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LIFE CYCLE COSTS (LCC) FOR COFFEE VENDING MACHINES AND OTHER TYPES OF VENDING MACHINES - DESCRIPTION OF TOOL AND ITS PARAMETERS

LCC IN THE PROCUREMENT

The LCC tool for vending machines has been primarily adapted for use in the evaluation of tenders to clarify the actual costs that the procuring authority will need to pay for the product. The tool can also provide assistance in the needs analysis to better plan purchases and to make an estimate of what a green alternative would cost in comparison to a conventional product - it may prove to be less rather than more expensive! In the needs analysis, MSR's general calculation tool may also be of assistance, see www.msr.se/sv/Upphandling/LCC-och-miljoekonomi/Generell-LCC-kalkyl/.


However, this document focuses on how LCC is used in the tender evaluation. In order to use LCC as an award criterion when assessing the economically most profitable tender, the tender documentation must clearly describe the parameters that will be included in the calculation and the documentation and measurement methods that will be applied, so that it is clearly evident which information the tenderer must provide. Below are some examples of which information the procuring entity should provide in the tender documentation and which information should be requested from the suppliers in order to make the evaluation.

THE PROCURING ENTITY DEFINES THE FOLLOWING CONDITIONS

Calculation conditions (defined in tender documentation)	
Quantity	each
Number of years the calculation comprises	year
Cost of capital/discount rate	%
Annual use	h/year
Electricity price	SEK/kW
Decommissioning costs ¹	SEK/each

The red squares in the calculation indicate information that the procurer shall provide.

¹ This value can also be determined by the supplier if standardized information can be obtained. A scale can otherwise be used if different machines are believed to lead to different decommissioning costs. This must then be clearly specified in the tender documentation.

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THE SUPPLIER MUST PROVIDE THE FOLLOWING DATA

Investment costs	
Prices including delivery costs per machine	SEK/each
Energy consumption as defined by standard EVA-EMP ² per unit, Idle phase (stand-by) ³	Wh/h
Costs for service and repair agreements	SEK/each, year

From the above parameters, it is important to select those parts that are appropriate for the procurement in question. For example, costs for service and repair agreements should only be considered if such agreements will be made. This must then be clearly defined in the tender documentation so that the submitted tenders can be compared on equal terms. The conditions that apply for the procurement must be clearly specified by the procuring entity and it must be clear what the supplier will provide. The information requested from the suppliers must also be produced in a standardized and uniform manner in order to permit a comparison. Of course, the evaluation must also compare equivalent products, which must be specified in the tender documentation.

DEFINITION AND EXPLANATION OF THE TOOL'S PARAMETERS

The tool analyzes an economic life cycle and *not* a "cradle to grave" life cycle. Accordingly, the tool only takes costs that impact the procuring entity into consideration and not other environmental costs that impact society. In order to guarantee that the investment is environmentally appropriate, we recommend that the tool is used as a supplement to the Swedish Environmental Management Council's environment criteria, perhaps as part of a needs analysis or as an evaluation criterion.

The user can enter the necessary parameters into the calculation and include all the costs that arise during the *period of ownership*. The tool includes red tabs with examples. However, explanations are provided below for some important parameters in the tool:


CONDITIONS

The "Number of years of use" and "Quantity" parameters are the only parameters in the tool that must be entered in order to define the prerequisites for the calculation. The procuring authority provides this information.

The interest used internally within the procuring entity is entered as the cost of capital and consequently can vary depending on the organization. A 4--5% cost of capital is usually recommended for municipalities and counties. For more information on cost of capital, see the chapters on present values and sensitivity analysis below.

² measurements shall be conducted in accordance with EVA-EMP version 2.0, "The European Vending Association Energy Measurement Protocol"

³ Stand-by (ready-to-use-mode) signifies that the machine is ready for use but that it is not serving drinks, food, etc. For a coffee vending machine, this means that the water tank is already at the serving temperature of, say, 94 degrees. This differs from the energy saving mode, where the water will have a lower temperature (see below for more information).

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RUNNING AND MAINTENANCE COST

It is important that the information provided by the suppliers is standardized so as to permit a comparison of different products.

Energy costs

Energy consumption shall be measured in accordance with EVA-EMP version 2.0, "The European Vending Association Energy Measurement Protocol". Consumption shall be given in Wh/h and calculated when the machine is in stand-by mode. Stand-by (ready-to-use-mode) signifies that the machine is ready for use but that it is not serving drinks, food, etc. For a coffee vending machine, this means that the water tank is already at the serving temperature of, say, 94 degrees. This differs from the energy saving mode, where the water has a lower temperature. In the energy saving mode, the water in the machine's water tank has a lower temperature. The water is then heated at initiated use. It will then, for instance, rise from 65 to 94 degrees. The water in the water tank is then cooled to a predetermined temperature. This mode is common during nights and weekends, for example, but it is also perfectly possible to have it activated all the time.

SERVICE COSTS AND SERVICE AND REPAIR AGREEMENTS


It is possible to enter either service costs or costs for service and repair agreements. This must, however, be specified in the tender documentation if it will be included in the calculation. It must be clearly specified for the supplier what will be included in this item so that comparable figures can be obtained for use in the calculation.

DECOMMISSIONING COSTS

Decommissioning costs are the costs that arise when the machine is transported away at the end of the usage period. This is a very uncertain parameter as it occurs so far in the future. The longer the period of time in question is, the more uncertain this figure will be. If this is used in evaluation, a standardized value should be used, particularly if it comes from the supplier. The procuring entity can also establish this value; it must then be clearly specified in the tender documentation.

PRESENT VALUE

The present value method is used to recalculate all expected expenses in the investment and any earnings to a present value in order to compare future costs with those of today. This is because a Swedish Krona today has a different value from a Swedish Krona tomorrow, as a Swedish Krona today can be invested or provide a return in some other way. Therefore, all future costs are recalculated to the time of the purchase. The extent to which the future costs are counted down depends on the rate of interest chosen and this can accordingly have a major significance for the final overall cost. The interest rate used by the organization is defined in the calculation under *cost of capital*. A high value here affects future costs such as operation and maintenance costs and ascribes these less significance in the total calculation.

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SENSITIVITY ANALYSIS

<p>Real rate of interest = Nominal rate of interest - Inflation</p>

The interest is therefore an uncertain factor in this context. The calculation will change according to what cost of capital is used. This interest rate varies somewhat between different organizations and should be determined within the organization. In this, either real interest or nominal interest rates can be used, with the real interest rate roughly equalling the nominal rate minus inflation

Another uncertainty is the operating cost, which can change in the future. A price change, such as an increase in the energy price, can affect the calculation values.

Another uncertain factor that affects cost is the number of years the machine will be used. This can be the economic lifespan or the total lifespan that the product will have in its existing condition. Lifespan must be defined by the procuring entity and will have a significance for the final total cost as the purchase price from a cost standpoint becomes less important the more years the product is used.