risks attached to this approach under the 2004 directives. As it has been remarked, the “sustainability paradigm is almost taking over the realm of public procurement, and it is marketed as a major ‘selling point’ of the new legislation” (Dragos & Neamtu, 2014, pp. 304).

The EU public procurement and concessions directives focus on procedures rather than substance. ‘How to buy’ is what they are about, they are not about ‘what to buy’. The latter choice is left to contracting authorities’ discretion, generally guided by the Member States (Trepte, 2012, pp. 85). The leading principles of non-discrimination and equal treatment, as well as the need to ensure open competition, may constrain that choice, e.g., under Article 18(1) of Directive 2014/24/EU (Hamer, 2021). However, Article 18(2) Directive 2014/24/EU has also introduced a ‘principle’ of sustainability (Andhov, 2021). In the *TIM* case, the CJEU has highlighted that this principle constitutes a cardinal value of Directive 2014/24/EU (Case C-395/18, *Tim*, ECLI:EU:C:2020:58).

Still, the 2014 EU public procurement and concessions directives revision clarified that SPP is permissible but steered clear from introducing mandatory rules (Andhov & Mitkidis, 2017). It was thought better to leave sector-specific legislation to set mandatory criteria and targets (COM, (2011) 15 final, p. 41 ff) (Trepte, 2012).

Moreover, the Commission has issued guidance to help the contracting authorities willing to engage in SPP through the *Buying Green* and the *Buying Social* Guides. The Commission has also developed GPP criteria that cover a range of specific procurements. These criteria are divided into so-called ‘core criteria’, which are deemed to be for easy application and ‘comprehensive criteria’ that are designed to reach a higher environmental performance along the different phases of the procurement process.

3. Specific rules for buildings and works

Already today the building sector is the object of a number of sectoral EU legislative measures that in some cases regulate procurement or at least are relevant for it. More seldomly, even SPP is specifically regulated. Some of these measures focus on the building environment, such as the Energy Performance of Buildings Directive (EPBD) or on materials used to build, such as the Construction Product Regulation (CPR). Other measures concern energy instead, as is the case with both the Energy Efficiency Directive (EED) and the Renewable Energy Directive (RED).

Directive 2010/31/EU (EPBD), as recast by Directive 2018/844/EU, is currently laying down measures to enhance energy savings in buildings and to reduce the large differences between Member States’ achievements in this sector. Those measures should take into account climatic and local conditions as well as indoor climate environment and cost-effectiveness (Recitals 7 and 8).

The EPBD foresees the adoption of national plans, which “should set more ambitious targets for the buildings occupied by public authorities” (Recital 21). Those same authorities should become ‘early adopters’ of energy efficiency improvements (Recital 23). To set an example showing that environmental and energy considerations are being taken into account, those same buildings should be regularly subject to energy certification (Recital 24). The plans should ensure that all new buildings are ‘nearly zero-energy’ buildings by 2020.

Regulation (EU) No 305/2011 - the CPR - lays down harmonised conditions for the marketing of construction products. As it is now, the CPR does not set product requirements, and the Member States are competent in relation to safety, environmental and energy requirements applicable to buildings and civil engineering works.

Concerning energy, Directive 2012/27/EU on energy efficiency, the first EED, was enacted to introduce a set of binding measures to help the EU reach energy efficiency targets aiming at mitigating climate change. It has been modified several times, including by Directives 2018/2002/EU and 2018/844/EU, which further modified the EED to reflect more ambitious targets.

Public authorities are given a specific role under the EED, including with reference to public procurement. The first phrase in Recital 39 indicates that “[l]ocal and regional authorities should be given a leading role in the development and design, execution and assessment of the measures laid down in Directive 2012/27/EU”. This leading role is reflected in Articles 5 and 6, the latter focusing specifically on public procurement (referred to as purchasing). More specifically, Article 5 (*Exemplary role of public bodies’ buildings*) provides for the exemplary role of public bodies’ buildings, indicating that each Member State shall ensure that “3 % of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year to meet at least the minimum energy performance requirements” (near zero energy buildings). Under Article 6 (*Purchasing by public bodies*), subject to some proviso, the Member States shall ensure that central governments purchase “only products, services and buildings with high energy-efficiency performance”. Moreover, the Member States shall encourage public bodies, including at regional and local levels, “to follow the exemplary role of their central governments to purchase only products, services and buildings with high energy-efficiency performance”.

Finally, Directive 2009/28/EC (RED) as recast by Directive 2018/2001 sets a common target – currently at 32% – for the amount of renewable energy in the EU’s energy consumption by 2030. It establishes common principles and rules to remove barriers, stimulate investments and drive cost reductions in renewable energy technologies. The RED does not refer to public procurement explicitly but refers back to the EPBD. Under Art. 15(5), “Member States shall ensure that new public buildings, and existing public buildings that are subject to major renovation, at the national, regional and local level, fulfil an exemplary role in the context of this Directive from 1 January 2012. Member States may, inter alia, allow that obligation to be fulfilled by complying with nearly zero-energy building provisions as required in Directive 2010/31/EU or by providing for the roofs of public or mixed private-public buildings to be used by third parties for installations that produce energy from renewable sources.”

The measures just analysed follow two different approaches to SPP. The EPBD and the RED set targets for the Member States. The EED instead relies on specific criteria or requirements to be adhered to by public bodies. This is a big difference - at least for lawyers - as only the non-adherence with the latter might be justiciable in the context of an individual award procedure under the provisions of Directives 89/665/EEC and 92/13/EC. Missing targets might be instead challenged in those Member States having developed a case law on the lines of the Dutch *Urgenda* judgment (*Urgenda Foundation v. State of the Netherlands* ECLI:NL:HR:2019:2007).

Construction specific EU GPP Criteria, including for Office Building Design, Construction and Management (currently under revision) and Road Design, Construction and Maintenance are to be categorised as (non mandatory) criteria/requirements.

The 2016 EU GPP Criteria for Office Building Design, Construction and Management address the procurement process for office buildings, including their design, site preparation, construction, servicing and ongoing management. For the purposes of the criteria, the product group “Office

buildings” shall comprise buildings where mainly administrative, bureaucratic and clerical activities are carried out. Major renovations of office buildings are also addressed within the scope of the criteria.

The revision of the GPP Criteria for Office Building Design, Construction and Management will expand the scope to other types of buildings purchased and/or maintained by public authorities, in particular schools and social housing. The criteria will also try to be in line with recent policy developments relating to the Renovation Wave, the Level(s) common framework and the EU Taxonomy. Criteria will aim to be clear and ambitious, based on a life-cycle approach and a scientific evidence base.

The EU GPP Criteria for Road Design, Construction and Maintenance - also from 2016 - contain recommendations that apply to both the construction of new roads and maintenance and rehabilitation of existing ones. The criteria address the main hot-spots along the whole life cycle of a road, from materials production (including raw materials extraction and transportation), to construction, use (fuel consumption during the road service life due to the pavement-vehicle interaction), maintenance (and operation) and end of life. The most significant environmental impacts are related to greenhouse gas emissions from fuel consumption during the use of the road and resource use to manufacture construction materials. Other environmental areas of interest, such as water, habitat preservation and noise emissions reductions are also addressed.

4. The commission’s proposals

The Commission’s *Reflection Paper Towards a Sustainable Europe by 2030* highlighted the need to “make the circular economy the backbone of EU industrial strategy, enabling circularity in new areas and sectors, empowering consumers to make informed choices and enhancing efforts by the public sector through sustainable public procurement”. The EU Green Deal indicated that “[p]ublic authorities, including the EU institutions, should lead by example and ensure that their procurement is green” (COM(2019) 640 final, pp. 8). The Commission committed to proposing further legislation and guidance on green public purchasing (Janssen & Andhov, 2020; Pouikli, 2020). As already recalled, (above § 1), the Circular Economy Action Plan indicates the Commission’s intention to ‘propose minimum mandatory green public procurement (GPP) criteria and targets in sectoral legislation’². Furthermore, the EU Green Deal Investment Plan stated: “The Commission will propose minimum mandatory green criteria or targets for public procurements in sectoral initiatives, EU funding or product-specific legislation. Such minimum criteria will ‘de facto’ set a common definition of what a ‘green purchase’ is, allowing the collection of comparable data from public buyers and setting the basis for assessing the impact of green public procurements. Public authorities across Europe will be encouraged to integrate green criteria and use labels in their procurements” (COM(2020), 21 final, pp. 12). As the Circular Economy Action Plan avows, the shift towards mandatory criteria is born out of the realisation that instruments such as the EU GPP criteria “have reduced impact due to the limitations of voluntary approaches”³.

The first implementing act for the European Green Deal was the EU Climate Act (Regulation (EU) 2021/1119) which wrote into the law the goal for Europe’s economy and society to become climate-

² https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf, paragraph 2.2.

³ https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf, paragraph 2.1.

neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The ‘Fit for 55’ Commission’s Communication is the cornerstone of the initiatives specifically targeting climate change (COM(2021), 550 final). It is a very complex package of proposals for both new and amended legislation. The EPBD, the CPR, the EED and the RED are among the legislative measures whose amendment is foreseen to contribute in reaching the ambitious EU climate targets. Those proposals have been drafted based on a balanced policy mix. According to the analyses, “an over-reliance on strengthened regulatory policies would lead to unnecessarily high economic burdens, while carbon pricing alone would not overcome persistent market failures and non-market barriers. The chosen policy mix is, therefore, a careful balance between pricing, targets, standards and support measures” (COM/2021/550).

In parallel, in the European Green Deal the Commission indicated that “[t]o address the twin challenge of energy efficiency and affordability, the EU and the Member States should engage in a ‘Renovation Wave’ of public and private buildings” (COM(2019), 640 final, pp. 9). The strategy for the Renovation Wave was laid down in a 2020 Communication (COM(2020), 662 final). Administrative, educational and healthcare facilities, as well as social housing, are at the core of the Renovation Wave, which translates directly into potential relevance for SPP. Since Building Information Modelling (BIM) improves transparency and reduces costs and resource use, the Commission is to “provide a recommendation to promote Building Information Modelling in public procurement for construction and provide a methodology to public clients to conduct cost-benefit analysis for the use of BIM in public tenders” (pp. 16).

Another relevant reform strand is linked to the Sustainable Product Initiative (SPI) (COM(2022), 140 final), which is part of the Circular Economy Action Plan. The SPI aims to make products placed on the EU market more sustainable to help in reaching the Green Deal objectives of lower resource consumption and less environmental impact. The main legislative proposals regarding sustainable products are the reforms of the current Ecodesign Directive 2009/125/EC and the consumer empowering directives (Directives 2005/29/EC and 2011/83/EU). Public procurement is given a prominent place in the SPI, with the aim of leveraging public budgets to increase market demand for sustainable products. The 2022 Communication of the Commission on making sustainable products the norm indicates that the Ecodesign Regulation “[...] aims to leverage the weight of public spending to boost demand for more environmentally sustainable products by setting mandatory criteria for the public procurement of these products, drawing where appropriate on existing voluntary criteria. This means that contracting authorities would be required to use green procurement criteria to purchase specific groups of products” (COM(2022), 140 final, pp. 6).

The SPI is relevant here since the reform of the CPR is to be read as part of the overall SPI architecture. Indeed, the Circular Economy Action Plan already foresaw the revision of the CPR, including the possible introduction of recycled content requirements for certain construction products, taking into account their safety and functionality, and the use of Level(s) to integrate life cycle assessment in public procurement, also exploring the appropriateness of setting of carbon reduction targets and the potential of carbon storage (COM(2020), 98 final, pp. 12; see also COM(2020), 662 final).

Sustainability in the built environment is therefore part of a multi-pronged and very complex reform push articulated in numerous policy documents. The focus here is on the Commission's reform proposals for the EPBD, the CPR, the EED and the RED.

4.1 The reform of the EPBD

The revised EPBD will be tasked to promote “the improvement of the energy performance of buildings and the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050 taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness” (Article 1).

While in principle, all provisions in the proposed revised EPBD apply to buildings occupied or owned by public authorities (e.g. Article 11(3) on measuring and control devices for the monitoring and regulation of indoor air quality or Art. 12 on infrastructures for sustainable mobility), specific provisions apply to ‘public bodies’, i.e. “contracting authorities’ as defined in Article 2(1) of Directive 2014/24/EU”. The reformed EPBD is thus aligning its terminology with public procurement jargon.

Basically, buildings occupied or - ‘and’, previously in the text, is now gone - owned by public bodies must reach the objectives laid down in the EPBD before the rest of the building stock. More specifically, under Article 7(1), new buildings occupied or owned by public bodies must be ‘zero-emission’ as of 1 January 2027, while for other buildings the date is 1 January 2030. Concerning existing buildings under Article 9(1), the Member States shall ensure that (a) buildings and building units owned by public bodies achieve at the latest (i) after 1 January 2027, at least energy performance class F; and (ii) after 1 January 2030, at least energy performance class E. The target dates just mentioned - and those for non-residential buildings and building units - anticipate those for ‘residential buildings and building units’ by three years.

Under different provisions, public authorities are required to double down on specific efforts or to show their commitment to high-energy performance. Under the last sentence of the proposed Article 12(2) EPBD, “In case of buildings owned or occupied by public authorities, Member States shall ensure pre-cabling for at least one in two parking spaces by 1 January 2033”. Under Article 18(1) EPBD, in the case of buildings occupied by public authorities and frequently visited by the public, “the energy performance certificate is displayed in a prominent place clearly visible to the public”.

4.2. The reform of the CPR

From the point of view of SPP, the most relevant proposal is the one concerning the Regulation laying down harmonised conditions for the marketing of construction products, amending Regulation (EU) 2019/1020 and repealing Regulation (EU) 305/2011 – CPR (COM(2022), 144 final). The CPR revision answers the two general objectives to achieve a well-functioning single market for construction products and to contribute to the objectives of the green and digital transition, particularly the modern, resource-efficient and competitive economy. Indeed, “[t]he EU Green Deal Communication, the Circular Economy Action Plan and the Renovation Wave Communication highlighted the role of the CPR as part of efforts towards energy- and resource-efficient buildings and renovations and in addressing the sustainability of construction products” (pp. 1).

Concerning specifically the linkage with the Circular Economy Action Plan and the SPI, the CPR must be seen as a dedicated instrument or product specific legislation (COM(2022), 142 final). As such, it has the same level of stringency as the Ecodesign for Sustainable Products Regulation (ESPR) (pp. 4). At the same time, specific construction products are still to be regulated by the ESPR, such as energy-related construction products (COM(2022), 144 final, pp. 4). The proposal, therefore, establishes new environmental obligations and lays the ground for “the development and the application of an assessment method for the calculation of the environmental sustainability of construction products” (Recital 7).

Product standards are normally established by European Standardisation Organisations. In case the standards are in line with EU rules, they may be cited in the O.J.E.U. and thus become binding. Development of standards is however too often very slow, and it happens that standards are in conflict with EU rules and cannot, therefore, be cited. In line with Regulation (EU) No 1025/2012 on European standardisation, the proposal for the CPR has developed a fall-back solution empowering the Commission to develop the standards itself (Recital 18). This is notably the case under the proposed Article 4(3) CPR when there are undue delays in the adoption of certain standards, or there is urgency, or the standards developed are insufficient or “not in line with EU climate and environmental legislation and ambition”.

The proposed CPR has a specific focus on public procurement. Article 7, defining the ‘harmonised zone and national measures’ limits the power of the Member States to add ‘additional requirements’ when standards have been cited in the O.J.E.U.; this rule also applies to “public tenders or direct attributions of contracts where those public tenders or direct attributions are executed under direct or indirect control of public entities or are executed with reference to public provisions on public tenders or direct attribution of contracts” (Article 7(2)).

This strict stance is not consistent with the relevant role given to SPP under Recital 90, according to which “Member States’ public procurement practice should target the most sustainable amongst the compliant products”. True, the last phrase in Article 7(2) provides that “However, harmonised technical specifications may permit or recommend Member States to link the decisions on the attribution of public tenders, of contracts or of grants or other positive incentives to sub-classes or additional classes other than those established in accordance with Article 4(4) where these still relate to environmental performances assessed in accordance with these harmonised technical specifications”.

The default approach chosen is that, once a reference to ‘harmonised technical specifications’ has been published into the O.J.E.U. there is only what - if any - space for SPP that is left by the harmonised technical specifications themselves. The ‘harmonised zone’ is generally understood as a fully (instead of minimally) harmonised zone. However, the second phrase in Article 19(6), which is grounded on the possibility for the harmonised technical specifications to specify that their requirements only constitute ‘minimum requirement’. Reading US categories, Article 7(2) treats buying decisions as if they were regulatory decisions which are instead regulated under Article 7(3) and (4) (Arrowsmith & Kunzlik, 2009, pp. 21). A very limited departure from strict internal market orthodoxy is only allowed under Article 7(7) for mandatory deposit-refund systems.

This strict approach is confirmed by the proposed Article 84 (GPP), which is actually ‘centralising’ SPP in the construction sector. Recital 91 indicates that “contracting authorities and entities should, where appropriate, be required to align their procurement with specific green public

procurement criteria or targets, to be set out in the delegated acts adopted” by the Commission (Recital 91). This is because, “Compared to a voluntary approach, mandatory criteria or targets will ensure that the leverage of public spending to boost demand for better performing products is maximised”.

On these bases, under Article 84(1) the Commission may adopt delegated acts “establishing sustainability requirements applicable to public contracts, including implementation, monitoring and reporting of those requirements by Member States”. If Article 84 is read together with Article 7(2), once the Commission has established ‘sustainability requirements’, neither Member States nor an individual contracting authority may ‘set additional requirements’.

Under the proposed Article 84(3), in setting the sustainability requirements, the Commission shall take into account (a) the value and volume of public contracts awarded for that given product family or category or for the services or works using the given product family or category; (b) the need to ensure sufficient demand for more environmentally sustainable products and (c) the economic feasibility for contracting authorities or contracting entities to buy more environmentally sustainable products, without entailing disproportionate costs.

Under the proposed Article 84(2), the sustainability requirements may - but do not need to - “take the form of mandatory technical specifications, selection criteria, award criteria, contract performance clauses, or targets, as appropriate”.

4.3. The reform of the EED

The recast of the EED aims at contributing to the enhanced ambitions announced in the EU Green Deal and further spelt out in the Commission’s Climate Target Plan (CTP) (COM/2020/562 final). The latter aligns with the Paris Agreement's objective to keep the global temperature increase below 2°C and pursue efforts to keep it to 1,5°C (COM(2021), 558 final, pp. 1). Buildings, including heating and cooling, still represent a major potential for energy savings, which is also true of public buildings (at p. 3). There is a strong relationship between the EED and the EPBD. Indeed, the EED “sets a framework for other energy efficiency policies by laying down the energy efficiency targets and setting the main cross-sectoral measures as well as more specific ones. It targets energy savings in the public sector, including via obligations to renovate public buildings annually and taking into account energy efficiency in procurement of goods, services, works and buildings. Its particular aim at public buildings is complementary to the EPBD, which sets the standards and specific technical obligations related to buildings” (pp. 5). Also, the EED has important interlinkages with the RED, notably in relation to heating and cooling (pp. 7).

Contrary to the EPBD and CPR, Article 1(2) of the EED proposal states: “The requirements laid down in this Directive are minimum requirements and shall not prevent any Member State from maintaining or introducing more stringent measures. Such measures shall be compatible with Union law. Where national legislation provides for more stringent measures, the Member State shall notify such legislation to the Commission”. As it will be explained in the conclusions, this minimum harmonisation approach is generally to be preferred when legislating SPP.

The proposal for the recast of the EED strongly reinforces the exemplary role of the public sector. The evaluation of the old EED had shown reluctance in the public sectors to systematically include energy efficiency requirements in procurement, and this is because of price considerations and

several limitations that prevent reaping energy savings potential in the public sector. In particular, allowing the Member States to assess if the measures were cost-effective and/or economically and/or technically feasible provided them with easy escape routes (pp. 15). Article 5 of the EED proposal introduces an obligation for the public sector to reduce its energy consumption, while Article 6 broadens the scope of the renovation obligation, making it applicable not just at the State level as it is under the rules now in force, but to all public bodies at all administration levels and in all sectors of public bodies' activities, including healthcare, education and public housing, where the buildings are owned by public bodies. The EED proposal aligns the definition of the public bodies to the well-articulated notions defined under Directive 2014/24/EU (Recital 28), thus benefiting from the clarifications flowing from the long-standing case law of the CJEU. The renovation rate remains at least 3%. The proposal aims at renovations meeting the Near Zero Energy Buildings (NZEB) standard in line with the Renovation Wave Strategy and the more recent recast of the EPBD proposal (COM(2021), 802 final).

Concerning SPP, Article 7 EED now refers explicitly to 'public procurement' rather than 'purchasing by public bodies' as it is in the Directive now in force. Aligning the terminology is expected to ensure coherence across different legislative measures all relevant for contracting authorities. The proposed Article 7(1) too extends the obligation to take into account the energy efficiency requirements to all public administration levels by referring to "contracting authorities and contracting entities", the latter relevant in the utilities sectors whose procurement are regulated under Directive 2014/25/EU. The proposed Article 7(1) also does away with conditionalities, removing references to cost-effectiveness, technical and economic feasibility and providing that the Member States shall ensure that contracting authorities and contracting entities, when concluding public contracts and concessions with a value equal to or greater than the EU thresholds, (a) "purchase only products, services, buildings and works with high energy-efficiency performance in accordance with the requirements referred to in Annex IV to this Directive" and (b) "apply the energy efficiency first principle referred to in Article 3 of this Directive, including for those public contracts and concessions for which no specific requirements are provided in Annex IV".

The proposed Article 7(3) refers to the contract design phase and creates an obligation on the Member States to "ensure that contracting authorities and contracting entities assess the feasibility of concluding long-term energy performance contracts that provide long-term energy savings when procuring service contracts with significant energy content". The first phrase in the proposed Article 7(5) refers directly to the EU GPP criteria. It provides that "Member States may require that contracting authorities and contracting entities take into account, where appropriate, wider sustainability, social, environmental and circular economy aspects in procurement practices with a view to achieving the Union's decarbonisation and zero pollution objectives. Where appropriate, and in accordance with the requirements laid down in Annex IV, Member States shall require contracting authorities and contracting entities to take into account Union green public procurement criteria". The proposed Article 7(5) also includes a provision that contracting authorities may require that tenders disclose a Global Warming Potential of new buildings (numeric indicator in kgCO₂e/m² (of useful internal floor area) for each life cycle stage averaged for one year of a reference study period of 50 years), in particular for new buildings above 2000

square meters. It is linked to a provision aimed at increasing awareness of the circular economy and the whole life-cycle of carbon emissions in public procurement practices.

Finally, under the proposed Article 7(5), Member States will be required to support public bodies by providing guidelines and methodologies on the assessment of life-cycle costs, and by putting in place competence support centres and encouraging using aggregated procurement and digital procurement. Member States would be required to publish information on winning tenders (in line with the thresholds set out in the EU Public Procurement Directives).

4.4. The reform of the RED

The revision of the RED aims at increasing the share of energy from renewable resources to at least 40% by 2030 (Article 3(1)) and to at least 49% in the building sector (Article 15a(1)).

The proposed revision of the RED has limited direct specific references to public procurement. The first phrase in the proposed Article 15a(3) indicates that the “Member States shall ensure that public buildings at national, regional and local level, fulfil an exemplary role as regards the share of renewable energy used, in accordance with the provisions of Article 9 of Directive 2010/31/EU and Article 5 of Directive 2012/27/EU”. Reference is now to the old EPBD and EED and will have to be updated.

5. Conclusions: Of proposals needing to be coordinated and possibly strengthened

The European Green Deal and the Circular Economy Action Plan are bringing about a tectonic shift in public procurement from the traditional market opening approach focused on ‘how to buy’ towards a framework for ‘what’ is bought (Janssen & Caranta, forthcoming). This sharp acceleration towards mandatory SPP heeds the call for an EU-wide increase in the uptake of SPP avoiding fragmentation of the internal market (Andhov et al., 2020). Moreover, as was convincingly argued by Mélon, “mandatory GPP promotes the availability of information on the market, further standardisation, and more legally certain and efficient procurement processes for the authorities. Furthermore, a mandatory GPP approach is likely to increase market demand and innovation and lower the costs of environmentally-friendly products and services” (Mélon, 2020).

Against this background, the reform proposals for the EPBD and the RED are mainly setting sustainability targets for the Member States to achieve. By cross-referring to the EED, the RED however also refers to the more general ‘exemplary role’ to be played by the public sector as a whole, including therefore contracting authorities. Here the problem will be to monitor if targets are met and to require the application of remedial actions if they are not. Monitoring whether an ‘exemplary role’ is indeed fulfilled will be even more difficult.

The CPR and the EED instead foresee a role for mandatory SPP criteria, to be required when not designed by the Commission. The approach in the two cases is however very different. The proposed CPR adheres to a very traditional internal market approach of total harmonisation, leaving no space for Member States and/or contracting authorities to pursue more sustainably minded contract solutions. On the contrary, Article 1(2) of the EED proposal clearly states that the requirements foreseen thereunder are ‘minimum requirements’.

There is no reason why we should have conflicting approaches and, more to the point, the total harmonisation approach will put a brake on more sustainably minded Member States and

contracting authority. As already recalled, under the proposed Article 84(3) of the CPR, in setting sustainability requirements, the Commission shall take into account *inter alia* of the (c) the economic feasibility for contracting authorities or contracting entities to buy more environmentally sustainable products, without entailing disproportionate costs. This potentially contradicts the change of track in the EED proposal, as Article 7(1) of the latter did away with conditionalities, removing references to cost-effectiveness, technical and economic feasibility, to ensure a strong impact on climate targets. Again it is as if in the Commission the left hand doesn't know what the right hand is doing. But clearly what is 'economic feasible' will be very different among the Member States. Having a one size fits all approach will necessarily mean for the Commission to adopt not very ambitious standards which might benefit less SPP performing Member States. In turn, adhering to a total harmonisation approach will translate into a prohibition to pursue more ambitious standards, with the risk of a reform partaking less - not more - SPP. Minimum harmonisation should instead be the preferred manner of introducing mandatory requirements, allowing the Member States and individual contracting authorities to go beyond EU SPP requirements in their procurement procedures.

Another surprising and disturbing inconsistency between the CPR and the EED proposals is that only the latter refers to the EU GPP criteria (Article 7(5)). The EU GPP criteria have evolved much in the past years, and they are a precipitate of good practice that the proposed CPR simply ignores while they should instead provide at least inspiration for the mandatory requirement enacted by the Commission under Article 84. At a more general level, it is also true that the EU GPP should evolve rapidly into full SPP criteria (Caranta, 2022).

More generally concerning SPP, rules reinforcing monitoring and enforcement in the contract implementation phase are still ill adapted to the needs of contracting authorities. Articles 72 and 73 of Directive 2014/24/EU are both muscular and difficult to be applied in practice (Gruyaert & Pissierssens, forthcoming).

In conclusion, to meet the momentous goals our societies are facing, the current reform proposals need to be streamlined based on the more ambitious ones rather than just indulging in internal market fantasies as if dismantling barriers to trade was still the only *raison d'être* for the EU. A change in paradigm is overdue in EU public procurement and concessions law (Caranta, forthcoming).

References

- Andhov, M. & Peterkova Mitkidis, K. (2017). Sustainability requirements in EU public and private procurement – a right or an obligation? *Nordic Journal of Commercial Law (NJCL)*, 56-87.
- Andhov, M., et al. (2020). Sustainability Through Public Procurement: The Way Forward – Reform Proposals. <http://dx.doi.org/10.2139/ssrn.3559393>.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3559393.
- Andhov, M. (2021). Commentary to Article 18(2). In Caranta R. & Sanchez-Graells A., (Eds.), (2021). *European Public Procurement. Commentary on Directive 2014/24/EU*. Cheltenham, Edward Elgar.
- Arrowsmith, S. & Kunzlik, P. (2009), (Eds), *Social and Environmental Policies in EC Procurement Law*. Cambridge University Press.
- Caranta, R. (2022). Towards socially responsible public procurement. In ERA Forum, 2022. <https://link.springer.com/content/pdf/10.1007/s12027-022-00718-5.pdf>.
- Caranta, R. (forthcoming). Public Procurement for the SDGs – Rethinking the Basics. In L. Mélon, (Ed.), (forthcoming). *Sustainability in Public Procurement, Corporate Law and Higher Education*. London, Routledge.
- Dragos, D.C. & Neamtu, B. (2014). Sustainable public procurement in the EU: experiences and prospects. In Lichère, F., Caranta, R. & Treumer, S., (Eds.), (2014). *Modernising Public Procurement: The New Directive*. Copenhagen, Djof.
- Gruyaert, D. & Pissierssens, V. (forthcoming). Transforming the construction sector through minimum requirements. In Janssen, W. A. & Caranta, R., (Eds.), (forthcoming 2023). *Mandatory Sustainability Requirements in EU Public Procurement Law: Reflections on a Paradigm Change*. London, Bloomsbury Hart.
- Janssen, W. A. & Caranta, R. (forthcoming). Mandatory Sustainability Requirements. In EU Public Procurement Law: Reflections on a Paradigm Change, (forthcoming 2023). London, Bloomsbury Hart.
- Janssen, W. A. & Andhov, M. (2020). #3 The EU Green Deal in light of public procurement law. In Bestek, (2020). *The Public Procurement Podcast*. www.bestekpodcast.com (6 June 2020).
- Mélon, L. (2020). More Than a Nudge? Arguments and Tools for Mandating Green Public Procurement in the EU. *Sustainability* 12, 1003.
- Pouikli, K. (2020). Towards mandatory Green Public Procurement (GPP) requirements under the EU Green Deal: reconsidering the role of public procurement as an environmental policy tool. *ERA Forum*, 21(1).
- Risvig Hamer, C. (2021). Commentary to Article 18(1). In Caranta, R. & Sanchez-Graells, A., (Eds.), (2021). *European Public Procurement. Commentary on Directive 2014/24/EU*. Cheltenham, Edward Elgar.
- Tátrai, T. and Diófási-Kovács, O. (2021). European Green Deal – the way to Circular Public Procurement. *ERA Forum*, 22(1).

Trepte, P. (2012). The Contracting Authority as Purchaser and Regulator: Should the Procurement Rules Regulate what we Buy? In Ølykke, G., Risvig, C. & Tvarnø, Ch., (Eds), (2012). *EU Public Procurement, Modernisation, Growth and Innovation. Copenhagen, Djøf.*

A multicriteria model to evaluate tenders for green procurement of public works

Luís Valadares Tavares

José Antunes Ferreira

Alexandre Ricardo

Abstract

Public procurement is quite an important activity in the European Union as it corresponds to more than 13% of the GNP in the EU (2017), and public works account for more than €500 000 M, which is about 25% of the total public procured value. The construction sector is responsible for about 38% of energy-related carbon emissions and 50% of resource consumption. Therefore, procurement of public works (PPW) should be considered a strategic instrument to pursue sustainable policies, but, quite often, the award criterion does not consider the sustainability objectives. The authors present in this paper a new multicriteria model to evaluate tenders to award design or design and build contracts for public works, respecting the principles of public procurement expressed by the European Directives of 2014 and pursuing the sustainability objectives according to the so-called Green Procurement. This model can be easily applied as it is confirmed by its application to the study of the procurement of a new public hospital in Portugal.

Keywords

Award criterion, Green Procurement, Multicriteria model, Public Works.

1. Green procurement of public works: Literature review

The procurement of public works (PPW) corresponds to more than 25% of total public procurement in the European Union, with a value of more than €500,000 M in 2017 (European Commission, 2019). The general objective of any construction design is achieving sustainability concerning the environmental, economic, and social dimensions, or fulfilling the so-called Triple Bottom Line (TBL), according to (Robert and Guenther, 2006). Notwithstanding, green procurement of public works gives special attention to the environmental dimension.

The environmental impacts of the construction sector are quite impressive (World Economic Forum, 2022a), as it is responsible for 36% of the energy consumption, 38% of energy-related carbon emissions, and 50% of resources consumption. Therefore, several green building rating systems have been developed (Ziqi, 2011), emphasizing “different aspects of sustainability, but all fall into six basic categories: energy efficiency, water efficiency, site and environmental impact, indoor environment quality, material conservation, and facility management and operations”. This explains the importance of green procurement of public works well expressed by a multiplicity of handbooks, papers, and EU Directives promoting and discussing Green PPW (GPPW), as shown by (Apolloni et al., 2019) and by the comprehensive reviews by (Chersan et al., 2020; Kadefors et al., 2021; Cheng et al., 2018; Rosell, 2021), with each including more than 60 relevant references. However, as shown by (Khan et al., 2018) and (Grandia, 2019), there are quite significant barriers,

and, unfortunately, in many European countries, the adopted award criterion in many procedures is still the minimal price, as shown in Tables 1 and 2, and in (Tavares, 2021), which is not appropriate when pursuing a GPPW philosophy. This contradiction led to the publication of multiple papers in recent years to address this theme. Nevertheless, they present perspectives about future developments rather than effective models that can easily be applied, namely (Braulio, 2020), (Wurster et al., 2021) and (Jimenez et al., 2019).

The European Commission defines Green Public Procurement (European Commission, 2011) 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”*.

The concept GPPW is the application of the Green Public Procurement to the contracting of public works. Its application has been studied by several authors, such as (World Economic Forum, 2022b), recommending the consideration of the following aspects:

“When specifying materials, include criteria to reduce their embodied environmental impacts and resource use (these may be based on a life-cycle assessment):

- *Give preference to designs that incorporate high efficiency or renewable energy systems;*
- *Give importance to indoor air quality, natural light, comfortable working temperatures, and adequate ventilation;*
- *Require the use of water-saving fittings (separate GPP criteria are available for sanitary tapware and toilets and urinals);*
- *Install physical and electronic systems to support the ongoing minimization of energy use, water use, and waste by facility managers and occupiers;*
- *Include contract clauses related to the installation and commissioning of energy systems, waste and materials management, and the monitoring of indoor air quality;*
- *Give contractors responsibility within the contract for training users of the building on sustainable energy use and, where they have ongoing responsibilities, for monitoring and managing energy performance for several years after construction”*.

The “Action Plan for Net-zero Carbon Buildings”, has been also proposed by the World Economic Forum (World Economic Forum, 2022b), considering that the green objectives should be achieved by minimizing the “carbon footprint” covering the five stages of a building life after an initial stage of conception and selection of macro alternatives. These stages are specified in Figure 1.



Figure 1 - Stages of a building life (after the initial stage)

Figure 2 discriminates the dimensions approached in each dimension (RICS, 2017).

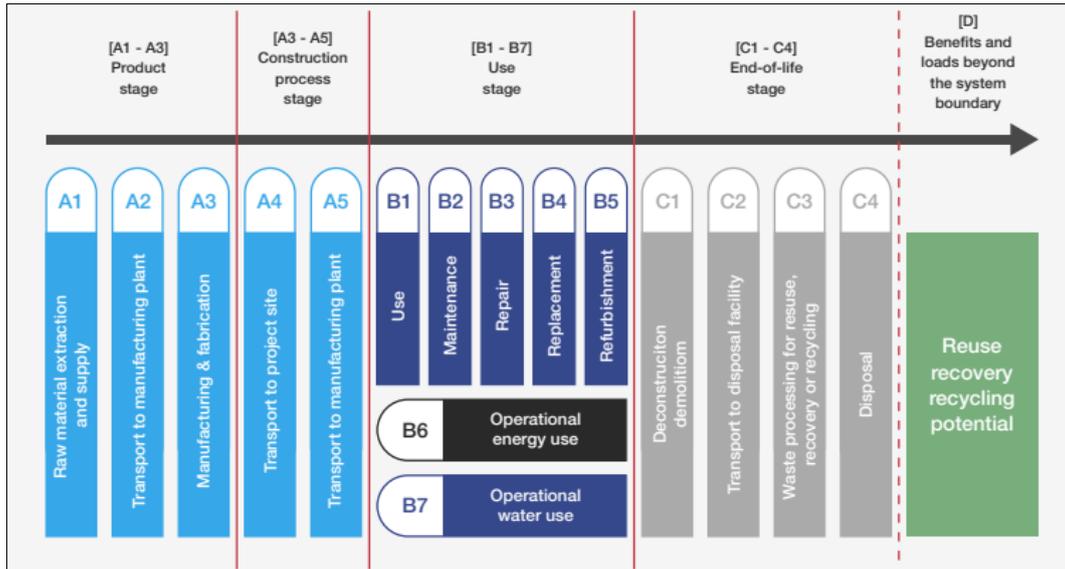


Figure 2 - Dimensions approached in each life cycle stage of a building (after the initial stage)

The UNEP handbook (UNEP, 2021) is quite explicit about the need to pursue a circular economy, a concept that in recent years has gained increased importance by multiple policymakers and researchers (Geissdoerfer et al., 2017), and the mandatory adoption of the Life Cycle Cost (LCC) to assess the cost of each construction. Furthermore, the benefits assessment should also cover direct and indirect impacts, so performance-based formulations can appropriately evaluate the balance between costs and benefits. The LCC and life cycle assessment (LCA) concepts integration in different business areas has been investigated by multiple authors throughout the years (Rebitzer, 2002). Nonetheless, it was originally designed for procurement purposes in the US Department of Defense (White & Ostwald, 1976), and it is still commonly applied in the military sector as well as in the construction industry (Woodward, 1997). A typical product life cycle diagram is presented in Figure 3.

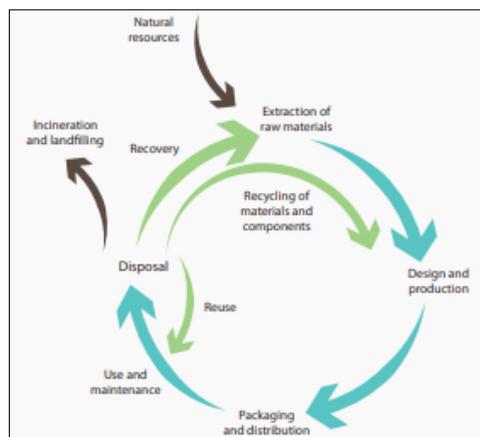


Figure 3 – Typical product's Life Cycle Diagram⁴

⁴ <https://www.lifecycleinitiative.org/starting-life-cycle-thinking/what-is-life-cycle-thinking/> (accessed in 14/09/2022)

Furthermore, the benefits assessment should also cover direct and indirect impacts, so performance-based formulations can appropriately evaluate the balance between costs and benefits.

