



Danish Ministry of the Environment

Guidelines for

# **Tools for Total Cost of Ownership in public procurement**

## **Bidet toilet seats**

Showers and air dryers for toilets

# Total Cost of Ownership and public procurement

## What is Total Cost of Ownership?

Total Cost of Ownership is the total of all costs resulting from acquisition of a product and the costs involved in using the product during its period of use. Both direct and indirect costs may be included in the calculation of total costs, and the total costs price may be used as a criterion for awarding a tender. Professionals often use the abbreviation TCO.

## Why TCO?

In continuation of the government's strategy for intelligent public procurement, the Environmental Protection Agency has instigated the development of national tools for incorporating TCO in public tenders. The aim of TCO is to calculate future outlay throughout the service life of the product. Instead of simply looking at the cheapest purchasing price, TCO tools make it possible to select the product that is cheapest throughout the service life of the product as a whole.

## Who constitutes the target group?

This tool has been developed primarily for public procurement officials and tender consultants, though it can also be used by private purchasers and by companies more generally.

## Why a TCO tool for bidet toilet seats?

The product groups for which TCO tools were initially developed were selected based on a number of parameters – including the ability of the industry to develop uniform data for determining operating costs and the presence of a financial and environmental potential in demanding products that are cheap to operate.

## How is the TCO tool used?

These guidelines contain the information required to begin using TCO in public procurement. They consist of a quick guide and a more detailed description of how to use the tool and of its functions. Finally there are details of the background to the tool and a summary of the industry's involvement and how it has reacted to the tool.

## How can I get more help?

The Danish Competition and Consumer Authority's guidelines on "Total Cost of Ownership in tender processes" from 2014 examines the legal tender aspects that must be taken into consideration when using TCO in public procurements, as well as the various ways in which to involve TCO throughout the tender process.

## Good luck in using TCO.

General information about tender processes.

[www.kfst.dk](http://www.kfst.dk)

Information and directions on using dialogue with industry.

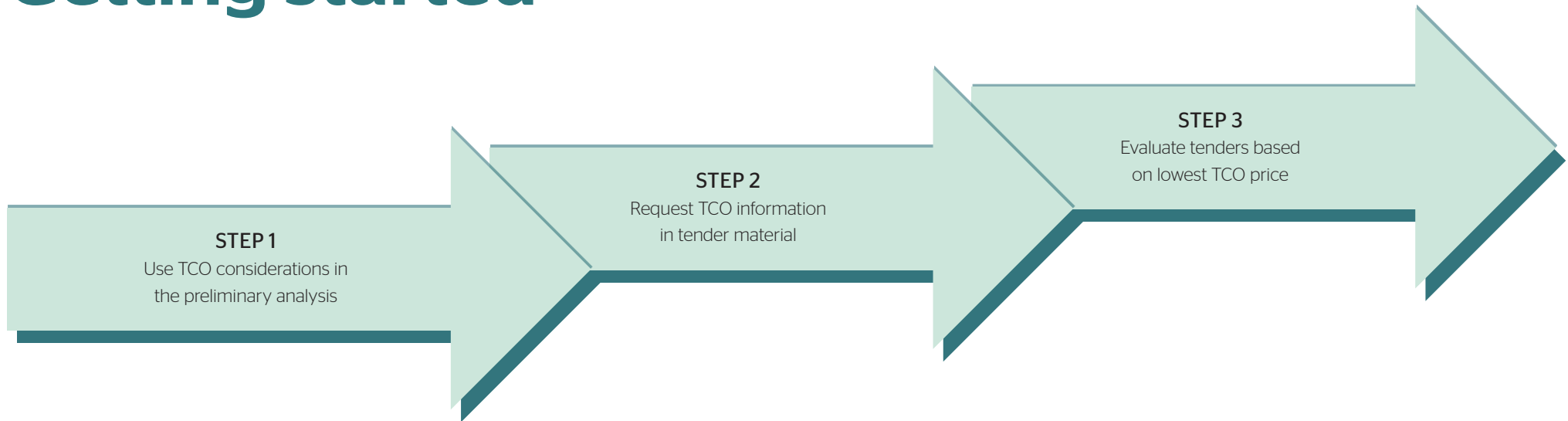
[www.kfst.dk](http://www.kfst.dk)

Inspiration in the form of how others have worked with TCO.

