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Public Procurement

Life-cycle Costing

CONTENTS

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Introduction

The activities of public institutions and the decisions made by them should be governed by the pursuit of objectives in the public interest and by the need to spend public funds efficiently. Public procurement decisions and activities are no exception, as a significant part of taxpayers' money is spent in this way.

The initial purchase cost is often one of the most influential factors determining the award of a public procurement contract. Contracting authorities may argue that the least expensive offer ensures the achievement of the important financial goal of budgetary savings.

However, the best value for money is not always achieved by accepting the least expensive offer. Even though budgetary savings can be achieved initially in relation to the purchase price, further costs will be generated by the use of the supplies, services or works that are procured. Further costs relate, in particular, to operational and maintenance expenditure. In addition to these direct costs, the use of the supplies, services or works may have an impact on the environment, which will probably result in other investments or charges. Some of these additional costs may be highly significant. All of the additional costs are paid for in the future by either the contracting authority or the end-users, but in any event the financial resources are the same: taxpayers' money.

As a consequence, from an economic perspective, the most rational approach is to consider all of the costs that will be incurred during the life span of the supplies, services or works in order to establish which offer is truly the "least expensive".

Life-cycle costing (LLC) is a methodology to evaluate all of the costs over the life cycle of works, supplies or services.

Governments and contracting authorities are becoming far more aware of the fact that the life-cycle costs represent a better indicator of value for money than the initial price alone. For this reason, the European Commission (EC) has consistently promoted this approach for several years. Life-cycle costing approaches in public procurement also help to support sustainable growth.

This procurement brief explains what the life-cycle costing methodology means and the advantages of using this approach. It highlights the key provisions in the Public Procurement Directive (the Directive)[1] that set out the legal framework for taking life-cycle costs into account in the various stages of the procurement process.

What is life-cycle costing and why use it?

Life-cycle costs represent all of the costs resulting from the use of goods, services or works during their entire life span. The LCC methodology is an instrument for assessing these costs over time. Its main purpose is to evaluate the various options (tenders) for achieving the contracting authority's objectives, where those alternatives differ not only in their initial costs but also in their subsequent operational costs.

Some costs have a purely economic nature and are directly borne by the contracting authority. For that reason, they are usually referred to as *internal costs*.

Other costs can be generated by the impact on the environment. These costs are sometimes borne directly by the contracting authority, but at other times they are borne by the local community or even by the general public. For that reason, these costs are usually referred to as *external costs*.

[1] Directive 2014/24/EU on public procurement and repealing Directive 2004/18/EC, 26 February 2014.

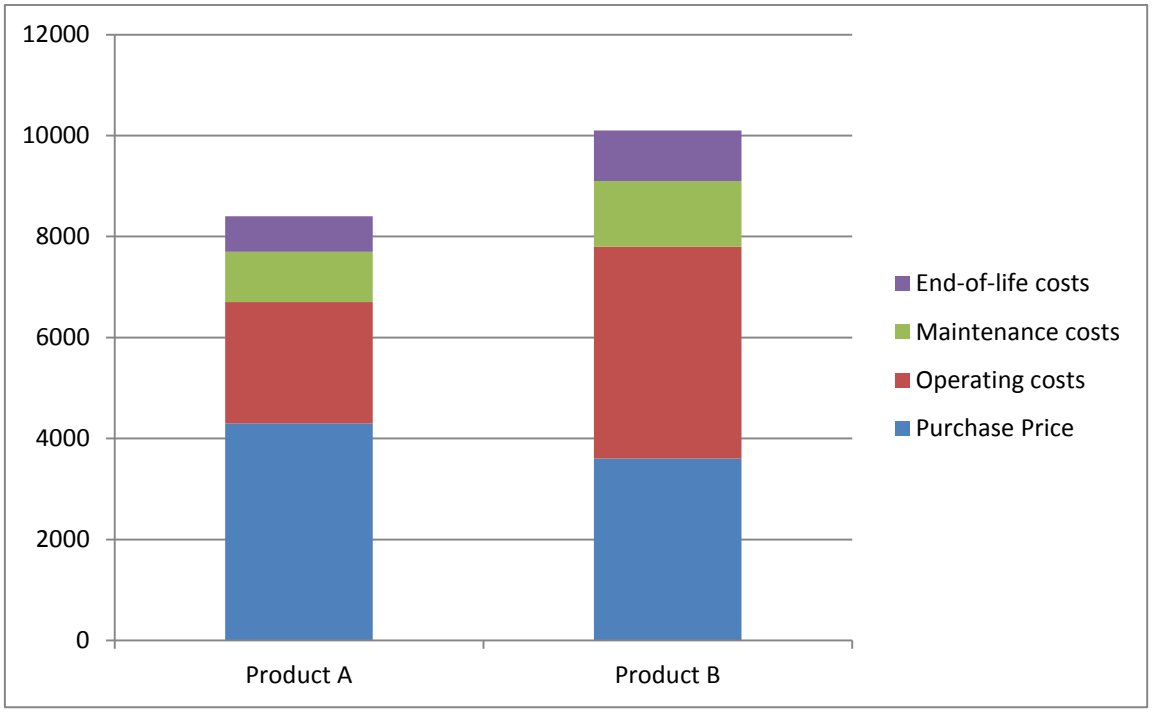
Conventional approach: The "conventional" LCC methodology can be described as a financial assessment of the following types of internal costs (cost categories):

