SMART SPP

innovation through sustainable procurement

Working with the market to procure sustainable solutions

Five case studies from the City of Barcelona, the London Borough of Bromley, the Municipality of Cascais, the Eastern Shires Purchasing Organisation (ESPO) and the Municipality of Kolding

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Authors: Helena Estevan, Mar Campanero i Sala, Ana Paula Duarte, Ana Cortiçada, Leonor Sota, Paula Trindade, Bente Møller Jessen, Henrik J. Kiel, Peter Joyce, Dave Starling, Kevan Twohy and Kevin Willsher

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Partners:

Associate partners:

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Introduction to the case studies

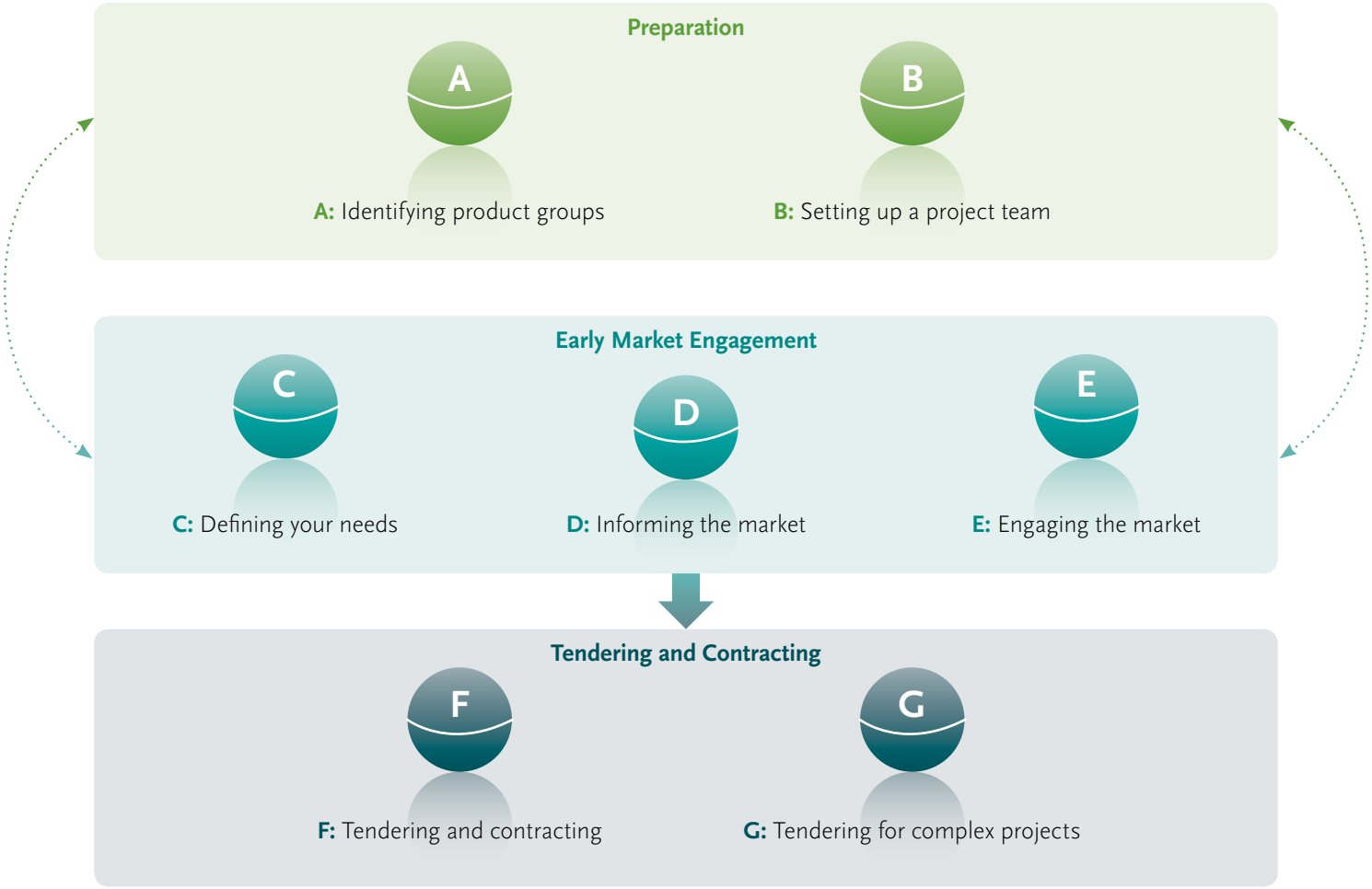
In this case study series the City of Barcelona (Spain), the London Borough of Bromley (United Kingdom), the Municipality of Cascais (Portugal), the Eastern Shires Purchasing Organisation (United Kingdom) and the Municipality of Kolding (Denmark) share their experiences, conclusions and lessons learned.

These SMART SPP public authority partners have used a particular procurement approach (see figure 1) which focuses on engaging the market effectively before tendering (early market engagement). This includes the assessment of the life-cycle costs and related CO_2 emissions of innovative products such as Light Emitting Diodes (LEDs) indoor and street lighting, energy efficient vending machines and electric mobility. This has been done before, during and/or after tendering.

The SMART SPP guidance includes a guide to procuring innovation, describing different ways to engage with the market, and a tool to calculate the life-cycle costs and CO_2 emissions of products. It can be downloaded at: www.smart-spp.eu/guidance.

Figure 1

Activities to guide authorities through a flexible approach to drive innovation through sustainable procurement



Barcelona City Council

Ajuntament de Barcelona

ecoinstitut BARCELONA

1. Summary

Barcelona City Council has applied the advanced SMART SPP tendering methodology to identify the most innovative and most energy-efficient solution for the installation and management of ten on-street charging stations for electric vehicles with two charging docks in each. Although demand for electric vehicles is still modest in the city, user awareness is increasing daily and there is increasing political support for this type of transport.

After the tendering process; for the first time generating information on the environmental performance of the product; and finally, estimating the real cost of ownership of the offered solutions using the SMART SPP Life-Cycle Costing (LCC) and CO_2 Assessment Tool).

