User Guide for the Life-cycle Costing (LCC) Tool for Public Procurement of Water and Sewage Pumps and Related Equipment



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User Guide for the

Life-cycle Costing (LCC) Tool for

Public Procurement of

Water and Sewage Pumps and Related Equipment

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1. The purpose of this user guide

This user guide is the accompanying document of the Excel file containing a life-cycle cost calculation (LCC) tool (hereinafter referred to as: the tool) developed for the public procurement of water and sewage pumps and related equipment. The aim of the tool is to encourage and facilitate the widespread use of life-cycle costing during the public procurement of water and sewage pumps.

The purpose of this user guide is to provide assistance to contracting authorities regarding how life-cycle costing method can be used in *the evaluation of offers in public procurement procedures of pumps and related equipment*. It explains how the accompanying tool can be used effectively in this context and what are the relevant legal provisions, and practical aspects that contracting authorities should consider during the public procurement procedure.

The user guide provides a brief general theoretical overview of the life-cycle costing method in accordance with the theoretical basis established in the general guide on life-cycle costing methodologies published by the Public Procurement Authority[1]. Then it explains the scope and application possibilities of the tool developed for pumps and related equipment, and finally it offers a step-by-step guide on using the tool.

The user guide and the tool provide detailed guidelines for the application of life-cycle costing; however, the orderly conduct of the public procurement procedure is the task and responsibility of the contracting authority.

[1]The Public Procurement Authority's guide to life-cycle costing methodologies. Public Procurement Bulletin Issue 35 of 2017, March 10, 2017. Available: https://kozbeszerzes.hu/kozbeszerzesek-az/magyar-jogi-hatter/a-kozbeszerzesi-hatosag-utmutatoi/kozbeszerzesi-hatosag-utmutatoja-az-eletcikluskoltseg-szamitasi-modszertanokrol/

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2. The Life-cycle costing method

2.1. The concept, advantages and scope of life-cycle costing

According to the general definition, the life-cycle cost encompasses the costs incurred during the life-cycle of a good, service or construction, in connection with its creation, acquisition and use, as well as any costs incurred at the end of the life-cycle. The method of life-cycle costing essentially serves as a tool for the evaluation of these costs over time, which enables the evaluation of the various solutions (offers) that differ not only in terms of their initial cost – at the purchase – (primarily the tender price), but also in terms of the costs incurred during operation. By applying the life-cycle costing method, **economically more efficient procurement outcomes can be achieved which are more sustainable in the long term**. This is due to the fact that in addition to the acquisition costs, the contracting authority also takes into account the costs incurred during the use of the purchased goods, services or construction. In addition, the use of the life-cycle costing method can result in resource savings in the longer term, it also facilitates forecasting of future expenses and the optimization of future costs and promote the realization of better-quality procurements. In the conventional approach, the method of life-cycle costing can be described as an evaluation process of internal (direct financial) costs. Internal costs include:

- acquisition and investment costs and other additional costs related to commencing use, e.g. installation, commissioning, and training costs,
- operating costs, e.g. energy consumption, other resources, materials, etc. required for use,
- maintenance costs, e.g. any service fees required for the product to function as intended, as well as the cost of tasks to be performed, e.g. regular cleaning, scheduled replacement of wearing parts and accessories,
- replacement costs, which arise in the case of technically complex procurement items, from the replacement of components and system elements with a shorter lifespan than that of the entire item, therefore occurring intermittently at certain intervals rather than continuously scheduled,
- end-of-life costs, e.g. decommissioning, disposal

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For specific procurement items, it is also possible to apply the life-cycle costing method from an environmental perspective, where, in addition to the direct costs defined above associated with the product, the so-called external costs are also considered. In this case, alongside the financial costs directly borne by the contracting authority, the calculation also includes the cost of negative environmental effects occurring at the social level.

For water and sewage pumps and their auxiliary equipment, the value of the electricity consumption required for using the equipment over the years can be many times the purchase price of the device, a feature that specifically enables the advantages of the life-cycle cost calculation briefly outlined above to be utilized.

2.2. Public procurement legal background

In accordance with the Hungarian Public Procurement Act of 2015 (Act CXLIII of 2015 hereinafter: PPA) which aligns with the provisions of EU directives[2], it is stipulated that when applying the award criteria of the **lowest cost** or the **best price-quality ratio,** the contracting authority may utilize the life-cycle cost calculation method regulated in §78 of the PPA.

Consideration of life-cycle costing (LCC) for certain evaluation methods

- Lowest price -> LCC calculation is not relevant
- Lowest cost -> the winning tenderer is selected based on the LCC calculation
- Best price-quality ratio -> the winning tenderer is selected based on the LCC calculation and other aspects

If the contracting authority decides to use the life-cycle costing method, in that case the contracting authority must comply with the basic obligations defined in §78 (1) of PPA. The contracting authority **must refer to the application of the life-cycle costing method in the call for tender initiating the procedure**. The **public procurement documentation must also include information related to the application of the method.** This includes indicating what

[2]The public procurement and concession directives: Directive 2014/24/EU of the European Parliament and of the Council (February 26, 2014) on public procurement and repealing Directive 2004/18/EC.
Directive 2014/25/EU of the European Parliament and of the Council (February 26, 2014) on procurement by contracting entities in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC.
Directive 2014/23/EU of the European Parliament and of the Council (February 26, 2014) on concession contracts.

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data the tenderers are expected to provide to the contracting authority, as well as a description of the method to be used in the procedure. The PPA §78 (2) also further stipulates **which costs the contracting authority is obliged to take into account partly or in whole in connection with the life-cycle of the procurement object.** These listed types of costs can be classified as internal and external costs **(acquisition, operational costs, maintenance costs and costs related to environmental externalities**). The §78 (3) of PPA stipulates that when considering costs attributable to environmental externalities, these cost elements must also be objectively verifiable, ensuring compliance with the principles set forth in §2 of PPA. They must not unduly favor or disfavor certain economic operators submitting offers. The method employed must be accessible to everyone and not specifically tailored to a specific public procurement procedure, and the tenderers must be able to provide data necessary for the application of the method with a reasonable effort.