According to Directive 2018/844/EU on Energy Performance of Buildings – EPBD of the European Union, “*new public buildings or significant rehabilitation of buildings should comply with the so-called label of ‘nearly zero-energy building (NZEB)’*”, and so a significant objective for GPPW is redesigning the energy system to reduce the carbon emissions and to achieve the NZEB target. The definition of the NZEB concept and its requirements are presented in (Szalay & Zöld, 2014) and in the recast of the older EPBD 2010/31/EU.

Summing up, GPPW implies setting up requirements and a multi-attribute award criterion, as it is also recommended by the (Confederation Suisse, 2014), considering the following attributes:

- A) Net energy consumption and percentage of the renewable percentage to minimize the carbon footprint and to achieve NZEB;
- B) Consumption of other natural resources (water, raw materials, etc.) and use of recycled materials, hence promoting the circular economy along the whole life cycle of each construction;
- C) Adoption of LCC as a criterion to describe the procurement cost;
- D) Use performance-based indicators to evaluate the balance between benefits and costs of each tender.

The authors believe that besides these attributes, the formulation of others based on relevant risks related to the life cycle of the constructed system should be considered, and they will be proposed in the next section.

Therefore, the evaluation of each tender ($i=1, \dots, M$) implies the adoption of a set of descriptors ($D(j)$ with $j=1, \dots, N$), with each one representing one relevant attribute ($j=1, \dots, N$). The score of each tender (i) according to attribute i , $S(i,j)$, should be defined in terms of $D(i,j)$, which is the configuration of $D(j)$ for tender i .

Thus, the inevitability and need to take into account the concerns underlying the GPPW justify three main research questions:

- R1) Which principles should be respected by GPPW?
- R2) Which procedural option to form a construction contract?
- R3) What criteria to adopt in the GPPW?

The answers to questions R1), R2), and R3), will be developed in Sections 2, 3, and 4, respectively. In Section 5, a case of application of this methodology to a Portuguese hospital (Seixal Hospital) is presented.

2. Which principles should be respected by GPPW?

The principles to be respected by GPPW include those expressed by the EU 2014 Directive on Public Procurement 2014/24/EU (European Union, 2014) and those including the objectives and the criteria of Green Procurement. The most relevant to developing a model to evaluate tenders are presented in the following sections.

2.1 Sequential separation between the stage of selection of candidates and evaluation of tenders

The Directive establishes separate and sequential stages for the selection of candidates and the evaluation of tenders (Articles 56^o to 58^o) as it is clear from:

Article 56^o General principles:

“1. Contracts shall be awarded on the basis of criteria laid down in accordance with Articles 67 to 69, provided that the contracting authority has verified in accordance with Articles 59 to 61 that all of the following conditions are fulfilled:

(a) the tender complies with the requirements, conditions and criteria set out in the contract notice or the invitation to confirm interest and in the procurement documents, taking into account, where applicable, Article 45;

(b) the tender comes from a tenderer that is not excluded in accordance with Article 57 and that meets the selection criteria set out by the contracting authority in accordance with Article 58 and, where applicable, the non-discriminatory rules and criteria referred to in Article 65.”

This last point and the articles there referred to indicate the existence of a first stage, in which there is the selection of the economic operators whose tenders, if presented, will be evaluated in the second stage. This first stage selects candidates that comply with all the legal obligations mentioned in Article 57 and meet the pre-defined non-discriminating criteria and objectives elicited in the contract notice or the invitation to confirm interest, as described in Articles 58 and 65. The second stage is only available for the accepted candidates and aims to award the most economically advantageous tender from the defined set.

It should be noted that Article 27^o1 of the quoted Directive allows the public authorities to introduce selection criteria in the open procedure and that Article 56^o2 allows that selection to be after the evaluation of tenders. Still, it does not enable mixing the award and selection criteria in the same evaluation stage. In any case, proposed methods incorporating selection and award criteria in the same decision, as suggested by (Zhang, 2020), violate the rules set up by the Directive.

2.2 Transparency and equal treatment

Article 18^o of the Directive, 2014/24/EU quite clearly states that:

“1. Contracting authorities shall treat economic operators equally and without discrimination and shall act in a transparent and proportionate manner.”

The principle of transparency has been subject to case law, namely by the so-called Lianakis case (CJEU, 2008), confirming that *“transparency also requires the selection and award processes are based on known criteria. This means that the criteria for assessing the suitability of tenderers and for assessing the tenders in order to award a contract must form part of the minimum information contained in the letter of invitation or contract notice.”*

Therefore, the information available to the candidates when preparing their tenders should include the descriptors $D(j)$ with $j=1, \dots, N$ as well as the score functions $S(i,j)$ in terms of $D(i,j)$ set up by the public contracting authority so that scores are well understood.

This principle excludes any model that will make score functions unavailable when submitting tenders.

The principle of equal treatment has also been clarified by the Court of Justice of the European Union (CJEU, 2005): “...the equal treatment principle requires that comparable situations are not treated differently and those different situations are not treated similarly unless such a difference or similarity in treatment can be justified objectively”.

This means that the score obtained by each tender should be independent of the features of any other tender. This principle has important implications for the adopted procedure to assess the score of each attribute for each tender. Two approaches have been adopted by several authors violating this condition, meaning that they should be rejected to avoid legal impugnation:

- a) Defining $S(i,j)$ not just in terms of $D(i,j)$ but also in terms of $\text{Max } D(i,j)$ and $\text{Min } D(i,j)$ with $I=1,\dots,M$ for each j using: $S(i,j) = (D(i,j) - \text{Min } D(i,j)) / (\text{Max } D(i,j) - \text{Min } D(i,j))$.

Let be given an example with two attributes, $j=1,2$, and a set of three tenders, $i=1,2,3$, denoted by A, B, and C with the following descriptors between 0 and 10:

Tender	Attribute 1	Attribute 2	Final Score	Final Score with D
A	9	8	0.89	0.83
B	7	9	0.67	0.88
C	6	6	0	0.63
D	1	6	-	0

The final score of each tender is also presented, assuming that the two attributes are equally important, revealing that A is the winner.

The authors of B may be expecting to be defeated. Hence, they may promote a so-called dummy tender, D, not intending to be the winner but to help B become the winner.

The final scores are now presented in the last column, becoming B the winner. This example confirms that this approach does not comply with the studied principle.

- b) A second approach is based on pairwise comparisons between tenders. Several models based on pairwise comparisons have been proposed to support the ranking of tenders, such as AHP (Analytical Hierarchical Processing) (Saaty, 1980 and 1988) and DEA (Marcarelli & Nappi, 2019; Leśniak et al., 2018; Falagario, et al., 2012). However, unfortunately, the score obtained for each tender depends on the contents of the others. Hence, it is vulnerable to the risks related to “dummy” applications. Let this problem be illustrated by the case discussed by Belton & Stewart (2002) and applied again to the evaluation of tenders:

Three tenders, A, B, and C are evaluated by three equally important criteria, I, II, and III. Considering this scenario, the pairwise comparison matrices using AHP are given by:

Tender	A			B			C		
	I	II	III	I	II	III	I	II	III

A	1	1	1	1/9	9	8/9	1	9	8/9
B	9	1/9	9/8	1	1	1	9	1	9
C	1	1/9	9/8	1/9	1	1/9	1	1	1

The obtained estimates for the value of A, B, and C using the Saaty model are 0.45, 0.47, 0.08, and so B ranks first. However, if another application, D, is included and the pairwise comparisons with A, B, and C are given by:

Tender	A			B			C		
	I	II	III	I	II	III	I	II	III
D	9	1/9	9/8	1	1	1	9	1	9

The new estimates for A, B, C, and D values are 0.37, 0.2, 0.06, and 0.29, meaning that now A comes first, confirming the possibility of having a rank reversal, as reported by Dyer (1990) and proven by this example. A similar problem can affect other methods based on binary comparisons using differences rather than ratios (e.g., Bana e Costa & Vansnick, 1994), as shown by Tavares et al. (2008). The adoption of arbitrary and given alternatives to be used for binary comparisons has also been proposed to avoid this shortcoming, but that implies that the decision-maker will just compare each tender with such arbitrary alternatives avoiding any comparison between tenders. Unfortunately, such restriction is hardly feasible and understandable by any decision maker.

The limitations of these two approaches explain why the authors adopt the general formulation of the MAUT (Multi-Attribute Utility Theory) method (Dyer, 2016; Fishburn, 1970), which has a complete theoretical foundation based on the probability theory, the axioms of preferences, and the utility theory (Løken, 2007). The MAUT model is based on a weighted average of the scores assigned to each tender, and so the final score for i will be given by the weighted average of the scores $S(i,j) = w(j).S(i,j)$ for each I and being $w(j)$ the weight assigned to j ($\sum w(j) = 1$).

This means that three major problems must be studied to apply this model:

How to define the attributes and specify the descriptors with $j=1,\dots,N$?

How to relate $S(i,j)$ with $D(j)$, being $j=1,\dots,N$?

How to estimate $w(j)$ with $j=1,\dots,N$?

These three questions will be addressed in the following sections.

2.3 Adoption of the “Most Economically Advantageous Tender” (MEAT) award criterion

Article 67^o of the EU Directives states that:

1. *“Without prejudice to national laws, regulations, or administrative provisions concerning the price of certain supplies or the remuneration of certain services, contracting authorities shall base the award of public contracts on the most economically advantageous tender.*
2. *The most economically advantageous tender from the point of view of the contracting authority shall be identified on the basis of the price or cost, using a cost-effectiveness approach, such as life-cycle costing in accordance with Article 68, and may include the best price-quality ratio, which shall be assessed on the basis of criteria, including qualitative,*

environmental and/or social aspects, linked to the subject-matter of the public contract in question (...).”

The adopted model for integrating the specified criteria should include the weight assigned to each criterion as it is ruled by Article 67^o-5:

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

Furthermore, special attention is given to the definition of the Life Cycle Cost (Article 68^o):

“1. Life-cycle costing shall to the extent relevant cover parts or all of the following costs over the life cycle of a product, service or works:

(a) costs, borne by the contracting authority or other users, such as (i) costs relating to the acquisition, (ii) costs of use, such as consumption of energy and other resources, (iii) maintenance costs, (iv) end of life costs, such as collection and recycling costs.

(b) costs imputed to environmental externalities linked to the product, service or works during its life cycle, provided their monetary value can be determined and verified; such costs may include the cost of emissions of greenhouse gases and of other pollutant emissions and other climate change mitigation costs.

3. Which procedural options to form a construction contract?

Several approaches have been adopted to develop a construction by a public contracting authority, namely:

- a) Using a two-stage process: contracting the conception and design followed by a contract to execute such design, often named by Design-Bid-Build (DBB).
- b) Forming a single contract, including the conception, design, and construction (so-called Design and Build – DB - contracts, see (Lupton, 2019)).

Several authors as (Riecke, 2004, Moolenaar et al., 2009 & Moolenaar, 2010) have presented comparative analyses of these approaches under the perspective of the contracting authority.

The main advantage of the two-stage approach is making separate decisions based on specific selection and award criteria avoiding any compensatory trade-off between the aspects of design and execution. Still, the second approach avoids a lack of coordination between design and construction and doubts about responsibility for arising problems, errors, cost, or time overruns. Actually, in this second approach, the client (the public contracting authority) has “just a single point of responsibility for architecture, engineering and construction services”, as noted by Roth, 1995.

Several authors have compared the performance of these two approaches, DB and DBB, showing that in most cases, DB has significant advantages, namely, reducing time and cost overruns (Molenaar, 1999, Sullivan et al., 2017).

Nowadays, the financing, operation, and maintenance of the constructed system can also be contracted following the Public-Private Partnerships approach (see Cui et al., 2018), and so, in this case, the contract will also cover the financing as well as the maintenance and operation of the

construction along with its total or partial life cycle (so-called DBO - Design Build Operate or Design Build Finance Maintain – DBFM - contracts according to several authors such as Patterson & Trebes, 2013).

These new types of contracts have the advantage of introducing automatic incentives to achieve higher levels of efficient design and construction because the contractor will have to pay for the eventual lack of efficiency during the contracted operational period (Morledge et al., 2021).

The EU Directives allow all these different contracting options, which reinforces why using this integrated approach to contracting is becoming more popular in most EU countries.

Sustainable contracting of public works is better approached by the last type of contracting because LCC will be directly allocated to the contractor, avoiding the risk of using estimates which are not close to reality (Adamtey, 2021).

The procedures to form each type of these contracts have also been enriched by new options presented by the EU Directives, but the most relevant for GPPW are the following:

- a) Open Procedure, which is based on a competition opened by notice;
- b) Restricted Procedure (also opened by notice), which includes an initial stage to select the candidates that can bid;
- c) Competitive Procedure with Negotiation (also opened by notice), which includes a stage to negotiate attributes subject to competition that can concern financial, quality, sustainability, or innovation aspects.
- d) Competitive dialogue, which includes:
 - a. A first stage publishing a notice with the objectives and requirements set up by the contracting authority.
 - b. A second stage including the presentation of alternatives solutions proposed by the selected bidders.
 - c. An evaluation stage to select one of these solutions and the presentation of the corresponding procedure documents.
 - d. Tendering and awarding stage

GPPW implies having bidders with a high level of competence on sustainability issues deserving high levels of trust by the public contracting authority. Thus, the first option tends to be less recommended than the second, and specific models to fulfill such selection have been proposed (see Tavares and Arruda, 2022).

The third option is by far the most flexible approach because it includes a negotiation stage enabling to adjust the tender to the needs and objectives of the contracting authority. Article 26^o of the Directive 2014/24/UE defines the required conditions to allow the application of this procedure:

“(a) with regard to works, supplies, or services fulfilling one or more of the following criteria:

- (i) the needs of the contracting authority cannot be met without adaptation of readily available solutions;

- (ii) they include the design or innovative solutions;
- (iii) the contract cannot be awarded without prior negotiations because of specific circumstances related to the nature, the complexity or the legal and financial make-up or because of the risks attached to them;
- (iv) the technical specifications cannot be established with sufficient precision by the contracting authority with reference to a standard, European Technical Assessment, common technical specification or technical reference within the meaning of points 2 to 5 of Annex VII’.

Therefore, it applies to most cases of innovative and sustainable GPPW, namely to contracts DB, DBO, or DBFM.

In any of these procedural options, considering the four criteria presented in Section 1 plus the relevant risks is incompatible with the award criterion based on the minimal price because all other dimensions are not formulated as attributes subject to competition. Therefore, this recommendation of the European Union to use MEAT by formulating alternatives as the life cycle cost or the cost-effectiveness is entirely appropriate to promote GPPW. Unfortunately, a significant percentage of public works and services in the EU is still awarded by the minimal price criterion, as can be confirmed by the statistics of public procurement (in <https://ted.europa.eu/TED/browse/browseByMap.do>) of 2021 presented in Table 1 and concerning the procedures with a value higher than the EU thresholds justifying their publication of notice through TED.

Table 1 - Number of public works and services published in TED and awarded (or in the awarding process) by following the MEAT criterion in the EU in 2021

	Services	Works
Central Public Administration	9240 (77%)	1055 (51%)
Regional and Local Authorities and Agencies	34565 (86%)	6131 (32%)
Others	26825 (77%)	6345 (53%)
Total	70630 (81%)	13531 (41%)

The contracts concerning services are also included because they are essential and cover all design contracts. These statistics confirm that a considerable amount of public works competition uses the minimal price award criterion, and such percentage is significantly higher for Regional and Local Authorities plus Agencies (RCAA). However, results are better for services, and for this type of contract, the RCAA group uses the MEAT criterion more often than the other groups. In Figure 4, the global comparative analysis for the EU Member States shows the high disparity of results between States and between Services and Public Works. This last conclusion can also be withdrawn from the data in Table 2.

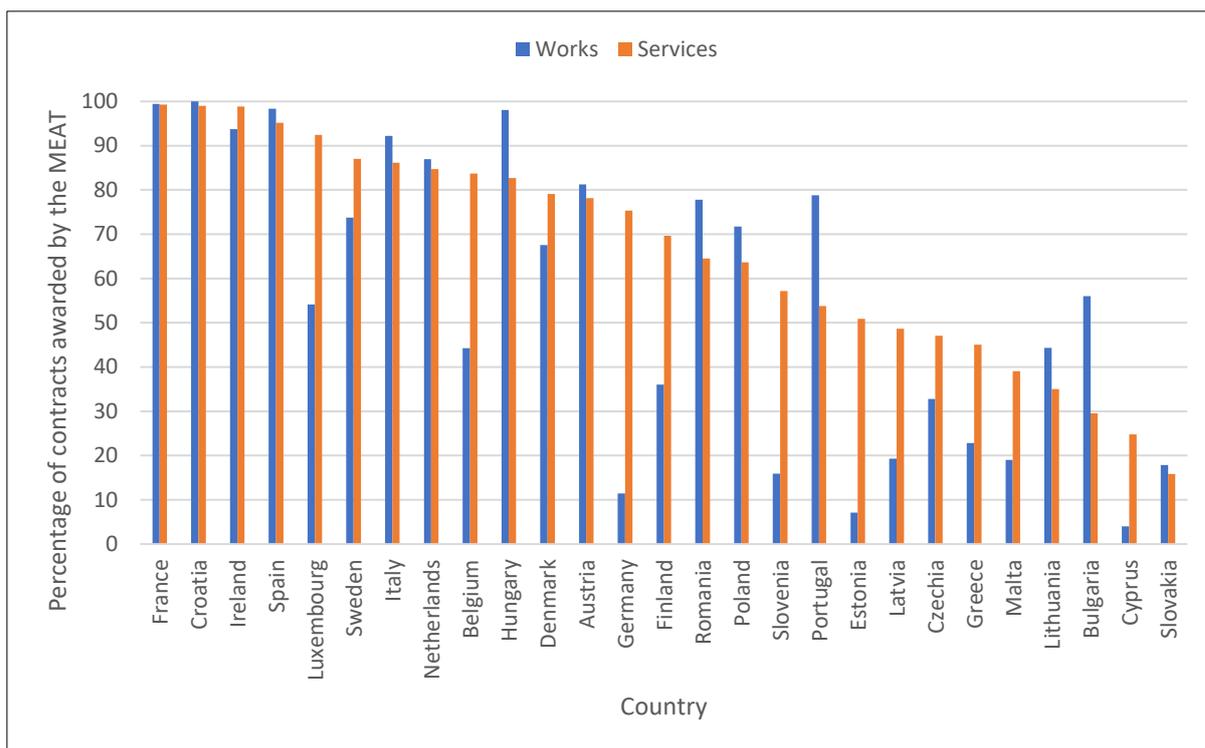


Figure 4- Percentage of contracts published in TED and awarded by MEAT in each Member State of the EU in 2021

It should be noted that these statistical data concern contracts formed after the publication of a notice by TED, thus meaning that they have a value higher than the EU thresholds (European Commission, 2021):

Table 2 - EU thresholds for public contracts (Directive 2014/24/EU)

Contracting authorities:	Supplies and Services Contracts:	Public Works:
Central Government	140,000€	5,382,000€
Other authorities	215,000€	5,382,000€

These results confirm the need to have operational models applying MEAT to evaluate tenders according to the GPPW. Therefore, the proposed model is presented in the next section.

4. The proposed award criterion for GPPW

The proposed award criterion to evaluate tenders includes two dimensions concerning the allocated resources and benefits plus a third dimension concerning risk impacts. Thus, the formulated criteria are:

- A) Life cycle cost (LCC) covering the acquisition, the operation (use), the maintenance, and the environmental costs, plus the cost related to the end of the life cycle.
- B) Expected benefits (EB) expressed by a utility function describing the generated value for the beneficiaries
- C) Risk impacts (RI)

Criterion A should be described by the traditional initial cost measured by the price of the contract plus the discounted operational and maintenance costs added to the environmental costs due to energy and water consumption as well as those due to the toxic and non-toxic wastes (DC):

- a) Net consumption of unrenewable energy, which is estimated in terms of the consumption (lighting, climatization, specialized equipment) and the renewable production (solar, wind, and biomass);
- b) Net consumption of water estimated in terms of total consumption less recycled water (excluding the water obtained from rainfall and snow);
- c) Toxic and non-toxic waste management.

Criterion B should be described in terms of the expected value of the generated benefits for the different groups of users of the system to be built above the minimal levels imposed by the documents of the procedure. Such benefits can be estimated in terms of descriptors, depending on the specific system to build. Still, they are often related to accessibility, internal comfort, internal mobility, and architectural quality. The evaluation of each descriptor can be achieved either through simulation models (for instance, to estimate the average time spent to have access or wasted in internal moves) or by surveys eliciting the evaluation of less quantified aspects like the quality of design. In any case, such evaluation should be expressed on the same scale, namely a Lickert scale from 1 to 5. The design quality should consider not just esthetical aspects but also its adaptation to the functions and the ability to cope with future changes (flexibility).

The methodologic contributions of Cost-Benefit Analysis (see Stewart, 1972 and Araújo et al., 2016) are quite useful in identifying and estimating LCC and EB components.

Criterion C should measure how much resilient each tender is to a predefined catalogue of risks. Such catalogue should include a set of hazardous occurrences due to natural causes such wind or seismic vibrations with a specific level as well as occurrence due to malicious human interventions such as cyber-attacks.

Therefore, the descriptor for Criterion A will be defined as a discounted sum of annual costs due to all components defined along the life cycle of the constructed or developed system following the indications of Article 68^o of the Directive (2014/24/UE) already quoted. Criterion B will be described by the aggregated value function (B) of the expected benefits above the minimum required levels. The third criterion will be described by a measure of the impact of each risk, k , with $k = 1, \dots, K$, in terms of each tender (ERI), which will be estimated an adapted version of the “Failure Mode and Effects Analysis (FMEA)”, which several authors have proposed (see, e.g., Fattahi and Khalilzadeh, 2018) in agreement with the international standard (ISO 31000:2018). According to this approach, ERI for each risk k , with $k = 1, \dots, K$, and each tender i , with $i = 1, \dots, M$ will be given by:

$$ERI_{k,i} = P_k * I_{k,i} * D_{k,i} \quad (4.1)$$

being P_k , $I_{k,i}$, and $D_{k,i}$ indicators expressed in a Lickert scale from 1 (best case) to 5 (worst case) representing:

- P_k - Probability of occurrence.
- $I_{k,i}$ - Magnitude of impacts.

$D_{k,i}$ – Possibility of detection before occurrence.

Thus, each $ERI_{k,i}$ can be between 1 and 125, and then a standardized measure $ERI_{k,i}^*$ (between $100/125=0.8$ and 100) of each $ERI_{k,i}$, can be defined by:

$$ERI_{k,i}^* = \frac{100 * ERI_{k,i}}{125} \quad (4.2)$$

Therefore, the total risk for the set of K risks considered is given by:

$$ERT_i = \sum \frac{100 * ERI_{k,i}}{125 * K} \quad (4.3)$$

Summing up, the award criterion (V) should be now described in terms of DC, B and RT .

The concept of generalized cost, GC , can be defined by:

$$GC = DC + w_R * ERT_i, \quad (4.4)$$

where w_R is an appropriate coefficient expressing the additional cost equivalent to an increase of 1 unit of R .

Then, two approaches to obtain the award criterion, V , can be proposed:

A) Cost-Effectiveness approach

In this case, V will be defined by:

$$V = \frac{B}{GC} \quad (4.5)$$

The awarded tender is the tender maximizing V .

B) Multi-Attribute Utility Theory formulation following Dyer et al. (1992).

In this case, V to be maximized is defined by:

$$V = w_b * B - GC, \quad (4.6)$$

where w_b is an appropriate coefficient expressing the additional cost equivalent to the decrease of one unit of benefit.

Applying the proposed award criterion implies the estimation of the weighting coefficients, w_R and w_b . According to the equation (4.4), the trade-off between C and R is expressed by:

$$\frac{dC}{dERT_i} = -w_R \quad (4.7)$$

and so w_R means the accepted increase of cost C due to the reduction of 1 point of the risk function assuming the linear assumption.

The estimation of w_R can be carried out by a survey asking the following question to a focus group: How much do you accept to increase the cost if R is reduced by 1?

A similar approach can be adopted to estimate w_b as it represents the answer to the question: how much should C be increased to justify an increase of one unit of B ?

5. An application: the award criterion for the design contract of a new hospital

5.1 The application of MEAT in Portugal

The comparison between the number of competitive procedures that include the publication of a notice by TED and are awarded by the MEAT criterion in the EU and Portugal are presented in

Figure 5. The results of Portugal are lower than the EU estimates for Services, but, on the other hand, the estimates for Public Works are significantly higher than those of the EU.



Figure 5 - Percentage of "works"(left) and "service" (right) contracts published in TED in which the awarding criterion was the MEAT in 2021

It should be noted that these estimates may be different if including contracts formed without prior notice published by TED. This is the case for Portuguese municipalities, as shown in Table 3, which is based on a sample of the four major contracts awarded by 18 Portuguese Municipalities.

Table 3 - Percentage of the four major contracts in eighteen Portuguese municipalities awarded by MEAT between 2018/2019 and 2020/2021

	2018 + 2019	2020 + 2021
Services	8%	32%
Public Works	19%	35%

These results confirm the need to propose models helping the public contracting authorities to generalize the adoption of the MEAT criterion, which is now more critical because public investment is supported by European Funds allocated through the so-called Recovery and Resilience Plan (Council of the European Union, 2021). This plan, which covers the period between 2022-2026 and includes a financial contribution of €16644 M, has approved regulations regarding the use of sustainability criteria (European Commission, 2021). The case of energy is also ruled by national legislation (Decree 101-D/2020), requiring that new public buildings should be NZEB (Nearly Zero - Energy Buildings) (see above §1).

5.2 The case of a new hospital in Portugal

The application of green procurement to public hospitals has deserved special attention due to its environmental, social, and economic importance (see Ng & Runeson, 2008, as well as Ziqi, 2011). The case study presented in this work concerns a new hospital in Seixal, a town located in the Lisbon Metropolitan Area, on the south bank of the Tagus River, about 25km from the city of Lisbon.

Seixal county has an area of 95.50km² and a population of 166,525 inhabitants requiring additional health services. This new hospital will be devoted to secondary health care, working in coordination with a tertiary hospital, *Hospital Garcia de Orta*, located in Almada (about 18km away). This new hospital will offer the following services:

- a) External consultations;
- b) Outpatient surgery unit;
- c) Complementary means of diagnosis and therapy;
- d) Basic Urgency;
- e) Convalescence Care Unit.

The Functional Program (FP) is the document defining all the requirements and the expected objectives for the new building to be constructed. This FP defines a net built area of 10,865m² and an outdoor parking area of 3,750m². The net area can be converted into the gross area by using a conversion coefficient of 1.8 to include the circulation areas and walls, obtaining a value close to 12,000m² for the footprint area and 19,186m² for the total construction area plus 3,750m² for outdoor parking.

Assuming that the cost per m² is estimated at €1,100, an expense for the construction of the building of €21,104,160 is expected, and this cost should be added to €400,000 for outdoor parking, totaling around €21,504,160. The award criterion to be adopted follows the proposed model, so the procedure used to estimate each magnitude should be discussed.

a) Life cycle cost, *DC*

The discounted cost, *DC*, is estimated in terms of the contract price, *P'* and the discounted cost of the consumption of non-renewable energy, non-recycled water, and waste management, and so these three components should be discussed.

The estimation of consumption of non-renewable energy is obtained by subtracting from the estimated consumption (*E*₁) the renewable production mainly through solar (*E*₂) wind (*E*₃) and biomass (*E*₄). The estimation of *E*₁ is carried out by:

$$E_1 = E(ac) + E(shw) + E(light) + E(mt) + E(eq), \quad (5.1)$$

where *E(ac)* is the consumption by airconditioned systems, *E(shw)* is the consumption due to hot sanitary water, *E(light)* is the consumption due to lighting, *E(mt)* is the consumption due to transportation of materials and goods, *E(eq)* is the consumption due to specialized health equipment. The consumption of water, *W* is estimated by:

$$W = W(O) + W(S) + W(H), \quad (5.2)$$

where *W(O)*, *W(S)*, *W(H)* is the consumption due to irrigation of outdoor spaces, to sanitary and washing, and to human consumption, respectively. The fraction of recycled water (*f*) should be known, and so the non-recycled consumption (*nf*) is obtained by:

$$nf = (1 - f) * W. \quad (5.3)$$

Any discount sum implies adopting the life duration, a discounting factor, and the unit costs for the three studied magnitudes. Thus, they should be defined by the contracting authority.

b) Risks

The five major risks considered are:

*R*₁ – Life cycle risk due to fire;

R_2 - Life cycle risk due to cyber-attack;

R_3 - Life cycle risk due to mishandling of toxic or contaminated materials;

R_4 - Life cycle risk of bio-contamination;

R_5 – Life cycle risk of a power cut;

They will be estimated using the approach FMEA already presented. The assessment of each risk will be done by experts belonging to or supporting the jury of the contracting authority using a Lickert scale and Tables 4 to 6, which present the descriptions supporting the assessment of these risks.

Table 4 - Evaluation of the probability of occurrence

Level	Annual probability of occurrence
1	$\leq 1\%$
2	$1 < x \leq 3\%$
3	$3 < x \leq 5\%$
4	$5 < x \leq 7\%$
5	$> 7\%$

Table 5 - Magnitude of impacts

Level	Magnitude
1	Just minor effects in the hospital requiring repairs with a value less than 20000€, without affecting the hospital activities and without having injured people
2	Effects requiring repairs with a value greater than 20000€, without affecting the hospital activities and without having injured people
3	Effects affecting hospital activities for less than 5 days but without having injured people
4	Effects affecting hospital activities for 5 or more days but without having injured people
5	Effects including injured people

Table 6 - Possibility of detection before occurrence

Level	Degree of difficulty
1	In 90% or more of occurrences, it is possible to reduce the magnitude of impacts at least one level of Table 5
2	In 70% to 90% of occurrences, it is possible to reduce the magnitude of impacts at least one level of Table 5

3	In 50% to 70% of occurrences, it is possible to reduce the magnitude of impacts at least one level of Table 5
4	In 30% to 50% of occurrences, it is possible to reduce the magnitude of impacts at least one level of Table 5
5	In less than 30% of occurrences, it is possible to reduce the magnitude of impacts at least one level of Table 5

c) Benefits

The estimated benefits should account for the beneficial impacts above the required minimum levels of service, and so they will cover:

B_1 - Quality of access and parking;

B_2 - Quality of internal circuits;

B_3 - Quality of indoor comfort (temperature, humidity, and ventilation);

B_4 - Quality of the design in terms of the esthetical and environmental integration aspects;

B_5 – Quality of the design in terms of the functionality adaptation and flexibility defined by the ability to change each internal space function.

Each of these attributes will be assessed using a Lickert scale, and its assessment will be done by experts belonging to or supporting the jury using Tables 3 to 7, which present the description corresponding to each level of such scale.

Finally, $B = \sum \frac{B_i}{25}$, with $i = 1, \dots, 5$, and so it is a standardized measure of the benefits ranging from 1 to 5.

Weights can be allocated to each component of B but they can also be considered equally important, which was the case, so their estimation will not be required.

Table 7 - Lickert scale for B1 criterion: Quality of access and parking

Level	Description
1	<ul style="list-style-type: none"> • Ineffective and unfunctional road routes; • The circulation routes for ambulances in emergency situations are not separated from other routes; • Pedestrian paths, although confusing, allow access to all entrances of the building, but they are not protected from road traffic; • There are fewer people entries in the hospital building than the expected objectives defined by the Functional Program (FP); • The parking areas do not meet the expectations defined by the FP.

2	Between 1 and 3
3	<ul style="list-style-type: none"> • Effective and functional road routes; • The circulation routes for ambulances in emergency situations are partially separated from the other routes, but there is the possibility of improvement without major changes to the proposal; • Pedestrian paths allow easy access to the different entrances of the building and are protected from road traffic, despite the coexistence of some unclear situations; • The number of people entries in the hospital is equal to the number defined by the FP; • The parking areas meet the requirements defined in the FP, although there is the possibility of improvement in terms of its organization, circulation, and access.
4	Between 3 and 5
5	<ul style="list-style-type: none"> • Easy, effective and functional road routes, with the connection between the origins and destinations points, thus contributing to a positive circulation flow; • The circulation routes for ambulances in emergency situations are totally separated from other routes, thus allowing clear and easy access to the emergency service; • Pedestrian paths are correctly separated and protected from road traffic and allow easy access to the different entrances of the building; • The number of people entries in the hospital is equal to the number defined by the FP, and they are functional and well located; • The parking areas meet the requirements defined in the FP, and they are easy to access and correctly organized, thus contributing to a good circulation of vehicles and people.

Table 8 - Lickert scale for B2 criterion: Quality of internal circuits

Level	Description
1	<ul style="list-style-type: none"> • Services accessibility is not clear, including cases with more than four negligent crossing between different services; • Overall circulation is not appropriate for the functionality of the building; • The number and type of vertical circulations axes are not sufficient, and they are not providing the separation between different flows; • Services are not organized logically and operationally according to the procedures and functions to be performed in each area; • The internal circuits are not well designed, including crossing between different circuits; • There is an insufficient specification of specialized functional areas; • Less than 20% of the areas belonging to the same cluster of adjacency are respected; • Less than 50% of the areas belonging to the same cluster of proximity are respected; • There is a shortage of signage in the building, and the existing one is confusing.

2	Between 1 and 3
3	<ul style="list-style-type: none"> • The direct access to all services is clear and distinct, presenting, however, 2 negligent crossings of other services; • Overall circulation enhances the good functioning of the building; • The number and type of vertical circulations axes are sufficient, but they are not strategically located and distributed and do not guarantee the separation between all flows; • Services are logically and operationally organized according to the procedures and functions to be performed in each area, but some of the services reveal the need for minor improvements; • The internal circulations promote adequate differentiation of circuits, presenting, however, some undesirable crossings that are easy to solve; • There is sufficient specification of specialized functional areas, although there is the possibility of improvement; • At least 50% of the areas belonging to the same cluster of adjacency are respected; • At least 80% of the areas belonging to the same cluster of proximity are respected; • There is sufficient signage in the building, but some are partially confusing.
4	Between 3 and 5
5	<ul style="list-style-type: none"> • The direct access to all services is clear and distinct, without any negligent crossing between other services; • Overall circulation is differentiated, allowing easy orientation and economy of routes, and contributing to the good organization of the building; • The number and type of vertical circulations axes are recommended, and they are strategically located and distributed, thus allowing a clear separation between all flows, the existence of escape routes, and the distance optimization between services; • Services are logically and operationally organized according to the procedures and functions to be performed in each area, thus increasing their overall efficiency; • Internal circulations promote adequate differentiation of circuits and avoid undesirable crossings; • All specialized functional areas are well specified; • All areas belonging to the same cluster of adjacency are respected; • All areas belonging to the same cluster of proximity are respected; • There is enough signage in the building, and it is all clear.

Table 9 - Lickert scale for B3 criterion: Quality of indoor comfort (temperature, humidity, and ventilation)

Level	Description
1	<ul style="list-style-type: none"> • The hospital building orientation does not optimize its solar exposure; • The location and dimensioning of the technical floor and technical areas (central technical equipment and ducts) are not the most convenient ones to cope with FP objectives; • The patios are poorly designed and landscaped;

	<ul style="list-style-type: none"> • The finishing options are not adequate to the FP; • The internal design does not promote a human and qualified environment.
2	Between 1 and 3
3	<ul style="list-style-type: none"> • The hospital building orientation partially optimizes its solar exposure, although there are some severe situations of compartments without natural light that can be modified; • The location and dimensioning of the technical floor and technical areas (central technical equipment and ducts) raise minor adequacy issues, easily corrected without major changes to the proposal; • The patios are well designed but poorly landscaped; • The finishing specifications are adequate to the FP, but they could be improved in terms of longevity and easiness of maintenance; • The internal design partially promotes a human and qualified environment.
4	Between 3 and 5
5	<ul style="list-style-type: none"> • The hospital building orientation perfectly optimizes its solar exposure. Thus there are no severe situations of compartments without natural lighting that can be modified, and the glazed areas provide solutions for reducing solar lighting; • The technical floor and technical areas (central technical equipment and ducts) are correctly located and dimensioned; • The patios are well dimensioned and landscaped, contributing to the quality of the environment of the hospital; • Finishing specifications are correct and contribute to longevity and ease of maintenance; • The internal design fully promotes a human and qualified environment, which also contributes to an adequate net area/gross area conversion index.

Table 10 - Lickert scale for B4 criterion: Quality of the design in terms of the esthetical and environmental integration aspects

Level	Description
1	<ul style="list-style-type: none"> • The hospital and external spaces are not integrated in terms of urban and visual perspectives; • There is a lack of quality concerning the coordination between the internal circuits and external road system; • The architectural options do not reflect the mission and nature of the building; • The architectural language that the building conveys leads to several misinterpretations regarding the type of use for which it is intended; • The proposed design does not fit into the topographic morphology.
2	Between 1 and 3
3	<ul style="list-style-type: none"> • The hospital and external spaces are partially integrated in terms of urban and visual perspectives with no physical or visual barrier between them and the surrounding environment;

	<ul style="list-style-type: none"> • There are some issues of concern in terms of the coordination between the internal circuits and external road system that can be improved without significant changes to the proposal; • The architectural options partially reflect the mission and nature of the building; • The architectural language that the building conveys does not promote a clear understanding of the type of use for which it is intended; • The proposed solution presents some incompatibility with the topography morphology, causing considerable earthworks.
4	Between 3 and 5
5	<ul style="list-style-type: none"> • The hospital and external spaces are fully integrated in terms of urban and visual perspectives, thus creating a harmonic environment between those areas and the surrounding ones; • The internal road system is correctly articulated with the surrounding road network, thus not disturbing or even improving the local road system; • The architectural options entirely reflect the mission and nature of the building; • The architectural language that the building conveys promotes a clear understanding of the type of use for which it is intended; • The proposed solution is fully compatible with the topography morphology, thus not requiring any earthworks.