2. Background

Various departments within the City Council of Barcelona have been strongly supportive of expanding the use of electric vehicles in the city and were planning the creation of the first networks of public charging points. The SMART SPP project team in the city identified this as an ideal opportunity for testing the advanced tendering methodology developed for the project.

Before implementing the project, Barcelona already had two charging points in a street near 22@ (PobleNou) and three on-the-street points for the car parks managed by B:SM (Barcelona de Serveis Municipals – Barcelona Municipal Services)[1] as a test phase. However, the city planned to purchase 380 electric vehicles and install 191 charging points, both at street level and in underground car parks in Barcelona through the MOVELE[2] project and the LIVE[3] Plan on the initiative of the Agencia de Energía de Barcelona (Barcelona Energy Agency)[4].

Specifically, the tender for the first ten of the planned 191 charging points for electric vehicles was selected for testing the SMART SPP approach to engage the market.

The municipal authorities already have a long history of supporting green, socially motivated and innovative contracting based on the *Ayuntamiento mas Sostenible* (a more sustainable city council)[5] which was initiated in 2001 with the Oficina Verde *(Green Office)*. In this respect, the SMART project has added new tools to promote innovation and facilitate knowledge, introduction and acceptance of new technologies for energy efficiency.

1 Available at: www.bsmsa.cat/
2 Available at: www.idae.es/index.php/mod.pags/mem.detalle/id.407/lang.es
3 Related information available: www.movilidadelectrica.com/search/label/proyecto LIVE
4 Available at: www.barcelonaenergia.cat/cas/laagencia/presentacion.htm
5 Available at: www.bcn.es/agenda21/ajuntamentsostenible/castellano/index.htm

3. Experience with the SMART SPP approach to driving sustainable innovation

3.1 Activity A – identifying appropriate product groups

The product for tendering was identified as *the supply, installation, integrated management and maintenance, according to environmental and energy efficiency criteria, of a network of ten on-street charging stations for electric vehicles, with two charging docks at each*. The bilateral meetings for Activity C (definition of requirements) defined the contractual management and maintenance services (the required software for management of the service, handling connection and disconnection, maintenance of stations, resolution of faults, replacement and advertising of the service).

3.2 Activity B – setting up a project team

The development of the specifications and carrying out of the procurement process required a team which included expertise on how renewable energies work and are implemented in urban mobility projects as well as financial, legal and management expertise. The project coordinators were:

- *Agencia de Energía de Barcelona* (Barcelona Energy Agency); managed municipal investments for the installation and management of the charging points, coordinating and providing technical assessment to define the scope and description of works.
- *Área de Medio Ambiente del Ayuntamiento de Barcelona* (Environmental Department of the City Council of Barcelona); coordinated and provided an environmental assessment of the specifications.

Other bodies that provided support throughout the process were:

- Ecoinstitut Barcelona and the remaining SMART SPP team; these offered technical and legal assistance for the inclusion of environmental and energy efficiency criteria in the specifications.
- Procurement section in the *Departamento de movilidad* (Mobility Department) of the City Council of Barcelona; provided legal and technical assistance.
- District 22@Barcelona, the innovation district[6]; offered previous pilot experience with the on-street installation of two charging stations and three parking spaces.

3.3 Activity C – defining your needs

During this phase, market consultation sessions were mainly held to identify possible stakeholders who are affected, involved and/or interested and in order to understand current service provisions.

For example, a market study was carried out by compiling contracts and holding bilateral meetings with suppliers, manufacturers and operators of these types of services (from July to November 2009) in order to gather prior information on the life-cycle costs of the support columns (essential information for application of the SMART SPP methodology): energy output of stations, composition and life-cycle cost of the materials used in the support columns, handling charging sessions, information provided for users, etc. These initial meetings are essential so that key information can be fed into the procurement process and ensure that the terminology used is comprehensible for everyone.

6 Available at: www.22bex.php?lang=es

In parallel, the minimum functional requirements for the tender were defined. For this CITCEA-UPC[7] were commissioned to define the technical requirements for the charging points for electric vehicles and were supporting the project with their own expertise in this subject. This included negotiations that were held with districts which were potential locations for charging stations using existing connection points to the electricity grid.

3.4 Activity D – informing the market

The aim of this was raise interest on the market for engaging with the City prior to tendering (see Activity E). This in turn should ensure that the market could meet the final specifications developed.

Promotional activities comprised the following:

- 16/05/2008. The future installation of a network of charging points for electric vehicles in order to reduce CO_2 and noise emissions published on the web site of the Energy Agency of Barcelona.
- 21/04/2009. Prior Information Notice (PIN) on procurement initiatives for innovative technologies with high energy efficiency by the members of the SMART SPP[8] consortium.
- 31/07/2009. Official presentation of the MOVELE project by the Ministry of Industry, with broad coverage by the media.
- Start of 2008 – end of 2009. Various bilateral meetings held between suppliers, manufacturers and operators of this type of services and the Barcelona Energy Agency. These stakeholders were attracted by the city, the capital of Catalonia and a motor of change and innovation in the country, committed to environmentally friendly innovation and maximum energy performance. Companies contacted the City Council on their own initiative to provide information on their products and the operating characteristics of their services. The information obtained during these meetings was matched to the requirements identified in order to establish a basis for prior consultations with the market (see Activity E).

3.5 Activity E – engaging the market

In this case, a seminar was chosen as the most appropriate method of consultation. This allowed an open dialogue with interested suppliers to present the requirements of the tender and answer any questions, as well as discussing potential solutions.

The seminar took plane on 23 November 2009 with companies and organisations involved in the manufacture, distribution and maintenance of charging points for electric vehicles invited to attend. Participation was high, with 63 participants attending who represented 32 companies, one electric vehicle association and five local organisations.

In order to facilitate the consultative part of the session, an anonymous questionnaire was filled out on the day (one per company) so as to be able to assess the ability of the market to meet the draft specifications.

An open discussion was then held on these measures in order to gather information on more ambitious, future requirements. During the seminar a second questionnaire was sent via email with the aim of compiling more specific data on consumption, efficiency, etc.