3. Application possibilities of the tool

The tool and user guide were developed primarily for the actors of the Hungarian public procurement market. The tool can be used in public procurements with an estimated value both below and above the thresholds of the EU public procurement directives. The tool serves to evaluate the life-cycle cost of the two specific pump types used in water utility services – as defined by Act CCIX of 2011 on water utility services –, along with the related equipment, classified by the Common Procurement Vocabulary[3] as:

- **CPV 42122130-0 Water pump**
- **CPV 42122220-8 Sewage pump**
- **CPV 32552420-7 Frequency converters[4]**
- **CPV 31110000-0 Electric motor**

The tool can be used if the purchase of the pump is part of the public procurement procedure, it cannot be used only for the purchase of electric motors or operating electronics (frequency converter/soft starter (drive)). At the same time, in addition to pumps, operating electronics

[3] Commission Regulation (EC) No 213/2008 of 28 November 2007 amending Regulation (EC) No 2195/2002 of the European Parliament and of the Council on the Common Procurement Vocabulary (CPV) and Directives 2004/17/EC and 2004/18/EC of the European Parliament and of the Council on public procurement procedures, as regards the revision of the CPV available: https://eur-lex.europa.eu/legal-content/HU/TXT/?uri=CELEX:32008R0213

[4] This may also include operating electronics (soft starter, drive).

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(frequency converters/soft starters (drive)) and electric motors used in the water utility sector, the tool can also be made suitable for evaluating the life-cycle costs of other types of pumps with appropriate modifications, if the procurement need of the contracting authority arise for these other types of pumps (for example: piston pumps, circulation pumps, irrigation pumps, etc.).

The tool is primarily intended for use in public procurement procedures, especially during the award phase, which enables the contracting authority to consider additional costs arising during the life-cycle of the offered devices alongside the purchasing price of the device, when evaluating the offers[5].

4. Application in the public procurement procedure

4.1. Preparation of the public procurement procedure

4.1.1. Decision to use life-cycle costing

If the contracting authority decides to use the life-cycle cost calculation tool for evaluation in its public procurement procedure for the acquisition of water and sewage pumps, it is necessary to consider whether

- **it intends to use the lowest cost criteria as the sole award criterion,** to be determined using the life-cycle cost calculation method (that is, using the tool), or
- **it prefers to take into account other quality criteria in addition to** the life-cycle cost, i.e. within the evaluation of the best price-quality ratio, it includes LCC as a cost-based evaluation aspect in addition to other quality aspects (with the application of weights that properly express the relationship between LCC and the other aspects).

[5] In addition, the tool can be used both in the pre- procurement phase or in the preparation phase of the procedure, and also in post-procurement during the performance phase.

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4.1.2. Questions to be decided by the contracting authority

During the preparation phase, the contracting authority must decide on a number of issues related to the application of life-cycle costing, which are essential for the correct application of the tool. The most important of these are[6]:

- Determination of the life-cycle cost evaluation period: the contracting authority must determine over what time period (specified in years) it intends to evaluate the costs associated with the use of the products to be procured. Practically, this period corresponds to the estimated useful lifetime[7] of the product[8] or the period until which the contracting authority plans to use the product, however, the contracting authority may specify a shorter period as well. It should be noted that the determination of the evaluation period is merely a data to be used for the evaluation of the offers and *does not obligate the contracting authority to use the device for exactly this duration in the future.*
- Discount rate[9]: it expresses the "time value" of money, meaning that it adjusts the value of the costs incurred at different points in time - in this case in various years of the life-cycle - by converting them to present value using the discount rate. Based on European Union recommendations[10] and relevant literature, **the recommended discount rate is 5%.** For particularly short-lived devices the contracting authority may also decide to apply a 0% discount rate in order to simplify the calculation. *We would like to draw the attention of contracting authorities that deviation from these recommendations requires proper justification of the applied discount rate in the public procurement documents, preferably supported by relevant and up-to-date official sources specific for the sector.* It is important to note that the discount rate is a parameter used only for life-cycle cost calculation, to evaluate the offers. However, its

[6] See the definition of the relevant terms on worksheet 5) of the tool.
[7] This may be based, for example, on the contracting authority's experience or on information provided by the manufacturer (if available)
[8] Meaning the pump, the electric motor and the operating electronics
[9]Detailed information on the discount rate can be found in chapter 6 of this guide.
[10] Commission Implementing Regulation (EU) 2015/207 (January 20, 2015), Official Journal of the European Union, 13.2.2015, Appendix 6, Paragraph 2.3.1, Point 4, Recommendation for Cohesion Countries; and "Buying green! A handbook on green public procurement" by the European Commission, 3rd edition, 2016, p. 60.

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level *does not affect the amount of consideration to be paid under the contract concluded through public procurement and is not relevant for determining the estimated value of the public procurement either!* For details, see subsection 4.1.4. and chapter 6.

- Selection of cost elements :

  The tool includes the following cost elements for life-cycle cost calculation, from which the contracting authority may omit certain elements as needed. For some cost elements, the tool provides reference values that the contracting authority can use if they do not wish to specify these elements using a custom method.

  - *Electricity*: when using pumps and related devices, the most significant cost item is the electricity consumption of the machines. Consequently, when applying the life-cycle cost calculation, it is definitely justified to calculate the expected costs resulting from electricity consumption.
    - *The price of electricity* (HUF/kWh)[11]used in the calculation must be determined. The contracting authority can determine this based on the current contract with the electricity supplier or other external reference values. If the price of electricity has undergone significant changes before its determination, the contracting authority can also determine the price considered during the calculation based on the average price over several previous years.
      - The contracting authority may also take into account the annual real growth rate (%) of electricity prices during the calculation, which represents the extent of price increases exceeding inflation. Since it's not possible to precisely determine the price change for the evaluation period in advance, the estimation of the price change necessarily relies on the contracting authority's judgment. The basis for estimation could be, for example, the average change in electricity prices in previous years (based on the prices paid by the contracting authority) or an externally referenced value showing changes in electricity prices. If the

[11]If the currency used differs from this, then by definition the price will be the value of 1kWh of electricity expressed in the given currency.

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contracting authority cannot or does not wish to estimate the rate of price increase, it may also determine a 0% rate.

