

1. Life-cycle costing as a tool in mainstreaming green public procurement

This chapter introduces the concept of life-cycle costing (LCC) and its links to the wider sustainable procurement agenda. It looks at the definition of LCC and how it has emerged as a tool for both cost savings and reducing environmental impact. The chapter also establishes the difference between LCC and similar concepts applying the life cycle approach, and discusses how they interact. Finally, it explains how LCC can be used throughout the public procurement cycle.

Current public procurement policies aim at achieving the best value for money, while also delivering in terms of broader policy objectives that entail social and environmental considerations. These developments call for a novel approach towards the typical procurement practices, especially in the light of the sustainable recovery and growth, with green public procurement gaining a momentum to become a driving force in the process.

Green public procurement is defined as *a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured* (European Commission, 2008^[1]). In the green public procurement context, LCC emerges as a tool that can deliver both savings and reduced environmental impacts. The terms green public procurement (GPP) and sustainable procurement (SPP) are often used as synonyms, however they have different scope. While GPP considers only the environmental impacts of purchasing decisions, sustainable procurement considers all aspects of sustainability to achieve the appropriate balance between the three pillars – economic, social and environmental – of sustainable development¹.

Public procurement practice has already demonstrated that the traditional savings-oriented concept of procurement efficiency fails to address the factual spending that occurs after the original contract has been finalised. If not addressed in the appropriate phase of the procurement, the costs generated throughout the lifetime of the purchase put an additional financial burden on the public buyer or the end-user, meaning, they may even hinder the success of a particular project by significantly raising the costs of its implementation. Such situations inevitably raise a question of the economic advantage of the decision from the long-term perspective.

LCC is a methodology that estimates the expenditures for a specific purchase during its lifetime, reaching beyond the initial price tag and taking into account other relevant costs incurred, such as installation, operation and maintenance including the regularly reoccurring replacement, renewal of components, financing and disposal.

Historically, the concept of LCC originates in the construction industry, where in the middle of the 20th century, large-scale constructions and military investments generated the need to compare decision alternatives in a way that also takes into account the impact of initial investment decisions on the operational phase. This “traditional” form of LCC focuses on direct, internal costs, and is similar in content to the Total Cost of Ownership (TCO) concept².

LCC deviates from the conventional approach that considers the initial purchasing costs of the product, works or services as the key factor, determining the decisions in awarding a public contract. A comprehensive LCC analysis also takes into consideration the costs of mitigating or reducing (external) environmental impacts, meaning that the best solution is identified based on both economic and environmental aspects. Furthermore, by taking into account the costs related to the energy consumption during the lifecycle, energy-efficient solutions can be favoured with an LCC approach. In turn, this has a favourable impact on the environment given that less resources are consumed, and use of emission-generating energy (e.g. fuel or electricity) is reduced.

By allowing a structured comparison between goods and services at various stages of the procurement process, LCC is a well-suited instrument for ensuring value for money. Beyond that, the potential of LCC in achieving green public procurement goals is increasingly being recognised and promoted. The use of LCC can specifically contribute to the implementation of green objectives and deliver value for money if it is combined with the incorporation of minimum green requirements in the tender procedures.

The European Union’s public procurement framework explicitly mentions LCC as a method to evaluate the cost-effectiveness of the tender. For instance, Directive 2014/24/EU, Art. 68, sets out the legal framework for using LCC in public procurement and recognises the European Commission’s mandate to establish mandatory methods for the calculation of LCC. The explicit mention of LCC as a method to evaluate the

most economically advantageous tender appears in the Directives as a novelty and encouragement to the public buyers to think outside of the box in the context of sustainable public procurement. In addition, the European Commission puts consistent effort to assist procurement practitioners with the application of the relevant articles by developing several ready-to-use LCC tools and related guidance.