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7 Centro de Innovación Tecnológica en Convertidores Estáticos y Accionamientos-Universidad Politécnica de Cataluña (Technical Innovation Centre for Static Converters and Drives-Polytechnical University of Catalunya).

8 Available at: ted.europa.eu/udl?uri=TED:NOTICE:112139-2009:TEXT:ES:HTML

15.62 % of participants replied with information on current consumption of support columns during charging and when not charging and the efficiency of the charging process; the service life of the various elements (of the support column, spare parts, software and other pertinent elements); the possibility of obtaining life-cycle studies for the support columns and the content of recycled materials used in the column and in users' cards.

3.5 Activity F – tendering and contracting

For reasons not related to the project, the tender procedure falls under the umbrella of the State Foundation for Local Employment and Sustainability (FEOSL) 2010[9]. This uses a service type contract model that does not allow for the assessment of environmental and energy efficiency criteria. The SMART SPP LCC-CO_2 tool could therefore not be applied in order to evaluate the best offers in terms of life-cycle costing and the reduction of emissions.

The Energy Agency, together with the Environmental Department and environmental assessment team at the Ecoinstitut Barcelona, incorporated environmental and energy efficiency criteria in the technical specifications (as technical specifications and performance criteria, in view of the limitations mentioned above), based on the feedback from the seminar. The main environmental aspects included were:

1. Service life of components in the electric charging station. Use of recycled materials in the housing of the charging points and protective components.
2. Energy consumption per charging session and information in situ provided for users (consumption or related cost) as well as the implementation of a charging profile and hourly definition of consumption (future management with time-related consumption limitations).
3. The maintenance vehicles for the charging points must be electrically powered and the type of vehicle must be specified (brand, model, registration and battery properties). Attached maintenance reports for charging points with details of kWh for the electric maintenance vehicles and kilometres travelled.

The contract was evaluated on the basis of total volume of employment, economic assessment of the offer and lead time for delivery to the temporary joint venture 'Etra Catalunya-Moncobra' which is using the charging columns of Circutor technology.

3.6 Activity G – invitations to tender for complex processes

Not relevant in this case.

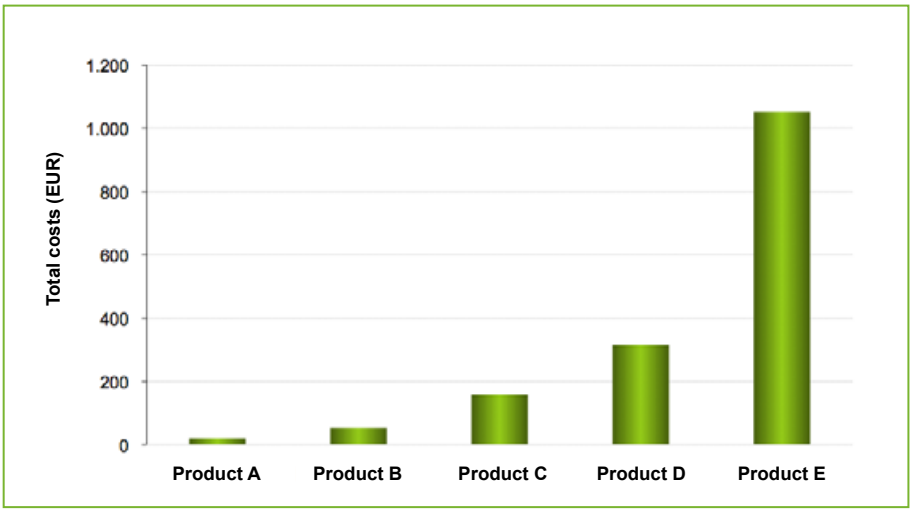
9 Available at: www.mpt.es/servicios/fondo_sostenibilidad

4. Life-cycle costing (LCC) and CO_2 emissions

The LCC-CO_2 evaluation tool to determine life-cycle costs was used after awarding the contract since the 'service type contract' of the FEOSL does not allow modifications to be made to evaluation criteria. The main benefit of acquiring this data a posteriori is to evaluate actual costs of the new service for the short and long term and to extrapolate them for future tenders. Specifically the following was calculated:

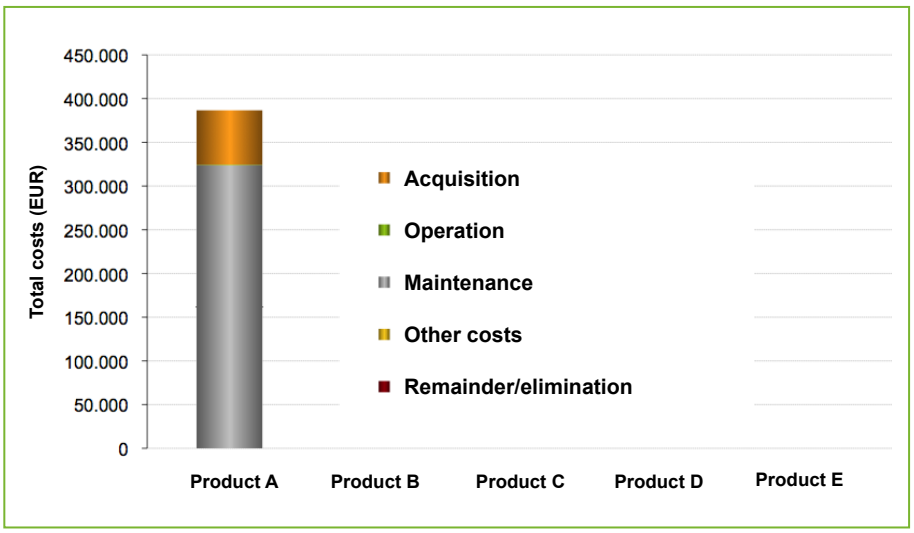
- CO_2 costs and emission values derived from the operation of various types of support column. The annual operating costs calculated from the consumption data for charging points (when not charging) provided by various companies which participated in the seminar are given below:

Figure 2: Annual operating costs per charging point



- Total CO_2 costs and emissions derived from the purchase, installation and maintenance of 10 charging points during a period of 10 years (in accordance with the data provided by the successful bidder):