- *Number of operating hours*: To calculate electricity consumption, it's essential for the contracting authority to provide the average daily operating time of the equipment to be procured (hours/unit). This determination is based on the contracting authority's estimation, which may rely on past operational experiences, for example.

- *Technical parameters*: In addition to determining the items to be procured, the contracting authority must also specify the minimum technical parameters of the products in the technical description. It should be noted that providing or requesting data related to technical parameters on sheets 3 and 4 of the tool is essential[12], as these data are indispensable for performing the life cycle cost calculation.
- *The cost of necessary replacements during the evaluation period:* During the lifespan of pump units, there is usually a need to replace individual components with shorter lifespans[13], such as operating electronics, the electric motor, or even the pump itself. If replacement is part of the contract established through the public procurement (see the guidelines related to contractual commitments in subsection 4.1.6), this cost item can also be considered in the calculation. On worksheet 3 (Contracting Authority Data) of the tool, you can enter the number of "Replacements considered" for the specific components. If the contracting authority does not include the cost of replacements as part of the contract, then zero should be entered for the given component on worksheet 3 (Contracting Authority Data) of the tool.[14]
- *Maintenance cost*: The contracting authority's decision on whether to consider maintenance costs associated with the purchased product in the life cycle cost

[12] From the perspective of the contracting authority: required flow rate, Required head, fluid density; from the perspective of the tenderer: efficiency, rated motor power, nominal performance. If a component (electric motor and/or operating electronics) is not requested for quotation by the contracting authority, then providing data for that component is logically irrelevant.
[13] The determination of lifespan typically relies on the estimation and experience of the contracting authority.
[14] It should be noted that the mentioned rows only refer to the replacement of the pump, electric motor, and control electronics (such as frequency converters, soft starters, drives). The scheduled replacement of associated components (e.g., rotating-wearing parts or other components according to the manuals) can be considered within the scope of maintenance costs or other expenses.

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calculation. The unit price of this can be provided by the contracting authority itself (e.g., if they perform this themselves or have contracted an external partner for it) or they can request an offer from tenderers.

- *Other costs*: the contracting authority may also take into account other costs incurred during the life-cycle of the product to be procured. The guide divides these into two categories: Other initial one-time costs (HUF) and Other annual costs (HUF/year). Given that their names are sufficiently general, the contracting authority can independently determine their exact content, however, it is necessary to describe them accurately in the public procurement documents in order to ensure equal treatment of tenderers during the procedure.

- Consideration of environmental externalities: Optionally, the contracting authority may decide to consider not only electricity consumption but also the environmental impact associated with the use of the equipment to be procured. Essentially, this means that the contracting authority gives greater weight to electricity consumption than if it were only considering energy costs. Firstly, it is necessary to determine the greenhouse gas emissions, expressed in terms of carbon dioxide equivalent (CO2-eq), released during the generation of electricity used by the equipment. The contracting authority can choose to consider the national electricity mix, or if the characteristic emissions of the electricity mix it uses differ (e.g., if a larger proportion of renewable energy sources is included in the contract with the service provider or if it has its own electricity generation capacity), it can take that into account as well. The national electricity mix can be determined, for example, based on data published for EEA member states or the most recent data published for Hungary[15]. Additionally, the contracting authority must assign a cost per CO2 equivalent (Ft/kg CO2-eq), for which the prices of emissions trading systems can serve as a basis.

[15] European Environment Agency. Available: https://www.eea.europa.eu/data-and-maps/daviz/co2-emission-intensity-12/#tab-chart_2

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Possible sources of reference values for[16] certain cost elements

The price of electricity and its annual real growth rate:

A possible source of national data on the price of electricity and its annual real growth rate is the data published in Eurostat's database, broken down by member state every six months , in relation to non-residential consumers (from 2007):

https://ec.europa.eu/eurostat/databrowser/view/NRG_PC_205/default/table?lang=en

Electricity mix CO2-equivalent emissions:

A possible source of data on CO2-equivalent emissions of the electricity mix is the statistics published by the European Environmental Protection Agency for the member states (2021):

https://www.eea.europa.eu/data-and-maps/daviz/co2-emission-intensity-12/#tab-chart_2

Cost of CO2 equivalent:

The source of the average cost of the CO2 equivalent can be taken into account, for example, from the public statistics available on the basis of data from the European Union's emission trading scheme: https://www.statista.com/statistics/1322214/carbon-prices-european-union-emission-trading-scheme/

It is a fundamental question which of the above cost elements the contracting authority specifies in the tool, and for which parameters it requests proposals from the tenderers. By definition, certain elements of the **calculation are necessarily determined by the contracting authority**, such as in particular the basic parameters of the life-cycle cost calculation (currency, LCC evaluation period, discount rate), the parameters of the calculation of operating costs (price of electricity, annual real growth rate of the price of electricity, average daily operating hours per pump), the quantity of assets to be procured, and – if applied by the contracting authority – the cost of environmental externalities (CO_2-equivalent emissions and its cost). **Some technical parameters (power, efficiency) are part of the tender, while maintenance and other costs can be sourced from both the contracting authority and the tenderer.** It is crucial in deciding the scope of the tender which factors or costs the contracting

[16]If the contracting authority does not have its own data, or despite having such data, it considers it appropriate to use external data sources.

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authority intends to include in the contract to be concluded as a result of the procurement, and which the tenderers can realistically commit to.[17]

As already mentioned above, some of the cost elements provided by the contracting authority cannot be precisely determined for the entire evaluated evaluation period. Despite this, it is recommended that the contracting authority **also determine the cost elements that are uncertain or cannot be precisely determined as objectively as possible, by referring to some relevant source (e.g. concluded contract, recommendations and forecasts of professional and international organizations, market research results)**. Furthermore, for the sake of transparency, it is recommended to describe in the public procurement documents how the contracting entity determined the cost elements it provided.

In the life cycle cost calculation, **the values provided by the tenderer form a part of the tenderer's price offer and professional offer.** The tenderer must be able to substantiate these values and commit to them in the contract to be concluded as a result of the procurement process.