However, LCC, as a method to evaluate the cost-effectiveness, was not initially geared towards sustainability *per se*. For many years, LCC was considered a financial appraisal tool, enabling a better assessment of the long-term cost implications of options under consideration (total cost for acquiring, operating, supporting and disposing of a specific purchase during its lifetime), based on forecasts of the future. Improved analysis and simulation of costs resulted into the current understanding of LCC that may include, in addition to the costs over the life-cycle, the monetised cost of environmental externalities and therefore can be used for sustainability purposes.

For example, such understanding is reflected in Directive 2014/24/EU. Article 68 of the Directive explicitly states that 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: (1) costs, borne by the contracting authority or other users such as: costs relating to acquisition, costs of use, such as consumption of energy and other resources, maintenance costs, end of life costs, such as collection and recycling costs; (2) 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.

However, in practice, such approach that includes the monetization of externalities and demonstrating the economic effect of choosing more sustainable purchases is often considered challenging due to the lack of commonly accepted methodologies and reference data on how to translate such impacts into monetary values.

Practitioners can oftentimes come across similarly sounding concepts, such as total cost of ownership (TCO), whole life costing (WLC) or life cycle assessment (LCA). All of these methodologies apply life-cycle approach, however their purpose and scope differ.

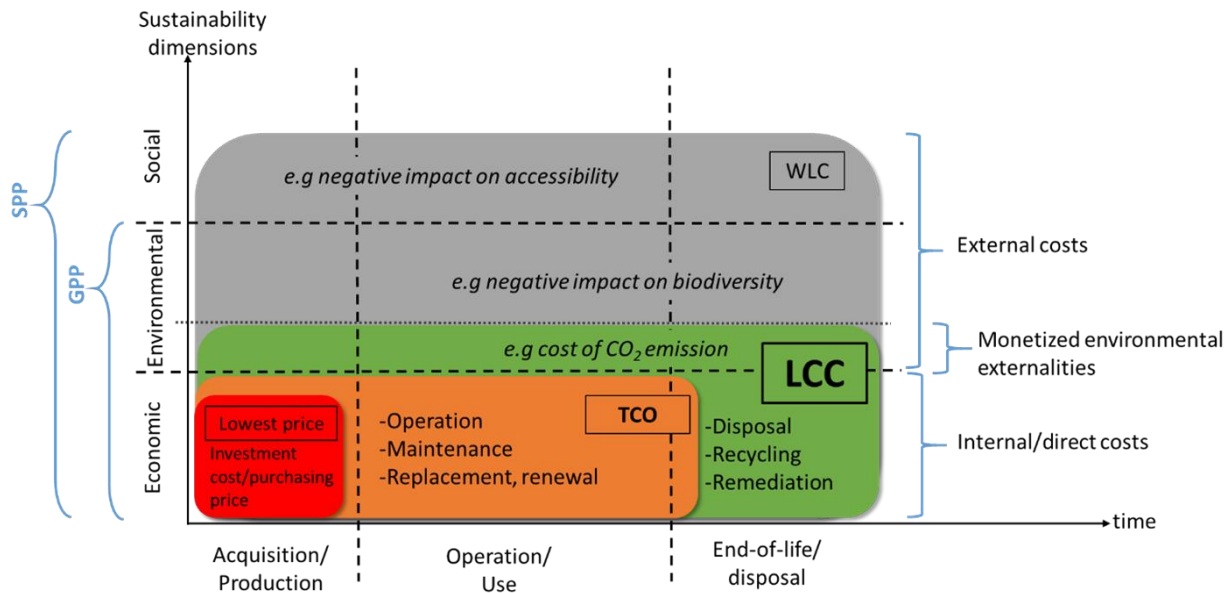
Firstly, we have to distinguish LCA, which is an environmental evaluation method, while the other methods focus on economic aspects. LCA is a systematic analysis of the potential environmental, social, health and resource impacts of products or services during their entire life cycle, such as, for example, global warming potential in manufacturing a product. However, contrary to the LCC, LCA does not attempt to quantify all externalities and monetise them, while LCC is not meant for environmental assessment as such. (Czarnecki, 2019^[2])

TCO (Total Cost of Ownership) is only concerned with the costs after the system or product is purchased (costs of operation, maintenance and disposal), excluding the costs of development and other costs that are not internalised by the specific market actor (in this case – public buyer) in some way. Social and environmental externalities are not accounted for in a TCO calculation. It is also focused on the time period of ownership, which is not necessarily the same as the life span of the product.