Figure 3: Total costs of service (period of 10 years)



5. Conclusions and lessons learnt

The process applied during the tender process for the installation, operation and management of the first on-street charging stations for electric vehicles in the city of Barcelona identified the following main points:

- The positive background and high exposure for planned energy projects in the *mass media* are defining factors for mobilising suppliers in this emerging sector, including during the phase prior to tendering.
- The type of consultation carried out according to the SMART SPP guide, namely a seminar, was a great success in terms of participation and the technical information gathered. Thanks to the positive dialogue resulting from the exchange of information and knowledge and in view of the flexibility required in tendering for innovative solutions, this greatly helped in the development of a successful tendering process.
- Due to the use of the LCC-CO_2 evaluation tool and acquisition of data on energy consumption and CO_2 emissions during the product life-cycle, it was possible to estimate the energy costs for the service. This information could be relevant for future tender processes as well as for analysing the proposition that the service is no longer free (energy consumption during charging, use of public space and maintenance costs for the network of charging points).

Likewise, the following weaknesses were identified:

- The offers submitted were significantly lower in number to that expected based on the interest shown by the sector and participation in the seminar, probably due to the short cut-off date of the tender procedure.
- In the end, the tender process permitted under this form of contract allowed very little flexibility for offers to include solutions that were not originally planned.

The main conclusions that the experience of Barcelona can provide with regard to application of the advanced SMART methodology for other public authorities are:

- Establishing communication, dialogue and consultation with the market is essential for emerging technology sectors such as electric vehicles.
- There is no single one-size-fits all methodology. Instead the activities covered by the SMART SPP approach, are intended to be flexible, and may overlap, happen in a different order, or be repeated. This is especially true for larger cities and important contracts, with high interest from suppliers.
- External factors (such as policies requiring a focus on employment creation) may restrict possibilities for the inclusion of environmental criteria such as energy efficiency.

6. Outlook

Other tender processes are due to be carried out with regard to the expansion of the charging points for electric vehicles. Barcelona has one of the largest number of motorcycles (running on petrol) in Europe and therefore the intention is to introduce electric motorbikes as quickly as possible.

Within a period of two years, the intention is that Barcelona should have 28 on-street public charging points (22 points on the street and 6 in BSM car parks), 32 on-street points for charging municipal fleets (with possible utilisation by the general public during the day) and 131 points in underground public car parks, to ensure equal distribution with the maximum coverage possible[10].

10 Source: Barcelona Energy Agency.

The uncertainty surrounding the actual development of these projects is significant since this depends on the involvement of many parties and the development of other factors. The Spanish market is currently growing but it needs the collaboration and coordinated efforts of very diverse sectors and has important implications for the GDP of the country (the automotive sector and the energy sector). Nevertheless, all EU governments are committed to reducing emissions by 20% between now and 2020, therefore promoting electric vehicles is one of the more interesting options for the replacement of internal combustion vehicles.

The use of electric vehicles as urban transport by the general public would encourage the use renewable energies and would reduce dependency on oil in the transport sector, thus diversifying the city's energy sources. In this respect, numerous activities will be required such as grants for vehicles, new charging infrastructure, media promotion for electric vehicles, research and development for the implementation of intelligent distribution networks and domestic charging technologies, etc.

Against this background, application of the concepts offered by the SMART SPP approach, such as the evaluation of costs for the whole system as well as dialogue with the market, will be key to finding the best possible solution from the point of view of sustainability.

7. Contact.

Xavier Felip, Barcelona City Council, xfelip@bcn.cat

Helena Estevan, Ecoinstitut Barcelona, helena.estevan@ecoinstitut.es

London Borough of Bromley

1. Summary

Through SMART SPP the London Borough of Bromley has been assessing the emerging market for LED lighting technologies.

Bromley has worked with the Eastern Shires Purchasing Organisation and Global to Local sustainability consultants to facilitate a framework of LED lighting suppliers accessible to the wider UK public sector.

Bromley has engaged with a wide range of suppliers, both manufacturers and importers, and lighting consultants. These organisations range from small start-up companies to large multi-nationals. Bromley has trialled LED office lights at two locations in the Civic Centre, tested the SMART SPP LCC-CO_2 Tool and proved the concept to implement LED lights in forthcoming office refurbishments.

The framework notice is forthcoming and will be advertised by ESPO in July 2011.

2. Background

Located to the south east of central London, Bromley is one of the 33 boroughs that make up Greater London. By area Bromley is the largest London borough; covering 58 square miles, 30% larger than the next largest borough. It comprises a wide mix of land use types within both urban and rural settings. The borough has a population of 300,000 people.

Bromley had a number of key drivers for joining the SMART SPP project. Bromley has long prided itself on being 'the clean and green' London borough, a reflection of its relatively rural setting and corporate priority of providing 'a quality environment'. Finance is another key issue for Bromley, the borough has always set one of the lowest local taxation rates in London each year.

Recently the cost of energy has come under increased scrutiny, the borough now spends circa £3 million on electricity and gas, in addition to which, it is also subject to the 'Carbon Reduction Commitment', a UK government levy on energy use for large organisations which will cost a further £300,000 a year. Also, Bromley, like a lot of public sector organisations is experiencing significant cuts to its funding (£30 million over the next two years) and needs to find ways of 'doing more with less'.

To save money Bromley has recently initiated a programme of office consolidation; refurbishing office accommodation in some buildings to increase capacity and in turn enable the disposal of surplus buildings. This programme has provided the opportunity to investigate and implement options to improve the energy efficiency of the consolidated estate.

This range of factors provided the incentive and opportunity to work on the SMART SPP project, save money and minimise energy use through implementing innovative sustainable technologies.

3. Experiences with the SMART SPP approach to driving sustainable innovation

3.1 Activity A – identifying appropriate product groups

Organisational procedures and policy are vital to successful project outcomes. To lay the foundations for the SMART SPP project Bromley changed its internal contract procedure rules (financial regulations) to base contracting decisions on whole life costs. This commits the authority to assessing the total cost of ownership of a good, work or service, factoring running costs and disposal costs etc. (as well as the usual acquisition cost) into the purchasing decision. Bromley also secured executive endorsement for sourcing innovative technologies via the adoption of a Sustainable Procurement Policy agreed by the Council's Chief Officers.