In addition to the above, it should be noted that the result of the life cycle cost calculation based on the elements provided by the contracting authorities and the tenderers **serves to compare the various bids. However, this value is fundamentally an estimate, so it may not necessarily correspond to the total actual costs incurred over the entire life cycle of the product!**

Summary of issues to be decided by the contracting authority for the LCC calculation

- ✓ Determining the exact subject(s) and quantity of the procurement
- ✓ Whether to evaluate the offers on the basis of the lowest cost (LCC) or the best price-quality ratio (LCC + other quality aspects),
- ✓ The timeframe for conducting the LCC calculation,
- ✓ The value of the discount rate (5% recommended)
- ✓ The relevant cost elements to be considered in the LCC calculation

[17]For example, a tenderer can undertake an obligation for the performance of the offered machine, based on its manufacturer's data sheet, as well as price the cost of maintenance if he performs this on the basis of the contract, however, by definition, he cannot guarantee the price of electricity.

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- ✓ In case of certain cost elements (e.g. maintenance), whether the contracting authority can provide the price on which the calculation is based, or it should request offers from the tenderers for it.

4.1.3. Preparation of the LCC tool (Excel).

After deciding the above questions (or in parallel with them), the contracting authority must prepare the tool to be used during the life-cycle cost calculation. For this purpose, the "LCC Tool for Public Procurement of Pumps and Related equipment" Excel file serves as a basis. During the preparation process, the contracting authority needs to fill out the 3rd worksheet (Contracting authority input). Certain cells are pre-filled in the tool (e.g. the length of the LCC evaluation period), in accordance with the recommendations for the use of certain values, but the contracting authority can modify them as necessary. Rows and columns that are not used by the contracting authority can be hidden, their size and format can be changed, however, inserting or deleting new cells, rows or columns is not recommended, as this may lead to the malfunctioning of the automated calculations!

After preparing the tool, it is advisable for the contracting authority to password protect Worksheet 3 to allow tenderers to input their data on Worksheet 4 while avoiding any unintended modifications.

Additional guidelines and instructions for using the tool can be found in chapter “5. Instructions for completing the tool”, and on the "1) Introduction" and "5) Definitions, formulas" worksheets of the tool.

4.1.4. Determination of estimated value

To determine the estimated value of the public procurement, the rules of PPA § 16-19 must be applied. The application of life-cycle costing as award criterion does not fundamentally affect the determination of the estimated value. For the method of determining the estimated value, § 28 (2) of PPA remains the governing rule. **It should be emphasized that regardless of the evaluation methodology, the estimated value of the public procurement includes the total consideration to be paid under the contract to be concluded through public**

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procurement, which – in most cases – does not match the final result of the life-cycle cost calculation.

Therefore, if indicative price offers are requested to determine the estimated value, the contracting authority does not need to perform the entire life-cycle cost calculation. It is sufficient to solicit indicative offers from tenderers regarding the prices and cost elements (e.g. purchase prices of tools and consumables, service costs). If the indicative bids also include other information to be provided by tenderers that is not considered a bid price (e.g. volume of hazardous waste, frequency of maintenance to be performed by the user), the expected costs calculated based on this do not have to be included in the estimated value of the contract. The discount rate determined and applied for the LCC calculation is also not relevant in calculating the estimated value.

Example

The contracting authority decides to select the winning tenderer for the procurement of pumps and electric motors based on the lowest life cycle cost (LCC) calculation. In addition to the purchase price of the equipment, the contracting authority intends to consider the expected electricity costs based on the performance and efficiency of the equipment, as well as the annual maintenance costs to be carried out by the tenderer. The annual maintenance fee is to be fixed in the contract for a period of 5 years.

In such a case, the **estimated value[18] = the estimated value of pumps and electric motors + the estimated value of the maintenance to be performed by the tenderer projected over 5 years.**

The cost of electricity consumption does not have to be included in the estimated value, as this *cost* is not part of the contract. *(Commitments regarding the performance and efficiency of the devices must be included in the contract regardless.)* The estimated value does not have to include the cost of any maintenance beyond 5 years, if it is not included in the contract.

The **amount of the available financial cover** must also be determined in line with the consideration under the contract to be performed.

[18] Assuming it's a one-time procurement, the value of contracts concluded during other procurements does not need to be considered according to § 19(3) of the Public Procurement Act

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4.1.5. Preparation of the notice launching the procedure and other public procurement documentations

In accordance with § 78(1) of PPA, it is sufficient for the contracting authority to **indicate the fact of using the life-cycle cost calculation method** in the notice launching the procedure, **all other information related to the life-cycle cost calculation should be provided in the public procurement documentation**. When using the tool, the contracting authority must (continue to) comply with the requirements outlined in § 76(6) of PPA regarding award criteria. That is, the use of the method must be related to the subject matter of the contract, ensuring that contracting authorities cannot make arbitrary decisions. Adherence to the principles set forth in § 2 of the PPA must be ensured, selection criteria cannot be evaluated, and the prohibition of double evaluation must also prevail. The contracting authority must consider the specific conditions of the public procurement procedure, for example, **by restricting the use of the tool only to the products to be procured in the given procedure, and in case of a more complex system of award criteria, the information already included in the life-cycle cost calculation cannot be evaluated as a separate criterion** (e.g. the purchase price)

The contracting authority is **obliged to clearly indicate also in the public procurement documents that it intends to use the life-cycle costing method during the evaluation of the tenders**. The contracting authority **must provide the life-cycle cost calculation tool (Excel) in the public procurement documents (as part of it).** In addition to providing the tool itself, the contracting authority **may also provide additional explanations in the public procurement documents** regarding the life-cycle cost calculation in order to facilitate proper submissions of offers, especially in relation to the information and documents it expects to be submitted by the tenderers.[19]

It is important that the contracting authority specifies in the technical description especially the parameters related to the use and technical characteristics of the given products (according to which the data required for the life-cycle cost calculation can be requested) and, if necessary, their source and, where applicable, the methods of verification. While the contracting authority defines in the technical description the requirements for each technical parameter that must be met for a valid bid, the technical parameters of the offered products

[19]In this regard, see the Public Procurement Authority's guidance on life-cycle costing methodologies already referred to

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that meet these requirements influence the evaluation order in the context of the life-cycle cost calculation. It is recommended that the tenderer also include a table in the public procurement documents, which provides an overview of the tender parameters and their method of verification (see subsection 4.2.1).