- investment costs, which include purchase price and, where applicable, other associated costs, such as installation, commissioning, and initial training of users;
- operating costs, which include consumption of energy, consumables and/or other resources needed for the use of the product;
- maintenance costs, which may include any service charges in this respect and spare parts that have to be periodically replaced;
- end-of-life costs, such as decommissioning and disposal.

For the purposes of the discussion below, the term "product" is used to refer to supplies. The same rules are equally applicable to the procurement of services and works.

If a choice has to be made between two products, it is wise to look not only at the lowest purchase price but also to take a long-term view in order to secure real value for money.

For a very inexpensive product, it may be the case that the initial purchase price represents only a small proportion of the total costs incurred over the duration of its life cycle. This is the case for Product B illustrated in the chart below:



The question is whether Product A or Product B will be the least expensive.

When the purchase price only is taken into account, the answer is Product B.

However, using an LCC approach, Product A is the least expensive from a long-term perspective.

Application of LCC: It is sometimes argued that LCC is only useful in the case of highly complex contracts, such as the design and construction of a sewage treatment plant or other facilities or the provision of sophisticated industrial machinery, such as turbines or oil drilling equipment. However, even for less complex contracts, the LCC approach may be appropriate and may lead to a different result than when the purchase price is the only factor taken into account.

Example

Contracting authority A needs to procure a new printer.

A simple market analysis undertaken by contracting authority A showed that two types of printers were the most suitable for its purposes. The printers had the same technical and performance characteristics, but there was a significant difference between their catalogue prices.

The prices were EUR 250 for Printer A and EUR 325 for Printer B; it would seem that the first printer was the best choice and that the contracting authority should therefore buy Printer A.

One of the employees from the procurement department made a supplementary verification and noticed that the price of one toner cartridge for Printer A was EUR 75, whereas for Printer B the price of the toner cartridge was EUR 49.

The most important cost for this simple, non-complex procurement was not the purchase price of the printer(s), but the operational cost arising from the need to replace the toner cartridges.

It is easy to see that when the contracting authority would need to replace the third toner cartridge, Printer A becomes more expensive than Printer B. The cost of the printer at this stage is the purchase price plus the cost of three toner cartridges. The contracting authority would pay:

For Printer A: 250 + (3 x 75) = EUR 475

For Printer B: 325 + (3 x 49) = EUR 472

If the intensity of the printing activity is relatively high, one toner cartridge could be consumed every month, and so the printer would need 12 toner cartridges every year. At the end of the year, Printer A would cost EUR 1 150 and Printer B would cost only EUR 913.

The best choice in this case is Printer B, which is the one that the contracting authority should buy.

Environmental approach: An environmental LCC methodology takes into account not only the four above-mentioned main cost categories, but also ***external environmental costs***. Besides the financial costs directly borne by the contracting authority, the environmental impact may entail significant costs for society under certain circumstances.

In general, constructed facilities, materials and products may have environmental impacts (e.g. emission of greenhouse gases, eutrophication[2] or land use) due to the processes of manufacture, transport, assembly/disassembly, maintenance and disposal associated with them. These various environmental impacts may have negative consequences on human health, availability of certain resources, soil erosion and so on.