In addition to this procedure and policy framework, Bromley set targets to reduce energy use. Previously Bromley had successfully achieved a Local Area Agreement with central government to reduce total energy use from its core estate, after which, Bromley proceeded to sign up to the Local Authority Carbon Management Programme. This programme is run and externally assessed by the Carbon Trust. Through the programme Bromley is committed to cutting its carbon emissions across all its activities (travel, suppliers, buildings, staff commuting) by 25% by 2015.

Bromley considered several category groups for the SMART SPP before settling on LED lighting. LED lighting was chosen as it would contribute to reducing the council's energy costs, contribute to carbon reduction targets and the office consolidation programme would provide the opportunity for trials and installation. Lighting is also an ideal product to trial the life-cycle costing approach to tendering.

3.2 Activity B – setting up a project team

The Bromley project team worked closely with the other UK partners, the Eastern Shires Purchasing Organisation and Global to Local, sustainability consultants. The internal procurement team is multi-skilled and had expertise in procurement, supplier management, sustainability and procurement law however external advice and clarification was sought when required. The project team drew on the council's property management division and external lighting consultants to advise and assess the differing lighting technologies. Specific advice on the tool was also sought from the UK Government's Cabinet Office and Improvement and Development Agency. This gave the project the key skills to engage with the market, assess the products (whether they were fit for purpose), assess running costs and environmental impacts and establish the appropriate route to market.

3.3 Activity C – defining your needs

Bromley's needs are relatively simple, low energy office lighting. Current lighting arrangements are typically warm white light fluorescent T5 or T8 tubes. These are a conventional common place lighting solution characterised by a low acquisition cost but high running cost, both in terms of electricity consumption and failure rate. Bromley was looking for a solution which provides the same or improved lighting performance which is suitable for office conditions, but also uses less electricity and has lower maintenance costs.

To benchmark this, current lighting consumption was established from calculations based on the wattage and known usage time of the lights. Overall energy costs are known from electricity bills. Carbon emissions are known from calculations for the local authority carbon management programme and carbon reduction commitment.

3.4 Activity D – informing the market

The project team engaged with the market consistently over the course of the project meeting with small SMEs and large multi-nationals. Potential suppliers were sourced through attending conferences and trade shows, internet searches, sales literature and word of mouth. The UK project co-ordinator organised a supplier seminar to further interest in the opportunity. LEDs are a rapidly maturing market with lots of new entrants. Some suppliers were inexperienced when dealing with the public sector procurement rules. All suppliers were interested in our opportunity though some prioritised simple quick orders over participating in a tendering process.

3.5 Activity E – engaging the market

When engaging the market it became apparent that the market was maturing rapidly and new developments were coming on stream all the time. However there was also a wide variety in the quality of supply. There are no agreed quality standards for LED lighting in the UK or Europe and this has led to some suppliers being poor quality and even dangerous; failing to meet minimum health and safety standards. Due to this there is a need to ensure the performance of all products is adequate and measured in a consistent way to allow fair comparison. After consulting with external expertise a number of performance characteristics will be considered in the tender:

- How is the life of the products defined? This should be stated both in terms of lights loss (performance over time) and physical failures.
- What is the lumen depreciation of the lights?
- What is the colour rendering index?
- How stable is the colour temperature?
- What ambient temperature is the luminaire performance based on?
- What is the photometric distribution
- What is the driver current?
- What is the power factor?

In addition to this we have also installed a number of 8W cool white LED tubes on a trial basis in two offices within the Bromley Civic Centre. These LEDs were retrofitted into existing luminaires and replaced 18W T8 fluorescent tubes on a like for like basis. The luminaires needed to be rewired to have the ballast removed. This was an unusual procedure and took the electrician an afternoon to complete one office. However by replacing an 18W tube with an 8W tube the offices now use 50% less electricity to light. The new lights were also well received by the staff affected who enjoyed being part of the trial.

3.6 Activity F – tendering and contracting

ESPO will be tendering for a framework for sustainable lighting suppliers in July 2011. This is proposed to be an open tender with strict pass/fail quality factors. Competitive dialogue was considered however given the number of SMEs in the market, their unfamiliarity with public sector procurement and the accelerated development of LEDs this was considered unnecessary. Whilst it would be preferable to use outcomes and output specifications, there will have to be a level of technical input specification as the quality of supply is so variable.

4. Life-cycle costing and CO_2 emissions

Describe the outcomes of using the SMART SPP LCC-CO_2 Tool and the results from the process. Include information on the financial results and also note if/how the tender evaluation sheet was used.

Bromley has made use of the tool as a comparator on a recent tender for multifunctional devices (combined printers, photocopiers, scanners and fax machines). Bromley found the tool technically complex to use and that it was difficult to source the information required from the suppliers. The tool was shown to smaller suppliers who also said they would not be able to provide some of the information required, but that they could demonstrate energy saving and payback for their products without using the tool. The tool does provides scope for allowing the different elements of the tender process and options appraisal to be completed and evaluated on a like for like basis, which the different calculation techniques used by the different suppliers did not.

5. Conclusions and lessons learnt

Procurers need a strong risk appetite when sourcing cutting edge innovative solutions; emerging technologies are by their nature unproven and under development.

At present there are no defined quality marks for LED lights and some imported supplies would not meet European safety standards.

The supply market for emerging technologies presents risk when compared to purchasing established products; smaller suppliers can be more responsive and innovative, however they can also cease trading at short notice and may not be unable to honour guarantees or maintain technical standards.

A multi-disciplinary team with engineering expertise is vital when assessing product performance and life-cycle costs. The knowledge gained from early market engagement and external advice was crucial when discussing the technical aspects of lighting.

Beware of resistance and conflicting messages on the merits of emerging technologies; some colleagues can take a great deal of persuasion to look beyond conventional solutions. We discovered that there is wide variation in quality; this was used to resist implementing LEDs. However this is not a reason to avoid implementing innovative solutions, but it is reason to research the market thoroughly and specify high quality products.