WLC (Whole Life Costing) is considered to have a broader scope than LCC, with emphasis not only on economic life-span but also the entire span of property existence, taking into account all the relevant costs or expenses and also - the income and benefits gained over the period of analysis (for example, business costs, income from disposals, external social/environmental costs and benefits).

The main differences between these methodologies lies in their purpose and in the range of cost elements considered. The figure below maps out these similar economic methodologies based on the cost elements they consider (Figure 1.1). It also indicates the scope of GPP and SPP, which certainly can have other tools than LCC to avoid or reduce negative environmental, social externalities and direct public procurement towards sustainability.

Figure 1.1. Economic methodologies applying life-cycle approach

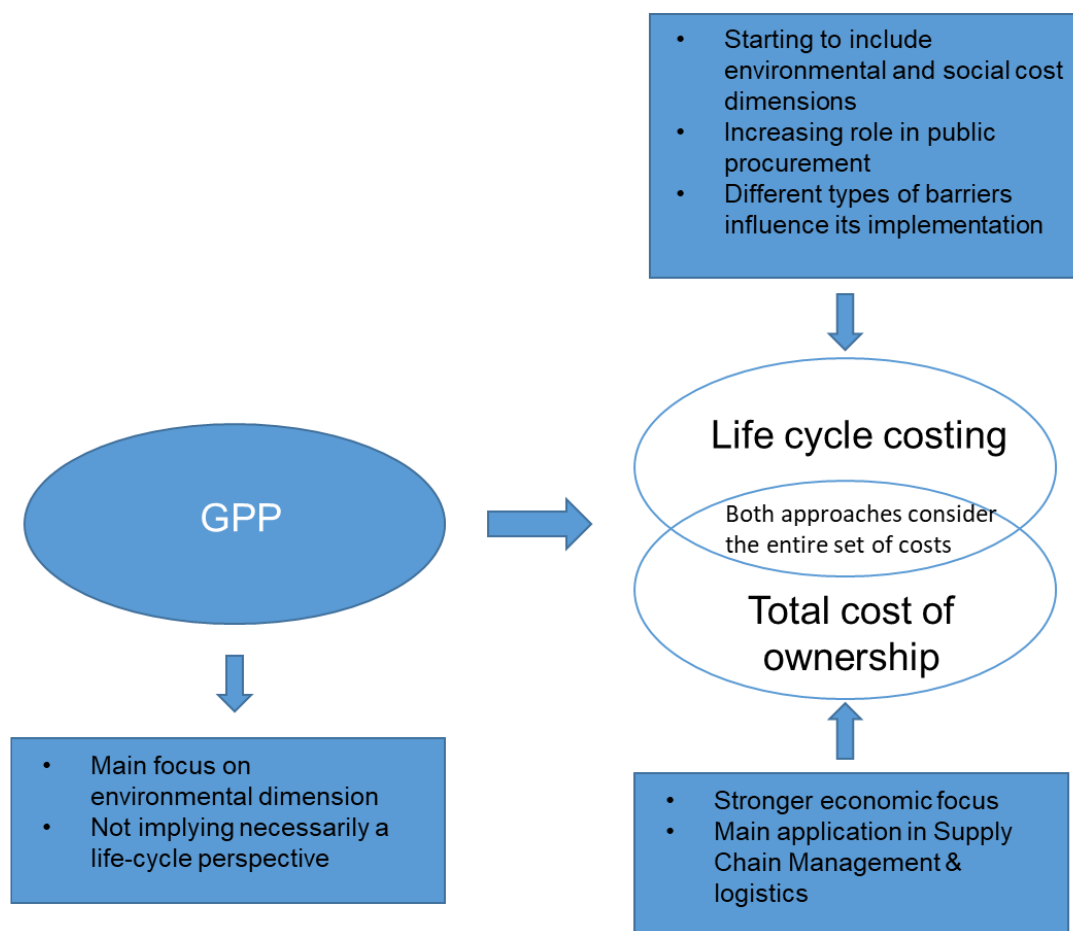


In the context of public procurement (the obligation for the public buyers to select the most economically advantageous tender) and the background for this report further focus will be on LCC. While the literature appears to show relative consistency in the application of the terminology around LCC, the same does not seem to hold true in conversation with procurement stakeholders and practitioners. Namely, as witnessed from fact-finding meetings with stakeholders, the terminology appears to be applied loosely and interchangeably, with LCC being the ‘catch-all’ term for approaches that strictly speaking would fall either under TCO or WLC. Vice-versa, some stakeholders use the TCO terminology to underline the fact that the methodology applied does not consider externalities. While these interpretations can be all correct as the figure above indicates, a slight confusion still can be detected in international comparison. However, this has no significant consequence in the practice as far as different terminologies are applied consistently at local level. For example, a TCO which takes into account end-of-life costs and an LCC which does not include external costs are practically the same thing.