As a result, considerable investment will be needed in the future to counteract such effects and reduce pollution[3].

The LCC methodology allows for the assessment of the cost of these impacts. A comprehensive LCC analysis therefore also takes into consideration the life-cycle costs of mitigating/reducing environmental impacts. Consideration of these impacts will help to ensure that best-value solutions are identified in both economic and environmental terms.

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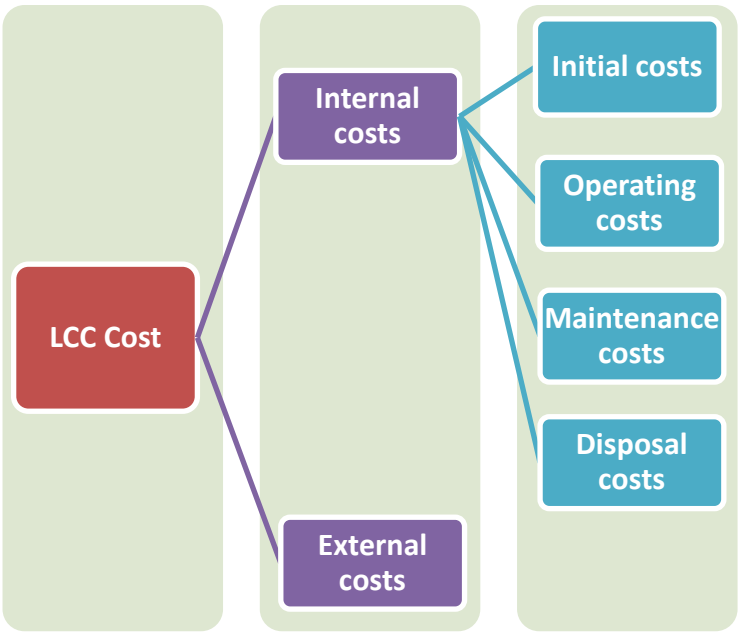
2 Eutrophication is the excessive richness of nutrients in a lake or other body of water, frequently due to runoff from the land, which causes a dense growth of plant life and the death of animal life from a lack of oxygen.

3 The direct costs to society from air pollution, including damages to crops and buildings, amount to about EUR 23 billion per year, according to the EC's press release of 18 December 2013.

The conclusion is that an exhaustive LCC methodology should include a financial assessment of all of the costs during the entire life span of a product/asset, including the environmental externalities, as shown below.



There are many benefits for contracting authorities, including in terms of external costs, to using an LCC methodology on a systematic basis. The use of an LCC methodology can:

- save money, ensuring better forecasting of future expenditures and optimisation of future costs;
- facilitate the acquisition of better products;
- support local/global sustainable development.

Generally speaking, the LCC approach can offer the possibility to achieve (and demonstrate) better value for money in various projects.

What the Directive says about LCC and how procurement principles are to be applied

The 2004 Public Sector Directive[4] had established that a contracting authority could award a public contract by using either the lowest-price criterion or the most economically advantageous tender criterion. The 2014 Public Sector Directive (the Directive)[5] changed this approach and placed much greater emphasis on the evaluation of criteria other than simply the price. Article 67 (1) states that "contracting authorities shall base the award of public contracts on the most economically advantageous tender". The definition of the most economically advantageous tender has been modified by highlighting that “value for money” represents a wider concept, as is explained further in Article 67 (2): "The most economically advantageous tender from the point of view of the contracting authority shall be identified on the basis of price or cost, using a cost-effectiveness approach, such as life-cycle costing... 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...".

[4] Directive 2004/18/EC on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts, 31 March 2004.

[5] Directive 2014/24/EU on public procurement and repealing Directive 2004/18/EC, 26 February 2014.

Article 68 (1) provides a list of costs that might be taken into account by the contracting authority, to the extent that they are relevant, when the LCC methodology is applied. This list includes both internal costs (related to acquisition, use, maintenance and end of life) and "costs imputed to environmental externalities[6] linked to the product, service or works during its life cycle, provided their monetary value can be determined and verified".

The Directive has extended, by means of these provisions, the possibilities for contracting authorities to use public procurement to both fulfil their basic needs and achieve societal goals, such as the protection of the environment. To put greater emphasis on the qualitative aspects of procurement, the Directive allows Member States to prohibit or restrict, where they consider it appropriate, the use of price only when assessing the most economically advantageous tender.