Table 11 - Lickert scale for B5 criterion: Quality of the design in terms of the functionality adaptation and flexibility defined by the ability to change the functions of each internal space

Level	Description
1	<ul style="list-style-type: none"> • The proposed design does not facilitate changes of functionalities between different spaces because of the bad location of supporting systems (such as the technical floor); • The proposed design does not facilitate changes of functionalities between different spaces because of difficult rearrangement of separation between different units; • The proposed design implies an additional cost higher than 20% if an increase of 20% of the hospital services will have to be adopted in the future; • There is no ability to increase the net area with or without changing the perimeter, in height, or by annexes, without prolonged loss of functionality or prolonged constraint on the building.
2	Between 1 and 3
3	<ul style="list-style-type: none"> • The proposed design facilitates changes of functionalities between different spaces, although there are some losses of cohesion, or even the appearance of new constraints, for the services, due to bad location of supporting systems; • The proposed design facilitates changes of functionalities between different spaces despite the emergence of difficulties related to the new rearrangement that could lead to interventions in the structure of the building and/or special installations with some level of complexity; • The proposed design implies an additional cost between 10% and 15% if an increase of 20% of the hospital services will have to be adopted in the future;

	<ul style="list-style-type: none"> The ability to increase the net area with or without changing the perimeter, in height, or by annexes, without prolonged loss of functionality or prolonged constraint of the building has been demonstrated.
4	Between 3 and 5
5	<ul style="list-style-type: none"> The proposed design facilitates changes of functionalities between different spaces without the need for complex structural interventions or special installations due to the bad location of supporting systems; The proposed design facilitates changes of functionalities between different spaces without any difficulties related to the new rearrangement; The proposed design implies an additional cost lower than 5% if an increase of 20% of the hospital services will have to be adopted in the future; The ability to increase the net area with or without changing the perimeter, in height, or by annexes, without loss of functionality or constraint of the building.

A team of experts should support the application of the presented model to each tender to provide an independent and objective estimation of each criterion.

6. Final remarks

The need to pursue green procurement in public works has been discussed and supported by a wide range of international institutions and authors, as reviewed in Section 1 of this paper. Still, the list of published evidence confirming its adoption in real cases is rather small. This contradiction may be due not just to its greater complexity compared to the traditional award criterion based on the minimal price but also to the lack of presentation of award criteria models applicable to different types of contracts.

Therefore, the authors presented a green award criterion for public works based on a multicriteria model based on three major perspectives: the life cycle discounted cost (LCC), the expected benefits (EB), and the assessment of the estimated risks (RI). The methodology of Cost-Benefit Analysis is relevant to support EB and RI estimation, and the authors adopted an adapted version of FMEA to estimate RI.

The proposed model fully complies with the principles and rules of European Public Procurement, as shown in section 2, avoiding the disrespect by such legal framework of other previous contributions, as is the case of Zhang, 2020.

The authors are successfully applying this model to a real and important case concerning the construction of a new hospital in Portugal supported by European Funds and having to comply with strict green requirements such as being an NZEB.

Acknowledgments

Alexandre Ricardo would like to thank the Portuguese Foundation for Science and Technology (FCT, from the Portuguese abbreviation of Fundação para a Ciência e a Tecnologia) for supporting this research via the Ph.D. scholarship UI/BD/153083/2022.

References

- Adamtey, S. A. (2021). A case study performance analysis of design-build and integrated project delivery methods. *International Journal of Construction Education and Research*, 17(1), 68-84.
<https://doi.org/10.1080/15578771.2019.1696903>.
- Appolloni, A., Coppola, M. A. & Piga, G. (2019). Implementation of green considerations in public procurement: a means to promote sustainable development. *Green Public Procurement Strategies for Environmental Sustainability*, 23-44. IGI Global.
<https://doi.org/10.4018/978-1-5225-7083-7.ch002>.
- Araújo, C., Almeida, M., Bragança, L. & Barbosa, J. A. (2016). Cost-benefit analysis method for building solutions. *Applied Energy*, 173, 124-133.
<https://doi.org/10.1016/j.apenergy.2016.04.005>.
- Bana e Costa, C. A. & Vansnick, J. C. (1994). MACBETH—An interactive path towards the construction of cardinal value functions. *International transactions in operational Research*, 1(4), 489-500.
[https://doi.org/10.1016/0969-6016\(94\)90010-8](https://doi.org/10.1016/0969-6016(94)90010-8).
- Belton, V. & Stewart, T. (2002). *Multiple Criteria Decision Analysis: An Integrated Approach*, Springer, US.
<https://doi.org/10.1007/978-1-4615-1495-4>.
- Borcherding, K., Eppel, T. & Von Winterfeldt, D. (1991). Comparison of Weighting Judgements in Multiattribute Utility Measurement, *Management Science*, 37(12), 1603-1619.
<https://doi.org/10.1287/mnsc.37.12.1603>.
- Braulio-Gonzalo, M. & Bovea, M. D. (2020). Relationship between green public procurement criteria and sustainability assessment tools applied to office buildings. *Environmental Impact Assessment Review*, 81, 106310.
<https://doi.org/10.1016/j.eiar.2019.106310>.
- Cheng, W., Appolloni, A., D'Amato, A. & Zhu, Q. (2018). Green Public Procurement, missing concepts and future trends—A critical review. *Journal of Cleaner Production*, 176, 770-784.
<https://doi.org/10.1016/j.jclepro.2017.12.027>.
- Chersan, I. C., Dumitru, V. F., Gorgan, C. & Gorgan, V. (2020). Green public procurement in the academic literature. *Amfiteatru economic*, 22(53), 82-101.
<https://doi.org/10.24818/EA/2019/53/82>.
- Confederation Suisse (2014). Recommendations for the federal procurement offices. Federal Department of Finance, Federal Office for Buildings and Logistics, Office of the Swiss Federal Procurement Conference, 8.
- Costantino, N., Dotoli, M., Falagario, M., Fanti, M. P., Mangini, A. M. & Sciancalepore, F. (2011). Supplier selection in the public procurement sector via a data envelopment analysis approach. *19th Mediterranean Conference on Control & Automation (MED)*, 236-241.
<https://doi.org/10.1109/MED.2011.5983149>.
- Council of the European Union, 2021, “COUNCIL IMPLEMENTING DECISION on the approval of the assessment of the recovery and resilience plan for Portugal”, 2021/0154 - 10149/21.

Court of Justice of the European Union (First Chamber), Emm. G. Lianakis AE and Others v Dimos Alexandroupolis and Others, 2008.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62006CJ0532> (accessed June 12, 2021).

Court of Justice of the European Union (Second Chamber), Fabricom SA v État belge, 2005.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62003CJ0021> (accessed June 12, 2021).

Dotoli, M., Falagario, M., Mangini, A. M. & Sciancalepore, F. (2010). A novel formulation of the DEA model for application to supplier selection. *IEEE 15th Conference on Emerging Technologies & Factory Automation (ETFA 2010)*, 1–8.

<https://doi.org/10.1109/ETFA.2010.5749382>.

Dyer, J. S. (1990). Remarks on the analytic hierarchy process. *Management Science*, *36*(3), 249–258.

<https://doi.org/10.1287/mnsc.36.3.249>.

Dyer, J. S. (2016). Multiattribute Utility Theory (MAUT). In Greco, S., Ehrgott, M. & Figueira, J. R. (2016). *Multiple Criteria Decision Analysis: State of the Art Surveys*, Springer, New York, 285–314.

https://doi.org/10.1007/978-1-4939-3094-4_8.

Dyer, J. S., Fishburn, P. C., Steuer, R. E., Wallenius, J. & Zionts, S. (1992). Multiple criteria decisionmaking, multiattribute utility theory: the next ten years. *Management Science*, *38*(5), 645–654.

EC (European Commission). (2011). *Buying Green! A handbook on green public procurement*. European Commission.

European Commission, 2021, Commission Delegate Regulation (EU), 2021/1952, European Commission.

European Commission, 2021, Technical guidance on the application of ‘do no significant harm’ under the Recovery and Resilience Facility Regulation, Notice (2021/C 58/01).

European Commission, *Public Procurement Indicators 2017*, (2019).

<https://ec.europa.eu/docsroom/documents/38003/attachments/1/translations/en/renditions/native> (accessed May 16, 2021).

Evaluation of a Sustainable Hospital Design Based on its Social and Environmental Outcomes. A Thesis Presented to the Faculty of the Graduate School of Cornell University in Partial Fulfillment of the Requirements for the Degree of Master of Science by Ziqi Wu, August 2011.

Falagario, M., Sciancalepore, F., Costantino, N. & Pietroforte, R. (2012). Using a DEA-cross efficiency approach in public procurement tenders. *European Journal of Operational Research*, *218*(2), 523-529.

<https://doi.org/10.1016/j.ejor.2011.10.031>.

Fattahi, R. & Khalilzadeh, M. (2018). Risk evaluation using a novel hybrid method based on FMEA, extended MULTIMOORA, and AHP methods under fuzzy environment. *Safety science*, *102*, 290-300.

<https://doi.org/10.1016/j.ssci.2017.10.018>.

Fishburn, P. C. (1970). *Utility theory for decision making*, Wiley, 0471260606.

Geissdoerfer, M., Savaget, P., Bocken, N. M. & Hultink, E. J. (2017). The Circular Economy—A new sustainability paradigm?. *Journal of cleaner production*, 143, 757-768.

<https://doi.org/10.1016/j.jclepro.2016.12.048>.

Grandia, J. & Voncken, D. (2019). Sustainable public procurement: The impact of ability, motivation, and opportunity on the implementation of different types of sustainable public procurement. *Sustainability*, 11(19), 5215.

<https://doi.org/10.3390/su11195215>.

Jimenez, J. M., Lopez, M. H. & Escobar, S. E. F. (2019). Sustainable public procurement: From law to practice. *Sustainability*, 11(22), 6388.

<https://doi.org/10.3390/su11226388>.

Kadefors, A., Lingegård, S., Uppenberg, S., Alkan-Olsson, J. & Balian, D. (2021). Designing and implementing procurement requirements for carbon reduction in infrastructure construction—international overview and experiences. *Journal of Environmental Planning and Management*, 64(4), 611-634.

<https://doi.org/10.1080/09640568.2020.1778453>.

Khan, N. (2018). *Public procurement fundamentals: lessons from and for the field*. Emerald Group Publishing.

Keeney, R. L. & Raiffa, H. (1993). *Decisions with Multiple Objectives: Preferences and Value Trade-Offs*, Cambridge University Press, 0521438837.

Lall, V., Liu, J. & Ding, F. (2000). Using data envelopment analysis to compare suppliers for supplier selection and performance improvement. *Supply Chain Management*, 5(3), 143–150.

<https://doi.org/10.1108/13598540010338893>.

Leśniak, A., Kubek, D., Plebankiewicz, E., Zima, K. & Belniak, S. (2018). Fuzzy AHP application for supporting contractors' bidding decision. *Symmetry*, 10(11), 642.

<https://doi.org/10.3390/sym10110642>.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140, 1–55.

<https://psycnet.apa.org/record/1933-01885-001> (accessed May 26, 2021).

Løken, E. (2007). *Multi-criteria planning of local energy systems with multiple energy carriers* (PhD Thesis). Norwegian University of Science and Technology Faculty of Information Technology, Mathematics and Electrical Engineering Department of Electric Power Engineering, Trondheim, Norway.

Lupton, S. (2019). *Which contract?: choosing the appropriate building contract*. Routledge.

Maia, P. & Tavares, L. V. (2013). OPTIONCARDS: An interactive approach to elicit qualification and award criteria weight. In Piga, G., Treumer, S. (2013). *The Applied Law and Economics of Public Procurement*, Routledge, 97–112.

<https://doi.org/10.4324/9780203096314>.

Marcarelli, G. & Nappi, A. (2019). Multicriteria approach to select the most economically advantageous tender: The application of AHP in Italian public procurement. *Journal of Public Procurement*, 19(3), 201-223.

<https://doi.org/10.1108/JOPP-05-2018-0020>.

Molenaar (1999). Public-Sector Design/Build evolution and performance. *Journal of Construction Engineering and Management*, March, 54-62.

[https://doi.org/10.1061/\(ASCE\)0742-597X\(1999\)15:2\(54\)](https://doi.org/10.1061/(ASCE)0742-597X(1999)15:2(54)).

Molenaar, K., Sobin, N., Gransberg, D., McCuen, T., Korkmaz, S. & Horman, M. (2009). Sustainable, high performance projects and project delivery methods: A state-of-practice report. *White Paper for the Design-Build Institute of America and the Charles Pankow Foundation*, 1-26.

Molenaar, K. R., Sobin, N. & Antillón, E. I. (2010). A synthesis of best-value procurement practices for sustainable design-build projects in the public sector. *Journal of Green Building*, 5(4), 148-157.

<https://doi.org/10.3992/jgb.5.4.148>.

Morledge, R., Smith, A. J. & Appiah, S. Y. (2021). *Building procurement*. John Wiley & Sons.

Mousseau, V. (1992). Are judgments about relative importance of criteria dependent or independent of the set of alternatives? An experimental approach, 1992.

<https://basepub.dauphine.psl.eu/handle/123456789/4487> (accessed May 29, 2021).

Ng, K. W. & Runeson, G. (2008). An Evaluation of the Effectiveness of the Green Building Performance Tool in Singapore. *World Sustainable Building Conference*, SB08, 2008.

Patterson, R. L. & Trebes, B. (2013). NEC contracts for design–build–operate contracts. Proceedings of the Institution of Civil Engineers-Management, Procurement and Law, 166(5), 260-268.

Rebitzer, G. (2002). Integrating life cycle costing and life cycle assessment for managing costs and environmental impacts in supply chains. *Cost management in supply chains*, Physica, Heidelberg. 127-146.

https://doi.org/10.1007/978-3-662-11377-6_8.

Riabacke, M., Danielson, M., Ekenberg, L. & Larsson, A. (2009). A Prescriptive Approach for Eliciting Imprecise Weight Statements in an MCDA Process. *Algorithmic Decision Theory*, Springer, Berlin, 2009, 168–179.

https://doi.org/10.1007/978-3-642-04428-1_15.

Riecke, V. R. (2004). Public Construction Contracting: Choosing the Right Project-Delivery Method. *Popular government*.

Robert G. & Guenther, R. (2006). Environmentally responsible hospitals. *Improving Healthcare with Better Building Design*, 81-107.

Rosell, J. (2021). Getting the green light on green public procurement: Macro and meso determinants. *Journal of Cleaner Production*, 279, 123710.

<https://doi.org/10.1016/j.jclepro.2020.123710>

Roth, M. (1995). An empirical analysis of US Navy design/ build contracts, Thesis, University of Texas.

Roy, B. (2016). Paradigms and Challenges. Multiple Criteria Decision Analysis: State of the Art Surveys, Springer, New York, 2016, 19–39.

https://doi.org/10.1007/978-1-4939-3094-4_2.

Royal Institution of Chartered Surveyors (RICS). (2017). Whole Life Carbon Assessment for the Built Environment.

Saaty, T. L. (1980). *The Analytic Hierarchy Process: Planning*. McGraw-Hill, New York, 0070543712.

Saaty, T. L. (1988). What is the analytic hierarchy process? *Mathematical models for decision support*, Springer, Berlin, Heidelberg, 109-121.

https://doi.org/10.1007/978-3-642-83555-1_5.

Stewart, F. (1972). Method and Project Appraisal. *The Frontiers of Development Studies*, 347-366, MacMillan, 978-1-349-05017-8.

Sullivan, J., Asmar, M. E., Chalhoub, J. & Obeid, H. (2017). Two decades of performance comparisons for design-build, construction manager at risk, and design-bid-build: quantitative analysis of the state of knowledge on project cost, schedule and quality. *Journal of Construction Engineering and Management*, 143(6), 04017009.

Szalay, Z. & Zöld, A. (2014). Definition of nearly zero-energy building requirements based on a large building sample. *Energy policy*, 74, 510-521.

<https://doi.org/10.1016/j.enpol.2014.07.001>.

Tavares, L. V. & Arruda, P. (2021). Public policies for procurement under COVID19. *European journal of public procurement markets*, 3, 9-36.

<https://doi.org/10.54611/CUIN2767>.

Tavares, L. V. & Arruda, P. (2022). A multicriteria model to select candidates for public contracting using the OPTIONCARDS method. *Automation in Construction*, 136, 104162.

<http://dx.doi.org/10.1016/j.autcon.2022.104162>.

Tavares, L. V., Coelho, J. S. & Maia, P. (2008). O modelo e o software SIAP 2008 para avaliação de propostas e candidaturas segundo o Código dos Contratos Públicos, OPET.

The European Parliament and the Council of the EU Directive 2010/31/EU of the European parliament and of the council of 19 May 2010 on the energy performance of buildings (recast). *Official Journal of the European Communities* (2010). L153/13-35.

United Nations Environment Programme, *Sustainable Public Procurement: How to Wake the Sleeping Giant! Introducing the United Nations Environment Programme's Approach*, 2021.

<https://www.unep.org/resources/publication/second-edition-uneps-sustainable-public-procurement-guidelines> (accessed November 18, 2021).

White, G. E. & Ostwald, P. F. (1976). Life cycle costing. *Management accounting*, 57(7), 39-42.

Woodward, D. G. (1997). Life cycle costing—Theory, information acquisition and application. *International journal of project management*, 15(6), 335-344.

[https://doi.org/10.1016/S0263-7863\(96\)00089-0](https://doi.org/10.1016/S0263-7863(96)00089-0).

World Economic Forum (2022a). *The Global Risks Report 2022*. WEF, 17, 978-2-940631-09-4.

World Economic Forum (2022b). Accelerating the Decarbonization of buildings: The Net-Zero Carbon Cities Building Value Framework. *WEF*.

Wurster, S., Schulze, R., Simon, R. G. & Hoyer, S. (2021). A Grounded Theory on Sustainable Circular Public Procurement in Germany: Specific Product Case and Strategies. *Sustainability*, *13*(24), 13525.
<https://doi.org/10.3390/su132413525>.

Zhang, Y. (2020). Construction of bid evaluation index system in government public project green procurement in China based on DS evidence theory. *Sustainability*, *12*(2), 651.
<https://doi.org/10.3390/su12020651>.

The interplay between EU public procurement and human rights in global supply chains: Lessons from the Italian legal context

Giulia Botta

Abstract

Linking EU public procurement and the recently consolidated *Business & Human Rights* field of international law is a core challenge and opportunity in the current globalized economy. Global supply chains play a crucial role in enhancing socio-economic development, however evidence from NGOs and case law shows that human rights and labour standards abuses persist in many market sectors. Thus, goods, works, services procured by public entities may entail human rights risks, potentially occurring throughout their global supply chains. The EU regulatory framework has not adequately regulated such intersection, fostering ambiguity and uncertainties in the application which require legal clarification at multiple levels. This article looks at public procurement from a human rights' legal perspective, firstly analysing whether there are human rights obligations for contracting authorities (§ 1). Key potentials and uncertainties under the EU Public Sector Directive are highlighted (§ 2), followed by the analysis of the case of Italy, unpacking the use of minimum sustainability requirements to foster human rights respect along global supply chains (§ 3).

Keywords

Business & human rights, EU public procurement, Human rights criteria, Italy, Labour rights, Minimum sustainability criteria, Socially responsible public procurement, Supply chains.

1. Introduction

Public procurement constitutes an important leverage for more responsible business conduct along global supply chains. Indeed, public procurement is immersed in the context of the current global economy shaped by complex and fragmented value chains, whose exposure to human rights risks and adverse impacts has been increasingly documented in recent years. Although awareness on States and business' shared responsibility towards human rights has been gradually consolidated by the *Business & Human Rights* (B&HR) subfield of international law and the UN Guiding Principles on Business & Human Rights (UNGPs), enforcement gaps persist. Particularly, ambiguities and legal uncertainties regard the public procurement field, risking to foster irresponsible States' consumption (Methven O'Brien & Martin-Ortega, 2019).

In the EU public procurement legal context, given its high economic leverage (17% GDP), the potentials to use public contracts as means of strategic regulation for more responsible supply chains are several (Ankersmith, 2020). Indeed, procurement creates "unique opportunities to promote awareness of and respect for human rights by enterprises, including through the terms of contracts" (UNCHR, 2011, GP 6). Despite the urgency to act, the interplay between EU public procurement and B&HR has not been scrutinized in depth at regulatory level. Indeed, the EU public procurement framework appears contradictory on the inclusion of human rights considerations throughout the procurement process. Although the 2014 Public Sector Directive

envisages *legal possibilities* to include social criteria, their effective implementation depends on Member States (MSs) and most often contracting authorities' discretion (Andhov, 2020).

Core questions are, thus, whether there is an obligation to prevent human rights violations in procurement; and how contracting authorities can leverage more responsible supply chains in practice. Exploring MSs' practices becomes fundamental to grasp how contracting authorities can be held accountable for human rights while purchasing. Italy represents one of the most prominent example of MSs adopting mandatory Minimum Sustainability Requirements in public procurement law for specific procurement categories since 2017. Such developments constitute drivers of transformation towards mandatory green criteria (Caranta, Marroncelli, 2021), incentivizing also experimentation in human rights-based criteria for product categories considered highly exposed to human rights risks (Cellura et al, 2022).

In this article, the interplay between EU public procurement and B&HR is disentangled, from an international human rights law perspective at first (1). Further reflections are developed, positioning human rights under *EU Sustainable Public Procurement*, unpacking dilemmas and potentials of the Public Sector Directive (2). To better grasp possible ways to implement human rights criteria at national level, the experience of Italy is explored to inspire future initiatives in other jurisdictions.

2. A human rights perspective on public procurement: Obligations for the State as purchaser?

Public procurement represents a substantial share of the EU overall economy, accounting for 14% GDP (17% if utilities procurement is included) (European Commission, 2022). Contracting authorities in the EU are, thus, important market players to influence commercial behavior through their purchasing decisions, encouraging responsible supply chains (Caranta, 2021; Sjøfjell & Wiesbrock, 2015). Considering the State's multiple roles as a regulator, employer, consumer, a growing attention has been on the use of public contracts as a tool for pursuing social objectives (Wiesbrock, 2016). Nonetheless, this is not a new phenomenon. For instance, in the nineteenth century's France, workers enjoyed limited working hours in public contracts; in the UK in the aftermath of World War I, public procurement was used to provide work for disabled ex-servicemen; more recently anti-discrimination provisions in favour of minorities have been used in the US, the UK, Canada, South Africa (McCrudden, 2007a; Williams-Elegbe 2022), while scholarship has increasingly focused on procurement potentials for regulating international labour standards (Corvaglia, 2017; Eamon, C. 2020, Ortega O'Brien 2017) and for driving more corporate social responsibility (McCrudden, 2007b; Ankersmith, 2017).

Contracting authorities, as any other consumer, purchase goods, works, services via transnational supply chains, which shape the current global economy. Global supply chains form "complex, diverse, fragmented, dynamic and evolving organizational structures" (Delautre, 2019), characterized by subcontracting cascades with variegated ownership structures and employment relations (Sarter, 2022). Value chains unleashes economic development, employment opportunities, higher competitiveness, but also increased exposure to human rights risks (Ufbeck et al., 2019). Indeed, throughout each supply chain phase, adverse impacts may impinge international labour standards and internationally recognized human rights (Bernaz, 2016; ILO, 2016). Emblematic cases, such as the Rana Plaza collapse in Bangladesh (2013) and a flourishing case law in different jurisdictions, have gradually raised awareness on the opaque and untraceable nature of supply chains (Agrawal et al., 2019). In a context of legal unclarity and structural gaps

(Ruggie, 2013), the Business and Human Rights (B&HR) subfield of international law has addressed corporate human rights impacts gaining momentum especially with the adoption of the United Nations Guiding Principles of Business and Human Rights - UNGPs (UNCHR, 2011). Rooted in the Protect, Respect and Remedy Framework, the UNGPs structure rests on three main normative pillars: the (1) State duty to protect against human rights; the (2) corporate responsibility to respect human rights, through human rights due diligence, an assessment process through which companies 'identify, prevent, mitigate and account for how they address their impacts on human rights' in their business activities [GP 15]; (3) access to effective remedies for victims.

Approaching public procurement from a B&HR perspective requires to think about procured goods as entailing both domestic and foreign inputs added at different levels of production and in different jurisdictions, raising questions on extraterritoriality (Corvaglia & Li, 2018; Velluti & Tzevelekos, 2018). Particularly, abuses linked to public purchasing of goods (Methven O'Brien & Martin-Ortega, 2020) and services (Methven O'Brien, 2015) have been increasingly documented in recent years in relation to sectors characterized by complex value chains and high impacts of human rights such as workwear, electronics, personal protective equipment, healthcare surgical instruments, food, etc. Evidence has been collected by different NGOs and studies as the "Public Procurement and Human Rights: A Survey of Twenty Jurisdictions" (DIHR et al., 2016).

In a context of legal uncertainty, as irresponsible State purchasing may inevitably feed a vicious cycle of transnational abuses, it must be clarified whether there is an obligation to prevent human rights violations for contracting authorities. Indeed, the attention on the responsibility of the State towards human rights when procuring has been quite marginal (Williams-Elegbe, 2022; Methven O'Brien, Martin-Ortega, 2020). Also, under the EU public procurement framework the subject has had limited traction so far. The UNGPs have provided more clarity. Indeed, unpacking its First Pillar, public procurement is a key dimension of the State duty to protect, under the so-called State-business nexus, namely the commercial transactions among the State and the private sector. GP 6 specifies that the States should promote respect for human rights by business enterprises with which they conduct commercial transactions. The Commentary mentions procurement, as "unique opportunities to promote awareness of and respect for human rights by those enterprises, including through the terms of contracts, with due regard to States' relevant obligations under national and international law" (UNCHR, 2011). However, as a voluntary and soft law instrument, the UNGPs penetration and practical effectiveness has been consistently questioned (CHRB, 2020; Smit et al., 2021).

Other legal grounds of justification can be advanced to support the State intrinsic duty to protect human rights also when purchasing. States as primary human rights law subjects and duty bearers, own positive obligations to protect human rights having ratified international conventions and treaties. Regarding the extension of State responsibility in their business activities, the UN Committee on Economic, Social and Cultural Rights has clarified in the "General Comment n. 24 on State Obligations under ICESCR in the context of business activities" (2017) that the States have obligations to ensure that companies they do business with and procure from, respect human rights at home and abroad throughout their business chain. States could be "held directly responsible for the action or inaction of business entities if the entity concerned is acting on that State party instruction or is under its control or direction in carrying out the particular conduct at

issue”, as in the context of public contracts. Therefore, States do not relinquish their international human rights law obligations in conducting *acta iure gestionis*, as there is a direct link between the State, procuring entity and contractors in its supply chain.

A further argument is the idea of the State leading by example and responsible governance. Indeed, since governments operate both as regulators and participants in the market, “when principles they expose in the former are not applied in the latter, the government appears to lack coordination or to be simply hypocritical” (McCrudden, 2007).

In conclusion, although scholars have argued that public procurement may not be the right tool to ensure human rights protection (Sanchez-Graells, 2020) in comparison with other methods by which governments may use legal compulsion powers, as criminal justice, taxation policy, allocation of resources, the existence of State’s obligations to protect human rights while purchasing and incentives to lead by example justifies an increased use of public procurement framework to pursue B&HR objectives.

3. Human rights considerations in EU sustainable public procurement: Potentials and dilemmas

Under the EU regulatory framework, public procurement has been increasingly recognized as means of strategic regulation and driver for sustainable production and consumption through environmental and social considerations (Arrowsmith & Kunzlik, 2009; Caranta & Trybus, 2012). Indeed, the *Public Sector Directive* 2014/24/EU contains direct links to sustainable development in its recitals and provisions (Recitals 2, 41, 47, 91, 93, 95, 96, 123 and Arts. 2(22), 18(2), 42(3)(a), 43, 62, 68, 70). Under Recital 2, public procurement is defined as a strategic instrument to achieve overarching goals of smart, sustainable and inclusive growth, either directly in the performance of the contract or indirectly by encouraging companies to change corporate practices (Sjafjell & Wiesbrock, 2016). Recital 37 recalls that MS and contracting authorities have to take relevant measures to ensure compliance with applicable environmental, social and labour law. Recital 40 prescribes that environmental, social and labour law observance should be performed at all the relevant stages of the procurement cycle. Not only the 2014 Directives but also further legislative developments have recognized such potentials. The *EU Green Deal* explicitly calls public authorities to *lead by example* ensuring that their procurement is sustainable (European Commission, 2019). As such, the Sustainable Products Initiative clearly outlines it (European Commission, 2022). Indeed, under art. 58 of the proposed *Ecodesign for Sustainable Products Regulation*, contracting authorities must include sustainable requirements in the form of mandatory technical specifications, selection criteria, award criteria, contract performance clauses or targets as appropriate (European Commission, 2022).

In Sustainable Public Procurement, human rights-related considerations fall under the umbrella-term of *Socially Responsible Public Procurement*, “procurement aiming to set an example and influence the market-place giving companies incentives to implement socially responsible supply chain and management systems, achieving positive social outcomes in public contracts” (European Commission, 2021). The *Buying Social Guide*, updated in 2021, has given prominent attention to decent work, compliance with labour and social rights, ethical trade and human rights in supply chains. Furthermore, the EU *Communication on decent work worldwide for a global just transition and a sustainable recovery* has outlined that socially responsible public procurement is a powerful tool to combat forced labour and child labour, requiring the public sector to *lead by example* in public procurement activities (European Commission 2022).

Unpacking the *Public Sector Directive*, there are “legal possibilities” to include social and human rights considerations along the procurement process. Thus, willing contracting authorities (or MSs) can in principle and according to the ECJ case law (Case C-368/10 Commission v Netherlands; C-513/99 Concordia Bus; Case C-448/01 AG and Wienstrom GmbH v Republik Österreich), use their discretion as a lever to boost compliance with human rights (Sanchez Graells, 2020). However, their effective enforcement depends essentially on each MS and contracting authorities’ discretionary decisions (Wiesbrock, 2016). All relevant decisions are, indeed, left to either the implementing legislation of MSs – particularly limited and fragmented when looking at the EU panorama (La Chimia, 2017).

Art. 18.2 on procurement principles, known as the “horizontal clause”, is a key provision (Sjafjell & Wiesbrock, 2016; Andhov & Mitkidis 2017). MSs shall, indeed, take appropriate measures to ensure that in the performance of public contracts economic operators comply with applicable obligations in the field of environmental, social and labour law established by EU law, national law, collective agreements or by the international environmental, social and labour conventions (Annex X). Despite the legally binding nature of the Directive, nonetheless a mismatch between opportunities for sustainability and limitations in the application is outlined by scholars. Indeed, uncertainty flows in the broad and vague meaning of art.18.2, which does not impose a direct obligation upon contracting authorities (Andov, 2020; Andov & Hamer, 2021), but, rather, provides a “legal possibility”. Those contradictions are even more evident after the ECJ ruling in the *Case 395/18 Tim SpA*, clarifying that art. 18.2 constitutes a cardinal EU procurement principle, together with the ones prescribed by art 18.1 - open competition, non-discrimination among tenderers, proportionality, transparency - thus creating the basis for a “*sustainability* principle”.

Probably the clearest provision fostering human rights protection while purchasing is the mandatory exclusion of economic operators convicted by final judgement of child labour and other forms of trafficking in human beings (art. 57.1.f). The obligation to exclude is not limited to the tendering phase, but reinforced by an obligation to terminate any contracts awarded to companies subsequently convicted for those offences (art 73.b). Nonetheless such provision is narrowed to child labour and human trafficking confirmed by final judgements, not taking into account multiple cases of other labour and human rights risks hidden behind complex supply chains. Art. 57.4 allows MSs to take adequate measures to ensure that, in the performance of public contracts, economic operators comply with obligations of environmental, social, labour law established by EU law, national law, collective agreements or by certain international environmental, social and labour law provisions. This casts a rather wide net in principle, however the provision lays down optional exclusion grounds. Therefore, the application in practice is limited by constraints on the exercise of executive discretion (Sanchez Graells, 2020) and the sufficient link to the subject matter of the contract provision (Semple, 2015; Outhwaite & Ortega, 2016). Further, the provision creates significant uncertainty as to the scope of ‘applicable obligations’ where tenderers are based in jurisdictions other than the contracting authority’s (Ølykke, 2016; Conlon 2020). In connection to art. 18.2 further contradictions can be exposed: if sustainability represented a cardinal procurement value as interpreted by the ECJ in *Tim* case, why violations of obligations in the fields of environmental, social and labour law (art. 57.4.a) or professional misconduct (art. 57.4.c) would not constitute mandatory grounds of exclusion?

Third-party certification of compliance, in particular labels, constitute another possibility (D'Hollander & Marx, 2014). Indeed, according to Recital 75, “contracting authorities that wish to purchase works, supplies or services with specific... social or other characteristics should be able to refer to particular labels”. However, limitations again relate to the fact that requirements must only concern criteria which are linked to the subject-matter of the contract and appropriate to define characteristics of the procured subject-matter (art 43.1.a) hindering the possibility to use labels linked to general corporate policies or aspects of the supply chain that are too far detached from the direct provision of services or supply of products to the contracting authority. Another limitation is the contracting authorities’ capacity and resources, as they should have specific expertise to make judgements of equivalence between different labels and between the prescribed elements of the applicable label and the documentation provided by economic operators (Sanchez-Graells, 2020).

Another possibility is to include human rights requirements in the award phase (Ashraf; Van Seters). Indeed, the contracting authority has discretion to assess the most economically advantageous tender (MEAT) on the basis of criteria, including qualitative, environmental and/or social aspects, linked to the subject-matter of the contract in question (art 67.2). Nonetheless, the implementation of a general policy based on human rights guarantees as award criteria raises again difficult functional questions, related to the discretion and the link to the subject matter of the contract. It must be stressed that a specific situation where contracting authorities have no discretion to deviate from MEAT on the basis of the violation of labour or social obligations concerns abnormally low tenders (art. 69.3) (Ølykke, 2016). Thus, under Recital 103 contracting authorities have a specific positive duty to reject the tender where they have established that it is abnormally low because it does not comply with applicable obligation.

Finally, contract performance requirements based on labour rights and human rights are a possibility (Nielsen, 2017). Recitals 98 and 99 indicate clearly that contracting authorities should be able to impose contract performance requirements of a labour and social nature “to favour the implementation of measures for the promotion of equality of women and men at work, the increased participation of women in the labour market and the reconciliation of work and private life... and, to comply in substance with fundamental ILO Conventions, and to recruit more disadvantaged persons than are required under national legislation” or to implement “measures aiming at the protection of health of the staff involved in the production process, the favouring of social integration of disadvantaged persons or members of vulnerable groups amongst the persons assigned to performing the contract or training in the skills needed for the contract in question”. Core difficulties are related to ensuring effective monitoring and enforcement systems and identifying clear audit strategies (Gothberg, 2019). The effectiveness of mechanisms would rest on both the ability to specify the relevant applicable obligations, the investment of significant resources in monitoring and the practical possibility for the contracting authority to react to potential breaches of human rights guarantees in a manner that does not damage the more immediate public interest in the execution of the public contract—which can be particularly challenging where human rights infringements take place in a different jurisdiction or in a manner that only indirectly affects the core object of the contract (Sanchez-Graells, 2020).

Although the present EU regime is becoming more enabling towards sustainability, the scope it permits to use public tenders to advance respect for human rights globally remains quite limited.

Nonetheless, developments in the direction of B&HR in the EU suggests a policy shift underway that may alter such limitations (Ortega & O'Brien, 2017) providing more legal grounds to act in this direction, particularly with a *Directive on Corporate Sustainability Due Diligence* (European Commission, 2022). The proposed Directive, whose European Council negotiation position has been recently released (December 2022), sets out a horizontal framework of due diligence obligations applying to large limited liability companies over a defined threshold in terms of size, including EU and third-country companies operating in the EU market and smaller companies in high-risk sectors. Companies, pursuant to art. 4 on the “due diligence” process, are required to identify, prevent, mitigate and account for their adverse human rights, and environmental impacts, in their own operations and across their global value chains, defining clear ‘obligations of means’. Precise due diligence steps enucleated under artt.5-11 should extend not only to a company’s own operations, but also to those of its subsidiaries, contractors and subcontractors, at least to the extent of “established business relationships” (Art 6.1). Namely, companies would be asked to put in place “cascading” requirements reaching down all suppliers and covering all tiers of the supply chain. A criticism raised by scholars is the lack of precise reference to public procurement, differently from art. 18(2) the EU Parliament resolution (2020/2129(INL)), representing a contradiction and a golden missed opportunity (O'Brien & Ortega 2022; O'Brien & Ortega, 2020). The only reference to the public-private interplay is under art. 24 on “Public support”. Nonetheless indirect impacts on public purchasers’ practice can be foreseen, providing further legal justifications to include human rights considerations in procurement. The Directive could impact the applicability of mandatory (art. 57.1.f) and facultative (57.4.a and 57.4.c) exclusion grounds for tenderers, mitigating the risk of contracting with suppliers that abuse human rights. Indeed, the role of supervisory authorities (art. 18-20) monitoring, investigating, sanctioning businesses that fail to comply with due diligence obligations could facilitate public buyers in excluding non-compliant operators. Further implications may relate to selection criteria, since the *human rights due diligence* reporting could be used by suppliers as proof of technical ability pursuant to art. 58 together with Part II(d) of Annex XII of the Public Sector Directive. Regarding contract performance conditions, the envisaged creation of Model Contractual Clauses (art. 12) and Guidelines provided by the Commission to support companies to comply with the directive (art. 13) provides a powerful opportunity.

4. CAMs: Minimum sustainability requirements and voluntary human rights criteria in Italy

In Italy approximately 169.9 trillion euro are spent yearly by over 22.000 public agencies in public procurement (ANAC, 2020), a significant share to orientate the market towards more compliance to B&HR (Fiorentino & La Chimia, 2021). Italy is an example of MS adopting mandatory sustainability criteria in public procurement law, driving transformation towards mandatory green requirements (Caranta & Marroncelli, 2021), including experimentation of voluntary social and human rights criteria.

After the adoption of a *National Action Plan on Green Public Procurement* (2008) following the Green Paper on *Integrated Product Policy* (EU Commission, 2003), specific “Minimum Sustainability Criteria” (so-called *Criteri Ambientali Minimi* - CAMs) have been elaborated since 2011 to be included in procurement procedures for certain categories. CAMs are mandatory sets of rules and technical criteria adopted by Ministerial Decrees issued by the Ministry of the Environment (Cellura, 2018). The criteria became mandatory for the first time in 2015 (Law

221/2015) for above specific contract thresholds and then transposed in the actual Public Contracts Code (D. Lgs. 50/2016) under art. 34- *Energy and Sustainability Criteria*. In 2017, the article has been amended by D. Lgs. 57/2017, making the criteria mandatory for all contracting authorities for whatever the contract value. The case-law has consolidated the mandatory force of CAMs, stating that contracting authorities do not only have a general obligation to *sustainable development* but they are obliged to include CAMs when procuring specific categories (Botta, forthcoming). Furthermore, the jurisprudence has clarified that under art.34, the contracting authorities are obliged to include in their tender documents “*at least* technical specifications and contract clauses” of CAMs (art.34.1). The inclusion of award criteria for the application of the *most advantageous tender* is “to be taken into account”, but not mandatory (art. 34.2). Finally, art.34.3 specifies that the aforementioned obligations shall apply contract awards of any amount. Currently, CAMs exist for 18 procurement categories⁵, regularly updated and under expansion.