For LED installations a design and fit approach is preferable to supply only and retro-fitting into existing luminaires. The characteristics of the light cast by LEDs differs from fluorescent tubes, fixing LEDs into existing luminaires can compromise the functional performance of the LED resulting in different light temperatures, unwanted shadows and vacant fittings where LEDs are not required but fluorescent tubes were. Conventional fluorescent tube luminaires also need adjusting by an

electrician to accommodate LEDs, if luminaires are not adjusted correctly the LEDs can be compromised and will consume more electricity and burn out quicker, negating the cost savings and environmental benefits. These difficulties can be overcome but it is preferable to start afresh using a planned lighting design.

Challenging a supplier to achieve a certain level of energy reduction, light level and budget can be a stronger drive for innovation than suppliers working with the confines of a strict input specification.

6. Outlook

Further LED installations throughout the Bromley estate are planned, both internal and external. The borough will also be looking at street lighting applications. Bromley currently spends £1.2 million each year on street lighting, there is scope for significant energy and cost saving in this area.

Beyond LEDs the borough is also looking to take advantage of the new feed-in electricity tariffs to install solar photovoltaic arrays at the Civic Centre site. Feed in tariffs allow on site micro-generation technologies to pass surplus generation back to the grid and claim payment for the electricity. Bromley is engaging in pre-procurement discussions with suppliers to understand the technology, market, business case and scope for installation.

7. Contact

Dave Starling, Head of Procurement, London Borough of Bromley,
dave.starling@bromley.gov.uk

Municipality of Cascais

1. Summary

The Municipal Council of Cascais, the Cascais Energy Agency and the National Laboratory for Energy and Geology (LNEG) have put the SMART SPP methodology into practice in purchasing energy-efficient public lighting, focusing on techniques to involve the market prior to the call for tenders (in the pre-procurement phase).

This approach allowed market-tailored technical specifications to be developed, which avoided complicated tendering procedures and therefore saved time and resources.

2. Background

Cascais Municipality is located in the district of Lisbon, on the eastern estuary of the river Tagus. It consists of six parishes (Cascais, Estoril, Parede, Carcavelos, São Domingos de Rana and Alcabideche), with around 190,000 inhabitants. Since 2007, the authority has had a municipal energy agency – *Cascais Energia* – and has signed the Covenant of Mayors. Within this framework, various initiatives and projects are taking place with the aim of boosting energy efficiency and the use of renewable energy, while reducing CO_2 emissions within the municipality, which includes the SMART SPP project.

3. Experiences with the SMART SPP approach to driving sustainable innovation

3.1 Activity A – identifing appropriate product groups

Meetings were held with technicians from departments of the Cascais Municipal Council and Cascais energy Agency, in order to identify the innovative products of greatest interest, taking into account that they would be the subject of a public procurement contract during the three year project. Energy efficient outdoor public lighting emerged as a priority product as the Municipality planned to replace around 40 lamps with high-pressure sodium vapour (HPS) technology in the area around the Pedra do Sal Environmental Centre. This space, which raises awareness on the subject of energy efficiency and renewable energy concepts, already had a pilot LED technology system in place.

3.2 Activity B – setting up a project team

With the aim of ensuring the availability of the various technical skills needed to develop the procurement process, a multidisciplinary team was set up comprising the Cascais Energy Agency, Cascais Urban Services Company, the Electricity and Public Lighting Division, Procurement Division, Transport and Mechanics Division and the Coastal Management Division, as well as the LNEG.

The role of the LNEG was to guide and provide technical assistance to Cascais Municipality in applying the methodology developed in the SMART SPP project

to promote innovation and energy efficiency through purchasing, particularly in phases involving the market and those developing the purchasing criteria.

This team held regular meetings from October 2009 to July 2011, enabling knowledge to be actively exchanged, thus enriching the final outcome of the project.

3.3 Activity C – defining your needs

Defining the needs that the purchase must fulfil, performance requirements and possible solutions

Once the decision was made to purchase energy-efficient outdoor public lighting to replace around 40 lamps at the Pedra do Sal Environmental Centre, a market study was performed with the aim of:

1. Identifying existing technologies on the market and other technologies which were about to be introduced onto the market, their main features, advantages and disadvantages;
2. Identifying suppliers of these technologies.

LED technology appeared to be a promising, albeit emerging solution on the (outdoor) public lighting market.

Important issues to include in the purchasing process were also defined:

- It was decided to replace the HPS lamps, keeping the existing columns;
- A light control system was included in the call for tenders, so as to allow flux to be regulated and thus boost energy savings;
- Suppliers were asked to carry out a photometric study, taking into account existing conditions (the columns would not be replaced and therefore the distances between the lamps would already be defined) so as to present the best solution, both in terms of photometric performance and in terms of energy performance.

An initial version of the technical and energy efficiency criteria to be included in the tender procedure was established in this phase.

3.4 Activity D – informing the market

Supplier/buyers seminar

In order to bring together suppliers and buyers, an energy efficient lighting seminar was organised, focusing on LED technology for public lighting. In this seminar, the SMART SPP approach was presented and the aim was:

- To convey to potential suppliers information on purchasing intentions and the generic initial requirements
- Increase buyer knowledge on energy-efficient lighting and LED public lighting through the various suppliers presenting their products, followed by a moderated debate.

The suppliers also displayed their products.

3.5 Activity E – consulting the market

Informal meetings with suppliers and collecting data on the products

The Cascais Energy Agency invited eleven LED lamp suppliers to take part in informal and individual meetings with the aim of:

- Learning about the features of the products available on the market
- Informing suppliers about the features of the lamps to be purchased, reflected in the technical and energy-efficiency criteria defined in C;
- Receiving comments from suppliers on the technical and energy-efficiency criteria;
- Gathering technical and energy-efficiency data, and data on product life-cycle costs.

All suppliers identified in the market investigation process, in previous contracts with the Cascais Energy Agency and Cascais Municipal Council and on their own initiative were invited to take part, having access to the same information. The informal involvement process was carried out in a phase prior to the tender process.