[www.ansvarligeindkob.dk](http://www.ansvarligeindkob.dk)

(Links in Danish only)

# Getting started



## 1. Use TCO considerations in the preliminary analysis

Before starting a tender process, it is helpful to launch a market dialogue. Find out what products exist on the market and which best meet the actual needs of your organisation. Only some selected, directly measurable costs are included in the TCO tool. Before drawing up the tender, it is therefore important to enter a dialogue with the market in relation to other cost factors and to establish what significance these could have for the resulting costs/savings of using various product types.

*Read more on page 4.*

## 2. Request TCO information in the tender material

When drawing up the tender material, it is important to ask for the TCO values used in the relevant TCO calculation. In order to be able to use the values provided by the tenderers, it is important that these are stated using the standards given in the TCO tool. The TCO tool itself must either be integrated in the tender lists or included in the tender material, so that the supplier knows how the total TCO price will be calculated and used as a basis for the evaluation.

*Read more on page 6.*

## 3. Evaluate tenders based on lowest TCO price

When the tenders are received, the TCO price is calculated, and subsequently used as the basis for evaluation. The TCO price replaces the pure purchase price irrespective of the weighting of the price in the tender evaluation.

*Read more on page 7.*

# Use TCO considerations in the preliminary analysis

# 1.

Before a tender process is started, it is helpful to initiate a market dialogue and to find out what product types exist on the market and how to best meet the needs of your organisation at the cheapest price in the long term. Calculation of TCO is relevant where costs relate to both procurement and subsequent use.

Identify important cost drivers  
Not all costs are included in the TCO tool itself, and are thus not used directly in the tender evaluation. We recommend including the significance of some of the costs in the preliminary analysis instead, where they can influence the selection of product type and thus which requirements are subsequently set out in the tender.

In order to ensure market acceptance of the tools, an industry-acknowledged standard/method must exist on how costs are measured before this factor can be included in the tool. For example, product quality usually has some influence on the service life of the product, but in most cases it is not possible to ascertain differ-

ent service lives between products. Standardised methods rarely exist for ascertaining the service life of products in any given use situation, and it may therefore be difficult to incorporate this TCO factor in the tool. It is therefore important to consider the effect of different quality parameters on the overall costs during the preliminary analysis. These considerations can subsequently be used as requirements and criteria in the tender material and thereby continue to have an effect on the total TCO price.

In the preliminary analysis, it is relevant to consider the expenses/savings that may result from different product types. How might certain product types affect work procedures? What related savings will this result in for operations?

Specific to bidet toilet seats, there is a considerable total saving in that bidet toilets reduce the need for home helpers to visit the elderly person, while at the same time reducing hospital admissions as a consequence of

illness caused by poor hygiene. It is important to calculate the total cost when considering the purchase of a bidet toilet seat.

Compile all of the questions that are relevant in terms of TCO that may feature in a market dialogue and the needs analysis. The answers you find can be used as part of the decision basis that you use to select a product type and thus what you ultimately ask for in your invitation to tender. This will ensure that TCO considerations are integrated early on in the tendering process.

## Enter into dialogue with interested parties

It can be a good idea to involve the intended users and suppliers in these considerations. Use the needs analysis and the market dialogue as a decision-making basis for how TCO is to be involved in the tender process in question. See the Danish Competition and Consumer Authority's guidelines on opportunities for dialogue in tender processes [www.kfst.dk](http://www.kfst.dk) (In Danish only).

When selecting which factors you wish to include in your TCO considerations, be pragmatic and make sure

you only use significant factors that give a real picture covering the entire period of ownership.

## TCO factors

It may be relevant to ask about the following TCO factors in connection with the needs analysis and market dialogue:

- Purchase price
- Total installation costs
- Training/teaching/instruction
- Other initial one-off costs
- Operating costs for energy (fuel, propellant, electricity)
- Operating costs for use of related products (e.g. coffee, filters)
- Maintenance costs (service inspections, repairs)
- Time wastage when using the product
- Labour costs for maintenance of the product (cleaning etc.)
- Service life
- Licence/subscription
- Residual value/disposal price
- Insurance
- Repairs
- Leasing or renting
- Costs for training employees in use of the product type
- Costs from changing supplier
- Other transaction costs

## Important considerations when selecting bidet toilet type

Lower total costs is often one of the arguments in favour of using bidet toilets, but there is no guarantee of a saving.