It is important to highlight the interplay between GPP, TCO and LCC, as displayed in Figure 1.2 below. Namely, GPP does not necessarily imply life-cycle considerations, and is primarily focused on an environmental perspective. In contrast, both TCO and LCC are primarily focused with costs over the life-cycle. Furthermore, both LCC and TCO are linked with GPP in that sense that cost considerations over the life-cycle may lead to resource-efficient choices, which in turn are more environmentally friendly. Beyond that, LCC may also include the environmental and social cost dimensions, while TCO has almost exclusively economic focus, also due to the fact that its main application can be found in supply chain management and logistics (De Giacomo et al., 2019^[31]).

In the procurement community, the commonly used term is LCC, even though the full consideration of externalities is rarely being implemented. For the purposes of simplification, this report refers to LCC tools without specific differentiation whether they consider externalities or not. While this report is focused on LCC tools, other tools that are not considered LCC tools in a strict sense are also discussed on occasion, given their relevance in the overall context of promoting LCC and GPP.

Figure 1.2. Interplay between GPP, TCO and LCC



Source: Adapted from (De Giacomo et al., 2019^[31])

LCC is susceptible for the use in different stages of the public procurement cycle, allowing to gain better understanding of the full sets of costs stemming from any good, service or work in the preparation phase, conduct objective evaluation and comparison of the tenders in the award phase, and ensure consistent evaluation of the results during the contract implementation (Figure 1.3).