Regarding human rights considerations and ethical criteria, a landmark source is the “Guide for the integration of social aspects in public procurement activities” for all the Italian Contracting Authorities (MITE, 2012). It is based on two innovative elements: (1) *minimum social criteria* to promote the application of internationally recognized standards on human rights and working conditions along the supply chains. (2) A *structured dialogue* methodology to foster cooperation and synergy between buyers and suppliers (Ricotta, 2014). The collaborative approach between contracting authorities, suppliers and sub-suppliers has different purposes: shedding lights on working and human rights conditions and social standards along supply chains; monitoring the application of social criteria and activating potential corrective actions in case of failure in meeting such standards. The Guide is not binding, thus its application remains voluntary, depending on a discretionary adherence by individual contracting authorities, resulting so far in isolated practices by pro-active entities (Cellura et al., 2021).

Linking CAMs and human rights, the revised version of the NAP-GPP (2013) highlighted the need to apply the Guide approach to high-impact sectors exposed to human right abuses. The revised NAP has significantly addressed social aspects, recommending their integration in the tender procedures when purchasing product categories characterized by complex supply chains with risk “of lack of human rights protections and undignified working conditions” (MITE, 2013). Some specific CAMs have been updated including reference to voluntary social criteria, related to social clauses, labour conditions and equal pay, transparency of supply chains, CSR standards. A peculiar attention to human rights requirements related to supply chains transparency and due diligence processes is to be found in the CAMs on textiles, work-shoes and leatherware, office furniture and food. Voluntary human rights criteria have been integrated under various procurement phases: selection criteria, technical specifications, award criteria and contract clauses.

Focusing on the textiles sector, the set of obligations on minimum sustainability criteria (**CAM-textiles**) was updated in 2017 and most recently in 2021. Voluntary social and human rights criteria for suppliers have been included along with mandatory environmental ones, to guarantee that textiles are produced respecting decent work conditions, human rights and the UNGPs. Section E of the Ministerial Decree enucleates the core facultative social criteria. Appendix B lists the internationally recognized human rights and ILO Conventions that must be respected. The

⁵ See Annex 1.

international social and environmental conventions contained in Annex X of the Public Contracts Code are mentioned together with the Universal Declaration of Human Rights and the national labour law applicable to the country where the supply chain phase is located. To effectively address human rights risks, social criteria and *human rights due diligence (HRDD)* are recommended during selection of tenderers, contract award phase, execution of the contract.

In the selection phase, economic operators may be asked to adopt ethical management systems based on *HRDD*, demonstrating the following elements: company policy and management systems integrating responsible business conduct; a clear mapping of human rights risks and adverse impacts along company's operations and supply chains; specific mechanisms established to prevent and mitigate adverse impacts; the public disclosure of due diligence processes; the definition of remediation processes as grievance mechanism for potential victims, as recommended by the UNGPs.

In the award phase, the inclusion of human rights considerations as specific award criteria is recommended when adopting MEAT (art. 95 c.6 of the Code). Additional technical points can be assigned to products for which the suppliers have demonstrated – through the adoption of specific management systems envisaging *HRDD* – that specific supply chain phases operations respected international human rights and international labour standards specified under Appendix B. Nonetheless, the points shall be assigned in a proportional way according to the number of production phases that are controlled in a transparent and proportional way and based on audits and controls executed.

Further, in the execution of the contract, setting up specific contract performance conditions related to social aspects in the supply chains is allowed. Art. 100 of the Code, indeed, provides that “contract performance conditions can be related to social and environmental needs”. The Decree recommends, among others, the implementation of ethical supply chain management systems and the requirement that contractors must respect human rights during the entire duration of the contract. Furthermore, for monitoring the compliance with the requirements, on-site audits, unannounced visits, desktop-audits, off-site interviews with trade unions and local NGOs can be required for different supply chain phases. The results of the audits must be communicated to the contracting authority and in the case of critical issues to the local authorities. At the end of the audit process, a comprehensive report of all actions taken must be produced.

Similarly, the **CAM-workshoes and leatherware**, updated in 2018 includes human rights requirements, acknowledging the complexity and fragmentation of leather production supply chains, which may have significant impacts on workers conditions. The Decree, thus, suggests to integrate social criteria related to human rights, workers' rights and labour conditions in the bidding documents, to ensure increased traceability of raw materials and transparent processes. Similarly to textiles, voluntary human rights criteria are recommended as selection criteria, award criteria and contract clauses. A peculiarity is that a specific *mandatory* requirement on “supply chain transparency and traceability” is provided under technical specifications. It requires the supplier to identify and map the entire supply chain, with the possibility to be exposed to on-site audit.

The **CAM-office furniture** updated by Ministerial Decree n. 167/2019, refers to human rights risks especially related to wood and timber production. The Decree clearly outlines that the supplier must comply with principles of social responsibility and minimum social standards defined by a

number of international human rights and ILO Conventions. Furthermore, as means of verification, the economic operator must submit documentation demonstrating compliance with the rights covered by the International Conventions, for instance through SA 8000 certification or equivalent. Where suppliers do not hold such certification, they must at least demonstrate that they have followed the *structured dialogue* recommended under the aforementioned Ministerial Guide.

Finally, the **CAM-food and catering** (updated in 2020) highlights the urgency to reduce social impacts and human rights risks raising throughout all supply chain phases of food production – entailing sowing, cultivation, harvesting – especially in case of intensive cultivation (MITE, 2022). The social aspects to consider concern: the conditions of farm workers, especially seasonal workers, to avoid their exploitation; the support, indirectly, to local economies and small producers introducing zero-km and reduced supply chains; the fair compensation of catering companies and farmers; poverty conditions and food insecurity of populations, to avoid deprivation of valuable food resources; the use of fair trade products; the employment of disadvantaged or differently-abled people and the use of social agriculture processes (Law No. 141/2018). Human rights concerns and traceability requirements are recommended not only for exotic products (fruits, coffee, chocolate) where most requirements relate to production from fair-trade, under a recognised certification scheme or multi-stakeholder initiative. Human rights and labour exploitation risks relates also to national challenges, considering the phenomena of informal work and “*caporalato*”⁶ (Fasciglione, 2022). To fight this phenomenon and ensure that food produced through forms of exploitation is not served in public canteens, a *structured dialogue* along supply chains between buyers and suppliers is envisaged, tracing back the supply chains all the way back to the farms where the products come from, in order to verify, also on the spot, how work is managed even in labour-intensive phases as harvesting.

In conclusion, the approach introduced by the Italian legislator recommending human rights criteria, *HRDD* and ethical management systems for more responsible supply chains of high risk produces, provides a potential example for inspiration and a way forward future development. Nonetheless, data on their effective implementation are still missing as their application is in an embryonal stage. More data is available on the implementation of the mandatory green requirements, outlining potential benefits but also multiple obstacles. These range from monitoring and enforcement challenges, together with lack of resources and capacities of single public administrations as outlined by the *Italian GPP Observatory survey 2021*, and which must be addressed with mandatory approaches and increased harmonization at EU and national level. However, the case of CAMs could provide inspiration for further developments in other MSs in this direction and at EU level for more harmonization on human rights criteria in public procurement.

5. Conclusion

The high exposure to human rights risks along complex global supply chains, and the lack of effective legal mechanisms at international and EU level requires to shed light on the role of public procurement. Bridging *B&HR* and public procurement constitutes a core challenge and opportunity justified by multiple arguments. Indeed, States as mega-consumers can strategically

⁶ Illegal phenomenon of recruitment and exploitation of workers through intermediaries, the so-called '*caporali*'.

encourage responsible business conduct of suppliers. Although a clear set of obligations on public procurement and human rights is missing, creating uncertainties, legal grounds of justification exist at international law level. Patterns of development under EU law on B&HR suggest the existence of an obligation to prevent human rights abuses for public purchasers.

Exploring EU public procurement law (the EU Public Sector Directive) a set of “legal possibilities” to include human rights considerations can be found. However, dilemmas and limitations in their implementation are evident, hindering contracting authorities’ potential willingness. Regardless limitations intrinsic to the law, possible future developments, such as the proposed Directive on Corporate Sustainability Due Diligence suggest impacts at procurement level, providing more legal grounds of justification.

Exploring MSs’ insight from practice, the peculiar Italian experience on mandatory sustainability criteria and peculiar voluntary human rights prescribed by CAMs, shows interesting experimentation. Despite implementation difficulties and the fact that the human rights criteria are still voluntary, the approach based on minimum social criteria and *structured dialogue* among buyers and suppliers represents a possible way forward that could inspire future developments and harmonization on public procurement and B&HR.

ANNEX 1 – Minimum sustainability requirements in Italy

Category	Normative framework (Ministerial Decree)	Voluntary social criteria
Office Furniture	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 23/2017</u> • Updated by <u>Decreto correttivo</u> (DM 3 luglio 2019, in G.U. n. 167 del 18 luglio 2019) 	YES
Urban Furniture	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 50/2015</u> 	
Nappies	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 16/2015</u> 	
Workshoes And Leatherware	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 125/2018</u> 	YES
Paper	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 102/2013</u> 	
Ink Cartridges	<ul style="list-style-type: none"> • CAM approved by <u>DM 261/2019</u> • Explanatory document: <u>Circolare esplicativa (2019)</u> 	
Public Works	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 259/2017</u> 	
Street Lighting (maintenance and management)	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 244/2017</u> 	
Street Lighting (Service)	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 98/2018</u> 	
Indoor Lighting, Heating and Air-Conditioning	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 74/2012</u> 	
Cleaning Services and Rental and Cleaning Of Linen	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 2/2021</u> 	
Urban Waste	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 58/2014</u> 	
Food and Catering	<ul style="list-style-type: none"> • CAM approved by <u>DM n. 65/2020</u>, in <u>G.U. n.90 del 4 aprile 2020</u>) • Supporting document: <u>Relazione di accompagnamento</u> 	YES
Sanitisation of Hospitals	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 51/2021</u> • Corrective Decree n. 24 September 2021 <u>G.U.R.I. n. 236 del 2 ottobre 2021</u>. 	
Printers	<ul style="list-style-type: none"> • CAM approved by <u>DM 261/2019</u> 	
Textiles	<ul style="list-style-type: none"> • <u>CAM</u>, including protective masks and individual protective equipment approved by <u>DM 30 giugno 2021</u>, in G.U.R.I. n. 167 del 14 luglio 2021 	YES
Vehicles	<ul style="list-style-type: none"> • <u>CAM</u> approved by <u>DM 157/2021</u> 	
Green Spaces	<ul style="list-style-type: none"> • CAM approved by <u>DM n. 63 del 10 marzo 2020</u>, in G.U. n.90 del 4 aprile 2020 	YES

References

- Agenzia Nazionale Anti-Corruzione (ANAC), (2020). Rapporto Annuale 2020.
- Andhov, M. & Mitkidis, K. P. (2017). Sustainability Requirements in EU Public and Private Procurement – A Right or an Obligation? University of Copenhagen Research Paper.
- Andhov, M. (2020). Contracting Authorities and Strategic Goals of Public Procurement – A Relationship Defined by Discretion? In Bogojevic Groussot & Hettne, (Eds.), (2020). *Discretion in EU Public Procurement Law*, Bloomsbury, 117-37.
- Andhov, M. & Risvig Hamer, C. (2021). Article 18-Public Procurement Principles. In Caranta R. & Sanchez-Graells, A. (Eds.), (2021). *European Public Procurement: Commentary on Directive 2014/24/EU*, Edward Elgar Publishing, 199-207.
- Ankersmit, L. (2020). The contribution of EU public procurement law to corporate social responsibility. *Eur Law Journal*, 26, 9–26.
- Agrawal T., Koehl L. & Campagne C., (2018). A secured tag for implementation of traceability in textile and clothing supply chain. *The International Journal of Advanced Manufacturing Technology*.
- Arrowsmith S & Kunzlik P. (2009). Public procurement and horizontal policies in EC law: general principles. In Arrowsmith & Kunzlik, (Eds.), (2009). *Social and Environmental Policies in EC Procurement Law: New Directives and New Directions*. Cambridge University Press.
- Ashraf N. & Van Seters, J. (2019). Sewing the pieces together: towards an eu strategy for fair and sustainable textiles. *ECDPM*.
- Bernaz, N. (2016). Business and human rights: History, law and policy - Bridging the accountability gap. *Taylor and Francis*.
- Botta, G. (forthcoming). Italy: Leading the Way towards Mandatory Sustainable Public Procurement through Minimum Environmental Criteria. In Caranta, R. & Janssen W. (Eds.), (forthcoming). *Mandatory green and social requirements in EU public procurement law: Reflections on a paradigm change in the European Union*, Bloomsbury.
- Caranta R. & Richetto S. (2010). Sustainable procurements in Italy: of light and some shadows. In Caranta R. & Trybus M. (Eds.), (2010). *The law of green and social procurement in Europe*, Djof Publishing Copenhagen, *European Procurement Law Series*.
- Caranta R., (2016). Labels as Enablers of Sustainable Public Procurement. In Sjaafjell, B. & Wiesbrock A. (Eds.), (2013). *SPP under EU Law: New perspectives as stakeholder*, Cambridge University Press.
- Caranta R. & Marroncelli S. (2021). Gli appalti pubblici tra mitigazione e resilienza: il contributo del GPP alla lotta contro i cambiamenti climatici. *Riv. giuridica dell'ambiente*, 23.i.
- Caranta, R. (2021). Public procurement for the SDGs – Rethinking the basics (2021), available at [SSRN](#).

Cassel D. (2020). State Jurisdiction over Transnational Business Activity Affecting Human Rights. In Deva, S. & Birchall, D. (Eds.), (2020). *Research Handbook on Human Rights and Business*. Edward Elgar Publishing.

Cellura, T. (2018). L'applicazione dei criteri ambientali minimi negli appalti pubblici – gli acquisti verdi dopo il correttivo al nuovo codice degli appalti. *Appalti & Contratti*, Maggioli Editore.

Cellura L. et al. (2022). Manuale per l'applicazione dei criteri sociali negli appalti pubblici – Strumenti e procedure per l'attuazione del Sustainable Procurement. *Appalti & Contratti*, Maggioli Editore.

Corvaglia M. A. (2017). Public Procurement and Labour Rights: Towards Coherence in International Instruments of Procurement Regulation. *Hart Publishing, Oxford*.

Corvaglia M. A. & Li, K. (2018). Extraterritoriality and public procurement regulation in the context of global supply chains' governance. *Eur. World*. 2(1).

<https://doi.org/10.14324/111.444.ewlj.2018.06>

CHRB Alliance, (2020). “Corporate Human Rights Benchmark: Key Findings Report”.

Craven, R. (2016). Subcontracting matters: Articles 43 and 71 of the 2014 Directive. In Ølykke & Sanchez-Graells (Eds.), (2016). *Reformation or Deformation of the EU Public Procurement Rules*, Edward Elgar, 295-317.

DIHR et al. (2016). Public Procurement and Human Rights: A Survey of Twenty Jurisdictions.

D' Hollander D. & Marx A. (2014). Strengthening private certification systems through public regulation: The case of sustainable public procurement. *Sustainability Accounting, Management and Policy Journal*, 5(1).

Delautre, G. (2019). Decent work in global supply chains: An internal research review. *Working paper 47*. Geneva: ILO.

Eamon, C. (2020). Civil liability for abuses of ILO core labour rights in European Union government supply chains: Ireland as a case study. In O'Brien, M. & Martin-Ortega, O. (2020). *Public Procurement and Human Rights: Opportunities, Risks and Dilemmas for the State as Buyer*, Edward Elgar Publishing.

EU Commission (2003). COM (2003) 302, Integrated Product Policy: Building on Environmental Life-Cycle Thinking.

EU Commission (2014). Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on Public Procurement and repealing Directive 2004/18/EC.

EU Commission (2021), 2021/C 237/01. Buying Social – A guide to taking account of social considerations in public procurement.

EU Commission (2022), COM/2022/66 final. Communication On Decent Work Worldwide For A Global Just Transition And A Sustainable Recovery.

EU Commission (2019), COM/2019/640. The European Green Deal.

EU Commission (2021), [COM/2021/350](#). Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery.

EU Commission (2022), [COM\(2022\)71](#). Proposal for a Directive Of The European Parliament And Of The Council on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937.

European Parliament (2021), Resolution [2020/2129\(INL\)](#): Recommendations as to the content of the proposal requested recommendations for drawing up a Directive of the EU Parliament and Council on corporate due diligence and corporate accountability.

Fasciglione M. (2022). Rapporto sulla Due Diligence d'Impresa nella Filiera Agroalimentare, IRISS-CNR.

Fiorentino, L. & La Chimia, A. (2021). Il procurement delle pubbliche amministrazioni. *Tra innovazione e sostenibilità*, Astrid Editore.

Gothberg, P. (2019). Public procurement and human rights in the healthcare sector: the Swedish county councils collaborative model. In O'Brien, M. & Martin-Ortega, O. (Eds.), (2019). *Public Procurement and Human Rights*, Edward Elgar.

Hansom, D. (2016). Mandatory exclusions: a new tool to protect human rights in EU public procurement? *International Learning Law on Public Procurement and Human Rights blog*.

ILO (2016). Decent work in global supply chains - Report IV to the 105th ILC. *Geneva*.

ILO (2020). Achieving decent work in global supply chains Report (accessed 12 November 2022).

La Chimia, A. (2019). Development aid procurement and the UNGPs on Business and Human Rights: Challenges and opportunities to move towards the new frontier of "Buying Justice". In Williams-Elegbe, S. & Quinot, G. (Eds.), (2018). *Public Procurement Regulation for the 21st Century Africa*, (JUTA).

GPP Observatory (2021). I numeri del Green Public Procurement.

Mazzantini, G. (2021). Analisi economica della spesa pubblica italiana. In Fiorentino, L. & La Chimia, A. (Eds.), (2021). Il procurement delle pubbliche amministrazioni. *Tra innovazione e sostenibilità*, Astrid Editore.

McCrudden, C. (2007a). *Buying Social Justice: Equality, Government Procurement & Legal Change*. Oxford University Press.

McCrudden, C. (2007b). *Corporate Social Responsibility and Public Procurement. The New Corporate Accountability: Corporate Social Responsibility And The Law*, Cambridge University Press, 2007.

O'Brien, M., (2015). Essential Services, Public Procurement and Human Rights in Europe. *University of Groningen Faculty of Law. Research Paper No. 22/2015*.

O'Brien, C. M. & Martin-Ortega, O. (2019). Public Procurement and Human Rights: Opportunities, Risks and Dilemmas for the State as Buyer. *Corporations, Globalisation and the Law series*, Edward Elgar.

O'Brien, C. M. & Martin-Ortega, O. (2020). "Human rights and public procurement of goods and services". In Deva S. & Birchall D. (Eds), (2020). *Research Handbook on Human Rights and Business*.

O'Brien, C. M. & Martin-Ortega O. (2020). Missing a Golden Opportunity: Human Rights and Public Procurement. In Deva, S. & Birchall, D. (Eds.), (2020). *Research Handbook on Human Rights and Business*.

O'Brien C. M. & Martin-Ortega O. (2022). Commission Proposal on Corporate Sustainability Due Diligence: Analysis From A Human Rights Perspective. *Policy Department for External Relations Directorate General for External Policies of the Union*.

Ministero dell'Ambiente (MITE), (2008). Piano di Azione Nazionale su Green Public Procurement, Decree n. 135/2008.

Ministero dell'Ambiente (MITE), (2015). Law 221/2015 on Environmental provisions to promote green economy measures and to limit the excessive use of natural resources (Collegato Ambientale).

Nielsen, H. N. (2017). Labour clauses in public contracts: ILO Convention no. 94 in the European Union after RegioPost. *Public Procurement Law Review*, 26(5), 201-219.

Ølykke, G. S. (2016). The provision on abnormally low tenders: a safeguard for fair competition? In Ølykke G. S., & Sanchez-Graells, A. (Eds), (2016). *Reformation or Deformation of the EU Public Procurement Rules*, Edward Elgar.

Outhwaite, O. & Martin-Ortega, O. (2016). Human rights in global supply chains: corporate social responsibility and public procurement in the European Union. *Human Rights and International Legal Discourse*.

Ruggie, J. G. (2013). Just business: multinational corporations and human rights. *First edition*. New York: W. W. Norton & Company.

Ricotta, S. (2014). Relazione italiana ed europea sui criteri sociali.

Semple, A. (2015). The Link to the Subject Matter: A Glass Ceiling for Sustainable Public Contracts? In Sjäffell & Wiesbrock (Eds.), (2015). *Sustainable Public Procurement under EU Law*. Cambridge University Press, 50-74.

Smit, L. et al. (2021). Human rights due diligence in global supply chains: evidence of corporate practices to inform a legal standard. *International Journal of Human Rights*, 25(6), 945-973.

Sanchez-Graells, A. (2020). Public Procurement and 'Core' Human Rights: A Sketch of the EU Legal Framework. In Martin-Ortega, O. & O'Brien, C. M. (Eds.), (2020). *Public Procurement and Human Rights*, Edward Elgar.

Sjaffell, B. & Wiesbrock A. (2016). Sustainable Public Procurement under EU Law: New Perspectives on the State as Stakeholder. *Cambridge University Press, Cambridge*.

Sjäffell, B. & Wiesbrock, A. (2015). Why should public procurement be about sustainability? In Sjäffell & Wiesbrock (Eds.), (2015). *Sustainable Public Procurement under EU Law: New Perspectives on the State as Stakeholder*, Cambridge: Cambridge University Press.

Stumberg, R. & Vander Meulen, N. (2019). Supply chain transparency in public procurement: lessons from the apparel sector. In Martin-Ortega, O. & O'Brien, C. M. (Eds.), (2019). *Public Procurement and Human Right, Elgar*.

Telles P. & Ølykke, G. S. (2017). Sustainable Procurement: A Compliance Perspective of EU Public Procurement Law. *EPPPL Review*, 239-252.

Ulfbeck, V. G., Andhov, A. & Mitkidis, K. (2019). Law and Responsible Supply Chain Management: Contract and Tort - Interplay and Overlap. *Routledge. Routledge Research in Corporate Law*.

UNGC (2018). Decent Work in Global Supply Chains. *Baseline report*.

UNHCHR (2011). Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy Framework".

Wiesbrock, A. (2016). Socially responsible public procurement: European value or national choice? In Sjaafjell & Wiesbrock (Eds.), (2016). *Sustainable Public Procurement under EU Law: New Perspectives on the State as Stakeholder, Cambridge University Press, Cambridge*.

Williams-Elegbe (2022). Public procurement as an instrument to pursue human rights protection. In Marx, A. et al. (Eds.), (2022). *Research Handbook on Global Governance, Business and Human Rights, Edward Elgar*.

Velluti, S. & Tzevelekos, V. P. (2018). Extraterritoriality of EU law and human rights after Lisbon: The case of trade and public procurement. *Europe and the World: A law review*.

Promoting sustainable public procurement through economic policy tools: From moral suasion to nudging

Désirée U. Klingler

Steven L. Schooner

Abstract

As the climate crisis accelerates and governments aspire to achieve more circular economies, this article encourages experimentation with innovative, interdisciplinary, and sustainable approaches that exploit governments' enormous spending power. Rather than waiting for legislative or regulatory changes, the article advocates driving sustainable public procurement (SPP) through efficient and available behavioral-economics-inspired "green defaults," nudging, persuading procurement officials, and, more broadly, rethinking the value proposition when confronted with price premiums.

Keywords

Comply or explain, Government contracts, Green defaults, Greenwashing, Life cycle cost analysis, Nudging, Sustainable procurement.

1. Introduction

In reaction to the April 2022 Intergovernmental Panel on Climate Change (IPCC) report, the United Nations (UN) Secretary General warned: "We are on a fast track to climate disaster [...]. Climate promises and plans must be turned into reality and action, now" (UN, 2022). In an era of outsourced government (Schooner & Swan, 2012; Schooner & Greenspahn, 2008), public procurement is poised to contribute to critical governmental efforts to mitigate the climate crisis in numerous ways: purchasing less harmful solutions, avoiding fossil fuel burning energy sources, and investing in, and creating markets for, new or more energy-efficient technologies, products, and services, ranging from solar panels and windmills to more sustainable foods and public infrastructure (Klingler, 2021; Klingler a, 2022). Government procurement spending, representing 13-20 percent of global GDP (The World Bank, 2020), offers fertile ground for accelerating sustainability initiatives, particularly to the extent that, increasingly, Constitutions, laws, and executive proclamations reference social and environmental goals (see e.g., Swiss Constitution, 1999, Articles 2 and 73 on "sustainable development"; U.S. Exec. Order No. 14057, 2021).

Experience, however, suggests that the primary hurdle impeding the public procurement community's conceptual and operational acceptance of evolving sustainable public procurement best practices derives from the longstanding, deeply entrenched tyranny of low purchase prices (Schooner, 2021, pp. 31; Schooner & Matsuda, 2021, pp. 7; Schooner & Speidel, 2020, pp. 37). Historically, governments designed procurement regimes to prioritize objectivity, transparency,

and corruption control or integrity (Schooner, 2002). The most common model, prevalent through the end of the 21st Century, emphasized publicly advertised solicitations, highly constrained offers (ranging from tenders to bids and proposals), and easily determined “winners,” typically the responsive firm that offered the lowest evaluated price. Not only were such regimes easy to replicate, but they required a lesser-skilled professional workforce and accommodated simple oversight and policing. Against that backdrop, many senior government officials scowl at governments consenting to above-market purchase prices and recoil at the thought of selecting a sustainable offer that requires what is perceived as the payment of a “price premium.”

Less than a decade ago, the EU and other countries reached a consensus to overcome the procurement community’s obsession with the lowest purchase price, and integrated sustainable considerations into the concepts of value for money and the most economically advantageous tender (Directive 2014/24/EU, Article 67). However, despite this regulatory opportunity to consider non-economic interests, rigid thinking, all-too-often dominated by the oversight of audit and budget institutes, struggles to acknowledge that the historical compliance-based approach to procurement (e.g., ensuring that the rules were followed), exacerbated by generations of transactional procurement data (e.g., how much was spent, how many offers were received, who and what type of firms received the contracts), fails to answer the government’s fundamental consumer questions: Does what we purchased work? Did it last? Did it aid us in achieving our governmental mission?

The evolving climate crisis necessitates that we answer a far more challenging question: how do we internalize what we previously ignored as environmental “externalities” but now recognize as the real effects of governments’ purchasing decisions? The UN Secretary General bemoaned: “Major cities under water. Unprecedented heat waves. Terrifying storms. Widespread water shortages. The extinction of a million species of plants and animals” (UN, 2022). These are the “externalities,” or the long-term effects of “saving” the marginal dollar by relying on the low-cost “brown” or “gray” energy solutions that defined and drove the industrial revolution (Garrett-Peltier, 2017; United Nations Economic Commission for Europe, 2011). Today, as the climate crisis accelerates, proactive government leaders increasingly realize that the question is no longer “how can we afford to make the investments required to procure more sustainable solutions?” Rather, as each successive IPCC report reminds us, the critical question becomes: “how can we afford not to?”

Our challenge, against this backdrop, is nothing less than a paradigm shift in public procurement toward greater sustainability and quality competition (Swiss Federal Procurement Conference (BKB), 2021; Swiss Federal Act on Public Procurement (PPA), 2019, Article 2) to dramatically alter procurement behavior and fundamentally change generations of procurement culture. Among other things, we must more intentionally define public procurement requirements or “needs” and justify (sometimes) higher upfront expenditures to reduce future carbon emissions. To the extent that most governments are reinventing their legislative and regulatory regimes too slowly, the authors suggest that familiar, readily available economic tools may help. In addition to reframing the value proposition, we also suggest that altering default positions (and economic model assumptions) with gentle behavioral “nudges” can open the door to procurement practices more likely to permit governments to adapt to and mitigate climate change.

2. Value: From price to sustainability

A. Reframing the value proposition

Procurement professionals commonly hide behind the specter of “higher prices” in rejecting sustainable procurement practices (Schooner & Speidel, 2020). On the one hand, this default position is understandable to the extent that most public procurement regimes (1) were designed to prioritize low purchase prices (which offer the benefit of objectivity) and (2) operate under persistent budget constraints. A more strategic (and economic) analysis exposes the fallacy of this type of thinking, yet the ingrained bias remains and must be overcome if governments are to achieve less harmful climate-related outcomes.

B. Can doughnut economics and procurement performance measurement change culture and overcome risk aversion?

The age-old adage “what gets measured gets managed” introduces both a daunting impediment to the adoption of sustainable public procurement practices, but also a powerful weapon to defeat the tyranny of low purchase prices (Barnett, 2015). Effectively integrating sustainability considerations into performance measurement (Klingler b, 2020; Schooner & Matsuda, 2021; Schooner & Speidel, 2020) pits consumer- or value-oriented outcomes against the formalism of low-price objectivity. When public procurement data systems focus exclusively on transactional data and venerate low purchase prices, low-price shoot-outs represent the gold standard, the coin of the realm. Consumers and behavioral economists routinely reject this simplistic rigidity. Instead, they recognize that low prices can represent false economies if what was purchased doesn’t work, meet their needs, or give them joy (Schooner & Matsuda, 2021).

Fixation on low prices proves particularly problematic in public procurement, where governments rely upon the private sector for the goods and services which they need to achieve government missions (Schooner & Swan, 2012; Schooner & Greenspahn, 2008). As Raworth explains in *Doughnut Economics*, “due to the scale and interconnectedness of the global economy, many economic effects that were treated as ‘externalities’ in the twentieth century have turned into defining social and ecological crises in the twenty-first century” (Raworth, 2017). By treating environmental effects and their associated costs as “externalities” in the perennial pursuit of low prices, governments have ignored the real, long-term costs of their procurement decisions or, at best, devalued the future costs of economic harms for which they must later bear responsibility (Union of Concerned Scientists, 2008). For example, unlike most consumers that weigh potential long-term savings, governments’ myopic focus on low purchase prices justified choosing fossil fuel burning vehicles over hybrid or electric, without acknowledging that doing so “buys” future health care expenditures, infrastructure damage and loss, food and water shortages, and, at worst, regional instability, migration, and war (Stand & Dimsdale, 2017; Klare, 2019).

C. Escaping the tyranny of low prices: life cycle cost analysis as a global best practice

Accordingly, procurement officials need to restate and rethink the value proposition upon which they base their purchasing decisions. The rapidly evolving global best practice entails adopting life-cycle cost (LCC) or life-cycle cost analysis (LCCA) (Czarnezki & van Garsse, 2019; Czarnezki, 2019; Andhov et al., 2019; Schooner & Matsuda, 2021; International Organization for

Standardization, 2017). Among other things, adopting LCCA tools—in acquisition planning, proposal evaluation, or comparing solutions—permits governments to internalize climate-related externalities or, in other words, consider the long-term effects of any given acquisition strategy or contractual outcome. LCCA thus permits governments to consider harmful environmental effects of a proposed contractual solution, or an offer’s social value, or both.

3. Moral suasion: better than nothing

Moral suasion offers the first of the three “cheap and easy” economic policy tools that we suggest for transitioning this new value proposition from dead letter into practice. To drive behavioral change, moral suasion shifts the focus, more broadly, to what is good or ethical or, quite simply, “doing the right thing.” Moral suasion can either be “pure,” when appealing to altruistic behavior, or “impure,” when backed by governmental coercion (Romans, 1996). Historically, pure moral suasion has gained traction in environmental law, while impure moral suasion appears mostly in economic policy, primarily deployed by central banks to curb inflation.

A. Morality’s role in economic and environmental policy

Although moral suasion, or the influence of moral considerations, remains largely absent from contemporary economic theory, it can play a valuable role in economic analysis (Sutinen, 1997). Adam Smith understood human economic motivation to be multidimensional, focusing on the psychic well-being that resulted from acting morally and receiving others’ approval (Smith, 1759; Sutinen, 1997). Similarly, Baumol and Oates found (at least some) potential for moral suasion to affirmatively impact environmental problems through voluntary programs to spur recycling, auto emission-control, and energy conservation (Baumol & Oates, 1979).

In the 1990s, the consideration of other non-economic goals was integrated into regulatory cost-benefit analyses (see Klingler, 2021). U.S. President Bill Clinton’s 1993 Executive Order established the basis for most modern cost-benefit analyses, conceding that many consequences of policies are difficult to quantify and emphasizing that qualitative concerns should be considered (U.S. Exec. Order 12866, 1993).

At the same time, “moral suasion appears to be undergoing a modern-day resurrection” (Romans, 1996). Just as President Bill Clinton deployed it to keep steel prices low and avoid labor strikes (Romans, 1996), strong executive statements—such as U.S. President Joe Biden’s Executive Order on “Federal Sustainability” (U.S. Exec. Order 14057, 2021) or the European Commission’s statement on “making sustainable products the norm” (European Commission, March 2022) — could similarly lead large-scale emitters to assume greater responsibility for their negative externalities—without the use of binding legal power.

B. Moral suasion can be effective

Healthy skepticism surrounds the use of moral suasion, with concerns ranging from the reward of non-compliance and lack of judicial review to uncertain effects on business decisions. Yet moral suasion is not demonstrably inferior to other policy instruments (Romans, 1996). All policies have opportunity costs, and moral suasion is often less costly than competing enforcement alternatives. It is certainly better than doing nothing (Romans, 1996; Sutinen, 1997).

Moral suasion can be an effective economic policy tool anytime the expected cost of non-compliance exceeds the cost of compliance (Romans, 1996). For example, Sutinen concluded that marine debris

would be disposed of legally (rather than being “dumped”) when the illegal disposal cost, plus the expected penalty, *and* the psychic and social influence cost, *cumulatively* exceed the legal disposal cost (Sutinen, 1997).

While these studies focused on the costs to the regulated party, the same rationale can be applied to costs to society. To achieve more sustainable public procurement, governments can effectively deploy moral suasion if, for example, the costs of carbon emissions from an “unsustainable” contract exceed the costs of delivering a more sustainable solution. Of course, this assumes a culture in which contractors face institutional or reputational harm (like Sutinen’s psychic and social influence cost) if they deliver unsustainable products and services.

Effective moral suasion policies require two necessary conditions: (1) the public must support the government’s position, and (2) the population to be persuaded must be small (Romans, 1996). In a democratic framework, the first condition entails public and political support of related policies (Romans, 1996). Evidence of political support of social and environmental sustainability in public contracting appears in new procurement legislation (see Directive 2014/24/EU, Article 67) and evolving procurement guidance (Danish Competition and Consumer Authority, 2018).

The second condition explains why moral suasion used by central bank works in England, but not in the United States. While only five English major banks must be persuaded; the large number of commercial banks in the U.S. makes it impossible to identify the culprits of non-compliance (Romans, 1996). Thus, for moral suasion to drive sustainable procurement, the relevant pool of qualified contractors must be small—such as in the case for complex infrastructure projects (but not for most off-the-shelf commercial items). Hence, moral suasion’s potential to promote sustainable public procurement appears greatest (1) where the public perceives an environmental interest and (2) in oligopolistic market sectors.

C. Moral suasion works best in combination with other policy tools

Moral suasion, of course, offers no silver bullet. A study on the preservation of waterfowl habitats in Canada found that “economic incentives [...] are inadequate because they ignore nonmarket costs, and that a positive attitude towards habitat preservation cannot be used as a substitute for monetary incentives” (van Kooten & Schmitz, 1992; Romans, 1996). This suggests that (a) while economic incentives do not account for nonmarket costs, moral suasion can and does, and (b) that moral suasion is a valuable complement but *cannot alone* replace financial incentives. Hence, moral suasion works, but only in combination with other policy instruments—such as the ones discussed below.

4. Disclosure: between regulation and nudges

To the extent that leading private sector firms currently possess greater knowledge, insight, expertise, resources, and understanding of many relevant aspects of sustainability than a typical public procurement office, governments need to alleviate what economists call “information asymmetries.” Governments can increase internal expertise or outsource information mandates to the private sector. For example, the U.S. Environmental Protection Agency (EPA) Greenhouse Gas (GHG) inventory regime provides a rubric for private sector firms to quantify, assess, attempt to reduce, and most importantly, publicly disclose their Scope 1 (direct), 2 (indirect), and 3 (related, including supply chain) emissions (The Greenhouse Gas Protocol, 2015; EPA, 2011). Similarly, the nascent Science Based Targets initiative (SBTi) offers private sector firms “a clearly-defined path

to reduce emissions in line with the Paris Agreement goals” (Science Based Targets, 2021). Thoughtful acquisition planning permits procurement professionals to design competitions, articulate evaluation factors, and craft solicitation inquiries to generate disclosures (e.g., that an offeror generates lesser emissions) that can be weighed against lower offered prices.

At the risk of encouraging “virtue signalling” or, in the pejorative, the expression of a moral viewpoint with the intent of communicating a good character that is exaggerated or insincere, governments may reap significant returns by highlighting competitive preferences for, and contractual awards made to, firms that offer more environmentally friendly solutions (see “peer effect” below). It is easy to underestimate the potential impact of offering firms a competitive advantage if they not only promise, but can demonstrate, lesser emissions than their peer competitors. For example, public procurement experts realize that firms go to great lengths (and willingly sustain significant losses) to obtain their first government contract (or their first contract with a specific government ministry), because such a contract serves as an imprimatur or quality seal that increases access to other markets, such as sub-central government instrumentalities. At the same time, from a government consumer perspective, modelling, or recognizing specific contractor actions that serve as a positive example (see “heuristics” below), is widely recognized as a fundamental component of public procurement training and professional development.

Governments possess other common procurement-related tools that might be deployed based upon these firms’ disclosures (or failures to disclose). For example, most states operate legal regimes to formally and publicly exclude corrupt or incompetent contractors (Swan, 2021). Governments could expand the mandates of “blacklisting,” suspension, and debarment regimes to eliminate firms that continue to rely on (or exclusively offer) fossil fuel solutions. Even if these tools are not aggressively deployed in this manner, we expect they will come to the fore as states identify and seek to not only “shame” but avoid firms that over-promise or fail to deliver on their emission-reduction promises, or worse, engage in demonstrable “greenwashing” by claiming that their products are more environmentally friendly than science can confirm (Kenton, 2022).