It is therefore important to find out the extent to which individual citizens need help going to the toilet before the use of bidet toilets can be deemed beneficial in terms of total cost.

The green boxes list a number of particularly important areas with a significant influence on TCO considerations of the extent to which bidet toilets might benefit you.

Read more in the Danish Competition and Consumer Authority's guidelines on "Total Cost of Ownership in tender processes" in relation to involvement of TCO prior to the actual tender.

[www.kfst.dk](http://www.kfst.dk) (in Danish only)

In the TCO tool itself, we have included the TCO factors that are deemed to be the most relevant for inclusion in an actual calculation. If your preliminary analysis reveals other relevant cost factors, these can be included in the form of (minimum) requirements in the invitation to tender or by actually changing the tool so that they are included.

The TCO tool can be adapted at any time to the individual organisation's actual invitation to tender and the organisations requirements for inclusion of TCO factors. The tool can thus be extended by the addition of more TCO factors, if required.

### Receiving further guidance and support

Århus Municipality has evaluated its trials with bidet toilets for municipality citizens.

[www.aarhus.dk](http://www.aarhus.dk) (in Danish only)

### Savings analysis

There are a number of savings to be had through the use of bidet toilets.

Bidet toilets may improve the health of citizens due to fewer urinary tract infections and skin problems as a consequence of improved hygiene. Similarly, bidet toilets will also relieve pressure on nursing staff and home helpers, as the citizens will be more independent. However, this means that the current condition of citizens must be analysed in order to assess the extent to which a bidet toilet might help and how much of a saving may be possible in terms of total cost.

### Hidden costs

There may be hidden costs associated with the use of bidet toilets that you should also consider when deciding the extent to which you will use bidet toilets. These hidden costs may include installation and removal costs associated with moving house, training in the use of the toilets' functions, extra cleaning and repairs and spare parts for the bidet toilet seats.

## Consider a performance based tender

As an alternative to using TCO calculations to calculate total costs for a product, you may want to consider a performance based tender.

In a performance base tender, the contracting entity does not prepare a detailed description of how the commission is to be filled, but instead sets out a number of performance based requirements (goals). The product, and any essential service provisions associated with the product, are therefore bought in as a collective service, allowing the contracting entity to hand over responsibility for ensuring low overall costs to the tenderers. You should note however that costs for electricity are not usually included in the tender price in the case of a performance based tender. In this case the TCO calculation can be used together with a performance based tender. See the guidelines from the Danish Competition and Consumer Authority concerning functional requirements in tenders.

[www.kfst.dk](http://www.kfst.dk) (in Danish only)

# Request TCO information in the tender material

## 2.

Once it has been decided which product solution is to be requested in the tender, TCO can be incorporated into the relevant tender in order to identify the supplier offering the product with the lowest overall costs.

Go through the following steps to complete and use the TCO tool:

The tool's **blue** area contains the information to be provided by the supplier, and thus the information to be requested in the tender material. It is important to stress that information is provided in accordance with the standards stated or equivalent standards. The information can be requested via individual tender lists. Tenderers can also enter the information in the tool itself.

In the **green** area, you enter your own information about usage/needs within your organisation. This lets tenderers know your specific needs and allows them to offer the product that meets your needs at the cheapest price.

The **brown** area is completed in advance with various qualified background data. If your organisation has more precise information, this can be used instead. The basis for the background data used can be found in the tool's help texts.

Remember to publish the evaluation method, including the partly-completed total costs tool together with the tender material in order to create transparency and consistent competition conditions.

### Supplement with energy and environmental requirements

It is recommended that you supplement the TCO-calculation with minimum requirements for energy consumption in order to avoid cheap but very power-hungry products. There are also other environmental requirements that may be relevant to your tender.

Find, for example, guidelines for energy and environmental requirements in [EUs Green Public Procurement criteria's](#) or at:

[www.csr-indkøb.dk](http://www.csr-indkøb.dk) (in Danish only)

It can be considered to establish sanction options in the event the supplied products do not conform with the information provided by the tenderers in relation to TCO. Guidelines concerning sanction options can be found in the Danish Competition and Consumer Authority's guidelines on total costs from 2014.