It is also recommended, to draw the attention of tenderers in the public procurement documents to submit the requested information via the "4) Tenderer input" worksheet, and to emphasize that all necessary data must be provided in full in order to calculate the life-cycle cost of the offered product, and thus their offer is considered valid. In addition, it is also recommended to the contracting authority to draw the tenderers' attention to the submission of the documents necessary for the verification of the different parameters

Obligations of contracting authorities regarding LCC calculation based on §§ 76-78 of the PPA.

- Reference to the application of the LCC method in the notice launching the procedure
- Specifying the detailed methodology of LCC calculation in the public procurement documents (attachment of Excel tool)
- Specifying the parameters taken into account for the LCC calculation (recorded on worksheet 3 of the Excel tool)
- Determination of verification and validation methods related to parameters that are part of the professional offer
- Additional instructions related to LCC calculation (recommended)

4.1.6. The contract draft

The contracting authority must include contractual terms in the draft contract, which is part of the procurement documents, allowing for the verification of compliance with the winning bid.

In accordance with § 131(2) of PPA, the contract must contain the elements of the winning bid that have been evaluated. In this context, it is important that the contract (draft) establishes a contractual obligation regarding each element of the life-cycle cost calculation that the tenderers are required to provide. In particular the offered prices, maintenance costs,

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technical parameters of the products and regarding any other costs specified. **In the contract (draft), only those *costs* need to be included as the tenderer commitments *that the tenderers are required to specify on worksheet 4 of the tool.*** In addition, the contractual obligations must extend to all tenderer proposals **that influence the life-cycle cost calculation** (e.g. performance and efficiency of devices), however, the related costs calculated by the tool do not need to be recorded as a commitment in the contract.

When defining the contractual terms, it is advisable for the contracting authority to carefully consider whether to include the **future replacement costs** of electric motors, operating electronics, or the pump itself in the contract when procuring pumps and related equipment. Since the replacement of these mentioned components arises at a later time compared to the original procurement (e.g. 5 or 10 years later), tenderers may not always be able to guarantee prices for such a duration. Solutions such as price indexing or revision clauses may be considered. However, since the life cycle cost calculation must be related to the subject matter of the contract concluded through public procurement, the cost of replacing the electric motor, operating electronics, or the pump may be included in the calculation only if the replacement is part of the original contract. Otherwise, if the replacement of the electric motor, operating electronics, or the pump is realized through a new contract and a new procurement procedure, the necessity of the award criteria being related to the subject matter of the contract[20] and the obligation to verify the tender submissions would not meet the legal requirements.

It is also advisable to specify in the contract which bidder commitments arising from the life-cycle cost perspective constitute as **serious breach of contract** and what level of violation results in such breach. It should be noted that pursuant to § 142(5) of the PPA, the contracting authority is obliged to notify the Public Procurement Authority if the party who has won the tenderer has seriously breached its contractual obligations, leading to the termination or cancellation of the contract, claims for damages, or enforcement of any other legal consequences applicable under the contract, furthermore, if the wrongful conduct of the successful tenderer resulted in, partially or entirely, the impossibility of the contract.

[20] See § 76(6) and (13) of PPA

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In the draft contract, it is also recommended to record the **provisions and consequences regarding lack of conformity of performance** (see also subsection 4.3).

Recommended content of the contract (draft) related to the LCC calculation (indicative list)

- Purchase price of products to be procured
- Cost of necessary replacements (fixed for a specific period of time, if part of the LCC calculation)
- Indexation clause for replacements (if applicable)
- Technical properties of equipment to be purchased (in particular: performance, efficiency)
- Maintenance cost proposed by the tenderer and its agreed duration (if relevant)
- Other offers from tenderers affecting life-cycle costing
- Methods of verification of offers by tenderers
- Provisions and consequences regarding breach of contract and lack of conformity
- Warranty provisions and terms

4.2. Application of the life-cycle cost calculation tool during the public procurement procedure

4.2.1. Tenderer duties

Based on the tool, tenderers must provide, as part of their offer, the data necessary for the contracting authority to perform the life-cycle cost calculation taking into account information provided in the public procurement documentation. With the information provided in the offers, the contracting authority can evaluate the offers based on the life-cycle costs calculated with the tool.

Tenderers must complete the "4) Tenderer input" worksheet of the tool provided by the contracting authority as part of the public procurement documentation. The cells to be filled in are determined by the contracting authority.

The relationship between the tenderer's offer and the LCC calculation

The data provided on worksheet 4 of the tool are part of the tenderer's price offer and professional offer. In contrast, the final result of the LCC calculation on worksheet 2 of the

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tool, is the value calculated from the parameters specified in the offer, used only to select the winning tenderer, it is not the same as the offer submitted by the tenderer.

It is important that the tenderers indicate the total life-cycle cost of the procurement **(E33 of worksheet 2), on the reading sheet, for the evaluation (comparison) of the tenders, unless specified otherwise in the public procurement documentation.** In contrast to this, if the contracting authority wishes to procure different products through several contracts providing the option of the division of the contract into lots and separate Excel tools are not provided for each lot, the values listed in row 20 of worksheet 2 of the tool should be listed on the reading sheet, as these will be relevant for comparing the offers.

Tenderers must verify their commitments taken into account in the life-cycle cost calculation during the bidding process. The verification methods are defined by the contracting authority in the public procurement documents. The verification methods defined in relation to certain parameters can be, for example, the following:

Offer parameter	**Recommended verification methods**
Required flow rate (Q [m^3/h])	Catalogue, manual, offer sheet, characteristic curve
Required head (H [m])	Catalogue, manual, offer sheet, characteristic curve
Pump efficiency at the required duty point	Catalogue, manual, offer sheet, characteristic curve
Rated power	Catalogue, manual, offer sheet

4.2.2 Duties of the contracting authority

If the tenderer has filled out the tool correctly, the result of the calculation is automatically displayed on worksheet 2 of the tool (LCC Results, summary). The contracting authority can select the winning tenderer based on this or, where appropriate, in combination with other award criteria specified in the public procurement documents.