5. Nudging procurement agencies into buying green

Nudging utilizes the human preference for the path of least resistance. As Thaler and Sunstein summarize: “a nudge is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not” (Thaler & Sunstein, 2008).

We suggest two common nudges—green defaults and social-proof heuristics—to promote sustainability in public procurement.

A. Green defaults and the “comply or explain” approach

In nudge theory, the default effect describes an agent’s tendency to accept the “automatic” or pre-selected option (Altman, 2017). Possible explanations are the cognitive effort (Gigerenzer, 2008) and the switching costs it takes to change the default (relying on human inertia or laziness) or an interpretation of the default as a recommendation from the policy maker (McKenzie, 2008). For example, in a rural German town that adopted renewable energy as the default source of electricity, ninety-nine percent of households embraced the green energy default; in other German

towns, usually only one percent would use green energy (Pichert & Katsikopoulos, 2008). In other words, a green default completely reversed the proportions.

We suggest experimentation with green defaults to promote sustainable public procurement. For example, governments could direct that procuring agencies call for (or specify) exclusively sustainable products and services, with the option that *agencies* opt out if satisfactory products or services are unavailable (like the opt-out option of the Buy American Act when domestic products are unavailable (Buy American Act, § 8303(b)(3), 2022). At the same time, requiring the generation of additional documentation for opting out also serves as a disincentive for procurement officials. Similarly, requiring an approved eco-label or standard (see e.g., U.S. General Services Administration, n.d.) for framework agreements, e-catalogues, and other high-volume purchases of common or so-called “commercial” products or services, could serve as a valuable default, and yet grant purchasers an opt out.

With its 2018 “comply or explain” approach, the Danish Competition and Consumer Authority implemented a similar idea for social policies. The agency either must include internships in its public contracts or publicly explain why it does not (Danish Competition and Consumer Authority, 2018). This comply or explain approach is traditionally used in corporate governance or financial supervision (see more on “regulatory shaming” in Yadin, 2019). If investors do not like the company’s explanation, selling their shares constitutes a “market sanction” rather than a legal one. Like the Danish approach, procurement policies could combine the default with a shaming element: if the agency either does not craft a “green” tender or include sustainability clauses in its public contracts, the agency must publicly explain its deviation.

B. Deploying heuristics to accelerate sustainable procurement

Another common nudge involves social-proof heuristics, which are decisional shortcuts or mental rules-of-thumb that reduce time and cognitive effort (Cheung, 2017; Shah & Oppenheimer, 2008). For example, we tend to look at others’ behavior as a reference for our own (Cheung, 2017; Cialdini, 2009). Studies analyzing people’s (healthy versus unhealthy) food choices, for example, when shopping on an empty stomach (Cheung, 2017), demonstrate this “peer effect” heuristic. When participants observed others choose a healthy snack, they were more likely to follow suit (Burger et al., 2010; Prinsen et al., 2013; Salmon et al., 2014).

To nudge procurement agencies into more sustainable purchasing, they can be shown positive examples of towns, municipalities, and federal agencies that procured sustainably. The European Green Deal refers to this approach as “leading by example” (European Commission, 2019). Other than suggesting an electronic product passport, it does not further detail *how* public authorities should lead by example. As one possibility, the authors of this paper suggest that when a contracting authority places a tender in the procurement database, the database could display a pie chart of sustainable versus unsustainable tenders in the relevant sector. This nudge seems to be particularly promising when the pie chart references peers that traditionally have taken a pioneering role in a country—like Zurich or Bern in Switzerland, or the Department of Defense in the United States (which accounts for nearly two-thirds of U.S. federal procurement spending) (U.S. Government Accountability Office, 2021).

Similarly, advertising “green champions,” private contractors that have delivered environmentally and socially sustainable services and products to the government (which,

conceptually, is the opposite of blacklisting), could “nudge” more contractors to create sustainable solutions and submit offers that meet or exceed sustainable tender requirements.

6. Conclusion

Public procurement systems are best understood as complex outsourcing regimes, animated and constrained by complex webs of regulations. Unfortunately, in too many jurisdictions, public procurement officials have evolved into risk-averse and compliance-oriented bureaucrats and functionaries (Gordon, 2006; Kidalov et al., n.d.; but see Arena et al., 2018). Until governments reinvent their procurement laws and practice, and dramatically alter their priorities, the public procurement regimes and people that implement them will struggle to deploy the mass of government spending necessary to mitigate climate change’s effects (Schooner & Speidel, 2020; Schooner & Matsuda, 2021). This article offers several alternatives and—primarily economic—policy tools to aid public procurement officials in combating the climate crisis until legislative and regulatory reforms come to fruition.

Rethinking the value proposition—focusing on life-cycle costs rather than low purchase prices—makes good business (and, frankly, common consumer) sense. Rethinking what matters in economics—focusing on outcomes rather than processes or prioritizing the public’s quality of life over firms’ profit maximization—seems consistent with the purposes for governments’ existence (Raworth, 2017). Exploiting the evolving research in behavioral economics suggests that harnessing the power of changing default behaviors and nudging officials in the right direction can pay enormous dividends. Stressing the importance of doing the right thing or focusing on what matters, rather than what is easy to measure, also seems like a worthwhile experiment.

We take heart from one of the small but significant successes of the U.S. government’s 1990s acquisition reform movement, in which the following sentence was added to the Federal Acquisition Regulation (FAR)’s guiding principles: “In exercising initiative, Government members of the Acquisition Team may assume if a specific strategy, practice, policy or procedure is in the best interests of the Government and is not addressed in the FAR, nor prohibited by law (statute or case law), Executive Order or other regulation, that the strategy, practice, policy or procedure is a permissible exercise of authority” (FAR 1.102-4(e), 2022). That simple message continues to resonate today: if the rules don’t prohibit integrating sustainability considerations into your acquisition planning, and you think it is in the best interest of the government customer and, more broadly, the public, then try it.

The climate crisis demands—at least as much as economic crises do—that governments (and our societies) change dramatically, evolve quickly, and experiment with innovative approaches. Public procurement expenditures—and, thus, public procurement policies—offer important opportunities to accelerate the necessary change (see e.g., Klingler a, 2020, suggesting making use of “expansionary procurement policies” to alleviate the negative consequences of recessions after the Covid pandemic). The enormous stakes and tremendous spending power of governments (what can be understood as the macroeconomic dimension of public procurement) demand that governments consider, experiment with, and implement new and innovative approaches. Fortunately, numerous potentially powerful economic policy tools are available. We encourage governments to try them.

Acknowledgments

The authors thank Sarah J. Reisinger, Law Student at the George Washington University, for her diligent and professional research assistance.

References

- Altman, M. (2017). Aspects of Smart Decision-Making. In Altman, M. (Eds.), (2017). *Handbook of Behavioural Economics and Smart Decision-Making*. Edward Elgar Publishing Limited.
- Arena, M. V., Persons, B., Blickstein, I., Chenoweth, M. E., Lee, G. T., Luckey, D., & Schendt, A. (2018). Assessing Bid Protests of U.S. Department of Defense Procurements: Identifying Issues, Trends, and Drivers. *RAND Corporation*.
- Barnett, P. (2015). If What Gets Measured Gets Managed, Measuring the Wrong Thing Matters. *Corporate Financial Review*, 19, 5-10.
- Baumol, W. J. & Oates, W. E. (1979). *Economics, Environmental Policy, and the Quality of Life*. Prentice-Hall.
- Burger, J. M., Bell, H., Harvery, K., Johnson, J., Stewart, C., Dorian, K., & Swedroe, M. (2010). Nutritious or Delicious? The Effect of Descriptive Norm Information on Food Choice. *Journal of Social and Clinical Psychology*, 29(2), 228-242.
<https://doi.org/10.1521/jscp.2010.29.2.228>.
- Buy American Act, 41 U.S.C. § 8303(b)(3) (2022).
- Cheung, T. T. L., Kroese, F. M., Fennis, B. M., & De Ridder, D. T. D. (2017). The Hunger Games: Using hunger to promote healthy choices in self-control conflicts. *Appetite*, 116, 401-409.
<https://doi.org/10.1016/j.appet.2017.05.020>.
- Cialdini, R. B. (2009). *Influence: Science and Practice* (5th ed.). Pearson Education.
- Czarnezki, J. J., (2019). *Green Public Procurement: Legal Instruments for Promoting Environmental Interests in the United States and European Union*. Uppsala Universitet.
- Czarnezki, J. J. & Garsse, S. V. (2019). What Is Life-Cycle Costing? In Andhov, M., Caranta, R., & Wiesbrock, A. (Eds.), (2019). *Cost and EU Public Procurement Law: Life-Cycle Costing for Sustainability*. Routledge.
- Danish Competition and Consumer Authority. (2018, December 19). *Guidance on Social Clauses in Tenders*. <https://www.kfst.dk/nyheder/kfst/ok-nyheder/2018/20181219-ny-udgave-af-vejledning-om-sociale-klausuler-i-udbud/>.
- Directive 2014/24/EU. *On public procurement and repealing Directive 2004/18/EC*. European Parliament and Council.
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0024>.
- European Commission. (2022, March 30). *Green Deal: New proposals to make sustainable products the norm and boost Europe's resource independence*.
https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2013.

European Commission. (2019, November 12). *Communication From the Commission: The European Green Deal*.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN>.

Exec. Order No. 14057, 86 Fed. Reg. 70935 (2021, December 13).

Federal Acquisition Regulation, 48 C.F.R. 1.102(d) (2022).

Garrett-Peltier, H. (2017). Green versus brown: Comparing the employment impacts of energy efficiency, renewable energy, and fossil fuels using an input-output model. *Economic Modelling*, 61, 439-447.

<https://doi.org/10.1016/j.econmod.2016.11.012>.

Gigerenzer, G. (2008). Why Heuristics Work. *Perspectives on Psychological Science*, 3(1), 20-29.

Gordon, D. I. (2006). Constructing a Bid Protest Process: Choices Every Procurement Challenge System Must Make. *Public Contract Law Journal*, 35, 427-445.

U.S. General Services Administration (GSA). (n.d.). *GSA Environmental Program Aisle*.

https://www.gsaadvantage.gov/advantage/ws/search/special_category_search?cat=ADV.ENV.

International Organization for Standardization (ISO). (2017, April). *ISO 20400:2017: Sustainable Procurement – Guidance*.

<https://www.iso.org/standard/63026.html>.

Intergovernmental Panel on Climate Change (IPCC). (2022). *Climate Change 2022: Mitigation of Climate Change*. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (hereinafter IPCC Report). Retrieved May 17, 2022 from https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf.

Kenton, W. (2022, March 22). *What Is Greenwashing?*. Investopedia.

<https://www.investopedia.com/terms/g/greenwashing.asp>.

Kidalov, M., Angelis, D., Sheinman, B., & Benishek, P. (n.d.) *Better Acquisition Management Through ADR and Other Best Practices for Preventing and Resolving Bid Protests* [PowerPoint Slides] (slide 39).

<https://dair.nps.edu/bitstream/123456789/325/1/NPS-AM-10-103.pdf>.

Klare, M. T. (2019). *All Hell Breaking Loose: The Pentagon's Perspective on Climate Change*. Metropolitan Books.

Klingler, D. U. (2021). Fair Pay and Safe Workplaces: Reassessing the Costs and Benefits in Government Contracting. *Yale Journal on Regulation*, 39(69), 69-98.

Klingler, D. U. (2020). Government Purchasing during COVID-19 and Recessions: How Expansionary Legal Policies Can Stimulate the Economy. *Public Contract Law Journal*, 50(1), 1-35.

Klingler, D. U. (2020). Measuring What Matters in Public Procurement Law: Efficiency, Quality and More. *Journal of Management Policy and Practice*, 21(3), 73-98.

McKenzie, C. R. M., Liersch, M. J., & Finkelstein, S. R. (2006). Recommendations Implicit in Policy Defaults. *Psychological Science*, 17(5), 414-420.

Pichert, D. & Katsikopoulos, K. V. (2008). Green defaults: Information presentation and pro-environmental behavior. *Journal of Environmental Psychology*, 28(1), 63-73.

Prinsen, S., de Ridder, D. T. D., & de Vet, E. (2013). Eating by example. Effects of environmental cues on dietary decisions. *Appetite*, 70, 1-5.
<https://doi.org/10.1016/j.appet.2013.05.023>.

Raworth, K. (2017). *Doughnut Economics: 7 Ways to Think Like a 21st Century Economist*. Chelsea Green Publishing.

Romans, J. T. (1966). Moral Suasion as an Instrument of Economic Policy. *American Economic Review*, 56(5), 1220-1226.

Salmon, S. J., Fennis, B. M., de Ridder, D. T. D., Adriaanse, M. A., & de Vet, E. (2014). Health on impulse: when low self-control promotes healthy food choices. *Health Psychology*, 33(2), 103-109.
<https://doi.org/10.1037/a0031785>.

Schooner, S. L. (2002). Desiderata: Objectives for a System of Government Contract Law. *Public Procurement Law Review*, 11, 103-119.

Schooner, S. L. (2021). No Time to Waste: Embracing Sustainable Procurement to Mitigate the Accelerating Climate Crisis. *Journal of Contract Management*, 61(12), 24-33.

Schooner, S. L. & Greenspahn, D. (2008). Too Dependent on Contractors? Minimum Standards for Responsible Governance. *Journal of Contract Management*, 6, 9-25.

Schooner, S. L., & Matsuda, E. (2021). Sustainable Procurement: Building Vocabulary To Accelerate The Federal Procurement Conversation. *GWU Legal Studies Research Paper* (2021-44).

Schooner, S. L. and Speidel, M. (2020). 'Warming Up' to Sustainable Procurement. *Contract Management*, 60(10), 32-41.

Schooner, S. L. & Swan, C. D. (2012). Dead Contractors: The Un-Examined Effect of Surrogates on the Public's Casualty Sensitivity. *Journal of National Security Law & Policy*, 6, 11-59.

Science Based Targets. (2021). *Set a Target*.
<https://sciencebasedtargets.org/step-by-step-process>.

Shah, A. K., & Oppenheimer, D. M. (2008). Heuristics Made Easy: An Effort-Reduction Framework. *Psychological Bulletin*, 134(2), 207-222.
<https://doi.org/10.1037/0033-2909.134.2.207>.

Smith, A. (1759). *The Theory of Moral Sentiments*. George Bell & Sons.

Stand, G. and Dimsdale, T. (2017). The EU and Climate Security. *European Union Institute for Security Studies*.

<https://www.jstor.org/stable/resrep17900>.

Sutinen, J. G. (1997). A Socioeconomic Theory for Controlling Marine Debris: Is Moral Suasion a Reliable Policy Tool? In J. M. Coe & D. B. Rogers (Eds.), (1997). *Marine Debris: Sources, Impacts, and Solutions* (Ser. Springer Series on Environmental Management, pp. 161-170). Essay, Springer-Verlag.

Swan, C. D. (2021). *Global Suspension & Debarment Directory*. The World Bank.

<https://www.worldbank.org/content/dam/documents/sanctions/office-of-suspension-and-debarment/other-documents/Global%20Suspension%20and%20Debarment%20Directory.pdf>.

Swiss Federal Act on Public Procurement (PPA). (2019, June 1). Federal Assembly of the Swiss Confederation.

<https://www.fedlex.admin.ch/eli/cc/2020/126/en>.

Swiss Federal Procurement Conference (BKB). (2021, May 5). Revision of the Swiss Public Procurement Law.

<https://www.bkb.admin.ch/bkb/de/home/themen/revision-des-beschaffungsrechts.html>.

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving Decisions About Health, Wealth, and Happiness*. Yale University Press.

The Greenhouse Gas Protocol. (2015). *A Corporate Accounting and Reporting Standard*.

<https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>.

The World Bank. (2020, March 23). *Global Public Procurement Database: Share, Compare, Improve!*

<https://www.worldbank.org/en/news/feature/2020/03/23/global-public-procurement-database-share-compare-improve>.

Union of Concerned Scientists (2016). The Hidden Costs of Fossil Fuels. Retrieved June 10, 2022 from

<https://www.ucsusa.org/resources/hidden-costs-fossil-fuels>.

United Nations. (2022, April 4). *Secretary-General Warns of Climate Emergency, Calling Intergovernmental Panel's Report 'a File of Shame', While Saying Leaders 'Are Lying', Fueling Flames*. United Nations Meetings Coverage and Press Releases. Retrieved July 1, 2022, from

<https://www.un.org/press/en/2022/sgsm21228.doc.htm>.

United Nations Economic Commission for Europe (UNECE), Timber Committee, 69th Session. (2011). *Country Market Statement 2011: Switzerland*.

U.S. Government Accountability Office (GAO). (2021, June 22). *A Snapshot of Government-Wide Contracting for FY 2020 (infographic)*.

<https://www.gao.gov/blog/snapshot-government-wide-contracting-fy-2020-infographic>.

van Kooten, G. C. & Schmitz, A. (1992). Preserving Waterfowl Habitat on the Canadian Prairies: Economic Incentives versus Moral Suasion. *American Journal of Agricultural Economics*, 74(1), 79-89.

<https://doi.org/10.2307/1242992>.

Yadin, S. (2019). Regulatory Shaming. *Environmental Law*, 49(2), 407-451.

Sustainability public procurement using new procedures of the 2014 Directives

François Lichère

Keywords

Competitive dialogue, Competitive procedure with negotiation, Innovation partnerships, Sustainable public procurement.

1. Introduction

It is common knowledge that the current directives on public contracts 2014/23/EU, 2014/24/EU and 2014/25/EU allow the use of award rules to foster sustainability. In particular, the main directive on public procurement, i.e. Directive 2014/24/EU, states that ‘this Directive clarifies how the contracting authorities can contribute to the protection of the environment and the promotion of sustainable development while ensuring that they can obtain the best value for money for their contracts’ (recital 91). It stems from it that this new ‘horizontal’ objective must be conciled with the core of public procurement rules, best value encapsulating free access to public contracts, equal access and transparency. In other words, there might be situations where those core principles may limit the use of public procurement for enhancing sustainability.

Bearing in mind this potential conflict, can the new award procedures put in place in 2014 be an efficient tool to promote the sustainability objective? Here lies the question we propose to deal with in this article.

One must first make clear what the expression of new award procedures covers since the 2014/24/EU directive does not refer to any ‘new procedures’. When it comes to novelties, it only refers to ‘new rules’ for cross border joint procurement (recital 72). But making no reference to any new procedures does not necessarily mean that no new award procedure was introduced. Indeed, at least one may be ranked in this category. Strictly speaking, the only real new procedure introduced in 2014 is the innovation partnership. It is aimed ‘at the development of an innovative product, service or works and the subsequent purchase of the resulting supplies, services or works, provided that they correspond to the performance levels and maximum costs agreed between the contracting authorities and the participants’ (article 31.2 of directive 2014/24). ‘In the procurement documents, the contracting authority shall identify the need for an innovative product, service or works that cannot be met by purchasing products, services or works already available on the market. It shall indicate which elements of this description define the minimum requirements to be met by all tenders. The information provided shall be sufficiently precise to enable economic operators to identify the nature and scope of the required solution and decide whether to request to participate in the procedure’. There can be either just one or several partner in developing the innovative solutions (article 31.1 of directive 2014/24) (Cerqueira Gomes, 2021).

However, two other procedures are relevant for the topic we are addressing: the competitive procedure with negotiation and the competitive dialogue. They actually existed before – the former under a different name – but they can be treated as new non just because their legal regimes have

been slightly updated but because, and more importantly, the legal conditions set for their use have been considerably extended. For instance, under the 2004 directive, competitive dialogue was only allowed when a procurement contract was ‘particularly complex’ i.e. when contracting authorities were not objectively able to define the technical means capable of satisfying their needs or objectives, and/or were not objectively able to specify the legal and/or financial make-up of a project (article 1.11.c of Directive 2004/18/EU). Negotiated procedures, as they were then called, were allowed in a limited number of exceptional situations. Both procedures are now subject to the same conditions so widely drafted that they are very likely to be easily met in practice (article 26.4.a. of Directive 2014/24/EU) (Telles and Butler, 2021).

The following reflections are based on the analysis of the text of the Directives, of the legal and economic literature regarding sustainable public procurement (SPP) and on a survey that the Chair on public contracts law is currently running¹. This Chair uses on the field investigation methods (interviews, online surveys) in order to assess the impact of public contracts rules on the actual purchasing practice. We will first analyse why these new procedures could have been a good tool for sustainable public procurement and then why this has not the case before drawing some conclusions.

2. Why the new award procedures could be good vehicles for SPPs?

In theory these new procedures should be a good legal vehicle for SPP. True, these new procedures were not introduced in the EU legislation as a way to enhance SPP, but in order to introduce more flexibility in the public sector buying practices. Precisely this flexibility may contribute to a good use of SPP.

Indeed, several economic studies have pointed out that one of the main obstacles for using public procurement to foster sustainability is the lack of knowledge and competence of civil servants in charge of drafting the award process and the future contracts. Flexibility may help contracting authorities to use SPP by allowing market participants to inform contracting authorities about innovative goods, services or production and construction processes enhancing sustainability. For example, all three procedures offer the option of reducing the number of candidates to be invited to submit tenders, or to set a staged procedure in order gradually to reduce the number of tenders to be negotiated or solutions to be discussed. This flexibility allows contracting authorities to learn from the market.

Innovation partnership and competitive dialogue enable the contracting authorities to set the technical specifications in a way to promote horizontal goals. Article 42.1 of Directive 2014/24/EU provides that ‘The technical specification shall lay down the characteristics required of a works, service or supply. Those characteristics may also refer to the specific process or method of production or provision of the requested works, supplies or services or to a specific process for another stage of its life cycle even where such factors do not form part of their material substance provided that they are linked to the subject-matter of the contract and proportionate to its value and its objectives’. Article 42.1. is not specific to the above-mentioned procedures, but they authorize the definition of those specifications in such a way that will allow candidates to make

¹ <https://chairedcp.univ-lyon3.fr/>

proposals during the award procedure, thus creating the condition for a knowledge transfer from the market to the contracting authority.

Competitive dialogue seems to be even more adequate to this end: article 30.3 of Directive 2014/24/EU reads ‘Contracting authorities shall open, with the participants selected in accordance with the relevant provisions of Articles 56 to 66, a dialogue the aim of which shall be to identify and define the means best suited to satisfying their needs. They may discuss all aspects of the procurement with the chosen participants during this dialogue.’

Despite the clear potential synergies between the flexibility inherent in these three new procedures and SPP, it seems that SPP do not depend on their use. In the legal and economic literature, no references are made to those procedures nor to any types of procedures. In other words, award procedures appear neither as obstacles nor as incentives to SPP. In the interview the Chair is currently running on the topic ‘public contracts and the protection of the environment’, none of the interviewees have indicated that the choice of the award procedure plays any role in fostering SPP.

3. Why the new award procedures in practice do not work as good vehicles for SPPs?

The explanations may be found in the award procedures themselves as well as in external causes. While widely worded, the conditions to use competitive procedure with negotiation and competitive dialogue can be interpreted strictly. Indeed, the French *Conseil d’Etat* ruled out the use of the former procedure in the case of a public procurement contract for real estate diagnoses required by law (Council of State, 7 October 2020, 440575, *Lyon Métropole Habitat*). In other words, there is still a legal risk in having recourse of those procedures. As far as innovation partnerships are concerned, they are rarely used and this may be due to the legal uncertainty which goes with the vague concept of ‘innovation’.

There seems also to exist a reluctance to define the needs in broad terms so as to leave enough room for specifying them during the award process. The reason may be that, by doing so, contracting authorities will end up with comparing goods or services which are quite different. They might fear that their decision to choose one over another would be challenged.

Finally, the complexities of the rules of competitive dialogue and innovation partnerships do not render them very attractive, not to mention that these procure are time consuming and resource intensive for the contracting authorities.

One interviewee of the Chair said he tends to limit the use of SPP to small value contracts as he does not want to take any management or legal risk, for bigger contracts, of either a pointless procedure (if no one submits tenders or suitable tenders) or of the annulment of the procedure if a court deems the SPP criteria or clauses as inappropriate or too favourable to local candidates. Such a risk of aborting the award procedure would be too costly.

Other explanations of the fact that new procedures do not constitute an ideal legal environment for SPP are to be found elsewhere than in the award procedures rules and more generally outside legal rules.

In the economic literature, the obstacles to SPP are identified with different considerations, which can be classified in order of importance as follows: the search for efficiency (cost killings), the lack of knowledge, as already said, the complexity added by SPP to the award process, the absence of

willingness from senior managers, the lack of political willingness, the resistance to change, the absence of external assistance, the increase of risk of procedural fiascos, the existence of a legal risk but not linked to the type of award procedure chosen (Testa et al., 2012; Chiappinelli et al., 2019).

From the interviews run by the Chair, people insist on the importance of prior information gathering, in particular in relation to what the firms are capable of providing. However, scouting for information adds an additional phase in the award process which is already seen as too long. The question of human resources during the award phase is also of utmost importance. The political orientation of the contracting authority might also play a role although a recent French economic study has shown it is not that obvious.

4. Conclusions

To conclude, the promotion of SPP - or the other way around the obstacles to it - depends very rarely on legal issues and when it does, it is not linked to the types of award procedures chosen by the contracting authority. However, lawyers have an important role for finding legal tools in order to fight non-legal obstacles for the Directive to have macro-economic effects on SPP, which certainly represent the future of public procurement.

We think there is a clear misunderstanding regarding SPP. While the legal rules appear to allow for SPP with no insurmountable legal restrictions anymore, i.e. contracting authorities may find ways to promote green public procurement for example, they do so at a very limited scale. This is why, if the stakeholders want to promote SPP, whether it being the European Commission or Member states, they shall adopt compulsory criteria. Although the European Commission does not seem to go far enough in that direction, it is not yet sure that courts will be able to impose such obligations by their own, even in countries like France or the Netherlands where the courts have called the governments to act promptly and effectively towards more action to fight climate change. By the way, among different SPP objectives, low carbon public procurement, as it is sometime called, should be given priorities precisely because of the Paris agreement that has put concrete legal duties on the shoulders of public authorities.

References

- Bourdon, (2021). Commande publique et environnement: point de vue local. In Laetitia JANICOT (Eds.), (2021). *Les collectivités territoriales et la protection de l'environnement*, Boulogne Billancourt, Berger Levrault, 181-197.
- Chiappinelli, Gruner & Weber, (2019). Green Public Procurement: Climate provisions in public tenders can help reduce German carbon emissions. *DIW Weekly Report*, 9[51/52], 433-441.
- Dieu, (2014). Les considérations sociales et environnementales dans la nouvelle directive Marchés du 26 février 2014. *BJCP*, 96, 326.
- Bezy, (2020). Guide de «verdissement» des marchés publics. *AJCT*, 464.
- Benrahou, (2022). Pour une commande publique sociale et environnementale: état des lieux et préconisations. *La Semaine Juridique Administrations et Collectivités territoriales n°2, act. 25*.
- Cantillon, (2016). Marchés public et développement durable. In JurisClasseur Contrats et Marchés Publics, *LexisNexis, fasc. 57*.
- Cerqueira Gomes, (2021). Innovation Partnership. In Caranta & Sanchez Graells (Eds.), (2021). *European Public Procurement. Commentary on Directive 2014/24/EU*. Cheltenham, Elgar, 335.
- Testa, F., Iraldo, F., Frey, M. & Daddi, T. (2012). What factors influence the uptake of GPP [green public procurement] practices? New evidence from an Italian survey. *Ecological Economics*, 82, 88-96.
- Fisher, (2013). The Power of Purchase: Addressing Sustainability through Public Procurement. *European Procurement & Public Private Partnership Law Review*, 8(1), 2-7.
- Halonen, (2021). Is public procurement fit for reaching sustainability goals? A law and economics approach to green public procurement. *Maastricht Journal of European and Comparative Law*, 28(4), 535–555.
- Hasquenoph, (2021). Prise en compte des considérations environnementales dans les marchés publics. *Contrats et Marchés publics n° 3, alerte 19*.
- Hasquenoph, (2021). Sustainable public procurement and geography. *Public Procurement Law Review*, 2, 63-77.
- Hourson, (2017). Les partenariats d'innovation. In *JurisClasseur Contrats et Marchés publics, LexisNexis, fasc. 65-12*.
- Kunzlik, (2013). From suspect practice to market-based instrument: policy alignment and the evolution of EU law's approach to "green" public procurement. *Public Procurement Law Review*, 3, 97-115.
- Mialot & Poulard, (2016). Les partenariats d'innovation, retours d'expérience. *Cahiers de droit de l'entreprise n° 6, Novembre 2016, dossier 49*.
- Melin, (2018). Le sourcing, un outil au service de la performance de l'achat public. *Contrats publics*, 185, 37.

Molino, (2019). Sustainable public procurement in the Green Climate Fund: a "walk-the-talk" strategy on climate change. *Public Procurement Law Review*, 4, 154-169.

Chiappinelli, O., Gruner, F. & Weber, G. (2019). Green Public Procurement: Climate provisions in public tenders can help reduce German carbon emissions. *DIW Weekly Report*, 9[51/52], 433-441.

Rosell, (2021). Getting the green light on green public procurement: Macro and meso determinants. *Journal of Cleaner Production*, 279, 123710.

Telles & Butler, (2021). Public Procurement Award Procedures in Directive 2014/24/EU. In Lichère, Caranta & Treumer (Eds.), (2021). *Modernising Public Procurement: The New Directive*. Cheltenham, Elgar, 131.

Testa, F., Iraldo, F., Frey, M. & Daddi, T. (2012). What factors influence the uptake of GPP [green public procurement] practices? New evidence from an Italian survey. *Ecological Economics*, 82, 88-96.

Valaguzza, (2016). Sustainable Development in Public Contracts, An Example of Strategic Regulation. *Public Procurement Law Review*, 4, 179-180.

Hansson, W. & Johansson, S. (2017). Institutional incentives for sustainable public procurement: a case study of sustainability considerations in the Swedish construction sector. *Public Procurement Law Review*, 5, 220-235.

Westphal, (1999). Greening procurement: an attempt to reduce uncertainty. *Public Procurement Law Review*, 1, 1-14.

II – CASE-STUDIES

Case study 1

The criteria for establishing and maintaining an optimal governance model for public procurement

Nikola Komšić

Abstract

The objective of this paper is to analyze methodologies for evaluating public procurement system, as well as, statistical data, in order to determine which elements can be identified as essential for establishing an optimal governance model for public procurement and to provide recommendations how to maintain it. Public procurement system consists of a process that involves policies and procedures which are aimed at acquiring the goods, services and works which are essential for accomplishing goals, responsibilities and critical activities of public entities and institutions, which contribute to the overall normal functioning of country's economy and well-being of its citizens, at large. On the other hand, public procurement system can be viewed as a tool for assessing if a country is prepared to avoid or to mitigate the negative effects caused by emergency events. This was especially the case during the past two years, since there was a worldwide emergency situation caused by the COVID-19 pandemic since the 2020. Other recent extreme events, such as floods, earthquakes, tsunamis, social events and wars, have challenged the preparedness of public procurement systems to respond and secure essential and vital functions of countries, regions and global world economy. These emergency events have shown that no country in the world is immune to negative effects which manifest as either a lack of necessary, many times, vital goods or services or in the worst case, the loss of human life. Therefore, it is important to question again if the preparedness of public procurement system can contribute to alleviate these extreme situations and if it can contribute to determine what should be considered the optimal governance model for public procurement.

Keywords

Governance, Optimal, Public interest, Public procurement, Risk management.

1. Introduction

Public procurement has functioned for years as a governmental activity which enables contracting authorities to successfully carry out their duties. It can be said that public procurement has the task of supporting the implementation of projects which are of public interest. The result of this concept has been visible through successful use of large infrastructure projects such as new highways, railroads, hospitals, airports etc. However, the last couple of years have demonstrated that public procurement preparedness can be an indicator of whether a country is capable of handling crisis or not. The widespread of the COVID-19 virus since 2020 caused a global and radical change and a challenge to businesses, as well as to functioning of a state. In the first year of COVID-19 pandemic all countries have been tackling how to maintain the healthcare system in order to avoid collapse. The task of acquiring the necessary medical items, especially personal protection gear

(masks, suits), testing kits (materials), respirators and the vaccines, due to high demand became consequently an expensive and difficult challenge. Some countries were able to quickly mobilize and reduce the damage caused by the pandemic, while others were unable to properly act and have taken a serious toll.

Two years have passed since and many have analyzed what was done well, what was done wrong and how to prepare for something similar or worse. Besides the pandemic, the world is more frequently than before faced with new challenges, among the latest caused by the war in Ukraine. This war conflict has caused an additional hurdle for many, but for some a serious challenge in acquiring goods and especially commodities that were believed to be generally available.

Due to these events, it is necessary to question what is an optimal governance model for public procurement? Some systems in developed countries were considered to be well established, but because of the crisis they were put to the test and many flaws and vulnerabilities became visible. The objective of this analysis is to present what are the criteria for establishing an optimal model for public procurement with the recommendations for maintaining it.

2. The methodology of assessment

EU – Single market scoreboard

Prior to the COVID-19 pandemic, in the field of public procurement the methodology for assessing the quality and effectiveness of a national public procurement was based on, what could be defined as the standard criteria: the average number of bids, award criteria, duration of the procedure etc. In the EU the main goal is to achieve the “value for money” principle, which is defined as providing the required goods, works, and services in an economic, efficient and effective way (European Commission, 2017). Also, the EU regulation emphasizes compliance with the three key principles: equal treatment, non-discrimination and transparency (European Commission, 2022). Additionally, the EU Commission has developed a Single market scoreboard for the sector of public procurement. The performance of public procurement in each EU member state is measured by 12 indicators (European Commission, 2022). Some of these indicators are valuable since their effect is measurable, such as: the portion of contracts awarded where there was only one bid, the number of negotiations without public call, the number of procedures where the award criteria was only price, how many SMEs have been awarded the contract etc. On the other hand, some indicators are defined in such a way that it is difficult to measure their concrete effect on public procurement and therefore their value. Precisely, those indicators are the following: missing call for bids, missing buyers registration number and seller registration number. As stated in the methodology, the explanation for missing call for bids is that it measures the proportion of contracts awarded after a call for tender whose name and conditions were not clear. Unfortunately, this explanation does not provide a clear indication and its effect on public procurement. For the indicators, missing seller and buyer registration number, in public procurement the principle of transparency requires to provide information regarding the name of the contracting authority as well as the name of the bidder who has been awarded the contract, therefore the use of these indicators for measuring the performance of the public procurement system is not well established.

MAPS - Methodology for Assessing Procurement Systems

MAPS represents Methodology for Assessing Procurement Systems (MAPS, 2003). This methodology was designed and supported by a joint initiative of the International Financial Institutions, such as the World Bank, EBRD and others, and the Development Assistance Committee (DAC) starting in 2003/2004 and it has been used by the development banks, bilateral development agencies and partner countries to assess their national procurement systems (MAPS, 2003). This methodology is based on four main pillars:

1. Legal, Regulatory and Policy Framework
2. Institutional Framework and Management Capacity
3. Procurement Operations and Market Practices
4. Accountability, Integrity and Transparency

Each of these pillars has several indicators and sub-indicators. In total, there are 14 indicators and 55 sub-indicators. This represents a very detailed approach for assessing a national public procurement system. The main objective of this methodology is to examine if a national public procurement system can successfully implement the principle “value for money”, as well as sustainability. Some of these indicators are similar to the ones in the EU and are also a standard when it comes to analyzing public procurement, but some indicators/sub-indicators from this methodology are valuable for a detailed estimation of a national procurement system.

The first sub-indicator is: 1(b) – Procurement methods. This sub-indicator assesses whether the legal framework includes: i) a clear definition of the permissible procurement methods; and ii) the circumstances under which each method is appropriate.

An important aspect of this sub-indicator is, as follows: “*justifying single-source procurement on the grounds of an emergency should be permitted only in the exceptional circumstances of a catastrophic event, where there is an extremely important need and where any other method of procurement would be impractical given the time constraints.*” (MAPS, 2018). It is also stated that it should not, however, be used simply as a consequence of poor planning.

Since ICT technology in the past decade has been widely introduced into public procurement systems, MAPS defines sub-indicators that are designed to measure this area: electronic procurement (e-Procurement); norms for safekeeping of records, documents and electronic data etc.

Additionally, there is another indicator, which measures if “*public procurement is embedded in an effective information system*”. The objective of this indicator is to assess the extent to which the country or entity has systems to publish procurement information, to efficiently support the different stages of the public procurement process through application of digital technologies, and to manage data that allows for analysis of trends and performance of the entire public procurement system, and therefore, this indicator captures the availability, accessibility, integration and reliability of public procurement information systems (MAPS, 2018). This indicator is assessing if the information system provides publication of, among other details, information related to specific procurements, at a minimum, advertisements or notices of procurement opportunities, procurement method, contract awards and contract implementation, including amendments, payments and appeals decisions. As part of this indicator there is a sub-

indicator, that is worth mentioning. It is called “*Strategies to manage procurement data*”. Public procurement is an activity that is based on data. In other words, public procurement consists of acquiring data, analyzing data, using that data in practice and verifying it afterwards. As stated in this sub-indicator, statistical information on procurement is essential to evaluate the policies and the operation of the system. Statistics also provide a means for monitoring performance of the system and compliance with the legal and regulatory framework (MAPS, 2018). It also states that statistical information can also be a tool for procurement planning and market analysis and in order to ensure comprehensiveness and efficiency, the system should be based on data available in e-Procurement or other information technology systems.

The next significant indicator from this methodology, measures if “*the public procurement market is fully functional*”. This indicator is primarily assessing if the market can respond to public procurement solicitations. The market is shaped by many different factors (political, economics, geography etc.), which all either support or hinder the contracting authority when it has planned to acquire the desired good, services or works. In relation to that, there is a sub-indicator – Dialogue and partnerships between public and private sector. Since public procurement is an activity which depends on information, the dialogue between the government and the private sector is crucial. Proper planning and execution are not possible without taking into account the voice of the private sector. This is especially relevant, as stated for this sub-indicator, with national procurement objectives, changes to the legal and institutional framework and practices (MAPS, 2018). Therefore, this sub-indicator analyzes if there are forums for dialogue between the government and the private sector.

Additionally, it states that information and training programmes on public procurement should be regularly offered for the private sector, either by the government or in co-operation with private institutions. These programmes should include approaches tailored to the needs of small businesses, to support supplier diversity, and should include a module on ethics and integrity in public procurement (MAPS, 2018).