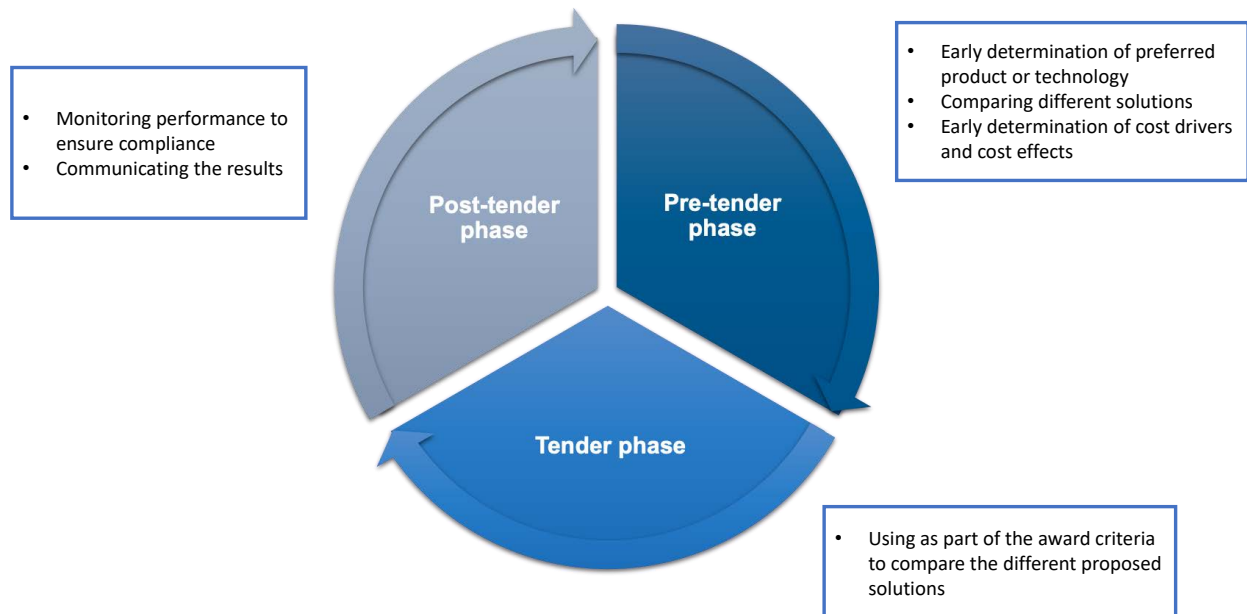
Specifically, in the pre-tender phase, LCC can be used in the option analysis to help contracting authorities roughly evaluate the different technical solutions to be considered or select the type of solution to purchase. In particular, it can be used to compare the cost drivers of different solutions, and getting an understanding of which cost categories are most relevant. For this purpose, public buyers may be using preliminary data gathered in the consultation process with the relevant parties, such as end-users, other departments in the organisation, and potential suppliers. Through a better understanding of cost drivers in a given procurement, LCC can help in designing tender specifications that reflect resource efficiency and are more environmentally-friendly. Importantly, LCC allows justifying the purchase of environmentally and/or socially responsible alternatives that require a high purchasing cost but would provide the best value for money across the life cycle.

LCC can be used during the tendering process for evaluating offers. Namely, it allows to consider different cost categories instead of the pure acquisition price and to evaluate all other significant cost flows over the entire life cycle of the supply, service or works, such as installation, operation, maintenance and end-of-life (disposal) costs or even to consider the anticipated CO₂ emissions of different offers. As such, the LCC

approach allows selecting the most cost-effective option, thereby generating value for money (LCC can be included in the award criteria if a specific cost can be monetised and verified accordingly, resulting in an objective, non-discriminatory and accessible methodology).

Finally, in the post-tender (contract implementation) phase, if LCC was part of the tender, LCC can be used for monitoring performance to ensure compliance with claims made by contractors (comparison whether the effectiveness and costs proclaimed by the supplier during the tendering procedure have actually been achieved). If LCC was not included in the tender, it can be used as a tool to evaluate the cost effectiveness of the purchased product in comparison to other available options on the market.

Figure 1.3. LCC use throughout the public procurement cycle



References

- Czarnecki, J. (2019), *What is Life-Cycle Costing?*, Routledge Press. [2]
- De Giacomo, M. et al. (2019), “Does Green Public Procurement lead to Life Cycle Costing (LCC) adoption?”, *Journal of Purchasing and Supply Management*, Vol. 25/3, p. 100500, <https://doi.org/10.1016/J.PURSUP.2018.05.001>. [3]
- European Commission (2008), “Public procurement for a better environment”, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0400>. [1]

Notes

- ¹ Clement, S., Semple, A., (2016): *The Procura+ Manual: A Guide to Implementing Sustainable Procurement*, 3rd Edition, ICLEI – Local Governments for Sustainability, European Secretariat
- ² For the explanation of the TCO, please see further in the text.



From:
Life-Cycle Costing in Public Procurement in Hungary
Stocktaking of Good Practices

Access the complete publication at:
<https://doi.org/10.1787/8d90f627-en>

Please cite this chapter as:

OECD (2022), "Life-cycle costing as a tool in mainstreaming green public procurement", in *Life-Cycle Costing in Public Procurement in Hungary: Stocktaking of Good Practices*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/148f83f4-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. Extracts from publications may be subject to additional disclaimers, which are set out in the complete version of the publication, available at the link provided.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.