The main procurement principles must be observed when using LCC: When contracting authorities adopt LCC approaches, they are still required to observe the main procurement principles derived from the case law of the Court of Justice of the European Union and laid down in the Directive.

Award criteria must be linked to the subject matter of the contract: Contracting authorities are free to define the subject matter of the contract and to choose award criteria accordingly, but they are not permitted to apply award criteria that relate to considerations outside the scope of the tender procedure. The "list" of costs provided in Article 68 (1) of the Directive includes the phrase "*to the extent relevant*" and should be interpreted in the same way.

The Directive confirms in Article 67(3) that "award criteria shall be considered to be linked to the subject-matter of the public contract where they relate to the works, supplies or services to be provided under that contract in any respect and at any stage of their life cycle…even where such factors do not form part of their material substance".

The Directive also defines "life cycle" in Article 2(1)(20) as "all consecutive and/or interlinked stages, including research and development to be carried out, production, trading and its conditions, transport, use and maintenance, throughout the existence of the product or the works or the provision of the service, from raw material acquisition or generation of resources to disposal, clearance and end of service or utilisation".

Award criteria must have been advertised previously: As a general rule, the Directive requires that award criteria be set out either in the contract notice or in the tender documents.

Where contracting authorities assess the costs using an LCC approach, they must indicate in the procurement documents the data that is to be provided by the tenderers and the method that the contracting authority will use to determine life-cycle costs on the basis of that data.

These provisions aid compliance with the principles of transparency and equal treatment.

Award criteria must not confer unrestricted freedom of choice on contracting authorities: This requirement means that contracting authorities must provide an objective and adequately specific basis for distinguishing between tenders. Award criteria must be formulated clearly so that all reasonably well-informed and normally diligent tenderers will interpret them in the same way.

The Directive provides explicitly that award criteria "shall ensure the possibility of effective competition and shall be accompanied by specifications that allow the information provided by the tenderers to be effectively verified in order to assess how well the tenders meet the award criteria". In case of doubt, contracting authorities are obliged to verify the accuracy of the information and proof provided by tenderers.

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[6] Externalities are damages or benefits that are not paid for by the polluter or beneficiary under normal market conditions but are borne by society as a whole.

In the context of LCC, to allow for effective verification, environmental costs must be quantified and expressed in monetary terms. The reason for this requirement is that if the award criteria relate to factors that cannot be verified by the contracting authority, it will be difficult to demonstrate that they have been applied objectively.

Award criteria must not be discriminatory: This principle is clearly reflected in Article 68(2) of the Directive, which stipulates that the "method used for the assessment of costs imputed to environmental externalities shall fulfil all of the following conditions:

- it is based on objectively verifiable and non-discriminatory criteria. In particular, where it has not been established for repeated or continuous application, it shall not unduly favour or disadvantage certain economic operators;
- it is accessible to all interested parties;
- the data required can be provided with reasonable effort by normally diligent economic operators, including economic operators from third countries party to the GPA or other international agreements by which the Union is bound."

Use of common method for calculation of LCC: Article 68(3) of the Directive requires that "whenever a common method for the calculation of life-cycle costs has been made mandatory by a legislative act of the Union, that common method shall be applied for the assessment of life-cycle costs". The list of common methods is included in Annex XIII of the Directive. The list currently provides only one common method concerning certain types of road transport vehicles, as discussed further below.

The EC is empowered to update the list provided in Annex XIII when new legislation is adopted that will make the use of a common LCC method mandatory.

How to apply the LCC methodology

Even if the concept of LCC is understood in theory, its application in practice is not always a simple task.

Analysis: When considering whether or not to use LCC, it is useful to start with a systematic analysis in order to identify the types of procurement for which an LLC approach is appropriate. This analysis should be a standard element of the contracting authority's internal procurement policy and part of strategic planning in both the short and medium terms.

Expertise: Where an LCC methodology is appropriate, the contracting authority should create a nucleus of specialist staff who possess or will acquire the necessary expertise and who will be responsible for procurement using LCC, in particular for complex contracts.