Another important sub-indicator from this group is - Key sectors and sector strategies. Depending on the contracting authority there will be different key needs and therefore different key markets in public procurement. However, it is important to have a clear representation of all the elements that are part of that sector. As stated for this indicator, performing a sector market analysis helps to determine sector - related risks (in terms of expenditure, competition, environmental impact, socio-economic risks, etc.) and the government’s scope to influence specific market segments (MAPS, 2018). Since contracting authority has a strong influence on the market it is important to carefully analyze potential effect that can be created in the long-term. Through careful analysis it should be determined how to achieve, if it is possible, sustainability, innovation etc.

Four countries (Chile, Peru, Senegal and Norway) have participated in the pilot phase, which was carried in 2017, in order to test this methodology. From this group Norway is the only developed country that participated. The majority would agree that public procurement system in Norway is well established and well-functioning and what is also interesting is that public procurement rules in Norway are harmonized with EU directives. However, this methodology has discovered something interesting. When it comes to strategies to manage procurement data, it was discovered that there is a lack of capability for conducting complex analyses of the acquired data. Precisely, it was concluded that: “While Norway’s e-procurement system is quite advanced, the data collected

through the system does not allow for complex analysis, such as trends, levels of participation, efficiency and economy of procurement and compliance with requirements. Decentralisation makes it difficult to collect the information; not all information is required to be published on Doffin (national public procurement platform), so that data is located in a decentralized database and not fed into Doffin. While larger contracting authorities use analytics, smaller agencies do not have the skills, technical capabilities or capacity to conduct the same level of analysis. In addition, the reliability of information in the database remains unclear: audits are carried out, but not routinely, and they remain limited to financial information.” (MAPS, 2018). Also, it was concluded that Norway’s e-procurement system does not provide all details related to the public procurement. More precisely, it is stated that evaluation reports, the supplier’s bid and other details related to implementation are usually not disclosed in accordance with national regulations. It must be pointed out that these reports from the pilot phase may differ from the final approved methodology and therefore are not subject to quality assurance, however they do provide valuable insight about the public procurement system. Additionally, the data for Norway shows that suppliers on average have rarely participated in engagement meetings organized by contracting authorities (MAPS, 2018).

OECD – Government at a glance

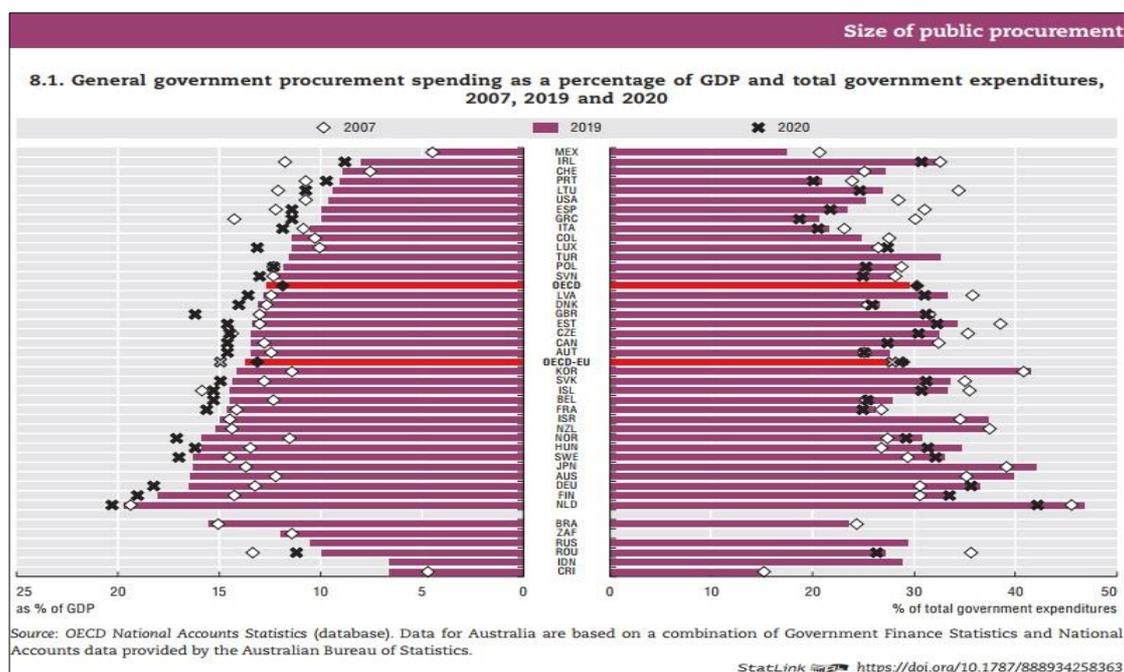
Another methodology for estimating the national public procurement system is used by the OECD. Precisely, it is the methodology in the Government at a Glance document, which is published every two years. Even though this is aimed at public governance for OECD countries, their analysis has a part which is dedicated to public procurement. Since the latest edition has been published in 2021, it has been updated because of the COVID-19 pandemic and it has the following elements which were analyzed: size of public procurement; strategic public procurement for delivering social value, E-procurement and integration with public financial management; managing emergency procurement and risks and professionalization of public procurement.

When talking about the size of public procurement, the data from Figure 1 show that public procurement expenditure, as percentage of GDP has increased across the OECD over the last decade i.e. from 11.8% of GDP in 2008 to 12.6% of GDP in 2019 (OECD, 2021). On the other hand, the COVID-19 pandemic contributed for the increase in public procurement relative to GDP in 2020. Based on the data that is available, among 22 OECD-EU countries public procurement increased from 13.7% of GDP in 2019 to 14.9% of GDP in 2020(OECD, 2021). Other countries had significant increases such as Norway (from 15.8% to 17.1%) and the United Kingdom (13.2% to 16.1%)(OECD, 2021). It is concluded that these increases are due both to governments purchasing goods and services to support their COVID-19 responses, and to GDP falling as a result of the crisis.

However, it was also concluded that public procurement as a share of total government expenditure decreased across all responding OECD countries by 1-2 percentage points in 2020 compared to 2019. The explanation for this is because non-procurement government expenditure grew faster than procurement expenditure since support packages provided by governments in response to the pandemic have drastically increased total government expenditure (53.6% of GDP in OECD-EU countries on average in 2020) (OECD, 2021).

Public procurement, as mentioned before, is used as a tool to fulfill the demands across all public relevant areas from health to environmental protection, public order and economic affairs etc.

Figure 6- General government procurement spending as % of GDP and total government expenditures²



Detailed analysis shows that health expenditure represented the largest share of public procurement spending with an average of 29.3% across OECD countries in 2019. Belgium had the largest public expenditure for health sector with 46.7%, Japan 44.4%, the Slovak Republic 43.6% and Italy 42.3%.

The OECD also analyses the integration of e-procurement with public finance management, which is similar to the MAPS methodology. The data, displayed in Figure 2, show that 87% of OECD countries have integrated their public procurement systems with their public financial management system, i.e. planning public procurement in line with budget planning (OECD, 2021). Also, in 83% of OECD countries public entities are required to certify budget availability before starting public procurement (OECD, 2021). When it comes to functionalities of e-procurement it is stated that transactional functionalities of e-procurement were less developed: 97% of the countries used electronic bid submission, but just 63% used electronic submission of invoices (OECD, 2021). On the other hand, it was determined that more advanced e-procurement functionalities are also being developed: 82% publish procurement plans to communicate government needs, 61% have introduced ex post contract management; 64% use supplier registries, 70% framework agreement modules and 39% business intelligence functionalities (OECD, 2021). As an example, Israel provides a contract management function that allows internal government users to create a variety of procurement reports, while in Lithuania, information on concluded contracts is transferred from the national e-procurement system to the e-invoicing systems, which helps to track the implementation of specific contracts.

² Source: Government at a Glance 2021, OECD.

Figure 7 - General government procurement spending as % of total procurement spending³

8.2. General government procurement spending by function as a percentage of total procurement spending, 2019										
Country	General public services	Defence	Public order and safety	Economic affairs	Environmental protection	Housing and community amenities	Health	Recreation, culture and religion	Education	Social protection
Austria	11.8	1.6	3.0	21.4	1.3	0.7	36.3	3.9	9.1	10.9
Belgium	12.7	1.5	2.0	13.1	2.8	1.1	46.7	3.1	6.7	10.3
Chile	4.8	7.9	8.0	13.5	1.3	6.3	25.3	2.1	20.5	10.3
Czech Republic	8.6	2.5	4.1	22.3	5.0	3.4	32.5	5.4	11.5	4.7
Denmark	15.0	5.0	2.8	10.4	1.3	0.7	32.0	5.2	12.0	15.8
Estonia	9.5	10.7	3.9	18.1	3.7	2.4	24.8	6.8	15.7	4.4
Finland	22.6	3.8	2.3	12.8	0.5	1.1	23.0	4.1	11.8	18.0
France	7.3	6.2	2.5	13.0	4.2	3.5	38.1	4.8	6.5	13.8
Germany	11.2	4.0	3.2	9.2	2.1	1.1	39.6	3.4	6.7	19.4
Greece	18.0	4.4	1.6	15.3	5.1	1.7	38.6	3.3	7.7	4.1
Hungary	18.2	3.9	3.9	29.5	2.4	2.2	18.3	8.7	8.7	4.1
Iceland	7.5	0.4	3.8	20.3	2.4	2.4	25.7	8.7	19.0	9.8
Ireland	5.5	0.9	4.6	15.3	2.7	5.6	31.1	3.9	9.2	21.2
Israel	6.6	21.0	3.4	5.9	2.5	2.4	27.5	5.2	15.1	10.3
Italy	13.4	3.6	3.5	12.3	6.9	3.3	42.3	4.1	5.1	5.6
Japan	6.5	3.3	1.9	14.4	5.7	2.1	44.4	1.6	6.3	13.9
Korea	5.7	11.6	2.8	15.6	3.9	6.1	32.2	2.8	12.5	6.8
Latvia	7.9	7.1	4.4	19.9	3.6	4.0	28.4	5.5	12.3	6.7
Lithuania	7.6	11.1	5.4	23.2	2.8	6.0	14.7	6.0	17.1	6.2
Luxembourg	15.1	1.3	3.1	21.4	4.4	2.2	21.6	5.9	7.9	17.1
Netherlands	6.2	3.2	3.5	11.4	4.8	1.5	35.9	3.2	8.4	21.8
Norway	10.0	7.9	3.0	22.9	4.0	3.9	24.4	4.9	9.9	9.2
Poland	6.2	6.0	4.3	27.0	3.0	4.0	28.8	5.9	11.3	3.6
Portugal	12.8	2.7	3.3	21.1	3.9	3.3	35.3	4.7	9.3	3.6
Slovak Republic	8.8	3.6	4.3	21.1	3.7	2.5	43.6	3.4	6.8	2.1
Slovenia	10.2	2.7	3.4	22.7	2.9	2.9	31.5	5.1	13.3	5.4
Spain	10.8	3.2	2.8	14.8	6.8	3.0	32.4	6.1	10.9	9.3
Sweden	18.7	4.5	2.9	13.6	2.1	2.9	21.7	3.7	16.1	13.7
Switzerland	21.8	6.0	5.7	15.6	4.0	1.4	1.9	3.1	18.8	21.6
United Kingdom	3.7	10.3	6.0	14.3	3.8	3.4	32.1	2.8	10.0	13.6
United States	10.4	21.7	6.1	22.3	0.0	2.4	13.6	1.7	18.5	3.2
OECD	9.4	10.5	4.1	16.7	2.8	2.6	29.3	3.0	11.6	10.0
OECD-EU	10.7	4.2	3.2	13.8	3.7	2.4	36.4	4.3	8.1	13.4
Costa Rica	4.7	0.0	7.7	13.5	3.7	4.5	35.4	1.8	21.2	7.6
Romania	8.7	3.6	2.8	29.7	4.5	8.6	26.9	5.2	6.6	3.6

Source: OECD National Accounts Statistics (database); Eurostat Government Finance Statistics (database).

StatLink  <https://doi.org/10.1787/888934258382>

The available data shows that from 32 OECD countries, only in 19 countries there is an ex post contract management as part of e-procurement system.

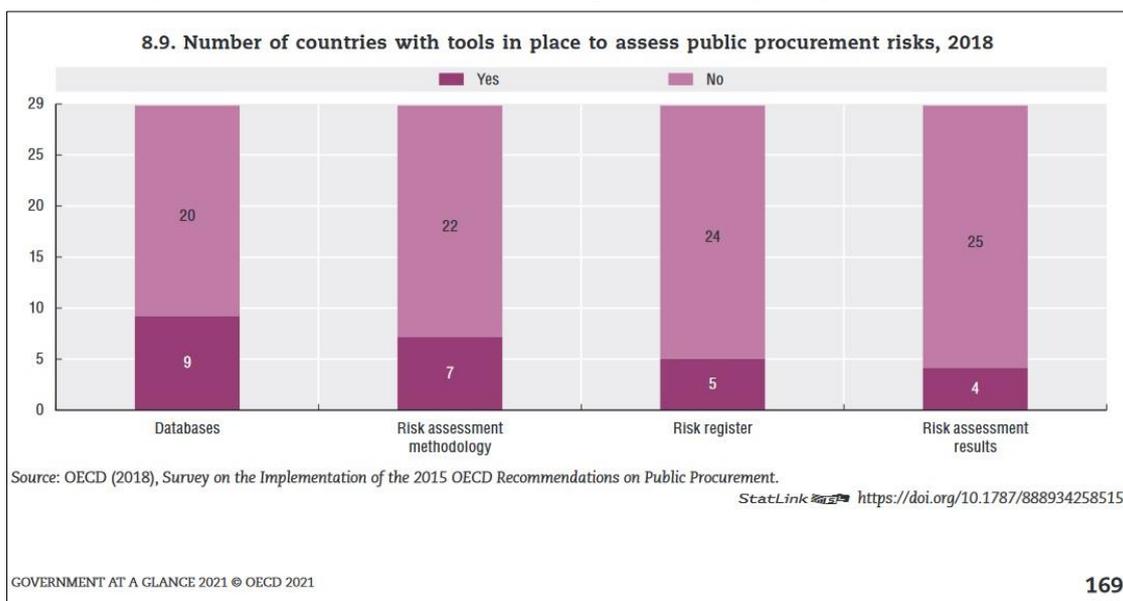
The next element or indicator, which was added because of the COVID-19 pandemic is – managing emergency procurement and risks. This indicator has shown quite interesting data. The data collected by OECD shows that prior to the pandemic, only a few countries, such as Finland, already had a public procurement strategy in place as part of crisis preparedness, for instance through stockpiling (OECD, 2021). Majority of countries have been forced to rethink their risk management strategies and put measures in place that can be activated in the event of a shock. In relation to that, the data shows that 14 countries (46.7%) introduced temporary public procurement regulations (e.g. France), or developed additional COVID-19 legislation with specific public procurement provisions, as Slovenia did (OECD, 2021). On the other hand, 25 countries (86%) have developed specific guidance to support public buyers conducting procurement during the crisis, from detailing emergency procedures to implementing changes in ongoing contracts or using specific payments terms, as done in Austria (OECD, 2021). Further, 19 out of 29 OECD countries (63.3%) have increased the co-ordination or centralization of the procurement of essential goods, including not just health products but also IT equipment and services. For example, Belgium has set up a task force to monitor supplies and communicate orders, while in Italy, Consip, the Italian central purchasing body, was given the mandate to centrally procure goods and services needed to respond to the crisis (OECD, 2021).

When it comes to tools for assessing public procurement risks, based on the data from the 2018 OECD survey on the implementation of the OECD recommendation on Public Procurement of the

³ Source: Government at a Glance 2021, OECD.

2015, it is concluded that 43% of respondents still do not have any tools to assess public procurement risks (OECD, 2021). The data shows that, when it comes to the tools that have been implemented, 9 out of 29 OECD countries (31%) had developed risk databases, 7 (24%) had a risk assessment methodology, 5 (17%) have a risk register and 4 (14%) have risk assessment results. For example, in New Zealand, mandated government agencies must follow guidance on assessing and managing risks, which foresees different obligations, including submitting information on management of high-risk contracts for critical services.

Figure 8 - Number of countries with tools in place to assess public procurement risks⁴



This indicator has shown that proper public procurement risk strategy and tools are vital for avoiding or at least reducing possible negative effects of a crisis. Why this particular element of public procurement is important now than ever, will be explained in the following part which analyzes the impact of crisis.

EBRD – Capacity Building Assessment

The European Bank for Reconstruction and Development (EBRD), as an international financial institution has developed a capacity assessment tool kit, also known as Institutional Capacity Assessment (ICA). The ICA is an integral part of the Institutional Capacity Building (ICB) and Outreach Programme (CTOP) launched by EBRD in 2010 with the objectives of: a) evaluating the procurement capability of Clients, b) assessing the risks (institutional, political, organizational, procedural, etc.) that might affect the Client in carrying out the procurement process and (d) developing an action plan to be implemented, as part of the project, to address deficiencies detected by the capacity analysis and to minimize the risks identified by the risk analysis (EBRD, 2011). This toolkit has been since then mostly used in countries outside the EU (Serbia, Albania, Ukraine etc.).

The toolkit has 62 items or indicators grouped in nine categories to be assessed in the Client and in the project. These nine groups are: a) legal framework b) organization c) support and control d)

⁴ Source: Government at a Glance 2021, OECD

staffing e) record keeping f) procurement planning g) procurement cycle h) general assessment i) project assessment (EBRD, 2011). It should be noted that for each item/indicator there is a corresponding standard of compliance and the majority of standards of compliance are taken from the Methodology developed by the OECD for government procurement. Taking into account all these categories it is possible to conduct a gap analysis, which has the objective of identifying priority areas for improvement regarding the institutional capacity. Based on the full-fledged assessment or its simplified version risk categories (high, moderately high, moderately low and low) of the client will be defined. After the risks have been classified mitigating measures will be defined, followed by the previously mentioned Action plan and Supervision plan. In other words, the aim of this toolkit is to have a comprehensive internal capacity assessment before commencing any action.

Additionally, this toolkit provides a valuable insight into which areas of opportunity are most frequent. For example, it has been verified that procurement planning is not used as management tool. This is reflected in the sense that a procurement plan should be used for e.g. adequate procurement packaging, forecasting of future requirements, controlling and keeping inventories (EBRD, 2011). Even though there is no available standard for this, it is important to have this objective of using a procurement plan as a tool for properly managing the preparation, implementation, monitoring and other planning activities.

Regardless of the fact that this has been developed more than 10 years ago and it is mostly focused on assessing the Clients capacities, this toolkit provides insight on how to conduct a capacity assessment, to identify the risks and mitigate them with an action plan. In order words, the framework from this toolkit could be used as a model for establishing a proper public procurement preparedness in each country.

3. Impact of COVID-19 crisis

COVID-19 pandemic has caused many negative effects, from which the most visible one was the lack of necessary medical equipment. Due to the lockdown measures that were applied in all the countries in the world, supply chains of medical equipment were temporarily disabled which caused higher demands and therefore higher prices, which all together resulted in bottleneck situations. Also, it must be taken into account that the majority of countries are importing medical equipment rather than producing it. This was the issue with face masks. This medical gear was the cause of disputes among countries. For illustration, United States were accused by Germany and France for using “wild west” methods. Precisely, Germany has accused United States of confiscating face mask en route in Thailand and then diverting them to the US on April 3, even though they were paid by Germany (Ankel, 2020). France accused the United States of outbidding at the last moment, i.e. the masks were reportedly already on a plane bound to leave the airport in Shanghai when US buyers turned up and offered three times the amount the French were paying (Ankel, 2020). On the other hand, there was a similar case in the EU, where France confiscated an estimated six million masks from the Swedish company Mölnlycke (Marlowe, 2020). As stated, these masks had been contracted for, including a million masks each for France, Italy and Spain, while the rest were destined for Belgium, the Netherlands, Portugal and Switzerland, which has special trading status with the EU. Since Italy and Spain urgently needed their masks, Mölnlycke tried to cover the loss of the confiscated masks by ordering more from suppliers in far east Asia. In the end, France allowed two million masks which Mölnlycke had

contracted to deliver to Italy and Spain to be shipped and the French media reported that France donated one million masks to Italy in the spirit of solidarity. Similar situation happened with the ventilators, which is followed by the story that US manufacturing company 3M confirmed on April 3 that the Trump administration ordered it to stop exporting its ventilators from its US production sites to Canada and Latin America, while in the end than ban was only temporary (Ankel, 2020).

The most extreme situation was acquiring the vaccines. Unfortunately, the majority of countries were not able to acquire more than one or two types of vaccines. It also came to financial power and negotiation position. Precisely, wealthier countries, as well as the ones in which vaccine manufactures have their production facilities, were able to acquire vaccines much quicker. For illustration, only three countries in the world were able to acquire vaccines already in May 2020, i.e. United Kingdom was the first country to buy 90 million doses of AstraZeneca, followed by United States with 300 million doses of AstraZeneca and 10 million doses of Novovax and Israel bought 2 million doses of Moderna (Evershed et al., 2021). There was also an example in 2021 when Italy blocked export of 250,000 AstraZeneca vaccine doses to Australia, because the company failed to deliver the required amount because of production problems in one of its EU sites (Boffey, 2021). The peak of distribution problem was that EU and United States blocked the proposal made by South Africa and India at the World Trade Organization that would waive intellectual property rights for COVID-19 vaccines and treatments (Gebrekidan & Apuzzo, 2021). This illustrates how different policies and actions affect the entire chain of public procurement. However, there were examples of countries which have managed to avoid these issues. That was the case with Serbia, which was able to use the vaccine diplomacy to acquire four types of vaccines: China's Sinopharm, Russia's Sputnik V, Pfizer, and AstraZeneca. In addition to that, Serbia has managed to arrange the beginning of the production of the Russian vaccine Sputnik V in Serbia (Government of Serbia, 2021). Besides that, Serbia took additional measures to stop the spread of COVID-19 by financing innovative product and services. Precisely, the Innovation Fund of Serbia in May of 2020 approved 53 million dinars (450.757 euros) for financing 12 innovative projects developed by domestic companies (Innovation Fund of Serbia, 2020). These solutions were developed in one month and made available for use, with the goal of suppressing the effects of the coronavirus pandemic. It is worth mentioning that all innovative projects have been donated throughout Serbia to organizations and institutions of public importance. Some of those innovations were: reusable protective masks, system for fast 3D printing of urgently needed parts for machines and medical devices, devices for mechanical ventilation of patients with positive pressure, disinfection tunnel and disinfection cabin, UV-C disinfection etc. This example represents pre-commercial procurement, because through this program a domestic market was created in order to provide the possibility for contracting authorities to procure these healthcare innovations.

4. Impact of war conflict in Ukraine

Since the COVID-19 pandemic, the world has changed significantly and one could say that other challenges such as global warming (floods, drought, wildfires etc.) or other virus pandemics, that are highly likely to occur in the future, will cause tremendous damage in the future if we do not organize ourselves properly for them. However, another crisis has caused a tectonic change. It is the war between Ukraine and Russia. This conflict has caused many consequences, besides the loss of human lives and the huge refugee crisis. The most disruptive consequence is the energy crisis which is still present. Because of the war conflict EU has sanctioned Russia, while Russia

has retaliated by forcing EU countries to pay in rubles for the gas that is transported from Russia to EU member states. The issue with this is that 35% of gas in EU is imported from Russia and for some EU member states Russian gas represents 100% share which makes Russia the largest if not the main supplier. According to the Center for Strategic and International Studies (CSIS) Ukrainian transit of Russian gas has been reduced by 70%, from over 140 billion cubic meters (bcm) in 1998 to less than 42 bcm in 2021 (Chestney, 2022). Even though, some countries can and could import gas from other countries, like Germany has the possibility of importing from Norway, the Netherlands, Britain and Denmark via pipelines, the issue is that this cannot fully replace the missing supplies from Russia (Chestney, 2022). This situation has caused the spike of gas price which is for some countries an additional financial burden as well as a challenge to their utility infrastructure that is hard to resolve because of the prior COVID-19 pandemic. Simultaneously, this energy price increase has affected the prices of other available commodities and, therefore, the majority of contracting authorities are forced to restructure their public procurement budget.

This energy crisis caused many countries in the world to reconsider their energy strategy. Since the EU is planning to become “net zero” by 2050 and to reduce the dependence from Russian oil, coal and gas, a recent study by Eurometaux (umbrella association representing voice of non-ferrous metals producers and recyclers in Europe) has determined that Europe’s plans to establish domestic production for clean energy technologies will increase its demand for a wide range of metals. Precisely, when it comes to aluminium and copper, by 2050, Europe will require new demand equivalent to 30-35% of today’s consumption levels for manufacturing of electric vehicles, electricity net-works, batteries, wind turbines, and solar panels (Eurometaux, 2022). The largest demand is with battery metals, i.e. by 2050, batteries will be Europe’s major use for lithium, nickel, and cobalt under all the study’s scenarios, with new demand reaching up to 3500% of Europe’s lithium consumption today, 350% of cobalt, and 110% of nickel (Eurometaux, 2022). When it comes to rare earth minerals, which are required for electric vehicles and wind turbines, it is concluded that even a moderate level of European domestic magnets production - as reflected in the study’s medium scenario - would transform the European rare earths market, requiring between 90% and 200% extra compared with Europe’s consumption today (Eurometaux, 2022). At the end, it is concluded that Europe’s main opportunity is recycling. However, it is pointed out that recycling will not provide Europe with meaningful supply for many metals until after 2040 when high volumes of clean energy technologies start reaching their end-of-life (Eurometaux, 2022). Therefore, there will be a need for importing primary metal but from diversified, responsible partners and in accordance with fair trade. Lastly, the change will occur only through innovation, substitution and shifting towards shared economy. This study has shown that contracting authorities and especially the utility companies, must carefully reassess their long-term strategies for achieving carbon neutrality, since it has to be implemented through public procurement which requires proper market analysis, estimates and implementation strategy.

Besides the energy crisis, another issue has emerged, and that is the food supply. Ukraine and Russia are the largest wheat producers in the world, i.e. in 2019 together they exported more than a quarter (25.4 percent) of the world’s wheat, according to the Observatory of Economic Complexity (OEC) (Duggal & Haddad, 2022). Because of the war conflict many countries have difficulties of acquiring this commodity. Additionally, this conflict caused a shortage of fertilizer. Precisely, Russia and Ukraine together export 28% of fertilizers made from nitrogen and phosphorous, as well as potassium, according to Morgan Stanley (Domm, 2022). Also related, Russia and Belarus

had provided about 40% of the world's exports of potash, according to Morgan Stanley (Domm, 2022). This issue is an additional burden for contracting authorities beside the energy price increase, which again points out that contracting authorities need to focus more on proper risk assessment and risk mitigation which contributes to proper public procurement preparedness.

5. Criteria for establishing the optimal governance model for public procurement

The crisis and extreme emergency situations in the past, present and mainly the ones that will come in the future raised the question – what is the right criteria for defining an optimal governance model for public procurement? The meaning of the word “optimal” in the Cambridge Dictionary is: “*best or most likely to bring success or advantage*” (Cambridge, 2022). Different methodologies, which were presented previously, have shown that depending on the objective of the methodology for evaluating public procurement, certain criteria will be more relevant than the other in order to define an optimal model. However, since public procurement, as mentioned before, is an activity which is focused on acquiring the data, analyzing the data (which is implemented through procurement planning e.g. market research, defining the needs etc.), using the data (e.g. technical specification, selection criteria, award criteria) and verifying that data through monitoring and control, it is necessary to reconsider which criteria is relevant for evaluating if the optimal governance model for public procurement is established or not.

The first category/criterion which represents the main frame, or the main structure is the legal framework. Even though, the legal framework is a standard element of analysis, in the previous methodologies certain aspects were neglected. None of these methodologies have precisely measured the impact of the legal framework. In the EU, since all member states have harmonized their legislation with the EU directives, it has not been measured how many member states have used certain possibilities which are available within the Directives. For illustration, the EU directives state that the main goal for awarding the contract is to use most economically advantageous tender (MEAT) criteria. In practice, the contracting authorities have discretionary right to determine in which case which procurement method and corresponding award criteria will be used, based on the subject of public procurement (except for innovation partnership and competitive dialogue where the award criterion is best price-quality ratio). In the EU only few member states have used the possibility to specify in their national legislation in which sectors price, as the only award criterion, cannot be used. In relation to that, according to the methodology of the EU for indicator 5 – award criteria which measures the proportion of procedures awarded solely based on the cheapest offer, shows that Croatia has been for two years the leader since only 1% of procedures were awarded based on price criteria only (European Commission, 2022). In order to understand this situation better, it is relevant to know that the Croatian Law on public procurement stipulates that the award criterion is MEAT. However, when analyzed carefully it is stipulated that public contracting authority cannot use only price or cost as the only criterion for awarding the contract, in which case the relative weight of the price or cost must not exceed 90% (Article 283, Law on public procurement Croatia). This means, that even if there are two criteria for awarding a contract, price cannot be more than 90%. Due to a lack of precise data it is hard to determine how much the price was more dominant than quality, e.g. the best price-quality ratio was 70% price and 30% quality or in 50% of procedures the award criteria was 90% price and 10% quality. This is especially important because if there is no proper view on how a legal framework is set up it will be difficult to give a precise conclusion. Details matter the most since they can

indicate if there is a significant hurdle or support for optimal public procurement. Besides this, the EU methodology does not analyze if EU member states have established mechanism for market consultation. This is relevant since the dominant use of price as the only award criterion and the lack of market dialogue hinders competition. Therefore, it can be said that this criterion measures if the legal framework is contributing or reducing the chances for achieving the goal of value for money by fostering the use of other award criteria different from price, since it is determined that price cannot be the only award criteria in order to acquire quality as well as if proper market dialogue has been well established or not.

Also, when analyzing the MAPS methodology, for example in Norway, it is indicated that with regards to evaluation and award criteria, the Norwegian legal framework follows the EU rules including the obligation to specify award criteria, attributes like price, non-price aspects and life cycle costs, specifications for consulting services, the relative weighting which it gives to each of the criteria chosen, and process (MAPS, 2018). This may seem clear, however, we do not have a clear indication on, for example how many contracts were awarded only on price basis and how many on quality and price etc. Only in a recent study which has a comparative analysis of EU Member States during COVID-19 it was revealed how much was price or MEAT criterion was used (Tavares & Aruda, 2021). On the other hand, the OECD methodology shows a clear picture of the size of public procurement spending as a percentage of GDP, but it also does not show if the award criterion was based only on price or price and quality.

The second category/criterion, which is related to previous one, is the functionality of the e-procurement system. Previous methodologies have demonstrated that e-procurement is relevant for transparency and efficiency. The OECD methodology analyzed among OECD countries if the e-procurement system covers the entire process, i.e. from the planning and budgeting, conducting procurement procedure (electronic submission of the bids, invoices etc.) contract management, etc. However, the MAPS methodology was the only which was analyzing if the system can cover all levels of procurement (central level, decentralized level and also procurements that are below the threshold) and has stated that in the case of Norway at the time of conducting that analysis the issue was to gather all information and present in a coherent way. Further, it is important to address the procurement in the emergency situation cases, since the precise data for this is lacking. The system must allow, at least for the central level and contracting authorities to cover these cases.

The third category/criterion is the public procurement data. It is required that a well-established e-procurement system provides the necessary data. Precisely, the public procurement data must contain: number of contracting authorities; public procurement plans of contracting authorities; number of awarded contracts; number of procedures that were implemented or terminated; used award criteria and in that regard – was it price, cost, price and quality/cost and quality, green criteria, social criteria; a special part should be dedicated to innovation procurement; procurement sectors (health care, construction, defense etc.); average number of bids; database of bidders that have been awarded the contract; contract management, which should show real time implementation (if there were changes to the contract, price, parties etc.) and there must be data on public procurement that are below the defined thresholds. As mentioned in the MAPS methodology it is necessary to have as much data as possible in order to properly determined the current situation. This is relevant for complying with the principle of transparency, but also

efficiency. One aspect that is more important than before is measuring innovation acquired via public procurement since the challenges that lay ahead in relation to energy stability, waste management, health care, food production can only be solved by innovative solutions. The current methodologies do not provide data for this.

The fourth category/criterion is strategy and risk management in public procurement. The MAPS methodology indicated in the Norway example if there is a lack of data it is hard to properly prepare for the future, or in other words it is difficult to compose a detailed short-term or long-term strategy. In a similar manner, the EBRD capacity assessment toolkit points out that procurement planning should be used as a management tool for e.g. forecasting of future requirements, controlling and keeping inventories. Also, the OECD methodology demonstrated that during the crisis only few countries had strategies for resolving crisis situations. The COVID-19 pandemic has shown that countries must assess their capabilities for resolving a crisis.

Taken into account all these categories/criteria we can say that the optimal governance model for public procurement is established when it allows the contracting authority, or state in general, to fulfill all its defined needs in accordance with the value for money principle in an efficient and transparent manner and provide enough resilience so that it can avoid or at least reduce the potential damage from unforeseen event.

6. Maintenance of the optimal governance model

When discussing the issue of maintaining this optimal governance model, it is relevant to point out the following. The four categories/criteria are interconnected. One will have a larger effect on the other, but they all together contribute to achieving the optimal governance model for public procurement. There are several requirements that have to be fulfilled for successful maintenance.

The first requirement is that identified gaps in the legal framework have been mitigated. Unresolved gaps in the legal framework will only hinder the process of optimal governance of public procurement. For example, even though in the EU all member states have harmonized their legislation, there are still legal difference between them. Only few member states in the EU have used the possibility of limiting the use of price as the only award criterion, as well as that not many member states do a proper market research and consultation. This requirement is also related with the level of centralization/decentralization and their ability to adapt to potential changes and carry out defined tasks. In some EU countries, a central body was responsible for procuring the necessary medical equipment, while in other countries that was not the case. For illustration, Germany had serious issues with resolving the COVID-19 pandemic since its legal system allowed for each German state to impose COVID-19 restrictions at their own pace. The outcome of this type of system was disparity among the states in Germany as well as the lack of synchronization in tackling COVID-19. Therefore, the main requirement is that a detailed capacity assessment of the current legal framework has been done, that all the legal gaps/risks have been identified and that the action plan for mitigating them has been successfully implemented.

The second requirement is that public procurement planning is aligned with the local/national strategy and risk management. If there is no well-established strategy which involves all the relevant stakeholders and if the responsibility is not properly divided so that each risk is being handled by the party who has the most experience, it will be difficult to avoid or even mitigate

potential damage that could occur in the future. It is important that public procurement planning has been framed and it is used as a strategy and risk management tool, in accordance with the action plan for mitigating the legal gaps. Additionally, it is relevant to have a good system of control (either audit, inspection, a government supervision board etc.) which can overlook the entire process.

The third requirement is that the e-procurement and public procurement data are used as supporting tools for public procurement. These two are related because if the e-procurement system is not set up in the most efficient way and does not gather all the necessary data, the overview of the public procurement system cannot be detailed and precise. This is relevant since the data that is acquired through this system affects the preparation of short-term and long-term strategies. Besides that, if the data is not verified it could cause more harm than expected. For illustration, if the contracting authority does not have a clear situation regarding the market or which need is a priority, time and resources are being wasted and chances for success are reduced. With that being said, it is an obligation for each country to further improve their infrastructure since technology is developing at an accelerated rate, so that the e-procurement can cover the entire process of public procurement as well as that the data can allow the contracting authorities to carefully set up goals for the future in order to avoid potential bottleneck situations.

7. Recommendations

Considering all the different methodologies and available data, recommendations for establishing and maintaining an optimal governance model for public procurement can be summarized in the following.

The first recommendation is that each country must conduct a proper capacity assessment of its public procurement system. The objective of this is to determine the current level of preparedness of the public procurement system by identifying all current and possible gaps/risk and compose and successfully implement an action plan for mitigating the risks. This should include stipulating in the law in which situations the contracting authorities must not use price as the only award criterion, compulsory market dialogue, resolving the issue of centralized and decentralized bodies etc. For example, the EBRD toolkit can be used as a reference model for establish the entire process for this activity accompanied by the MAPS methodology.

The second recommendation is that e-procurement system must be structured in a manner that is fully contributing to the contracting authority. This means that e-procurement must be framed and used as a tool to improve the entire process of public procurement and not just some aspects of it. It needs not only to cover the process starting from budgeting, planning, all the way to conducting, monitoring the contract execution, but it also must enable acquiring all the relevant data in a coherent way so that it could be used for reevaluating and future planning.

The third recommendation is that public procurement planning is used as a tool for establishing strategies and risk management. The emergency situations that have occurred in the previous period have, again, pointed out the importance of conducting proper public procurement planning with the goal of devising a long-term strategy, strategies for overcoming natural disasters, reducing bottleneck in relevant areas etc. The COVID-19 pandemic has demonstrated that only few have been prepared for emergency situations and many had false sense of preparedness. Also, the relevant task of reaching carbon neutrality requires long-term planning from 10 to 30 years

which has to be conducted through public procurement and that requires thorough analysis and planning. Otherwise, it will be difficult to avoid the potential damage of severe climate change.

8. Conclusion

The crisis/emergency situations which occur every year because of one event or another, have demonstrated that regardless of the level of development of a country there are always challenges that need to be properly resolved.

The COVID-19 pandemic has pointed out that if a legal framework is not well established, e.g. if there is no regulation on how to handle emergency situations or certain aspects of it have been neglected, the majority of the system will be dysfunctional. The crises have shown that investments that were made through public procurement have to be reevaluated in order to see if they were done properly. For illustration, the size of investments (% of GDP) in the healthcare sector does not necessarily correlate with the preparedness to deal with an emergency. If there were no investments in overcoming potential emergency situations through proper strategy and risk management then there is a high probability of healthcare collapsing. Likewise, if the public procurement system does not have a proper e-procurement system which can cover the entire process as well as generating the all the necessary data in coherent way, it will hinder the state's ability to properly react in non-emergency situations, as well as significantly reduce its capabilities in emergency situations. Lastly, the food, energy and oil crises have again shown that proper strategic planning through public procurement is important for mitigating future risks.

Each country should have the main objective of establishing an optimal governance model for public procurement which must fulfill the following two requirements: a) it is able to fulfill all the defined needs of the state in accordance with the value for money principle in an efficient and transparent manner and b) it must provide enough resilience so that it can avoid or at least reduce the potential damage from unforeseen event.