[www.kfst.dk](http://www.kfst.dk) (in Danish only)

# Evaluate the tenders on the basis of lowest TCO price

## 3.

Once the tender period has ended, the submitted tenders must be evaluated on the basis of lowest TCO price.

The tool automatically calculates the TCO price for the product based on the details entered. If several tenders have been received, the details can be copied over into one tool if necessary, to allow comparison of the various tenders by means of graphs and bar charts at the bottom of the tool.

Select the tender which has the lowest TCO price overall according to the TCO tool. This allows the contract to be awarded based on the lowest overall costs of procurement of the specific product and the costs of using the product during its period of use.

When the tenders are evaluated, in addition to the TCO calculation, one or more qualitative criteria may also be established on which the tenders must compete. There will often be factors other than total costs that will have some significance in terms of overall evaluation of the tenders. This could be quality or user-friendliness, for example.

### Relevant links

*Click on the links to see more. Links in Danish only.*

#### The Danish Energy Agency's procurement recommendations

[www.ens.dk](http://www.ens.dk)

#### The tender portal - The responsible procurer

[www.csr-indkob.dk](http://www.csr-indkob.dk)

#### Forum for sustainable procurements

[www.ansvarligeindkob.dk](http://www.ansvarligeindkob.dk)

#### The Danish Competition and Consumer Authority's guidelines on functional requirements

[www.kfst.dk](http://www.kfst.dk)

#### Danish Standard's DS 700 series

[www.ds.dk](http://www.ds.dk)

#### Baltic GPP - Green Public Procurement

[www.balticgpp.eu](http://www.balticgpp.eu)

#### The Danish Competition and Consumer Authority's guidelines on total costs in tender processes

[www.kfst.dk](http://www.kfst.dk)

#### The Danish Competition and Consumer Authority's guidelines on opportunities for dialogue in tender processes

[www.kfst.dk](http://www.kfst.dk)

#### The Danish Competition and Consumer Authority's guidelines on the tender process - Step by step

[www.kfst.dk](http://www.kfst.dk)

#### The Danish Energy Agency's checklist for energy-efficient design - Lighting

[www.spareenergi.dk](http://www.spareenergi.dk)

#### Guidelines from the Danish Building Research Institute

[www.sbi.dk](http://www.sbi.dk)

# Guide to the tool's functions

- 1 Enter the consumption of electricity and water in the blue area. This is calculated by the tenderer using the method described in the tool. It is important to specify in the tender documents that electricity and water consumption is to be measured in accordance with this, as this is accepted by the industry.
- 2 The green area must be completed by the contracting entity.
- 3 The brown area contains background data that is completed in advance. It is possible however for the procurer to change the background data if more precise information is available.
- 4 The grey area contains the results of the TCO calculation.
- 5 TCO prices for the various tenders received are illustrated by means of two diagrams that show the gains. The graph shows whether, and if so when, one product pays for itself compared to the other. The bar chart shows distribution between operating costs and purchase costs in the specific calculation.
- 6 Much of the information to be provided by the supplier requires the conditions for the data to be described in the tender material, e.g. in the requirements specification. If, for example, a price is requested for a service agreement, the requirements specification must state precisely what is to be included in this agreement.
- 7 This tool does not necessarily give an accurate picture of TCO for an existing product compared with a new solution (product). If a comparison of this kind is required, it is recommended that a rough calculation be performed based on the TCO factors highlighted under "TCO PRIOR TO TENDER".
- 8 The formula used to calculate the final TCO price is explained under a separate tab in the Excel TCO tool itself.
- 9 If not all values are required to be included in the TCO calculation, these can be removed by deleting the lines from the tool in order to remove them from the formula. This might be the

case if a service agreement were required, for example.

- 10 Brief directions for how the various values can be gathered are found to the right of the tool.

- 11 Click on the plus sign to add more product columns.

- 12 The tool has a print tab and a tab containing a description of the calculation method.

- 13 Tab with a simplified version of the tool. This version does not include calculation of current value and energy price increase. The calculation formula in this version is therefore simpler, and it will therefore be easier to add/remove factors or integrate the method into individual tender lists.