Methodology: Any LCC analysis or methodology must be developed so as to be suitable to the specific characteristics of the supplies, services or works that the contracting authority intends to acquire. The scope and complexity of the LCC analysis should generally reflect the complexity of the procurement concerned, the capability of predicting future costs, and the significance of future costs for the decision that will be made by the contracting authority.

In properly assessing LCC, the following issues must be considered:

- types of costs and their relevance
- data availability and reliability
- period of analysis (time horizon)
- method of economic evaluation of future costs.

The key parameters for the analysis will be determined to a large extent by its objectives, but sometimes also by the rules that are applicable to the public sector. For example, a contracting

authority may be bound by national financial requirements regarding the discount rate to be used.

Evaluation: The LCC analysis will be applied so as to create a method for evaluating and comparing tenders submitted by interested economic operators.

LCC analysis and assumptions: Many assumptions need to be made over the course of an LCC analysis, and these assumptions will influence the result of the tender evaluation. The main goal of the LCC analysis is to generate a reasonable approximation of the costs, rather than to attempt to obtain a perfect answer.

It is extremely important, however, that all assumptions used in an LCC analysis are clearly stated in the tender documents so that economic operators participating in the tender procedure are aware of the method that will be used for the assessment of their tenders.

Assumptions in LCC calculations are further discussed below.

Technical specifications: At the same time, the contracting authority should define the technical specifications in terms of performance characteristics, focusing mainly on the desired outcome ("what to obtain") rather than on the means to achieve that outcome ("how to do"). This performance-based approach will allow the contracting authority to stipulate requirements with respect to life-cycle costs and environmental considerations, while leaving tenderers the freedom to propose how these requirements will be fulfilled. The submission of variants should be allowed as a means of introducing greater flexibility.

Example

In the design of a building, the tender documents should not describe in great detail the requirements with regard to the type of insulation or the air conditioning systems.

A performance specification would indicate that the requirement is to ensure that the building be kept at a temperature of 20°C when the temperature outside is between minus 10°C and 32°C.

The price indicated by one tender may be higher than that of another tender, but the life-cycle costs may be lower due to better insulation, air circulation systems rather than air conditioning, and the recycling of rainwater.

Assumptions in LCC calculations

Costs to include: The assessment of life-cycle costs inevitably includes an element of unpredictability with regard to the costs to be incurred in the future. Data availability and reliability are important factors when these assumptions are defined; the analysis may be based on historical or benchmark data or on detailed data derived from producers' specifications and comparable cost-in-use data.

Depending on the characteristics of the procurement, some costs may be important while others are completely irrelevant. The challenge is to identify the relevant types of costs that will be incurred during the operational life of the finished product. These costs are then "transformed" into evaluation criteria, which are clearly provided in tender documents, together with the method that will be used for their assessment.

Life-cycle costs can be either "one-off" costs or "recurrent" costs.

One-off costs are costs that are paid only once, such as:

- acquisition price, offered by the tenderers, which usually includes, if appropriate, delivery and installation and/or initial training costs;
- end-of-life costs.

Note
It should be noted that certain assets have no end-of-life costs as there is no disposal, but instead there may be, for example, a residual value (the value of the asset at the end of the contract period).
In such a case, the formula for calculating the value of all the costs during the period of operating life should be adapted as follows:
Life Cycle Cost = initial capital costs + (projected) lifetime operating costs + (projected) lifetime maintenance costs ***- residual value***

Recurrent costs are costs that are paid throughout the life cycle of the product, such as:

- energy consumption
- consumables
- maintenance and repairs
- spare parts
- other necessary services.

Potential costs: One important issue to consider is the likelihood that some costs may or may not arise. Will there, for example, be a real need in the future to repair a product or require spare parts?

For some products, particularly those with a short life span, the cost of repairs or of spare parts is of no, or minimal, relevance, as it is very unlikely that these types of expenses will be incurred. For more complex products, particularly those with a long life span, the probability of replacing certain spare parts is quite high. In that case, it would be wise to take into consideration the assumption that such potential costs will occur in the future. As a consequence, tenderers should be asked to provide information regarding the prices of spare parts for the product that they are offering.