In relation to the proper legal framework, which represent the basis of it, it is relevant that each country carefully assesses the level of preparedness of its public procurement system. This requires evaluating how much the current legal framework is contributing or hindering the implementation of the value for money principle, i.e. the use of other award criteria than price and market dialogue is mandatory. Each country in accordance with its current level of development must compose its own model which can be successfully implemented. Additionally, it is important to use public procurement planning as a tool for proper strategy and risk management. This is crucial since the lack of proper planning and risk management can cause more harm which will, consequently, cost more than it was anticipated. This will be especially relevant for achieving carbon neutrality goal which requires careful decision making. As mentioned previously, each country must first analyze current gaps and determine the best way for eliminating them when it comes to strategy and risk management.

When it comes to e-procurement, the country should choose either to establish a new or further improve the existing system so that it can cover the entire process in accordance with transparency and efficiency. The data which is generated by this system must be complete and verified since it will be used for creating short-term or long-term strategies. Therefore, it is important to conduct a proper market analysis for current technology solutions in order to select the one which can fulfill all demands.

To conclude, the proper level of preparedness of the public procurement system has to be derived from a thorough and well-designed framework which will not only contribute to mitigating future emergency situations, but it will also contribute to establishing a sustainable, optimal model of governance which will in the long-term resolve all the challenges that lie ahead.

References:

Ankel, S. (2020). At least 5 countries — including a small Caribbean island — are accusing the US of blocking or taking medical equipment they need to fight the coronavirus. *Business Insider*.

<https://www.businessinsider.com/coronavirus-us-accused-of-diverting-medical-equipment-from-countries-2020-4#on-the-same-day-french-officials-claimed-that-a-mask-order-coming-from-china-was-bought-from-under-them-at-the-last-moment-their-cargo-was-already-on-the-runway-in-shanghai-when-it-was-bought-for-much-more-money-they-said-2>.

Član 283. Zakon o javnoj nabavi. *Zakon.hr*.

<https://www.zakon.hr/z/223/Zakon-o-javnoj-nabavi>.

Bofey, D. (2021). Italy blocks export of 250,000 AstraZeneca vaccine doses to Australia. *The Guardian*.

<https://www.theguardian.com/world/2021/mar/04/italy-blocks-export-of-250000-astrazeneca-vaccine-doses-to-australia>.

Cambridge Dictionary, (2022). *Cambridge Dictionary*.

<https://dictionary.cambridge.org/dictionary/english/optimal>.

Chestney, N. (2022). Factbox: What are Europe's options in case of Russian gas disruption? *Reuters*.

<https://www.reuters.com/business/energy/what-are-europes-options-case-russian-gas-disruption-2022-02-15/>.

Domm, P. (2022). A fertilizer shortage, worsened by war in Ukraine, is driving up global food prices and scarcity. *CNBC*.

<https://www.cnn.com/2022/04/06/a-fertilizer-shortage-worsened-by-war-in-ukraine-is-driving-up-global-food-prices-and-scarcity.html>.

Duggal, H., & Haddad, M. (2022). Infographic: Russia, Ukraine and the global wheat supply. *Aljazeera*.

<https://www.aljazeera.com/news/2022/2/17/infographic-russia-ukraine-and-the-global-wheat-supply-interactive>.

EBRD (2011). Capacity Assessment Toolkit. *Manual and Guide Note*. 7, 20, 54.

<https://www.ebrd.com/downloads/procurement/project/ToolkitGuidanceNote.pdf>.

Eurometaux, (2022). Metals for Clean Energy, Pathway to solving Europe's raw materials challenge. *Eurometaux*.

<https://www.eurometaux.eu/metals-clean-energy/>.

European Commission, (2017). EUROPEAN SEMESTER THEMATIC FACTSHEET. *Public Procurement*, 2.

https://ec.europa.eu/info/sites/default/files/fileimport/european-semester_thematic-factsheet_public-procurement0.pdf.

European Commission (2022). Single Market Scoreboard. *Public Procurement*.

<https://single-market-scoreboard.ec.europa.eu/policyareas/public-procurement>.

Evershed N., Nicholas J., & Ball A. (2021). Which countries rolled out vaccines faster – and why. *The Guardian*.

<https://www.theguardian.com/world/ng-interactive/2021/dec/17/vaccine-rollout-data-by-country-shows-who-has-vaccinated-faster-and-why-exposing-the-global-covid-19-divide>.

Gebrekidan, S., & Apuzzo, M. (2021). Rich Countries Signed Away a Chance to Vaccinate the World. *The New York Times*.

<https://www.nytimes.com/2021/03/21/world/vaccine-patents-us-eu.html>.

Innovation Fund of Serbia, (2020). RESULTS OF THE PUBLIC CALL FOR SUPPRESSION OF THE EFFECTS OF THE COVID-19 PANDEMIC PRESENTED. *Innovation Fund of Serbia*.

<http://www.inovacionifond.rs/en/news/results-of-the-public-call-for-suppression-of-the-effects-of-the-covid-19-pandemic-presented>.

MAPS, (2018). ASSESSMENT OF NORWAY'S PUBLIC PROCUREMENT SYSTEM. Testing the new methodology. 55, 62.

<https://www.mapsinitiative.org/assessments/Norway-maps-test-methodology.pdf>.

MAPS, (2003). About.

<https://www.mapsinitiative.org/about/>.

MAPS, (2018). Methodology. 20, 40, 50, 51.

<https://www.mapsinitiative.org/methodology/>.

Marlowe, L. (2020). Coronavirus: European solidarity sidelined as French interests take priority. *The Irish Times*.

<https://www.irishtimes.com/news/world/europe/coronavirus-european-solidarity-sidelined-as-french-interests-take-priority-1.4216184>.

OECD (2021). Government at a Glance. 162, 166, 168.

<https://www.oecd.org/gov/government-at-a-glance-22214399.htm>.

Tavares, L.V., & Arruda, P. (2021). Public Policies for Procurement under COVID-19. *European Journal of Public Procurement Markets – 3rd Issue*. 23.

<https://eupublicmarkets.com/wp-content/uploads/2021/07/EJPPM-3rd-Issue.pdf>.

The Government of Republic of Serbia. (2021). Production of Sputnik V vaccine starts in Serbia. *The Government of Republic of Serbia*.

<https://www.srbija.gov.rs/vest/en/173799/production-of-sputnik-v-vaccine-starts-in-serbia.php>.

Case study 2

Proposal for optimal governance model of central procurement in Slovakia

Jozef Kubinec

Abstract:

When the government or a municipality wants to establish a central procurement body (CPB), it must consider several aspects and issues. These factors will significantly influence how CPB performs its duties and stakeholders perceive its success. This case study will present different models of a central purchasing body's organizational and operational structure; then, the steps that the newly created CPB at the Prime minister's office in Slovakia should consider to achieve the positive effect of central procurement. Finally, an optimal solution and governance model are proposed to overcome fragmentation and promote cooperation among the CPBs in Slovakia.

Keywords

Central procurement, Central purchasing body, Cooperation of CPBs, Governance models.

1. Introduction

When the government or a municipality wants to establish a CPB, it must consider several aspects and issues. These factors will significantly influence how a CPB performs its duties and how its stakeholders perceive its success. Even though they need to be considered in the early phase of establishing a CPB, if the conditions change in the future or the original settings are unsuitable, the CPB can change them.

The objective of this case study is to present different models of a central purchasing body's organizational and operational structure; then, steps that the newly created CPB at the Prime minister's office in Slovakia should consider are proposed to achieve the positive effect of central procurement.

The expected result is to find the optimal governance model for centralized public procurement in Slovakia to overcome fragmentation and promote cooperation among the CPBs in Slovakia.

2. General issues concerning governance models of CPBS

To centralize or not, this question must be answered even before the government or municipality decide to establish a CPB. This almost Hamlet-like dilemma is here with us procurers for a long time and will stay forever. We can observe waves of decentralization and, again, centralization in public administration for decades. There are several pros and cons of centralizing public procurement, and these must be carefully considered in the early stages of the decision process. According to some authors, centralization of procurement does not bring the same benefits to all categories of contracting authorities. Still, it may be suitable instead just for those for which "decentralization results in a lack of the professional competences needed to efficiently administer the procurement process, such as municipalities and utilities" (Chiappinelli, 2020).

There are several goals that a CPB could aim to achieve, for example, costs savings by aggregating the demand of several contracting authorities. By bulking and aggregating, the CPB can achieve savings by exploiting economies of scale. There are several examples of how collaborative and centralized procurement, when progressively implemented over time, can generate savings through reduced unit costs for standard equipment and supplies (Graells, 2018). The positive effect of reducing the price when using central procurement was confirmed by a relatively recent paper that added another aspect, and that is that as prices decrease, delivery times increase; however, the effect of centralized procurement was in this case, perceived as relatively small (Clark et al., 2021).

Another goal could be reducing transactional costs. According to Albano, savings are achieved in the "overall process cost of procurement activities, as central agencies are in a position to bear the fixed cost of investments in infrastructures" (Albano et al, 2010).

In addition, a third goal could be the professionalization⁵ of public procurement, which is achieved by specialists working at the CPB. The CPB can afford to employ experts on specific commodities who will prepare technical descriptions and procurement strategies based on a profound knowledge of market and commodity groups. By centralizing human capital and expertise, "specialized teams can be formed to design better procurement strategies and improve them over time through continuous learning and experience" (Piga et al., 2011). Having skilled professional procurement experts who are law-aware brings benefit of presumably lower risk of procedural mistakes leading to less review procedures (Graells et al., 2014). CPBs can benefit from this as more complex and high value tenders have higher possibility of expensive litigations. The role of CPBs in the professionalization of public procurement is also acknowledged in recital 69 of Directive 2014/24/EU (Comba, comment on art. 37 in Caranta et al., 2021).

Last but not least, a fourth goal could be the strategic use of public procurement at a centralized level to support the implementation of policy objectives. In a separate chapter, we deal with the strategic use of centralized public procurement to achieve sustainability goals.

3. The structure of a CPBs

Organizational model

The first factor to consider is the organizational model of a CPB. The most common organizational models are the following: state-owned company, government agency model, and a department within a ministry.

Each organizational model has its benefits and disadvantages. In the case of a department under the ministry, the benefit is that it is easier to establish it since there is already an existing structure from an organizational point of view. Another benefit is that because the control of CPB is under one body, there are clear objectives and views on the functioning of CPB. The disadvantage of such a model is that it is not as flexible in administrative questions and decision-making as a state-owned company could be. State administration bureaucracy limits its

⁵ For more information about the impact of professionalisation in public procurement, see following article. Coppola, M. A. & Piga, G. (2019). The Impact of Professionalization in Public Procurement – evidence from a case study, *European Journal of Public Procurement Markets*, 2(4), 59-73. Available at <https://doi.org/10.54611/NLRE4256>

functioning when it comes to recruiting experts directly from the market, which is connected to a more rigid payment and salary possibilities.

In the case of a state-owned company, the benefits are that such organizational model is more flexible in business decisions, also it can implement fees for its services and it usually has a broader range of users which could be not only central administrations but regional and local ones. Moreover, such model is more flexible when it comes to recruiting experts directly from the market. Nevertheless, the disadvantages are related to the more complicated process of establishing such type of CPB as well as to the necessity to define the steering model carefully based on the conditions of the legal frame.

The third model is the Government agency model, which could be described as a model between the two ones described above. The benefit, mainly when comparing it with the department under the ministry model, is that the main task of such agency is to conduct procurement. Therefore, it does not overlap with other core activities of the "mother" ministries which could create problems with non-transparency and downgrading procurement functions (OECD, 2011).

Organizational structure

The organizational structure influences in many ways how the processes of a CPB are organized. It influences what person or department is responsible for writing technical specifications, preparing the tender strategy, running the tender procedure itself, managing the procurement contract, and other functions or services that the CPB may provide.

There are different models of possible organizational structures: functional, divisional, project, and matrix.

Financing models of CPBs

Decisions influence the financing model on the organizational model of the CPB. In the case of the department within the ministry, it will be financed by the state budget. In contrast, in the case of a company owned by the state, we can often see financing by fees from economic operators or contracting authorities.

CPB can be financed from the government budget or services fees from contracting authorities or economic operators. In the case of fees from economic operators, which are usually in the form of a percentage of supplier's invoiced sales, these need to be introduced with caution because there might be a possibility that this will negatively influence the participation of SMEs on central tenders. There are also examples of hybrid financing from the state budget and service fees. (Albano et al., 2016).

4. The current state of central purchasing bodies in Slovakia

Centralized public procurement is defined in Slovak law in § 15 of the Public Procurement Act. Currently, there are three major CPBs in Slovakia on the national level:

- the Ministry of Health, acting as CPB primary for hospitals and medical institutions;
- the Ministry of Interior, which is the CPB for different commodities for various CAs at national level;
- the Ministry of Investments, Regional development and Informatisation of the Slovak republic which acts as CPB for software licences for various CAs at national level.

The new amendment to the public procurement act, which entered into force on 31 March 2022, introduced a new CPB under the Prime minister's office (new CPB). The law states that CAs will mandatorily procure specific goods, services, and works at the national level utilizing this CPB. Such specific categories will be defined in a decree issued by the government. One of the downsides of such an arrangement is that the date when this decree will be issued is not yet known. Therefore, there is no obligation of CAs on the national level to procure through this newly created CPB at the moment.

5. SWOT analysis of central procurement in Slovakia

SWOT analysis is used for analyzing strengths, weaknesses, opportunities and threats of specific issues, mainly applied to companies. The definition of these would be slightly different depending on the sector where you conduct such analysis. Below it is illustrated the SWOT analysis of central procurement in Slovakia.

Table 1- SWOT analysis of the central procurement in Slovakia

Strength (+ positive)	Weakness (- negative)
<ul style="list-style-type: none"> • already existing and established several CPBs at the national level • good cooperation and communication between CPBs at the national level • already existing team of professional buyers with experience • in most cases, the division of competencies is based on the sectorial responsibilities of each CPB 	<ul style="list-style-type: none"> • unsure legal status and responsibility of the Ministry of Interior as the CPB due to a new amendment to the procurement law • not sufficiently analyzing the impact of higher value tenders on the market and competition • Ministry of Interior is primarily focusing on the needs of its end-users and not collecting the needs of other CAs • not sufficiently making use of possibilities of sustainable procurement • the service of CPBs for CAs is free, which leads to CAs not valuing the services the CPBs provided
Opportunities (+ positive)	Threats (- negative)
<ul style="list-style-type: none"> • promoting sustainable procurement with the possibility of having a more significant impact than in the case of small CAs • promotion of innovation and innovative procurement • to agree with CPB at the Prime minister's office that would allow the Ministry of Interior to further continue its function as CPB for specific goods and services with procurement of which it has already experienced - sectorial responsibility • by calculating savings show the benefits of central procurement • by showing the benefits of central procurement to CAs, introducing fees for services of CPB 	<ul style="list-style-type: none"> • no political will at the Ministry of Interior to continue as CPB • the newly created CPB at the Prime minister's office will lack skilled procurement professionals to conduct proper need analysis, tender strategy and tender itself • the newly created CPB would not be able to conclude contracts with better prices than the CAs could, and therefore there will be opposition to procuring through newly created CPB

6. What should the new CPB take into consideration and not forget

In this section, steps that the newly created CPB at the Prime Minister's office should consider will be proposed for such CPB to achieve the positive effects of central procurement. These steps consider the SWOT analysis in chapter 5, focusing on opportunities and threats.

Stakeholders management

It is crucial to identify the stakeholders. Internal stakeholders will be at least the owner of the CPB, in this case, the government, then CAs and economic operators. External stakeholders will be, for example, manufacturers, media, NGOs, end-users, taxpayers, lobbyists and others, depending on the nature of the procurement project.

It is essential to frequently communicate in a clear and structured way with all stakeholders involved, explaining the benefits of central procurement and presenting positive results of the procurement procedures. On the other hand, it is crucial to listen to their suggestions, experience and needs. Identify your allies and use them to persuade passives or opposition.

The organizational model of CPB

The decision on the type of the organizational model should be made in the early phase of establishing the CPB. As mentioned in chapter 3, there are several options. It is possible that in the early phases of the CPB, a divisional organizational model will be chosen. In this model, one person is responsible for the whole procurement cycle. One of the reasons would be a lower number of qualified personnel in the early phases of the CPB that could specialize in one function. After the CPB is already established, the other organizational models should be considered, for example, the matrix organizational model or functional.

Needs analysis

Only those who know the needs can cover them. The CPB shall know the needs of CAs for CAs to use the procurement contracts awarded by the CPB. If such needs are not met, CAs will not purchase from the contracts awarded by the CPB and will prefer to conduct their own separate tenders. It is suggested that the newly created CPB analyses the demand side to assess the potential demand regarding client users and the range of goods and services to target.

Market analysis

After the need analysis, the CPB shall conduct a market analysis. Why do we need market analysis? Because we need information regarding what kind of products and services are available on the supply side to prepare a tender strategy that will guarantee the successful result of the tender in the sense of price-quality ratio and quality of the product or services procured.

The professionalization of public procurement officials

A newly created CPB needs to start a recruiting process⁶ to ensure that its employees have sufficient knowledge and experience. The focus should not be only on legal skills and knowledge of national and EU public procurement legislation but also on the economic side of public procurement. The CPB must understand that public procurement is not only an extended domain of legal experts but an interdisciplinary field where different skills (legal, commercial and technical) are needed. Furthermore, the CPB should consider the need for continuous knowledge improvement of its employees, whether through internal training⁷ or by allowing them to attend specialized post-graduate programs focusing on purchasing and public procurement⁸. The European competency framework⁹ for public procurement professionals can provide sufficient guidance in this effort. There are scientific works that prove that competences of procurement officials are likely to be an important determinant of performance to the extent that categories of contracting authorities with more competent officials perform better on average (Chiappinelli, 2020).

Electronic platforms for e-procurement

The following should also be taken into consideration when establishing a system for e-procurement at the newly created CPB: the system should be user friendly; should cover the whole procurement cycle from the pre-tender phase¹⁰ until contract management; should include an analytic module that would allow monitoring existing contracts and framework agreements and also the previous tenders to use this data for preparing new tenders. Also, if the CPB wants to operate efficiently, it should include a re-ordering and e-invoicing module that would allow suppliers to send the invoices to all CAs that made orders through the system. This can save suppliers' money as it is more effective than using the different systems with separate CAs. Moreover, the new system should be interoperable with other state administration IT systems, for example, for checking economic operators' tax and health insurance responsibilities.

Contract management

The contract management is not specified as the regulated phase of public procurement process in EU directives or by national legislation (Hamer, chapter 7, in Risvig Hamer et al., 2021). We can observe that as the last phase of public procurement often neglected by CAs and CPBs. Newly created CPB must incorporate contract management principles into its processes to monitor the

⁶ The newly created CPB can consider attracting employees from other CPBs to benefit from their experience with central procurement.

⁷ The internal trainings can lead to creation of internal training program with its procurement specific curriculum. The example can be internal Academy for new but also existing employees established by BBG.

⁸ There are several well established programs focusing on different aspects of purchasing and public procurement such as IMMPM program at University of Tor Vergate in Rome, program focusing on sustainability side of Public Procurement at Universtiy of Turin or the LLM program at university of Nottingham.

⁹ The official name is ProcuCompEU - The European competency framework for public procurement professionals. More information can be found here: https://ec.europa.eu/info/policies/public-procurement/support-tools-public-buyers/professionalisation-public-buyers/procurcompeu-european-competency-framework-public-procurement-professionals_en.

¹⁰ Including functionality for conducting market analysis and need analysis.

orders of CAs, the fulfilment of orders and contract clauses by the suppliers, as well as other essential components of the contractual relationship between CPB, CAs and suppliers.

Mandatory vs voluntary use of CPB

It is essential to have mandatory use of CPB by CAs at the state level for some commodities because it enables the CA to establish first contact with the CPB and familiarise with its services. In addition, it is crucial to have a specific binding amount of goods or services when calculating the estimated price at the beginning of the procurement. If not, economic operators cannot calculate precisely their bidding price, which would result either in higher prices or in the inability to fulfil contract conditions. The list of commodities that will be mandatorily procured by the CPB will be defined in the decree that will be issued by the Slovak government. After the initial period of mandatory use of CPB other models could be considered ranging from conditioned compulsory mode to fully voluntary or optional model as they applied with success in some CPBs in Europe (Comba, chapter 3 in Risvig Hamer et al., 2021).

7. How can CPB contribute to sustainability goals

Central procurement can represent an essential tool for achieving secondary objectives in public procurement, such as promoting innovation and protecting the environment through applying green public procurement or achieving positive social impact. The use of centralized procurement may help spend the taxpayer's money in a way that would not only focus on what procuring entity may buy but how they buy it to achieve other deserving goals (Caranta, chapter 7, in Trybus et al., 2014). It is worth mentioning that sustainability resonates in public administration and the private sector. As Johnsen points out, "the pressure on business to deliver economic returns from greener goods is mounting and corporate social responsibility is no longer something that can be dismissed as fad for environmental fanatics" (Johnsen et al., 2014).

CPB which is aware of its role in promoting sustainable public procurement, can help to achieve a higher rate of use of environmental characteristics in public procurement. The reason is that it is easier to ensure that the environmental criterion is applied in one, more monitored public tender than if you would have several separate tenders done by each contracting authority by itself.

We observe that the correct application of environmental criteria may not always be easy. As mentioned above, CPBs are more likely to employ a specialist procurer who could specialize in sustainable public procurement, thus ensuring the correct application of green public procurement.

When it comes to the situation in the Slovak republic, strategic goals at the national level were set in the National Action Plan for Green Public Procurement for the years 2016-2020, with the fact that one of the goals for the years 2016 and 2020 was to achieve a 50% share of implemented "green" contracts by state administration bodies out of the total volume of contracts concluded by them for selected groups of products. This ambitious strategic goal was not achieved during the monitoring period. In the future, the newly created CPB at the Prime minister's office must acknowledge the importance of sustainable public procurement to the Slovak republic to achieve those goals.

8. Models for cooperation in public procurement between new and existing CPBs

The starting point for creating the models was the assumption that almost all CPBs implement cooperation with the others in some form. The models illustrated in the following paragraphs focus on the most common form of cooperation. The models aim to support, in particular, the qualitative component of cooperation between the new CPB and existing CPBs in the planning and implementation of activities. The models could be used as a guide for establishing contact between the new CPB and the already existing ones and vice versa.

Model of sectorial responsibilities for each existing CPB / general responsibilities of new CPB at the prime minister's office (Model 1)

This model is based on the parallel existence of the new CPB under the prime minister's office and the existing sectorial CPBs. The new CPB provides for intersectoral needs for stakeholders that are not related to the specialized area of these stakeholders. At the same time, sectorial CPBs meet the specialized needs of these stakeholders. A good example is the Ministry of Health of the Slovak Republic, the CPB for health care in Slovakia. In applying this model, the Ministry of Health of the Slovak Republic (or any other sectorial CPB) could continue in this activity while ensuring the stakeholders' fulfilment of their specialized needs, such as medical equipment, a specific type of medicament and other medical needs. At the same time, the new CPB under the Prime Minister's office could meet the other needs of the stakeholders, such as office equipment, software and software security, energy supply, ICT, security services, etc. At present, however, the new CPB under the Prime Minister's office is not in a position to secure stakeholders' needs, but it can be assumed that it is ideally moving towards this.

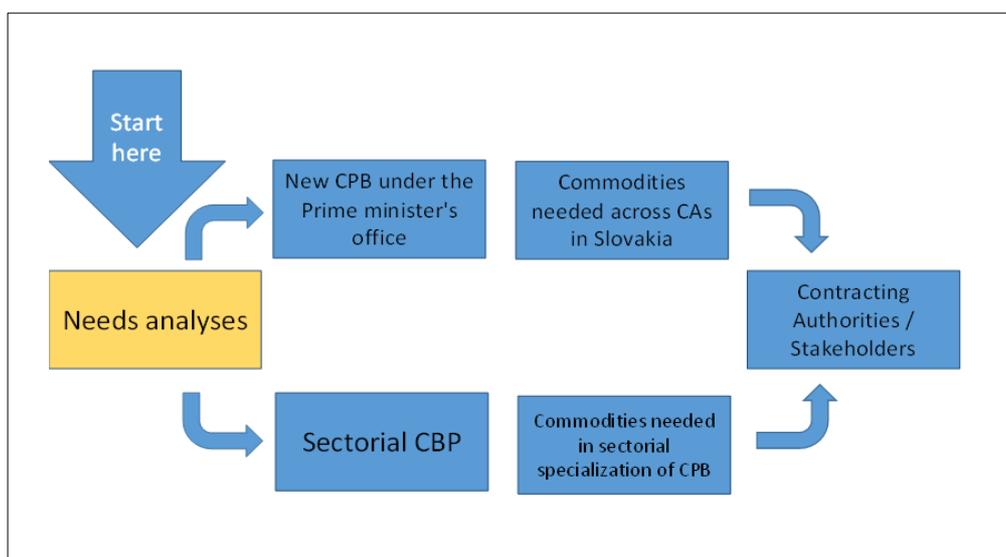


Figure 1 - Model 1 of cooperation in PP between new and existing CPBs

Model-based on the single lead buyer principle (Model 2)

A lead buyer principle is a strategic approach in public procurement. In principle, it means a unified procurement strategy under the umbrella of a single organization that requires technical expertise, qualified staff, standardization of goods, and volume commitment. This should lead to reduced overall procurement costs and coordination across the public procurement process. There

are several possibilities of how can the lead buyer principle works. The model presented here would mean a single CPB in Slovakia covering all areas of possible public procurement. It would mean that sectorial CPBs would no longer carry out these activities.

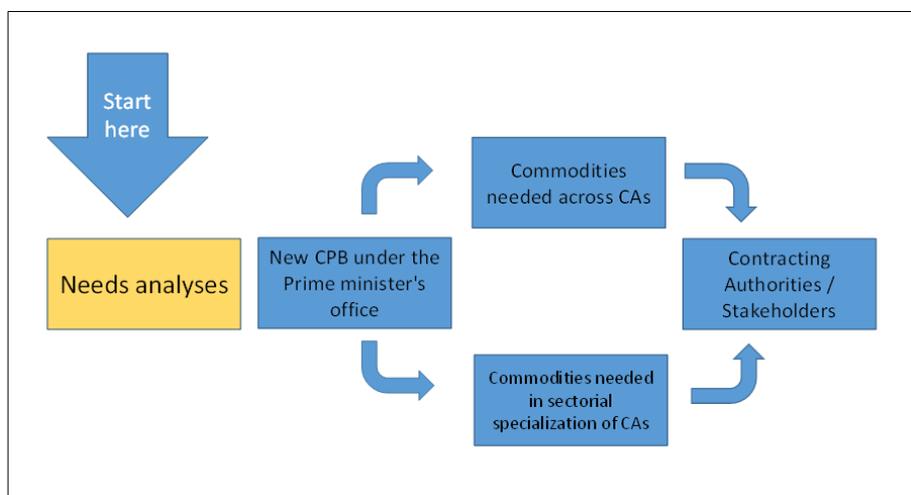


Figure 2- Model 1 of cooperation in PP between new and existing CPBs

Comparison of two selected models

The comparison of models mentioned above is presented in the following tables. First, the pros of the two models are compared in table 1 below. Then the cons of both models are compared in table 2 below.

Table 2 - Comparison of pros of two models

No.	Pros	Model 1	Model 2
1.	Specialized know-how	+	
2.	Sufficient number of qualified personnel	+	
3.	The existing relationship between sectorial CPBs and CAs	+	
4.	The existing relationship between sectorial CPBs and suppliers	+	
5.	Volume discounts of goods/services/works contract.	+	+
6.	The availability of a broader range of possible goods, services and works	+	+
7.	The faster availability of contracted products	+	+
8.	Standardized processes for all market segments		+
9.	Uniform and standardized environment for CAs		+
10.	The possibility of providing professional advice in the specialized market segment	+	
11.	Clearly defined areas of responsibility	+	+
12.	They have already established processes for conducting central procurement in their respective sector.	+	
	TOTAL	10	6

Table 3 - Comparison of cons of two models

No.	Cons	Model 1	Model 2
1.	The lack of capacity/competencies required to meet the needs of CAs		-
2.	Confusion of stakeholders regarding which CPB to address in case of a specific request	-	
3.	Possible corruption based on existing relationships	-	
4.	Perceived lack of trust from CAs towards new CPB		-
5.	The availability of a specialized range of possible goods, services and works		-
TOTAL		2	3

We can evaluate the score for each presented model based on the table above. For calculating the score the points received for cons should be deducted from the point received for pros. Higher score means a better result. The model 1 final score is eight (ten pros and two cons) The model 2 final score is three (six pros and three cons).

Best model in conditions of Slovak republic

According to the above-stated comparison of the two models, the best model would be a model with sectorial responsibilities for each existing CPB and general responsibilities of the new CPB at the Prime minister's office (Model 1).

However, I acknowledge the possibility of implementing a specific hybrid model between the above-illustrated models 1 and 2 that could also be intriguing. This hybrid solution would be based on allocating a strategic and policy-making procurement competence to the CPB in the Prime minister's office to give it the power to coordinate public procurement in Slovakia by using the already given experience of the sectorial CPBs. This solution would benefit both models and probably bring the most effective solutions. This solution is technically and legislatively demanding, and it is currently unclear whether there is a (political) will to implement it.

9. Conclusion and optimal governance model of central procurement in Slovakia

We consider one of the most significant issues of central procurement in Slovakia is fragmentation, where several CPBs on a national level exist without a clear mandate. Based on in-depth analysis, we propose that the optimal solution would be a model of sectorial responsibilities for each existing CPB and general responsibilities of the newly created CPB at the Prime minister's office. This means that the Ministry of Health would continue to act as CPB for hospitals and the health sector. The Ministry of Investments, Regional development and Informatisation of the Slovak Republic would focus on the Procurement of ICT, mainly software licences for various CAs at the national level. The Ministry of Interior would also focus on the security sector and, if agreed with CPB at the Prime minister's office, act as CPB in commodities it has experienced due to previous tenders, for example, vehicles or energy vectors and fuel. The CPB at the Prime minister's office should first analyze the needs of CAs at the national level and, according to the results, focus on commodities that are needed across CAs at the national level. To coordinate the actions of CPBs, regular meetings should be organized where CPB could interact and exchange best practices.

Several arguments back the proposals just mentioned. First, the CPB at the Prime minister's office does not have to train a sufficient number of qualified public procurement experts in a sector where other CPB are already making tenders. They should also focus on strategic commodities essential for the government, as stated in the introductory message to the amendment to the law, for example, ICT hardware, services of mobile telecommunication providers, and legal and audit services. Secondly, there is a perceived lack of trust from CAs on whether the CPB at the Prime minister's office will conclude FAs or Dynamic Purchasing Systems that would offer better conditions for goods and services as CAs procured by themselves. A sufficient level of trust will come with the first significant positive results. Thirdly, the infrastructure of existing CPBs already exists from an operational point of view, meaning they have established processes for conducting central procurement in their respective sector.

After the CPB at the Prime minister's office obtains qualified personal and significant results with specified commodities, it shall take responsibility for other CPB's non-sectorial responsibilities, such as procurement of energy vectors, ICT hardware, cars and special vehicles. We expect these steps to happen no earlier than in the horizon of two years due to the complicated process of hiring new personnel.

Regarding the e-procurement platform, I suggest that the newly created CPB continue the development of the state e-procurement platform, which all CAs could use without fees. This platform should not be made mandatory, but CAs should be able to choose also from e-procurement platforms provided by private companies in case the functionalities of these privately owned e-procurement platforms suit better needs of specific CAs.

Currently, the newly created CPB is, from the organizational point of view a department under the ministry (Prime minister's office). In our opinion, the best organizational model of CPB in Slovakia in future would be a state-owned company, which would bring the following benefits in the long-term horizon:

- more flexibility in business decisions, for example, faster signing of the contracts, which usually takes a longer time at ministries due to bureaucracy;
- easier implementation of fees for its services than in the case of the department under the ministry;
- more flexibility when it comes to recruiting experts directly from the market and probably also more attractive to employees;
- a more comprehensive range of auxiliary services that could offer to CAs, for example, ad-hoc consulting services.

References

- Albano, G. L. & Sparro, M. (2010). Flexible Strategies for Centralized Public Procurement. *Review of Economics and Institutions*, 1(2).
<https://ssrn.com/abstract=1887791>.
- Albano, G. L. & Nicolas C. (2016). The law and Economics of Framework Agreements – Designing Flexible Solutions for Public Procurement. *Cambridge*.
- Caranta, R., Sanchez Graells, A. (2021). European public procurement. Commentary on Directive 2014/24/EU. *Cheltenham*.
- Clark, R., Coviello, D. & De Leverano, A. (2021). Centralized Procurement and Delivery Times. Evidence from a Natural Experiment in Italy.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3927250.
- CPB network and OECD, (2016). Key Actions for setting up a Central Purchasing body (CPB). *European Commission. ProcuCompEU – the European competency framework for public procurement professionals. Brussels*.
https://ec.europa.eu/info/policies/public-procurement/support-tools-public-buyers/professionalisation-public-buyers/procurcompeu-european-competency-framework-public-procurement-professionals_en#contacttheprocurcompeuteam.
- Graells, A. S. & Anchistegui, I. H. (2014). Impact of public procurement aggregation on competition: Risks, rationale and justification for the rules in Directive 2014/24. *University of Leicester School of Law Research Paper*, (14-35).
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2534496.
- Nemec, A., Flach U. (2021). Centralized public procurement. *Module 3 of Public Procurement Excellence program. Vienna*.
- Graells, A. S. (2018). Centralization of procurement and supply chain management in the English NHS: some governance and compliance challenges.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3232804.
- OECD (2011). Centralized Purchasing Systems in the European Union. *Paris*.
<https://doi.org/10.1787/5kgkqgv703xw-en>.
- Chiappinelli, O. (2020). Decentralization and public procurement performance: New evidence from Italy.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3597052.
- Johnsen, T.E., Howard, M. & Miemczyk, J. (2014). Purchasing and supply chain management: A sustainability perspective. *Oxon*.
- Risvig Hamer, C., Comba, M. (2021). Centralizing Public Procurement: The Approach of EU Member States. *Cheltenham*.
- Figa, G., Dimitri, N. & Spagnolo, G. (2011). Handbook on Procurement. *Cambridge*.
- Trybus, M., Caranta. R. & Edelstam, G. (2014). EU Public Contract Law: Public Procurement and Beyond. *Brussels*.

Case study 3

Environmental and economic benefits of green public procurement through the Bilan Carbone and Life Cycle Costing methodologies: a case study for Arpa Piemonte

Arianna Sica

Abstract

The main objective of this article is to analyse the economic and environmental benefits associated with the implementation of Green Public Procurement and Minimum Environmental Criteria in a specific tender published by Arpa Piemonte for its headquarters in the city of Turin. The focus lies on the modernization of the internal lighting system shifting from CFL to LED technology: the analysis of environmental aspects measures the reduction of GHG emissions through Bilan Carbone; the economic benefits are analysed with the Life Cycle Costing tool of the European Commission.

Keywords

Benefits, Environment, GHG, Italy, LCC, Lighting, Procurement.

1. Introduction

In recent decades, the close interdependencies between the economic and the earth system have been at the centre of the discourse narrated by policy makers, scientists and citizens. The sustainability challenge has been advocated to face the current society's mechanism of consumption and production across the market economies (European Commission, 2008; Röckstrom et al., 2009; IPCC, 2022) and studies recalled the limited capacity of the earth system to sustain the current dimension and behaviour of business activities (Bonedahl & Eriksson, 2011).

Within academic literature, however, the potential of Green Public Procurement (GPP) is rarely understood (Nikolaou & Loizou, 2015), despite an increasing number of international organizations recognized its role to encourage firms towards less-polluting activities (OECD, 2003; UNEP, 2012). As indicated by the European Commission, GPP is “[...] 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” (European Commission b, 2008, p.5).

In the European Union (EU), public procurement makes up 14% of the Gross Domestic Product (GDP): the percentage is variable, as attested by countries like Portugal where it accounts for 4%, to others, such as Finland, which is around 18%. These differences reflect the different portfolio of public services offered by the countries, whether, for example, education or healthcare system are provided by the government (Sapir et al., 2022).

Indeed, only the emissions stemming from the public purchase amount to 15% of global Greenhouse Gases (GHG) emissions. Acting on the lever of public purchases could align to the scope of the Paris Agreement and to tackle climate change below the 2° threshold (World Economic Forum, 2022). For instance, the United Nations (UNEP, 2013) and the Organization for Economic Cooperation and Development (OECD, 2007) have taken significative steps to decrease the Carbon Footprint (CF) associated with the public purchase (Darnall et al., 2015).

Public purchase can influence both private and public behaviour in the market by affecting consumption and production patterns (Sapir et al., 2022). A change in the public consumption pattern can be obtained directly whether the PA replaces its current acquisition of products with less-polluting options (Sapir et al., 2022); indirectly, when public authorities are adopting GPP as well. With the latter dynamic, firms can develop clean technologies (Jiménez & Joint Research Centre, 2019) potentially generating a spill over, a dynamic that may change the composition of the market demand towards less polluting goods (Mazzucato, 2014).

In Italy, the Public Procurement Code in 2006 included environmental considerations in public contracts. For instance, intervention on different types of pollution, e.g. waste, water discharges, atmospheric emissions, etc., were gathered in one document. The Code had also the role to fully implement the 2004 Directives. The Legislative Decree April 18th, 2016, n. 50 “Code of public contracts” has replaced the previous 2006 Code and implemented the 2014 Directives. Among the novelties introduced within the 2016 Code, Article 34 made Italy the first European country to impose Minimum Environmental Criteria (CAM) in public procurement (Botta, 2022).

2. The context of the case study: the modernization of the indoor lighting system in Arpa Piemonte’s headquarters

The scope and application of this research must be read within in the Arpa Piemonte’s commitment to study the impacts caused by its activities. The object of this research is the central office (HQ) in the city of Turin and composed of 13 buildings, with 6 or 7 floors, and a single-floor structure that functions as a reception. Each building owns a specific denomination, such as: A1, A3, A4, B0, B2, B4, C1, C4, D0, D2, D3, E1, E4 and Reception (Figure 1). Building B2 is intended for other public organizations, while building D2 is undergoing renovation as of September 2022. In detail, in each building the number of the lightings is variable, depending by the number of floors and by the plan of the building itself.

