Using Total Cost of Ownership to save on lighting costs
Municipality of Syddjurs (Denmark)

Background
Syddjurs is a small and relatively young municipality created in 2007 as the result of municipal reform in Denmark. Syddjurs forms part of the Aarhus area and East Jutland metropolitan areas.

Syddjurs is a member of the procurement community Jysk Fællesindkøb (JYFI), which consists of eight municipalities: Farvskov, Haderslev, MariagerFjord, Norddjurs, Rebild, Skanderborg, Skive, Syddjurs, and Viborg. Procurement communities like the JYFI are common in Denmark to facilitate joint procurement, and are an effective way for authorities to increase their market power and leverage advantages in price, quality and service.

Lighting solutions were previously selected from a product catalogue, which focused on lowest price and included relatively few light emitting diode (LED) products. In recent years, some members of JYFI started to purchase LED lighting despite the higher initial upfront cost, due to perceptions that it was the more economic and environmentally-friendly product in the long term.

As such, when the time came to retender the contract for lighting equipment, the Municipality of Syddjurs decided to introduce a Total Cost of Ownership (TCO) model, in order to allow procurers to compare the lifetime operating costs of different technologies with confidence. While TCO is based on economic thinking and can provide large economic savings in the medium- to long-term, it also has the potential to provide environmental benefits by allowing better recognition of quality, energy efficiency and end-of-life costs, when comparing products.

Procurement objectives
In 2015, the Municipality of Syddjurs acted as the lead procurer on behalf of JYFI (not including the Municipality of Norddjurs, however) in the acquisition of lighting and electrical items.

The procurement was structured as a full assortment procedure, in order to allow the JYFI to have access to the supplier’s full range of products within the offered product categories, with a fixed discount price.

A full assortment procedure means that neither the supplier nor the municipality is locked into any single type of bulb or technology over the course of the contract. This is a particularly appropriate model in the lighting sector, where rapid changes in technology and pricing can occur.

The idea was to incorporate TCO into procurement decisions, and encourage suppliers to continually follow market trends and update offers to supply the most economically advantageous product within the product group. By continually updating the product list with the newest technology and providing TCO information, the goal was to shift from conventional light sources to LED over the period of the framework agreement.
Criteria used

Subject matter of the contract:
Supply of Light Sources and Electrical Items.

Some examples included:
Light sources: Fluorescent lamps, electric bulbs, LED, halogen, low-energy.
Electrical items: Extension cords, plugs, sockets, wires, cable ties, fuses.

Award criteria:
The framework agreement was awarded to the bidder offering the lowest costs. For electrical items, price was measured using conventional means, but in the case of lighting, the bid was assessed according to the total cost principle.

In order to compare bids, suppliers were asked to provide information on life time costs using the TCO tool created by the Danish Environmental Protection Agency.

The TCO price includes all costs connected to the use of a product over its lifetime (in this case, 15 years). It is the sum of the purchase price of equipment, the cost of replacement (including cost of labour involved) and the cost of operation (that is, energy consumption).

For the evaluation of TCO, bidders were required to provide information and prices on a representative sample of products, covering approximately 50% of historical purchases made by the procurer.

A product sheet was provided listing a range of lighting solutions in different technology categories which the procurer may require over the course of the framework agreement. Necessary assumptions for calculating TCO were provided, including:

• Time period in which the TCO must be calculated
• Electricity prices
• Discount rate
• Energy price increase
• Number of bulbs needed
• Number of operating hours per day
• Number of usage days per year
• Price of wages for replacing bulbs per light source.

Bidders were then required to add data on item price, energy consumption (watts) and lifespan into the tool, in order to create an estimation of TCO which could be compared across bids.

Contract performance clauses:
With regards to warranties, the suppliers must guarantee products over their specified lifetime.

Results
The TCO tool was created by the Danish Environmental Protection Agency and was designed to make it easier for procurement authorities to calculate and evaluate the total cost of products in 13 different product areas, including lighting.
By using the tool in the current procurement, the vast differences in the lifetime cost of different technologies over a 15-year period became visible. The approximate results were as follows, for a standard bulb with a E27 socket, 405-470 lumen
- Halogen – 2,354 krone kr (€316)
- Low energy bulbs - 581 kr (€78)
- LED - 362 kr (€49)

Using TCO showed that the purchase and use of an LED bulb is approximately six times cheaper (approximately 2,000 kr or €267) than a halogen bulb over a period of 15 years, thus allowing procurers to select these technologies with confidence despite higher upfront costs.

Bidders also welcomed the use of the TCO tool, as it is an important parameter in calculating the repayment time of a solution. Despite requiring more technical data from bidders, no challenges in providing this were reported.

The deadline for bids was 21 September 2015, with delivery starting on 1 November. The resulting framework agreement will operate for two years, with the option to extend this twice by 12 months. The estimated financial value of the contract was €295,854 for light sources, and €40,344 for electrical items.

Environmental Impacts

Over 90% of the environmental impact of lamps comes from the in-use phase via energy consumption and associated greenhouse gas emissions (Source). LED technology is highly efficient, requiring significantly less energy to produce the same level of lumens, in addition to having a longer bulb life-span. Reductions in upfront costs and further improvements to efficiency are also expected to continue as LEDs importance in the global lighting market rapidly continues to grow (Source).

Lessons learned

- When comparing TCO, it became clear that the low upfront costs of halogen and low-energy bulbs represented a false economy, and were the far more expensive options over the long-term.
- Calculating TCO is in many ways a common sense approach to procurement. However, it is rarely a trivial decision, and requires the use of reliable tools and thorough calculation to determine what product is cheapest over the longer-term.
- Data from past purchases specify light sources via their power consumption in watts. However, what is being purchased are lumens, and different types of light sources have different levels of power consumption to provide the same level of lumens. As such, some ‘detective work’ is necessary to convert watts to lumens for previous contracts, in order to compare past performance to the new solutions proposed.
- Engagement with suppliers has also highlighted the opportunity to include further TCO parameters in future tenders, including the temperature of the environment in which the light is located, and whether motion sensors are used to turn the bulb on and off.

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For related information, please see European GPP criteria for Indoor Lighting and the Technical Background Report.