Accuracy of future cost assumptions: Another issue to consider concerns the difficulty in anticipating accurately some costs over a long period of time. For example, it is not possible to know how much 1 kWh of electricity will cost in 2020, as the electricity market is very volatile. However, this uncertainty should not affect the decision to consider the costs associated with electricity consumption. To ensure a uniform method of assessing all of the submitted tenders, the contracting authority should provide in the tender documents its assumption regarding the final (unit) price that it assumes electricity will cost (e.g. EUR 0.2 per kWh). Tenderers should be asked to provide information regarding the specific electricity consumption of the product that they are offering.

Period of analysis: A contracting authority should ask itself the following question: how long is "the future"? Recurrent costs depend on predictions/assumptions with regard to the following:

- the length of the product's useful life: how long the product will remain usable and continue to satisfy certain performance requirements;
- the pattern of use of the product over time: the level and frequency of usage.

The period during which the product will remain usable may be expressed in years, months or even hours, but in certain cases it is suitable to use other units of measurement. For example, when you buy a car it is more relevant to indicate that the expected operational life taken into account for the calculation of recurrent costs is 200 000 kilometres, instead of ten years.

For strategic investment decisions in the public sector, it is typical to select a long period of analysis (50 to 100 years) in order to reflect the anticipated total life span of the product concerned. This period of analysis is an important factor in determining the operational and maintenance costs that have to be taken into account. The benefits achieved as a result of reducing the energy and resources consumption during the product's operational life are higher as the period extends longer. On the other hand, maintenance costs normally increase with the ageing of the product.

Even in the case of simple products, where maintenance and repair costs are irrelevant, the period of analysis is still important for making a life-cycle cost comparison. The frequency with which a product itself needs to be replaced and – even more significantly – its energy consumption will have an impact on its cost, especially over a longer period. An inexpensive product that needs to be replaced frequently may cost more over the long term than a higher priced product that lasts for a longer period. This consideration should be taken into account when determining over which period of time a life-cycle cost comparison is to be made.

Example – comparison between three types of light bulbs (LEDs, CFLs and Incandescent Standard[7])

	LED	CFL	Incandescent
Light bulb life span	30 000 hours	10 000 hours	1 500 hours
Cost per bulb	EUR 8	EUR 3	EUR 0.6
Bulbs needed for 30 000 hours of use	1	3	20
Cost of replacement	**EUR 8**	**EUR 9**	**EUR 12**

If the impact of the cost of electricity is added, the situation is even clearer:

Watts per bulb (equivalent to 60 watts)	10	15	60
kWh of electricity used over 30 000 hours	300	450	1 800
Cost of electricity (assumption: EUR 0.2 per kWh)	**EUR 60**	**EUR 90**	**EUR 360**

Discount rate: Other financial elements, such as interest rates or net current value, may be important factors for the LCC methodology, particularly in the case of supplies, services or works that have a long life span.

Future costs are not "worth" as much as costs that are currently incurred, because the capital is expected to accrue a certain amount of interest over time. This factor needs to be taken into account when comparing the life-cycle costs. The question is therefore the following: how do you evaluate future costs in comparison to current costs?

The usual solution is to apply a discount rate to future costs. This discount rate gives each cost a net present value (NPV), which allows a comparison between current costs and future costs.

The discount rate applied is an important assumption, as it may have a significant impact on the outcome of the analysis and potentially on the decision as to whether one option (tender) is preferable to another. It is therefore of key importance to select the appropriate rate. National treasuries may prescribe the discount rate for public sector projects (the rate is usually between 3% and 5%).

In conclusion, two main aspects should be kept in mind regarding assumptions in LCC calculations:

[7] All "traditional" incandescent light bulbs have been banned in the European Union (EU) since 2013.

- It is important to be systematic and realistic when estimating cost assumptions. Unrealistic or improper assumptions about cost, discount rate or period of analysis could entail a disadvantageous economic result.
- In order to provide an objective basis for comparing tenders, the cost assumptions must be disclosed in the tender documents so that all economic operators may take into account the same parameters during the preparation of their tenders.

Contract management

It is very important to ensure that the cost assumptions of the winning tender are observed during the execution of the contract. The main characteristic of the LCC methodology is the significant influence of future costs in determining the method for identifying the winning tender. Therefore the failure to meet the commitments assumed during the procurement procedure must be seen as the failure to fulfil the contractual obligations. If, for example, the price of the spare parts or maintenance services were higher than the price indicated in the tender, the contracting authority would incur additional costs due to the difference between what the contractor had "promised" during the tender procedure and what had to be paid. The same situation would occur in the case of failure to meet performance criteria, such as energy consumption levels.