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Given that the information on worksheet 4 of the tool is part of the financial offer regarding the prices, as well as part of the professional offer regarding the other values offered by the tenderers, there is only a very limited way to **supply missing information** if they have been provided incomplete or incorrect by the tenderer. If the tool does not include the necessary data, it cannot be supplied afterwards[21], however, if the tool includes the information and based on other elements of the offer (e.g. the certificates submitted regarding technical compliance) it is clear that tenderer made a typo in the tool, then it is possible to correct it.

As in many public procurement procedures, the contracting authority may request an explanation of abnormally low cost pursuant to § 72 of PPA when using life-cycle costing as well. Considering that in the case of pumps and related devices, the offer encompasses multiple different cost elements at the same time (purchase price, maintenance cost, other costs, technical parameters, etc.), when considering the request for explanation, the total cost calculated should be taken into account the entirety of all the information of the offer.

For example, it may happen that a tenderer sets a procurement price for the equipment to be procured lower than the estimated market price, while they provide a higher level of maintenance cost. The tenderer's offered prices for the equipment are naturally influenced by the technical parameters they propose.

Since the end result of the life-cycle cost calculation is usually not the same as the value of the contract concluded through public procurement, and certain data are determined by the contracting authority to be the same for all tenderers, the **request for explanation must necessarily refer to some data provided by the tenderer on the "4) Tenderer input" worksheet of the tool**.

Example

The contracting authority, during the evaluation of bids, notices that the Life Cycle Cost (LCC) calculated for one tenderer's bid shows a significantly lower value compared to the LCC values of the other bids. Subsequently, the contracting authority examines the data provided by the concerned tenderer and finds that the purchase price of the equipment to be procured – considering their technical specifications – is a fraction of their estimated market prices, while

[21]See Public Procurement Arbitration Board decisions D.426/9/2012. and D.431/2012., as well as no. 4.K.31.610/2013/6. ruling of judicial review of decision D.431/2012

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the other offered costs correspond to the estimated market price. Applying § 72 of the Public Procurement Act, the contracting authority requests justification regarding the purchase price of the equipment to be procured.

First of all, the contracting authority should be convinced that the values provided by the tenderers for the calculation are realistic based on the pre-defined documents of verification requested from the tenderers, and in appropriate cases, a request for further information or application of § 72(7) of PPA may follow.

4.3 Performance of the contract

If the contracting authority applies life-cycle costing during the evaluation process of the procurement procedure, it must also be taken into account during the contract performance period. In the context of contractual performance, the contracting authority should ensure that **the offers made by the winning tenderer in connection with the life-cycle cost calculation are actually fulfilled during the life-cycle of the products.**

To ensure contractual compliance, the contracting authority should consider including provisions for contractual guarantees in the draft contract, particularly concerning the relationship of life cycle costs. It is advisable for the contracting authority to specify these contractual guarantees based on a specific parameter of the product subject to procurement, rather than generally stipulating the possibility of applying the guarantee in cases where there is a deviation in a particular cost element during the use of the product.

For the pumps and related products covered in this user guide, it may be appropriate to primarily prescribe provisions regarding guarantees and warranties[22]. However, as a supplementary measure, penalties related to defective performance can also be prescribed. Regarding the latter, it is necessary for the contracting authority to specify what constitutes defective performance based on the provisions of the contract. For pumps and related products, life-cycle recommendations related to the performance of the goods may be particularly relevant (e.g., the efficiency of the motor at the required operating point).[23]

[22] Especially in cases where the warranty or guarantee claim cannot be enforced.
[23]Regarding the penalty clause, we draw attention to the provisions of Section 6:187 (2) of the Civil Code and the limitations on the requirement of security as per § 134 (3) of the Public Procurement Act.

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During the operation of the product, maintenance costs arise, which occur under normal operation of the product as specified in the contract. In contrast, under the **warranty obligation** the winning tenderer undertakes to repair or replace the faulty product. The contracting authority must clearly define what kind of maintenance service the tenderers should provide (if this will be the responsibility of the tenderer) and what is the duration and content of the warranty expected.

It is also possible for tenderers to compete on the terms of the warranty beyond the minimum warranty requirements set by the contracting authority, for example, in terms of offering additional warranty coverage for a longer period, with the cost incorporated into the price of the product. In case of different warranty periods, it is recommended for the contracting authority to take this into account separately from the life-cycle cost calculation, as a separate award criterion, and to include only the cost of normal maintenance in the life-cycle cost.

If the contracting authority has clearly defined the expected warranty conditions as a contractual condition in such a way that its cost is included in the price of the product, the separate cost of the warranty will also not appear during the life-cycle cost calculation - only the cost of normal maintenance.

However, the contracting authority can also announce the public procurement procedure in such a way that the tenderers compete in terms of the compensation for which they undertake a mandatory warranty period determined by the contracting authority, in which case the separate cost of the warranty can be included in the tool as "Other initial one-off costs" to be provided by the tenderers.

If the contracting authority expects a *warranty extended to the entire lifetime* taken into account in the life-cycle cost calculation, it may require a unified commitment that includes both comprehensive warranty as well as regular maintenance services and requests an offer for this in the tool as part of the annual maintenance cost.

As a contracting authority, it is advisable to include in the contract appendix the process of verifying the contractual commitments undertaken by the successful tenderer. As part of this, it can be stipulated in the contract that the contracting authority verifies the product characteristics undertaken by the successful tenderer using available instruments (if technically feasible). If the contracting authority detects significant discrepancies between the

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promised product characteristics and its actual operation during the verification process, which significantly affect the usability of the equipment or its operating costs, then the contracting authority - in accordance with the provisions of the contract - has the right to enforce warranty, guarantee, or any other contractual security as specified. This ensures the fulfillment of contractual obligations and the provision of adequate product quality.

In addition to inspect the compliance with contractual obligations, during or after fulfillment, examination of the costs related to the life-cycle of the products (goods) proposed by the winning bidder can also be useful for future procurement needs. The contracting authority can collect data for the preparation of similar or identical procurements, which can facilitate a better assessment of the specific market segment and product category, as well as the mapping of available procurement alternatives, ultimately leading to better procurement decisions.