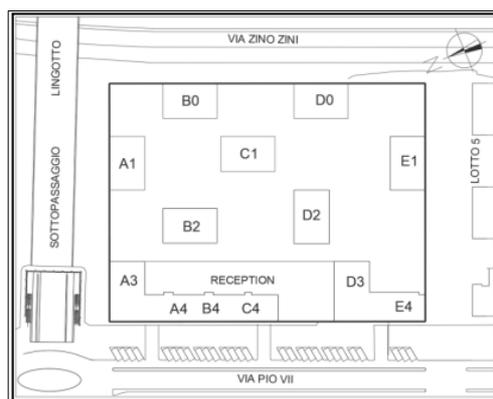


Figure 3 - Headquarters of Arpa Piemonte, plan of the former MOI complex placed in the city of Turin. ¹¹

Among the commitments of Arpa Piemonte there is the drafting of a social report aimed to analyse and reduce its energy-intensive activities. In September 2021 Arpa Piemonte announced a call for tenders to substitute the lighting system of the HQ buildings, specifically the lightings located in the hallways, corridors, stairwells of the fourteen buildings. The intervention includes the replacement of the previous compact fluorescent lamp (CFL) lighting system, with Light Emitting Diode (LED) lamps. The intervention, as justified in art. 2 of the Tender Regulation, would guarantee “[...] lower electricity consumption and longer life than other types of lamps” (Arpa Piemonte a, 2021, p.2). The features of the CFL lamps can be found within the General Technical Report of the public tender, according to three parameters (Arpa Piemonte a, 2021): (1) Installation method: recessed (I) or ceiling (P); (2) Functions performed: ordinary lighting (O) or emergency lighting indicated as multifunction (S), since it works also as ordinary lighting; (3) Protection level: glass screen (V) or without glass screen (N).

There are four types of lamps, which can be grouped according to the previous classification. The I-O-V and the I-S-V type have a power of 2x26 W and are placed in stairwells, hallways and corridors; the P-O and P-S type have a power of 2x18 W and are only placed in stairwells. All the substituted lamps are CFL, the technical characteristic that will be crucial for this research. CFLs are made of fluorescent lamp tubes in which the ballast is incorporated in the lamp; they consume between 65% and 80% less energy compared to the conventional incandescent lamps that were common before 2009 (Incandescent conventional lamps were substituted with CFLs with the Regulation 244/2009); usually have a lifetime between 6000 and 15000 hours.

The technical references relating to the new plant required in the public tender are mainly present in the Special Tender Specifications and in the Technical Report. The latter states that the new lamps must incorporate characteristics, such as: high lighting performance, ease of assembly / disassembly and aesthetic. The document shows some possible examples of lamps that should replace recessed lamps, i.e. classified as I-O-V or I-S-V, or ceiling lamps, i.e. classified as P-O or P-S.

LED technology is referred to in the exemplification of the requested lamps. 5 types of lamps must have a lifetime longer than 50.000 hours, such as (1) Type 1, n.554 of LED panel with ordinary function, nominal power $\leq 36W$; (2) Type 2 n. 330 multifunction LED panel recessed lamps,

¹¹ Source: Arpa Piemonte a, 2021.

nominal power between 18-24 W; (3) Type 3 n. 180 wall lamps with emergency exit signalling function and a nominal power between 18-24 W; (4) Type 4 n. 27 LED ceiling lamps with ordinary lighting function only and a nominal power $\leq 36W$; (5) Type 5 lamp n. 105 multi-function LED ceiling lamps, with the same technical characteristic of Type 4.

The technical specifications reflect the criteria envisaged in the CAM of 2017 relating to the “Minimum environmental criteria for the award of design services and works for the new construction, renovation and maintenance of public buildings” (Ministerial Decree 11/10/2017). Additionally, regarding the luminous efficiency and colour grading features, the lamps requested in the technical report have even more stringent specifics than those in the CAM.

After the launch of the tender in September 2021, new CAM (Ministerial Decree 08/07/2022) were published in June 2022, affecting the requirements for indoor and outdoor lighting systems. While the new CAM does not impact the tender in question as it precedes the new rules, it may still be relevant as Arpa Piemonte has deliberately tried to present more stringent requests than the 2017 CAM. In the new CAM, at point 2.4.3, greater emphasis is given to three main issues that constitute a novelty for the indoor lighting system: the provision of systems that regulate the operation of lighting devices, a minimum life of the LED lamps and the structure of the CAM reporting document presented by the designer of the contracting company.

The first novelty privileges those devices that can regulate the switching of the lighting, for example by incorporating twilight sensors. None of the LED lamps required in the tender include this type of sensor, requesting only an ON/OFF type light control; this will affect the calculation of the overall energy consumption of the buildings that will follow in the LCC and CF analysis. On the other hand, a lamp lifetime longer than or equal to 50,000 hours for all five types aligns itself with the new CAM. The third novelty concerns the means of proof that must be provided by the successful bidder, in addition to safety standard certifications, such as environmental product declarations of Type III or the ReMade in Italy certification. The tender document in question did not require these declarations.

The award criterion for the tender chosen is the lowest price. The choice is motivated by the fact that the “[...] characteristics of the service to be acquired are standardized [...]”, therefore “[...] it is decided to use the criterion of the lowest price, in accordance with the provisions of art. 95 of the Code of public contracts” (Arpa Piemonte a, 2021, p.3). In fact, within the Procurement Code, this is one of the exceptional cases in which it is still possible to use the criterion of the lowest price. This choice prevents tenderers from being rewarded for environmental certifications or other innovative features. However, before drafting the tender notice, Arpa had launched an internal analysis of its needs. It verified whether twilight sensors could have reduced the lighting operating hours. However, since the lightings are placed in stairwells and corridors, where there is no exposition to the natural light, the twilight sensor would have been unnecessary. Therefore, in the call for tenders, the bidder is awarded only according to the aggregate lowest cost attributed to the following macro activities: (1) Definitive elimination of existing recessed CFL lamps; (2) Installation of new LED lamps (recessed ceiling panels); (3) Installation of LED emergency lamps (in false ceiling); (4) Installation of LED emergency exit lamps with pictogram (on the wall).

The total amount for the procurement was 207.055,37 euros. The winner was chosen among the 224 offers received and considered valid. It was awarded with a total cost commitment of 163.735,37 euros, proposing an auction discount of 38.021,85 euros.

2.1 Evaluations on the economic benefits of the public tender with the LCC tool of the European Commission

The LCC tool can be instrumental in quantifying cost benefits stemming from the application of the GPP. In this case study, the evaluations are placed in the ex-post scenario, in which the call for tenders was closed and the works to install LED lamps were entrusted to the successful tenderer. The goal is to identify whether the purchase of LED lamps has actually brought benefits to the Agency, in terms of the total costs of the tender, compared to the purchase of new CFL lamps with the same features of the one that were previously installed.

The boundary of the calculation is delimited by the LED lighting systems subject of the tender called “modernization of the internal lighting system of the Arpa Piemonte headquarters”. The total number of lamps required is greater than the previous number of CFL lamps present in the buildings, i.e. 1526 compared to 1209. The greater number is due to the fact that the existing CFL recessed lamps, in some cases, had the normal and the emergency function, while the LED panels only perform the former function. Therefore, the analysis is restricted to LED of Type 1, 4 and 5 only, since they are comparable with the previous state, owning the ordinary function.

The tender includes LED lamps intended for stairwells and corridors, excluding all other types of lighting, such as those provided inside the offices or common areas, such as the canteen or bar area. While there are currently 13 buildings plus the reception structure, however, as already indicated, building B2 is intended for other public organizations and building D2 is undergoing renovation. Moreover, the Reception is a single storey structure with structural differences compared to the other buildings. For these reasons, the above three buildings were excluded from the reporting perimeter, including only buildings A1, A3, A4, B0, B4, C1, C4, D0, D3, E1 and E4 (Figure 1). Furthermore, since the LCC analysis and the estimates produced are closely intertwined with the respective analysis of GHG emissions that will follow and a previous study of CF of the site will be used as a basis for the comparison of LED and CFL benefits for the Agency, the same reporting perimeter is beneficial for the comparison.

There is no actual data available concerning the annual operating hours of the interior lighting. The switching on is regulated by a centralized time system divided by building and the on/off times change by the various periods of the year. For instance, the data made available by the project office for September 2022, are the following: for buildings A1 - A3 - A4 - B0 - B4 - C1 - C4 - D3 - E1 - E4, the switching on takes place from Monday to Friday in the time slot 6:30 - 7:30 and 18 - 19:30; Building D0 from Monday to Friday from 6:30 to 19:30; for building D3, it is switched on from Monday to Sunday in the 6:30 - 7:30 and the 17:45 - 20:00 slots. From these data, excluding the two buildings B2, D2 and the Reception, it is possible to deduce that the weighted arithmetic mean of the weekly hours per floor, amounts to 16 hours approximated by excess; while 828 are the annual operating hours approximated by excess.

The “LCC_Inputs_Results” in the LCC tool contains the information that should be entered by the PA, concerning the main characteristics of the space in which the system should be installed. For instance, it is requested the identification of an installation area that should function as base unit for the calculation; in this case, a single building floor has been identified as the base unit.

Other basic parameters are requested for the calculation in this sheet, such as the country of reference, the currency, the LCC evaluation period and the discount rate, which is indicated as

optional. The selection of the time reference is a relevant decision for the public purchaser: a shorter lifetime weights more the purchase price, but a longer lifetime doesn't act the same way, giving major weight to operational and maintenance costs (European Commission, 2019). Therefore, for the selection of a suitable time range for the lighting sector, several sources were analysed. For instance, the calculator suggests a 20-year period, adopting as a reference the recommendations of the previous LCC calculator for lighting sector published in 2007. However, 15 years is the time range selected since one of the few best practices reported and suggested to follow by the European Commission concerning the LCC estimation for the LED lighting is a case study for a municipality in Denmark (the Municipality of Syddjurs adopted the total cost of ownership approach to save on lighting costs in a public tender), which indicated a reference of 15 years (European Commission, 2017).

The discount rate is indicated as an optional parameter to consider; however, it is a relevant information to assess since it enables to transform future cost into present value, i.e. the discounting mechanism. As for the length of the evaluation period, a lower or a higher value implies a different consideration of the costs; for instance, a higher discount rate gives less weight to annual costs, e.g. operational, service and externalities (European Commission, 2019).

The tool proposes a discount rate of 1,8% based - again - on the previous EU LCC tool, or alternatively, references the orientation of the Directorate-General for Regional and Urban Policy of the EC. The latter recommends using, as a general rule, a social discount rate of 5% as a benchmark in Cohesion Member States, e.g. also in line with the social discount rate used for addressing costs in a Cost-Benefit Analysis (European Commission, 2014) or alternatively 3% for those countries not included. Italy is not comprehended in the category of the Cohesion Member States; additionally, it is considered that in the best practice of Denmark suggested by the EC it is proposed a 4% discount rate. Since these points and the context in which the analysis is embedded, it is set a social discount rate of 4%. For the evaluation of the operation costs, it is requested the value of the electricity price for the year 2021, which is reported as 0,143 Eur/kWh; since the aim and scope of this research, the electricity annual price increase has not been included.

To evaluate the energy consumption is made the following assumption: since the illuminated area, in terms of m², is not similar in the different buildings, it is considered the annual operating hours of the system referred to the base unit selected previously, i.e. a building floor of the Arpa Piemonte's HQ. Considering the different operating hours of the buildings reported in the boundaries of this research, 828 resulted the weighted arithmetic mean of the operating hours in each floor for the year 2021. The maintenance costs to be indicated in the section attributed to the PA are not referenced. In fact, Article 21 of the tender specifications does not deal with maintenance costs, since they are effectively zeroed: only if a LED breaks it is replaced, while CFL bulbs are periodically replaced. The tender includes guarantees that the installation company shall provide: up to the 5th year after the installation; in case of breakages or malfunctions, the company must intervene and replace, with the exception of breakages considered physiological, such as an additional guarantee that relieves the Agency of replacement costs. Since the impact of additional guarantees does not find space in the calculator, it has been decided to not evaluate this aspect for the LED system.

The calculator also treats CO₂ eq emissions as cost incurred during the use of the lightings. For the year 2021, the electricity provided is 100% from RES, as witnessed with the certificate released according to the European Energy Certificate System (EECS). Therefore, the CO₂ eq emissions correspond to the value of 0,024 kgCO₂/kWh, the same taken as reference in the GHG report of Arpa Piemonte for the year 2019 within the CreiAMO PA project (Arpa Piemonte b, 2021). Finally, the cost of CO₂ eq, in terms of EUR/ton CO₂ eq, is set to 90, adopting the proposal of the tool, which is based on the report “Update of the Handbook on External Costs of Transport” where is suggested a central value of 90 EUR/ton.

The bidder response sheet treats the data that enables to evaluate the economic offer with the specific costs of the lightings. The luminaires and its components are considered within the boundary of this research, and are considered respect to the unit base, i.e. the building floor. The number of the lamps installed in each floor is not fixed because it depends on the planimetry of the building: it is implemented an estimation in average of their number for the Type 1, Type 4 and 5.

Additional data concerns the lifetime and power resulted from the technical sheet provided by the winning bidder. Since the area in terms of m² is not available, it is not possible to calculate the LENI of the room, therefore, it won't be indicated in the calculator. The purchase price of the LED lamps is identified in the tender document called as the Estimated Metric Calculation. The luminaire installation cost is represented by the difference of the total amount required for the work, i.e. 115.310,53 euros, which is the amount resulting from the auction discount offered by the bidder, deducting the total price of the lamps, i.e. 88.883 euros; then, the result is divided by the 556 lamps installed in the buildings considered, which amounted 17,32 euro, excluding VAT and security charges. Furthermore, since the purpose of this research, e.g. the costs of removing the previous lamps, the new installation and the labour, are combined and represented by the unique import of 17,3 euros, the other costs by the authority per room or building zone are left blank.

Crucial to this analysis is to provide a valid comparison with the Business as Usual (BAU) scenario, under which Arpa Piemonte would continue to purchase CFL lamps. The specific objective, hence, is to verify whether the longer lifetime of LED lamps and lower energy consumption, in a range of 15 years, would justify the higher purchase price in comparison with new CFL lamps.

The benchmark CFL lamps meet the requirements of the CAM in force at the time of the call for tenders and match the power and number of previously installed. As in the Danish best practice, the prices of CFL lamps can vary considerably depending on the supplier despite having the same technical characteristics. For this study, CFL lamps were searched with all the aforementioned features and to deal with the price variability, two lamps were considered and indicated as CFL low price (CFL LP) or high price (CFL HP). In the previous installation there were two types of lamp, with 26x2 W and 18x2 W power, therefore the CFL LP lamps, obtained on the Philips manufacturer's portal are a pair of “Philips 230425” CFL lamps with a total power of 26 W, a purchase price of 14,08 euros and with 12.000 hours of lifetime as an alternative to Type 1 LED lamps; a pair of “Philips 383331” CFL lamps with 18 W, a purchase price of 15,46 euros and 10.000 hours of lifetime as alternative to Type 4 and Type 5 LED lamps. For the more expensive scenario, a pair of “Sylvania Cf26dd/841” with 26 W, a purchase price of 39,98 euros and 10.000 hours of lifetime; the pair of Philips 34500-9 CFL lamps with 18x2 W, a purchase price of 22,66 euros and

12.000 hours of lifetime. Following the same assumptions on the annual operating hours, the electricity prices, the discount rate and the system boundaries, the data are entered in the calculator with the technical specifications, however with evident differences as regards the estimate of maintenance costs attributable to each lamp. Each lamp is not made up of a single block, as for LED panels, but is made up of several parts, such as two light sources and the ballast, which increase maintenance costs, while for LED lamps they are zeroed and for this reason they were not included in the tender as costs.

Based on these assumptions, the output of the LCC calculator is analysed. At the bottom of the sheet named as “Inputs_and_Results”, is reported a list of total amounts, e.g. investment costs, operation costs, maintenance and service costs, other costs and externalities costs, life cycle cost, energy use and CO₂ eq emissions associated with the LED, CFL LP and HP scenario (Table 1). From these results, a series of considerations can be made on each aggregate cost item deriving from the three scenarios.

Table1 - LCC results associated to the CFL and LED scenarios contained in the LCC calculator for the lighting sector published by the European Commission ¹²

		LED	CFL LP	CFL HP
Investment costs	EUR	50502,92	26134,44	45747,04
Operation costs	EUR	20581,56	54617,36	54617,36
Maintenance and service costs	EUR	39179,18	65879,78	123675,96
Other costs	EUR	0,00	0,00	0,00
Cost of externalities	EUR	310,88	824,99	824,99
Life cycle cost	EUR	110574,55	147456,57	224865,34
Energy use	kWh	194174,28	515280,96	515280,96
CO₂-eq emissions	kg CO ₂ eq	4660,18	12366,74	12366,74

The total investment costs regard the acquisition and installation activities assumed to occur at the beginning of the contract and are indicated as higher with the adoption of LED lighting, aligning with market prices and purchase prices of the Danish case study as well. In this case, despite the considerable variability of the purchase price of CFL lighting, its price is doubling the CFL LP solution, while CFL HP is almost equivalent, saving only 4.755,88 euros compared to the LED. However, it is in the other aggregate costs that there is a substantial gap among the three solutions, i.e. within the operation and in the maintenance costs.

The operation costs represent the cumulative annual cost due to the energy use of installations during the evaluation period and expressed in net present value; they result as considerably higher for the solution with the CFL. This seems justifiable for two reasons: for the higher wattage of both CFL scenario; for the fact that the number of LED is lower since they own more brightness respect to CFL, as reported by the project office and witnessed in the technical scheme. In this way, over a time range of 15 years, the LED solution is preferable, since it results less expensive of 62.32% respect to CFL LP and CFL HP. The maintenance costs represent the cumulative annual maintenance and service costs for the duration of the evaluation period expressed in net present value; in this cost category there is again a saving attributable to the LED solution for 40,53% compared to CFL LP and 68,32% to CFL HP. This gap seems attributable to the lower lifetime of the CFL solutions of 10,000 or 12,000 hours, i.e. approximately 5 times lower than the

¹² Source: Calculation of the author; European Commission, 2019.

LED solution, which lead to a cost increase associated with maintenance, the decommissioning of old appliances and labour. The cost of externalities, i.e. concerning GHG emissions in the calculator, and the amount of CO₂ eq emissions are quite low compared to the total amount of the costs. Since the energy comes from RES, the emission factor is only 0.024 kgCO₂/kWh, but the LED scenario allows a 62,32% saving, in terms of CO₂ eq emissions, compared to the other solutions. However, it is in the energy use, in terms of kWh, that there is an evident saving equivalent to the 62,32% in the total electricity demand when the LED system is adopted. Furthermore, the LCC of the three solutions indicates that the LED lighting scenario is less expensive than the CFL LP for 25,01% and to CFL HP for 50,83%. With the availability of the output data from the calculator, it is possible to consider financial metrics as well, which may be instrumental for the PA to verify and test the financial performance of the proposals within the call for tenders. For instance, with the payback period metric can be found the amount of time needed to recuperate the original investment for the project. The payback period of LED compared to the savings associated to the less expensive scenario amounts to 45 years, a value higher than the average time for the lighting sector witnessed in the literature, where there is a maximum payback of 33 years for LED (EIB, 2019). Compared to CFL HP solution, instead, the LED investment is repaid faster, i.e. 19 years however it is reported as a higher value than the average lifetime of a LED lighting.

The high amount of time to repay the investment is addressed to the savings per year, i.e. 2458,80 and 7619,39 euros, which don't compensate enough to have a lower payback period than the lifetime. The additional consideration of this metric within the LCC calculator could be substantial for the PA in the awarding stage: for instance, a proposal with a higher LCC compared to others could be still awarded considering a lower payback period. As reported, within the LCC calculator it was set a 4% discount rate considering a 15-year range; however, a last consideration is implemented to verify the effect of applying a discount rate on the total cost of the LED lightings. To test this effect, a sensitivity analysis is realized, where are considered four types of discount rates: (1) ρ_1 : 1,80%, proposed by the EU LCC tool (European Commission, 2019); (2) ρ_2 : 3%, for those countries not included in the Cohesion Member States category (European Commission, 2014); (3) ρ_3 : 4%, the discount rate applied within the Danish best practice regarding the installation of LED lightings for a municipality (European Commission, 2017); (4) ρ_4 : 5%, the social discount rate suggested to conduct Cost Benefit Analysis for countries categorized as Cohesion Member States (European Commission, 2014).

Therefore, to calculate the Net Present Value (NPV) of the LCC, it is not set any discount rate in the LCC calculator, resulting a total LCC for the LED lightings of 129.192,18 euros. The result of the analysis shows that applying ρ_1 the NPV at year 15 is reduced by 23,42%, with ρ_2 is 35,81%, with ρ_3 is 44,47% and with ρ_4 a 51,9%.

2.2 The measurement of GHG emissions of the LED and CFL system through Bilan Carbone calculator

To quantify the CO₂ eq emissions, this analysis starts from the theoretical framework given by the previous report produced by Arpa Piemonte, which accounted the emissions of the Agency's HQ with the Bilan Carbone tool, with reference to the years 2017, 2018 and 2019 (Arpa Piemonte b, 2021).

The objective of this analysis is to verify any benefits brought about, *ceteris paribus*, by the new approach compared to the previous one, i.e. to identify the CO₂ eq emissions associated with the LED technology, and verify any differences compared to the BAU scenario with CFL. Therefore, the scope of the project, the boundaries of the investigation, the emission factors and the same calculation methodologies are maintained (for hydroelectric power is 0,024 kg CO₂ eq/kWh from the 7.4 Version of Bilan Carbone; for solar energy is 0,055 kg CO₂ eq/kWh from the Italian National Inventory Report, 2016).

The scope of the previous report included the main flows of several materials (Arpa Piemonte b, 2021); energy consumption for lighting was presented in an aggregate form in the macro-category “Electricity”. The perimeter is represented by 11 buildings A1, A3, A4, B0, B4, C1, C4, D0, D3, E1 and E4, which coincides with the boundary of the LCC analysis previously carried out. The organization has identified the operational boundaries on the basis of the incoming and outgoing flows to identify the emissions associated with its activity, according to the ISO14064: 2018 Standard and has divided them into direct emissions (Scope 1) and indirect emissions (Scope 2 and 3). This research is intended to analyse those emissions that accounts specifically under the category of Scope 2, i.e. those deriving from purchased or consumed electricity. The Emission Factors are specific to the individual systems of electricity production, which for the lighting are referred to the hydroelectric and oceanic energy power. As mentioned, the report referred to three years, 2017, 2018 and 2019, however, for this research it was decided to refer only to the year 2019 to compare the benefits between technologies.

The total luminaire power for all the buildings is 15.634 W, while for the CFL is 41.470 W. The resulting value for each building is then weighted for the operating hours, which were previously reported to be significantly different among the structures. The total annual consumption with the LED system amounts to 13.734,24 kWh, while for the CFL is 35.854,28 kWh.

The resulting value of the luminaire consumption is embedded in the specific frame named as “Energy Purchase and Production from RES” and weighted according to the origin of the energy source. The LED system of the winning proposal for the tender would have produced 340 kg CO₂ eq emissions adopting the data available for the year 2019, while the previous system with CFL produced, according to the estimation, 886 kg CO₂ eq emissions.

From the Bilan Carbone results a consideration emerges in line with what has already been described during the analysis of the LCC calculator. Since the supply of electricity for the Agency originates for 100% from RES, the emissions are lower, compared to other consumption activities of the agency, which, instead, originates from other non-renewable sources, i.e. as for the heat that comes from natural gas district heating (Arpa Piemonte b, 2021). However, it is found that with the new LED system there is a reduction in CO₂ emissions of 61.63% compared to the previous CFL system. However, these emissions are referring to Scope 2 only, i.e. to those emissions that occurred due to the purchase or consumption of electricity during the ownership. This data, therefore, should be offset by the respective emissions released during the production and decommissioning phase of the luminaires. The main limit to estimate the overall CO₂ eq emissions for Scope 3 is due to the lack of emission factors provided by the tool. In fact, the emission factor is envisaged for other types of inputs, therefore is possible the accounting of Scope 3 emissions, while for the lighting sector is not provided in the database. To act against this lack, it would have been necessary to rely on an LCA analysis made available by the manufacturers of light bulb; however,

for a PA that has to draw up numerous tenders and that has other duties, this implies and means a considerable consumption of resources and time. Furthermore, the bidders are the companies that deal with the installation and not the production companies of lighting, and the inclusion of more actors would add more complexity to the drafting of the tenders and to ex-post considerations. Additionally, comparing the benefits between the LED versus the CFL scenario emerged that with the adoption of LED there is a saving in electricity consumption of 61,69%, i.e. 22120,04 kWh amounting to 3163 euros per year (assuming an energy price of 0,143 EUR/kWh).

Alternatively, there was an option to compensate for missing factors for Scope 3, which was the one attempted for this research. This would have been to consult ENEA and ask whether a national emission factor for the sector in question had been determined. In this way, the simplest solution for a PA, and for this research, would be to use the emission factors for the lighting sector by the tool; however, the data is not available. Finally, the last point to stress is the gap between the CO₂ savings resulting from the Bilan Carbone and the LCC calculation. The difference is due to the fact that the total consumption, from which the emissions derive, have different values: for Bilan Carbone it was possible to insert the weighted consumption for the operating hours of each building reported from the project office and for this reason is a more accurate data, i.e. with LED are emitted 340 kg of CO₂ eq emissions, while with CFL 886 kg in the reference year, therefore there is a saving of 546 kg. In LCC it is not possible to multiply the consumption by the annual operating hours of each building, but it is the calculator that automatically estimates the consumption from the number of lamps inserted and then multiplies it by the total weighted average of hours, i.e. 828 hours. The total resulting value accounts for 15 years, while for one year amounts to 310 (LED) and 824 kg (CFL) of CO₂ eq emissions, i.e. a saving of 514 kg with LED. Despite 514 kg has the same order of magnitude of the emissions measured with the Bilan Carbone, there is a gap of 480 kg in a range of 15 years between the two calculations.

3. Conclusions

This research aimed to verify whether the new Arpa Piemonte's internal lighting system carried out environmental and economic benefits. It resulted that the LED solution, object of the tender, led to savings, respectively, to the alternatives CFL LP and CFL HP, of 25.01% and by 50.83% in terms of total cost. Also, in terms of environmental benefits, LED technology has led to a saving of 61.63% in CO₂ eq emissions compared to the previous system. However, as demonstrated in the quantification of the payback period of the 3 cost scenarios, it is found that the times to recover the investment by the Agency are greater than the useful lifetime of the lamps considered. With the adoption of a joint analysis through LCC, Bilan Carbone and financial metrics, the shortcomings were confirmed, but also the peculiarities of each calculation tool. With Bilan Carbone it came out that the possibility of inserting the values of the total consumption calculated from the operating hours weighted for each building. This brought a more specific estimation of the emissions rather than the one contained in the LCC calculator, where it is not allowed the insertion of the electricity consumption. Similarly, Bilan Carbone omits the economic aspects, strictly focusing on measuring environmental factors. However, the major limit leading the CF comparison between the LED and CFL scenario was the absence of the Scope 3 emissions due to the raw material processing and to the disposal of the lamp. The motivation behind this lack may lie in the fact that the energy-intensive and more emitting phase occurs during the consumption stage as reported in the literature by LCA for the LED (Ferreira et al., 2021). In this way, this

LCC calculator should be read together with a product LCA that can cover the other missing stages.

A substantial limitation of the research derives from the moment in which this analysis was implemented, i.e. in the post-tender phase, meaning that the award of the contract cannot be actively affected. However, the exemplification process showed how the use of these calculators, when the MEAT is adopted, can bring both environmental and economic benefits. In fact, it has been shown how the environmental and economic benefits could be considered within a tender with LCC award criteria and, additionally, how the financial metrics could avoid short-sightedness regarding the investment payback times and the actual overall savings.

References

- Arpa Piemonte (2021). RdO N.2861754. Lavori per L'intervento Di Ammodernamento Impianto Di Illuminazione Interna Degli Spazi Comuni Della Sede Arpa Di Torino, 7 Sept. 2021. <https://www.arpa.piemonte.it/lavora-con-noi/gare-e-appalti/gare-e-appalti-scaduti/anno-2021/29-2021-rdo-n-2861279-lavori-per-lintervento-di-ammodernamento-impianto-di-illuminazione-interna-degli-spazi-comuni-della-sede-arpa-di-torino>.
- Arpa Piemonte (2021). Report GHG Arpa Piemonte (2021) - L3WP2 – A3.7 Azioni di affiancamento on the job sui settori chiave dell'impronta ambientale che consentano di mettere a sistema il modello di gestione ambientale ed energetica.
- Bonnedahl, K.J., & Eriksson, J. (2011). The role of discourse in the quest for low-carbon economic practises: a case of standard development in the food sector. *European Management Journal*, 29, 165-180. <https://doi.org/10.1016/j.emj.2010.10.008>.
- Botta, G. (2022). The Interplay between EU Public Procurement and Human Rights in Global Supply Chains: Lessons from the Italian Legal Context'. *European Journal of Public procurement Markets* XXX
- Darnall, N., Stritch, J. Hsueh, L., & Bretschneider, S. (2018). A Framework for Understanding Sustainable Public Purchasing. *Academy of Management Annual Meeting Proceedings*, 2018(1), 15677. <https://doi.org/10.5465/AMBPP.2018.15677abstract>.
- European Investment Bank (2019). Energy Efficiency Projects in Europe. Examples of energy efficiency projects that could be financed through the PF4EE instrument. *March 2019, Berlin*.
- European Commission (2008). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. On the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan. *July 2008, Brussels*.
- European Commission (2008). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. Public procurement for a better environment. *July 2008, Brussels*.
- European Commission (2014). Guide to Cost-Benefit Analysis of Investment Projects: Economic Appraisal Tool for Cohesion Policy 2014-2020. *December 2014, Brussels*.
- European Commission (2017). GPP in Practice - Issue no. 73. *July 2017, Brussels*.
- European Commission (2019). User Guide to the Life Cycle Costing Tool for Green Public Procurement of Indoor Lighting. *August 2019, Brussels*.
- Ferreira, V. J., Knoche, S., Verma, J., & Corchero, C. (2021). Life cycle assessment of a modular LED luminaire and quantified environmental benefits of replaceable components. *Journal of Cleaner Production*, 317, 128575. <https://doi.org/10.1016/j.jclepro.2021.128575>.

IPCC (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. February 2022, Cambridge: Cambridge University Press.*

Jiménez, J.M., & Joint Research Centre (2019). *Revision of the EU Green Public Procurement Criteria for Transport. November 2019, Luxembourg: Publication office of the European Union.*

Mazzucato, M. (2014). *The entrepreneurial state: debunking public vs. private sector myths. Revised edition. Anthem frontiers of global political economy, London: Anthem Press.*

Nikolaou, I. E., & Loizou, C. (2015). The Green Public Procurement in the midst of the economic crisis: is it a suitable policy tool? *Journal of Integrative Environmental Sciences*, 12(1), 49-66. <https://doi.org/10.1080/1943815X.2014.993657>.

OECD (2003). *The environmental performance of public procurement: issues of policy coherence. November 2003, Paris.*

OECD (2007). *Improving the Environmental Performance of Public Procurement: Report on Implementation of the Council Recommendation. March 2007, Paris.*

Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S., Lambin, E.F., et. al. (2009). A safe operating space for humanity. *Nature*, 461, 472-475. <https://doi.org/10.1038/461472a>.

Sapir, A., Schraepen, T., & Tagliapietra, S. (2022). Green Public Procurement: A Neglected Tool in the European Green Deal Toolbox? *Intereconomics*, 57(3), 175-178. <https://doi.org/10.1007/s10272-022-1044-7>.

Scientific Committee on Health and Environmental Risks (2010). *Opinion on Mercury in Certain Energy-saving Light Bulbs. May 2010, Luxembourg.*

United Nations Environmental Programme (2012). *The impacts of sustainable public procurement: eight illustrative case studies. April 2012, Paris.*

World Economic Forum (2022). *Green Public Procurement: Catalysing the Net-Zero Economy. January 2022, Geneva.*

About the authors

Alexandre Ricardo alexandre.mv.ricardo@gmail.com

Alexandre Ricardo is a research fellow at Centro de Investigação em Organizações, Mercados e Gestão Industrial (COMEGI), and a Ph.D. candidate at Instituto Superior Técnico, funded by the Fundação para a Ciência e Tecnologia (FCT). His main research areas are multicriteria decision analysis, decision supports systems and value-based health care. He is also an associate Professor of Management at Instituto Superior Técnico.



Arianna Sica arianna.sica@edu.unito.it

Arianna Sica is a Junior ESG Consultant in WSP Golder - Sustainability Services Team in Turin. In this position, she supports the design and implementation of corporate ESG and Low Carbon Economy Transition strategies and targets. Further, she assists impact assessment for environmental footprint quantification of products and organizations, including LCA studies and carbon footprint. She received her master's degree in Economics of the Environment, Culture and Territory at the University of Turin in 2022.

Désirée U. Klingler desiree.klingler@yale.edu

Désirée Klingler, LL.M. (Yale) is a research fellow at Yale Law School, and Ph.D. Candidate at the University of St. Gallen, funded by the Swiss National Science Foundation. Since 2020, Désirée Klingler is lecturer at the Law and Economics Institute of the University of Hamburg, Germany and was research scholar at the Copenhagen Business School. She applies the interdisciplinary law and economics method to public procurement and competition law, with a focus on data analytics of efficient and sustainable procurement. As a Swiss lawyer, trained and admitted to the New York Bar, Désirée Klingler applies comparative legal analysis to pertinent legal issues, like sustainable procurement, applying U.S., EU, and Swiss law, as well as international law. Désirée Klingler is editor of the European Procurement & Public Private Partnership Law Review (EPPPL) of the section “International & Interdisciplinary” and senior expert in sustainable public private partnerships at the United Nations Economic Commission for Europe (UNECE).



François Lichère liche.re.francois@hotmail.com

François is a Professor of public law at the University of Jean Moulin Lyon 3 and a public procurement expert. After obtaining a Bachelor of Laws at the University of Montpellier and a diploma from Aix-en-Provence's Institute of Political Studies, he obtained a master's degree in public law in 1993 and a PhD at the University of Montpellier in 1998. He was appointed public law lecturer in 1999 and public law professor in 2000. He currently teaches public contracts law, economy and public law and administrative law at Bachelor and Master levels in Lyon. He has published numerous books and articles, in French and in English, mainly concerning public law contracts and economy and public law.



Giulia Botta giulia.botta@unimi.it

Giulia Botta is a Ph.D. candidate at the University of Milan, in the program “Law, Economics, Ethics for Sustainable Development”, under the Faculty of International and Public Law. She conducts research in Public Procurement law and intersection with Business & Human Rights legal field. She has been visiting fellow at the University of Copenhagen - Centre for Private Governance (CEPRI) and at the Danish Institute of Human Rights (DIHR). Giulia has recently joined the International Training Center of ILO as Associate Professional Officer, working in research and training in the Sustainable Public Procurement team.



José Antunes Ferreira jaantunesferreira@gmail.com

José Antunes Ferreira is a retired associate professor with habilitation at Instituto Superior Técnico (IST). He teaches at IST since 1976 courses in the fields of Operational Research, Project Management, Spatial and Urban planning. His main research topics have been in the field of public procurement, urban management, risk management on plans and projects and urban and public management and evaluation models. He has coordinated a wide range of projects and studies on public procurement, project management and urban planning. He is also author of several research papers published by several international journals (International Journal of Project Management, Land Use Policy, Town Planning Review, Landscape and Urban Planning) and is a consultant in the area of Spatial Planning and Project Management for National and International Organizations.



Jozef Kubinec Jozef.Kubinec@minv.sk

Jozef Kubinec is a Head of the Works and ICT Procurement Department at the Ministry of Interior of the Slovak republic. He is an experienced strategic public procurement officer, public buyer and procurement lawyer with a demonstrated history of working in government administration. Jozef is actively working on implementing public procurement of innovation, professionalisation and centralisation of public procurement. He is participating in the H2020 project iProcureNet as a leader of the WP4 'Establishing procurement pathways' and the IPNC for the Slovak Republic. He graduated from the University of Palacky (law) and Tor Vergata in Rome.



Luís Valadares Tavares lv@lis.ulusiada.pt

Full Professor and Coordinator of the Management Sciences Ph.D. Program of University Lusíada, Director of the Research Center on Organizations, Markets and Industrial Management (COMEGI) of the University Lusíada, Full Professor Emeritus of System and Management, University of Lisbon, IST. He is also the President of OPET (Observatory of Technology Foresight), the President of APMEP (Portuguese Association of Public Markets), Chairman of the Editorial Board of the European Journal of Public Procurement Markets, Scientific Advisor of VORTAL and Ombudsman of the Portuguese Electric Utility EDP.



Nikola Komšić n.komsic@naled.rs

Nikola Komšić is a Policy coordinator at NALED (National Alliance for Local Economic Development) in Serbia. Lawyer by profession. Ph.D. student of Faculty of Law, University of Belgrade (Serbia). Member of the first generation of Master program for public procurement management from Tor Vergata in Rome. Also, graduated from the Master in European Law, Union University, Faculty of Law, Belgrade (Serbia). Author of several research papers regarding public procurement. Participated as a legal expert in the project for improving public procurement system in Serbia "Effective Public Procurement for Economic Growth" which was implemented by NALED from 2021-2022 with the financial support from the Swedish International Development Cooperation Agency (Sida).



Steven L. Schooner sschooner@law.gwu.edu

Steven L. Schooner is the Nash & Cibinic Professor of Government Procurement Law at the George Washington University Law School in Washington DC. He previously served in the U.S. Office of Federal Procurement Policy (OFPP), at the Department of Justice, as a Commissioner at the Armed Services Board of Contract Appeals, (as an Army Reserve officer) as an Adjunct Professor at the Judge Advocate General's School of the Army, and as an attorney in private practice. He received his BA from Rice University, JD from the College of William and Mary, and LLM from George Washington University. He is a Fellow of the National Contract Management Association (NCMA) and a Certified Professional Contracts Manager (CPCM). Much of his recent research is available on SSRN at <https://ssrn.com/author=283370>.



Roberto Caranta roberto.caranta@unito.it

Roberto Caranta is a Full professor with the Law Department of the University of Turin (Italy), Coordinator of Sustainability and Procurement in International, European, and National Systems - SAPIENS -International Training Network (SAPIENS-ITN - H2020 – MSCA ITN: Grant 956696) and Vice chair of the Procurement Review Board of the European Space Agency. For many years he directed the Master's program on Public Procurement management for Sustainable Development with ITCILO. Together with Kirsi Maria Halonene he is editing the European Procurement Law Series <https://eplgroup.eu/publication-category/epls/>. With Albert Sanchez he edited European Public Procurement. Commentary to Directive 2014/24/EU (Elgar Publishing, 2021).