With these possible consequences in mind, during the stage of preparation of tender documents the contract drafter should seek to protect the contracting authority against such eventualities. The range of measures available might include, besides the performance bond, specific contractual clauses, such as the payment of damages for poor performance.

In order to implement such measures and to have the possibility of applying corrective actions, effective contract management is vital. The contracting authority must not only monitor the delivery of goods, service or works in accordance with specifications, but also ensure that the operational and maintenance costs are not higher than expected.

In some cases, the risk of future costs may be transferred to the contractors, in particular where they remain responsible for operational and maintenance activities.

Example – Energy performance contracting (EPC)

EPC is a contractual arrangement between the owner or occupier of a building (a public authority) and an Energy Service Company (ESCO), which aims to improve the energy efficiency of that building. The investment costs are usually covered by the ESCO. The contract establishes clear energy parameters that have to be met, with a view to obtaining energy savings. The ESCO receives a monthly/yearly fee, which is linked to the guaranteed energy savings. If the "energy targets" are not met, the fee is either not paid or is diminished, depending on the contractual clauses. In some cases, if better results than those provided as a minimum in the contract are obtained, the ESCO may receive a financial bonus. After the specified contracting period, the savings from energy-efficient improvements to the building revert to the public authority owner or occupier of the building.

How regulatory/advisory bodies can assist contracting authorities in using LCC

The introduction of specific rules on the LLC methodology into public procurement legislation does not suffice. Initially, such provisions should be promoted on the market, and explanations should be given by policy-makers about the benefits that LCC can bring in practice.

Many contracting authorities and economic operators need to better understand what the LCC methodology is and how it can be used. Guidelines and other educational material will therefore be required in order to provide detailed explanations and increase the understanding of LCC. Training on the uses and advantages of LCC as a tender evaluation

method is another "traditional" way of not only sharing information but also encouraging the implementation of this approach in practice.

Analysis, case studies and examples of best practice, if available, should be published. The academic and business communities could provide real support in elaborating LCC methodologies and developing tools for their application.

Common LCC methodologies

In the European Union (EU) it is considered of utmost importance to fully exploit the potential of public procurement so as to achieve the objectives of the Europe 2020 strategy for smart, sustainable and inclusive growth. Together with other legal and practical means, LCC methodologies represent instruments that could help to achieve the aims of the strategy.

Common methodologies will be developed at EU level for the calculation of life-cycle costs for specific categories of supplies or services. Where such common methodologies are developed, their use will be made compulsory for contracting authorities in Member States.

Article 68(3) of the Directive requires that "whenever a common method for the calculation of life-cycle costs has been made mandatory by a legislative act of the Union, that common method shall be applied for the assessment of life-cycle costs". The list of common methods is included in Annex XIII of the Directive. Currently only one common method is listed, relating to the procurement of certain road transport vehicles (see below). The EC is empowered to update the list in Annex XIII when new legislation is adopted that makes the use of a common LCC methodology mandatory.

LCC and the promotion of clean and energy-efficient road transport vehicles: The EU legislator has already established a common method to be used in the procurement by contracting authorities of certain categories of road transport vehicles. This common method is set out in Directive 2009/33/EC ("Clean Vehicles Directive")[8].

The Clean Vehicles Directive makes it mandatory for contracting authorities and entities to take energy and environmental impacts into account when purchasing certain categories of road transport vehicles. This directive provides a methodology for the monetisation of these impacts for the purpose of assessing the operational lifetime cost. This model allocates a monetary value to several types of emissions: carbon dioxide (CO_2), nitrous oxide (NOx), non-methane hydrocarbons (NMHC), and particulate matter.

Utilities

The same life-cycle costing rules and definitions apply under the Utilities Directive[9].

The Directive and the Utilities Directive have parallel provisions: the text of Articles 82 and 83 of the Utilities Directive is identical to the text of Articles 67 and 68 of the Directive.

[8] Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles.

[9] Directive 2014/25/EU on procurement by entities in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC, 26 February 2014.

Further information

Publications

SIGMA (2015), *Public Procurement Training Manual* – Module E5, OECD Publishing, Paris

http://www.sigmaweb.org/publications/public-procurement-training-manual.htm

Public Procurement Briefs

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