Questionnaires were sent out to potential suppliers in order to prepare for the meetings. The aim of the questionnaire was to gather technical and energy-efficiency data, and data on product life-cycle costs, as well as to validate these criteria for the market.

During the meetings the suppliers raised questions on the criteria used as well as the proposed performance values, which allowed for a better understanding of the most important questions related to this type of technology. These debates undoubtedly helped establish criteria to be included in the specifications, and allowed the public authority to confirm that the market is able to offer suitable solutions.

3.6 Activity F – tendering and contracting

The market involvement phase allowed the abovementioned technical specifications to be improved. Research was also carried out into the criteria used in similar procurement processes around the world.

The criteria developed included energy-efficiency (luminous efficiency) issues, equipment durability (useful lifespan, mechanical resistance and corrosion), as well as issues relating to the photometric performance of the overall solution (colour temperature, light distribution, etc.), using the standard DIN EN 13201 – Road Lighting as a reference. Other issues to be considered in the assessment were the guarantee conditions and integrating the lamps into the site.

For future activities, the decision to extend the procurement process to other streets and sites of tourist interest within the municipality. Given the high purchase cost involved and the fact that this is emerging technology, a restricted call for expressions of interest is to be used. The award criterion will be that of the most economically advantageous bids, and the costs throughout the product life-cycle will be taken into consideration in assessing the bids.

3.7 Activity G – tender process for complex projects

A standard tendering approach was used in this case. Thanks to the early market engagement it was not necessary to use these tools, and this led to resources being saved since competitive dialogue and pre-commercial procurement are lengthy processes which take up a great deal of time and resources.

4. Life-cycle costing and CO_2 emissions

The data gathered in this case study was used to test the LCC-CO_2 tool. Three of the LED lamp solutions available on the market for lighting streets were compared, based on the data obtained in Activity C. Since this involves new technology not all of the data needed for this assessment is available, particularly in relation to use and end-of-life. This test allowed an understanding how the tools works, as well as how to identify their main limitations, and it was very useful in perfecting them.

5. Conclusions and lessons learnt

- Involving the market allowed the development of more rigorous criteria due to the suppliers' comments, as well as saving resources by avoiding more complex tender processes;
- This experience will allow the development of performance specifications applicable to lighting technology in general;
- Having a multidisciplinary team was fundamental in involving the market and in developing procurement criteria, leading to a deeper knowledge of the issues studied;
- Suppliers were made aware of the opportunities for innovation in the public procurement processes and of the need to communicate the performance of their products by means of environmental labelling;
- LED public lighting is still not used a great deal on the site, meaning there has not yet been enough experience to gather data in relation to life-cycle costs;
- SMART SPP methodology for innovation in public procurements could be replicated in other procurement processes;
- The pilot installation demonstrated that energy saving of around 30% could be achieved by simply replacing conventional lighting with LED.

6. Outlook

This experience meant it was possible to verify in practice that there are advantages in the early involvement of suppliers in a phase prior to the call for tenders, as it enhances the way technical and environmental features are refined.

7. Contact

Paula Trindade, Laboratório Nacional de Energia e Geologia (LNEG),
paula.trindade@lneg.pt

Eastern Shires Purchasing Organisation (ESPO)

1. Summary

ESPO acting on behalf of Cambridge City Council (CCC) undertook a procurement in spring 2011 for the supply and installation of LED lighting to the Grand Arcade Annex Car Park in Cambridge. CCC's budget for this procurement was £120,000.

The three 'technologies in focus' of Smart SPP are:

1. Lighting systems (e.g. LED lighting, OLED lighting, lighting tubes)
2. Highly energy efficient (electric) vehicles (passengers and duty cars)
3. Construction services (e.g. heating/cooling systems using renewable energy sources)

This procurement has an obvious link to the fist technology listed here.

2. Background

Cambridge City Council operates several multi-storey car park sites in and around Cambridge including the Grand Arcade car park. The Grand Arcade car park facility is situated in the city centre and adjoins the Grand Arcade shopping complex. The annexed car park element forms part of an overall car park provision and is an existing below ground multi-level facility that consists of four parking areas/levels which are noted -1, -2, -3 and -4, with level -1 being situated at street level. The car park operates 24 hours a day, seven days a week, 365 days a year.

In line with CCC's environmental strategies the annexe car park site was reviewed and it was felt that significant energy efficiencies could be achieved with the implementation of the latest LED lighting technology. The car park was lit via 200+ multiple self contained ceiling mounted luminaires. Each luminaire lamp was of the metal halide type and rated at 150W.

CCC employed the services of an Electrical Design Consultant to review and document the lighting system that was in place and draw up a specification to replace with LED lighting technology.

3. Experiences with the SMART SPP approach to driving sustainable innovation

3.1 Activity A – identifying appropriate product groups

The CCC's Executive Councillor for Climate Change and Growth investigated other LED street lighting projects in neighbouring councils and requested that CCC install LED lights into one of their car parks. The main rationale behind this decision was to save electricity and help to reduce CCC's carbon footprint.

In the summer of 2008 enquiries were conducted with lighting design engineers in order to trial some LED lights in a separate car park and zebra crossing. These first trial lights were unsuccessful – the amount of light the sample LED lights emitted was not sufficient.

Further research was carried out online and through local trade associations to identify other LED lighting suppliers and installers. Two companies were identified; one that supplied replacement LED lights and one that supplied retrofit LED lights.

The Grand Arcade Annex car park was then identified as the most suitable car park to install LED lights because it had existing bright lights (it is an underground car park, thus little/no natural light) which were expensive to run in both electricity and spare parts. The indicative payback calculation looked very favourable for installing and running LED lights. Due to the favourable figures and councillor support CCC were able to secure the funding needed for the project from the climate change fund run by the City Council. Two sample LED lights – one retrofit and one remove/replace – were installed in this car park. It was felt at the time that either of these two samples could offer a successful and cost effective alternative solution to the existing lighting system.