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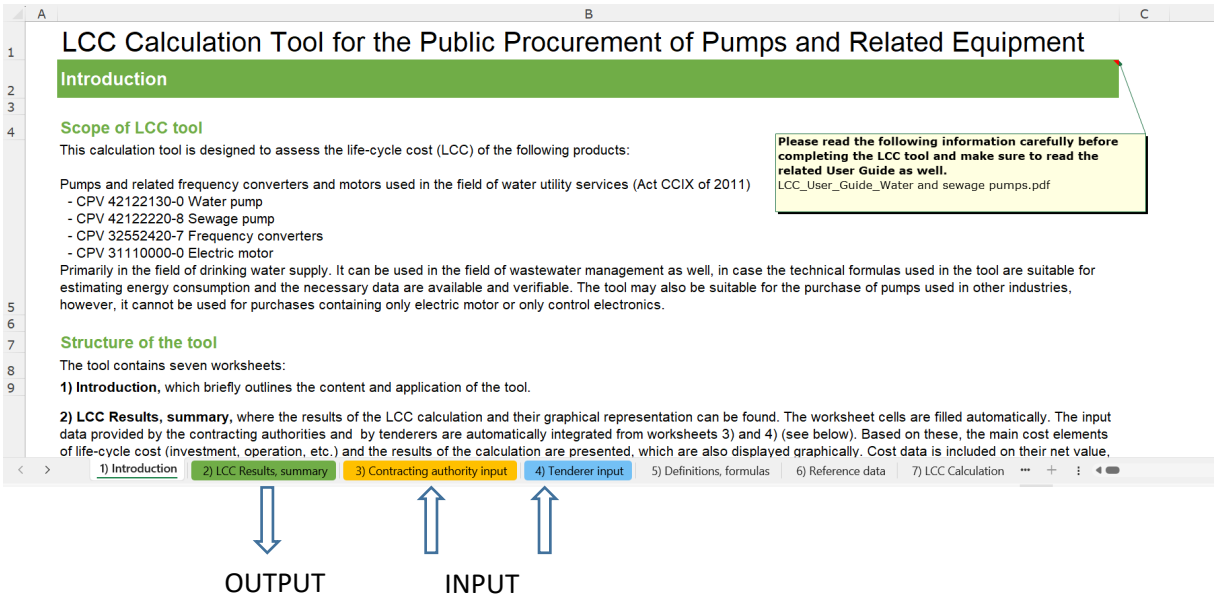
5. Instructions for completing the Tool

The life-cycle costing (LCC) in public procurement procedures is supported by the **"LCC_segédlet_Szivattyúk.xlsx"** Excel file (tool) associated with this guide. **Based on the information provided by the contracting authority and the tenderer,** the calculation of life-cycle costs is automated using predefined formulas in the structured table system of the tool.

The calculations in worksheets 2) and 7) of the tool are password-protected to minimize errors. However, they can be copied, allowing for further development in a separate file. With the appropriate modifications and additions, it is possible to expand the scope of products to include pumps with a similar cost structure as the above

5.1. Structure of the Tool

The tool contains seven worksheets, of which **users only have to work on worksheets 3) and 4) (input)**. **The results of the calculation are automatically summarized in worksheet 2 (output).** The other worksheets are necessary for interpreting the guide, determining the life-cycle cost(s), and ensuring the transparency and traceability of the calculation.



The contracting authority has to provide data only on worksheet 3), and the tenderer only on worksheet 4).

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It is important that the "2) LCC Results, summary" output worksheet displays the correct final results only after both the contracting authority and the tenderer have entered all the necessary data on worksheets 3) and 4).

Contents of the worksheets:

1) **Introduction,** which briefly outlines the content and application of the tool.
2) **LCC Results,** summary, where the results of the LCC calculation and their graphical representation can be found. The worksheet cells are filled automatically. The input data provided by the contracting authorities and by tenderers are automatically integrated from worksheets 3) and 4) (see below). Based on these, the main cost elements of life-cycle cost (investment, operation, etc.) and the results of the calculation are presented, which are also displayed graphically. Cost data is included on their net value, excluding VAT. In order to ensure the proper functioning of the automated calculations and to minimize the risk of errors, the worksheet is password protected.
3) **Contracting authority input**, where the contracting authority should provide the basic information necessary for the calculations (length of evaluation period, quantities, etc.) The costs required for valuation shall be expressed net of VAT. The tool has the capacity to manage up to 10 types of products or lots simultaneously (see E:N column range), unnecessary columns can be hidden. Please note that inserting or deleting new cells, columns or rows or altering cells with a non-white background, may result in the malfunction of the automated calculations.
4) **Tenderer input**, where tenderers should provide the necessary data in accordance with the established template to calculate the life-cycle cost of their offer. Multiple rows of the worksheet are automatically populated with the data entered by the contracting authority in the previous worksheet. The costs required for valuation shall be expressed net of VAT. Please note that deleting or inserting new cells, columns or rows on this worksheet, or altering cells with a non-white background, may result in the malfunction of the automated calculations.
5) **Definitions, formulas**, which contains the explanation of data fields, the definitions of LCC elements and parameters, and the mathematical formulas of the applied calculations.

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6) **Reference data**, which contains the recommended reference data used for the calculations and their official source, as well as the text of the drop-down menus. Please note that modifying the worksheet may result in the malfunction of the automated calculations.
7) **LCC Calculation**, which worksheet contains the detailed time series of the life cycle cost calculation. In order to ensure the proper functioning of the automated calculations and to minimize the risk of errors, the worksheet is password protected.

The cells of the tool have different color codes:

	Cells to fill: in worksheets 3) and 4) only these cells with a WHITE background needs to be filled in! (input cells)
	Drop-down menu: Please select!
	Reference: The cells are automatically populated with data from previously filled cells.
	Formula: Automatically calculated cells based on previously entered data.
	Not relevant: cell is not relevant based on previously provided information, does not need to be filled in!

There are notes on several cells to support the completion of the tool with important instructions and explanations.

In the course of data input, error messages[24] may temporarily appear in cells with a gray background containing formulas and references if some data is still missing. Before interpreting the results, check that all of the possible error messages have disappeared.