The screenshot displays the 'TCO tool for bid evaluation' interface, specifically for 'Bidet toilet seats (Spray heads and air dryers for toilets)'. The tool is organized into several color-coded sections:

- Section 1 (Blue): Information about the product – provided by the tenderer.** Includes fields for investment costs (purchase price per product, costs per product for installation, other one-off costs) and operating costs per toilet (electricity consumption for 10 uses, water consumption for 10 uses, standby consumption for 4 hours). It also shows total costs for service agreement.
- Section 2 (Green): Information about use – supplied by the contracting entity.** Includes fields for number of toilets, number of visits per day, and days of use per year.
- Section 3 (Brown): Background data – supplied by the contracting entity.** Includes fields for period for which TCO is to be calculated, price of electricity, energy price increase, water price, and discount rate.
- Section 4 (Grey): Result.** Displays the cost of purchase, cost of operation, and total TCO for two products (T1 and T2).
- Section 5 (Grey): Accumulated total costs.** A bar chart showing the accumulated total costs over time for two products.
- Section 6 (Grey): TCO for the specified time period.** A bar chart showing the TCO for the specified time period for two products.
- Section 7 (Grey): Directions for completing fields.** Provides detailed instructions for how to complete the fields, including specifications for testing electricity and water consumption.
- Section 8 (Grey): Print version.** A tab for printing the tool.
- Section 9 (Grey): Simple TCO.** A tab for a simplified version of the tool.
- Section 10 (Grey): Sum.** A tab for the sum of the results.

The tool also includes a 'Normal View' tab and a 'Sum' button. The interface is designed to be user-friendly, with clear instructions and a structured layout for data entry and calculation.



# Background

## Background to the TCO tools

Further to the Danish government's strategy for intelligent public procurement, the Environmental Protection Agency has initiated the development of national tools for involving Total Cost of Ownership (TCO) in tenders within the public sector.

The Environmental Protection Agency has been in charge of development of this TCO tool. Development of the tools is qualified by an advisory group made up of representatives of National Procurement Ltd. Denmark, The Danish Building & Property Agency, The Confederation of Danish Industry, The Danish Energy Agency, Danish Regions, City of Copenhagen, Local Government Denmark, The

Danish Competition and Consumer Authority, The Danish Construction Association, the Agency for Modernisation, the Danish Ministry of Climate, Energy and Building, the Danish Chamber of Commerce, Central Denmark Region, the Danish Ministry of Business and Growth and the Environmental Protection Agency.

FORCE Technology, department of applied environmental assessment, acting as consultants to the Environmental Protection Agency, has been responsible for the development of the TCO tools and guidelines. Operate A/S and Responsible Procurement Excellence have also been involved in development as subcontractors.

## The industry's acceptance of the methods

There has been continuous dialogue with the industry during development of the TCO tools for bidet toilets. On 1 July 2014, an industry workshop was held at FORCE Technology in Lyngby. Similarly, in November 2014, a meeting was held to discuss the tools. The following companies took part in the industry workshop: Welltech, J. Honoré Care Aps (Aspen Bidets), Ergolet and Invacare. These four companies represent a large part of this industry in Denmark. All four have vouched for the calculation method employed and have expressed their intention to submit tenders in response to the invitation to tender that make use of the TCO tool's calculation method. The actual method description for

measuring electricity and water consumption was developed in collaboration with the industry. The industry has also accepted that it itself must measure electricity consumption using the method description in the tool.

### Comments from the industry

The industry wishes to be notified in good time of which tests they are to perform on their products prior to any invitation to tender. The industry has no immediate need for an independent third party to perform and verify the measurement of water and electricity consumption. However, the industry is not averse to a third party performing the test, should the need for this arise.

## Disclaimer

We wish to stress that the TCO tool and these directions contain material and information which is generally very extensive and complex. Although both guidelines and tools are updated continuously, we are unfortunately unable to guarantee that all information is fully updated at all times.

Specifically for these reasons we must renounce any potential liability for errors, omissions and insufficient updates that may be contained in information and analyses in the TCO tool, including in texts, diagrams and guidelines.

Liability for the content of websites to which references or links are provided, as well as material which has been explicitly produced by other parties rests solely with the stated author.

We renounce any potential liability for loss, damage or inconvenience resulting from use of the TCO tool and guidelines, including loss of data and forfeit of rights.



Danish Ministry of the Environment

Børsgade 4  
1215 København K  
Phone: +45 72 54 60 00  
E-mail: [mim@mim.dk](mailto:mim@mim.dk)