5.2. Structure and completion of input worksheets

Worksheets 3) and 4) have the same structure. Column C contains the name of the input data required to determine the LCC, followed by its unit of measure in column D. **In the E:N column range, you can manage input data of up to 10 different types of products or lots** within a single Excel file. If the procurement involves fewer types of products or lots, unnecessary columns can be hidden

Completing the input worksheets

As a CONTRACTING AUTHORITY, you can "activate" the links and formulas of each column by entering the name on the "3) Contracting authority input" tab. Fill in the cells with a WHITE

[24] #N/A; #DIV/0; #VALUE!

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background in the columns that you activated by entering the name! If a cell in your procedure is not relevant, enter a zero value of "0". Note that for some parameters you may not have the information and will need to request it from other departments within your organization or from another organization.

The input data shall be provided in accordance with the purchasing needs of the contracting authority and **in accordance with the public procurement documentation, especially the technical specifications.**

In order to obtain the correct result, all cells with a white background (input cells) of each "activated" column must be filled. If a value is not relevant, zero "0" must be entered.

If you wish to accept several alternative offers from the same tenderer for the same technical specification, you can do so in two ways:

- on worksheet 3), activate as many columns with the same parameters, as you wish to receive alternative offers from a tenderer and indicate in the names/identification of the columns that they are used to enter the data of alternative offers (e.g. xy street-A1, xy street-A2, etc.) and clearly indicate this in the public procurement documentation and draw attention to it.
- it may also be expedient if the documentation allows a tenderer to submit several Excel files, so that the tenderer can submit alternative offers by filling out the tool multiple times as separate Excel files.

After entering your input data, protect this worksheet so that tenderers can enter their bid information on sheet 4) but avoid any unwanted changes. To set Sheet Protection, go to the top menu, click Review/Protect Sheet, and enter a password of your choice.

Then attach the tool (Excel file) to the public procurement documentation, it is also advisable to attach the completed, protected worksheet 3) in pdf format.

As a TENDERER, on the worksheet "4) Tenderer input", fill in the cells with a WHITE background in the columns to which your offer applies. All input cells must be filled in the columns in which a product is listed. If a cell/column is not relevant in your offer, enter zero "0" in the input cells. During filling out the tool, always take into account the requirements and instructions of the public procurement documentation, especially the technical

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specifications. Cells with a gray background will be automatically filled according to the data previously provided by the contracting authority, DO NOT modify these cells!

After you enter your offer information, protect this worksheet to prevent unwanted changes to the data by the contracting authority. To do this, go to the top menu, click Review/Protect Sheet and enter a password of your choice.

Then save the completed tool (Excel file) under a different name and attach it to the tender documentation, it is also advisable to attach the completed, protected worksheet 4) in pdf format.

The worksheet **"5) Definitions, formulas"** provides additional tool in filling out and interpreting the guide!

5.3. Structure and application of the output worksheet

The structure of worksheet "2) LCC Results, summary" follows the structure of the input sheets. So, in the column range E:N , there are no time series here either, but the results of the life-cycle cost calculation of the different products or lots. The detailed time series of the calculation can be found in worksheet 7).

During the procedure, each tenderer fills out the Tool, so each Excel file always contains the data of one tenderer's offer. In any case, by comparing the worksheet 2) of the returned Excel files, you can select the offer with the lowest life-cycle cost or an alternative.

If alternative offers are included in the same excel file, then the information on "Total procurement" in worksheet 2) cannot be interpreted, it is advisable to hide lines 26:40 of the worksheet.

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6. Methodological note

According to the general, methodological definition, the life-cycle cost is the present value of all costs during the entire life-cycle. The present value calculation is one of the basic methods not only during the LCC calculation, but also for several other economic evaluations (rate of return calculation, efficiency analysis, cost-benefit analysis, etc.) The essence is that the value of the costs incurred at different times – in our case, in different years of the life-cycle – is corrected in time and converted to a present value using the discount rate. This enables a methodologically correct summarization and comparability of the costs taking into account the "time value" of money in a dynamic approach.

General mathematical formula for determining present value:

7. $$PV = \sum_{n} \frac{C_n}{(1+i)^n}$$

where,

PV = present value of a series of costs over n years (present value)

C_n = the real value of the cost item arising in the nth year

i = real discount rate

n = number of years of the examined time period

Determining the "time value" of money, i.e. the value of the discount rate, is a complex economic task, which is based on various theoretical approaches and by considering a number of factors (e.g. the opportunity cost of capital, risks, the flexibility of the marginal utility of consumption, etc.). Regardless of scientific theories, however, well-known sayings such as "a bird in the hand is better than two in the bush" point precisely to the recognition of the time value of money, according to which we find HUF 100 more valuable if we receive it now than only after 10 years. In the same way, we consider a HUF 100 cost more serious if it has to be paid right away than only in 10 years. When considering society as a whole, this phenomenon is referred to as social time preference and its level is expressed by the discount rate.

In the tool, the present value is determined automatically, with the appropriate function built in Excel (NPV, or NMÉ in Hungarian). Since this assumes that cash flows arise at the end

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of the year, we do not discount the costs of the first year of the period, i.e. the procurement cost, in line with the practical procurement of water and sewage pumps, which procedures typically completed within a year.

The tool includes the recommended value of the discount rate based on the relevant guidance of the European Commission[25] In case of particularly short-lived assets, in order to simplify the calculation, the contracting authority may also decide to apply a 0% discount rate, in which case the value can be overwritten in cell E13 of worksheet 3). The calculations refer to the value of the rate from worksheet 6), where the official source of the recommended value of the discount rate also can be found.

We would like to draw the attention of contracting authorities that in case of deviation from these recommendations, it is important to substantiate the value of the applied discount rate in the public procurement documents, if possible, by providing an official source that is relevant and up-to-date for the sector.

The calculations are performed in real terms, at a fixed price level corresponding to the year of the evaluation, excluding inflationary distortions.

[25] EUROPEAN COMMISSION (2015): IMPLEMENTING REGULATION OF THE COMMISSION 2015/207., Official Journal of the European Union, 13.2.2015, paragraph 2.3.1 point 4, the recommendation for cohesion countries and the EU Commission's Handbook on Green Public Procurement: Buying green! The handbook on green public procurement, 3rd edition, 2016., p. 60.

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