3.2 Activity B – setting up a project team

The team that worked on this project are:

- Project Sponsor, Kevin Willsher, Assistant Director, ESPO
- Kate Shaw, Interim Commercial Manager, ESPO
- Martin Lawson, Buyer, ESPO
- Simon Guy, Electrical Design Consultant, ITserV Design
- Julie Edwards, Administration and Projects Coordinator, Parking Services, Cambridge City Council
- Douglas Streater, Cambridge City Council
- John Bridgwater, Procurement Officer, Cambridge City Council
- Sean Cleary, Operations Manager, Specialist Services, Environmental Department, Cambridge City Council

3.3 Activity C – defining your needs

CCC needed to develop a specification that detailed regulations and standards, an outline of the electrical systems required, comprehensive information on the lights that were currently in situ, an overview of two sample LED lights that had already been installed (one retrofit and one replacement), CAD drawing of the existing car park luminaire layout and light levels, design information requirements and health and safety requirements.

CCC realised very early on in the process that they did not have the specific knowledge of this product area to draw up a specification that detailed all this information. This was the first time CCC had procured this type of technology. Hence the specification that was included in the tender document was produced by an Electrical Design Consultant in December 2010 (an output and performance driven specification).

3.4 Activity D – informing the market

As stated in 3.1 initial enquiries were made with a range of electrical companies. Coupled with this online research was also carried out and two companies were identified to fit samples lights in the designated car park. These fittings were made without prejudice.

In order to gauge further interest in this project and to provide the project team with an understanding of the supply market of LED lighting technology CCC placed an advert in February 2010 on the Improvement East website (see below).

CAMBRIDGE CITY COUNCIL SEEKS PARTNERS FOR INNOVATIVE CAR PARK LIGHTING PROJECT

Cambridge City Council are in the process of producing a specification for the upgrade of all of their existing car parking facilities to LED lighting systems. This solution offers a range of potential benefits, including much lower energy use, lower maintenance and considerably reduced whole life costs. The council are not aware of this system being implemented anywhere else in the region as yet and hope to act as a pilot project, demonstrating both the cost and environmental benefits for others who are considering this type of system.

Cambridge City Council is also seeking potential partners who may be interested in a collaborative procurement exercise for LED lighting systems. If there is sufficient interest, **Improvement East** will consider providing funding support to set up a regional framework, subject to demand. If you are interested in finding out more about this project, or wish to register your interest in collaborating, then please contact colleagues at Cambridge City by e-mail in the first instance.

Operational – *Julie Edwards*, Julie.edwards@cambridge.gov.uk
Procurement – *John Bridgwater*, John.Bridgwater@cambridge.gov.uk

In summer 2010 CCC approached ESPO to undertake a procurement exercise. ESPO placed formal adverts on Contracts Finder website, ESPO's website and Contrax Weekly. CCC also used the ESPO advert on their website.

Prior to this ESPO placed a PIN in April 2009 for "Energy efficient products/ equipment based on innovative low carbon emission technologies and integrated solutions". This PIN put the three technologies in focus, the first of which provided details on LED's.

3.5 Activity E – engaging the market

All companies that responded to ESPO's PIN (April 2009), CCC's first advertisement (February 2010) and the final ESPO advert (April 2011) were logged and each was sent an Invitation to Tender document.

As part of the tender exercise ESPO and CCC agreed it would be beneficial to organise an open day with all potential suppliers/installers. 13 companies attended this open day and it gave them all a good opportunity to explore the car park and analyse the two sample lights that had been installed. It also gave them a good opportunity to ask questions. All questions that were asked at the open day were logged and the questions plus full answers were circulated to all bidders.

3.6 Activity F – tendering and contracting

An open tender route was taken. The rationale for this was:

- It allows for the assessment of bidders against selection criteria such as track record, financial stability, policies and procedures, etc. However instead of assessing these factors in advance of inviting tenders, they are assessed as 'qualifying criteria' within the tender evaluation process.
- Holding the open day helped in limiting the number of bids to only those that have a viable solution.
- The number of firms in the market place wishing to bid for this work was unknown and an open tender allowed the Council to receive bids from all organisations with an LED lighting solution – be it retrofit, remove/replace or other.

Tenderers that passed the selection criteria were evaluated against the award criteria, this was Price (60%) and Quality (40%). Price was scored on a sliding scale published in the tender document. Quality was broken down into four key areas: LED lights, Installation, Staff Support and Contract Management.

3.1 Activity G – tendering for complex projects

This is incorporated into Activity F for this particular project which, although requiring new technology, is not that complex.

4. Life-cycle costing and CO_2 emissions

The complexity of the tool coupled with the requirement for suppliers to provide data on emerging technologies raised questions over whether the tool could be employed in this procurement. If it was employed further questions were raised over the validity of the data it would produce (bad data in/bad data out), specifically the calculation of embedded emissions. ESPO had consulted with the IDeA (Local Government Improvement and Development) about use of the tool in UK procurement exercises and the advice provided was not conclusive. It was decided therefore that the SMART SPP LCC-CO_2 Tool would not be used.

ESPO included in the tender award criteria:

- Price
- Recycling and re-use
- Energy savings (including energy usage in watts and energy savings (%) compared with the traditional style lights)
- Robustness
- Warranty period

5. Conclusions and lessons learned

Strengths of the approach taken:

- The six/seven steps provide a structured and logical path to follow.
- Early market engagement provides a better knowledge for the procurement team of what is available on the market.
- Not disclosing the final budget for the project. A sliding scale was used in the tender document for the price scoring.
- The hiring of a consultant to draft the specification. The LED lighting procured in this project was very new and innovative. The consultant was the only person in the procurement team with the technical knowledge to draft a specification.
- Using the open tender route. The contracting authority required a solution as quickly as possible and the open route reduced procurement timescales more than a restrictive approach would have.
- Interviewing the shortlisted bidders. This provided a good opportunity to see, handle and test the LED lights. It was also a useful process to moderate each bidder's scores and decide the contractor CCC would use for this project.

Weaknesses of the approach taken:

- The selection criteria used in the contract was too restrictive. In particular the robust financial checks used by CCC ruled out two very competitive bids.

- Too much weighting was put on price (60%). CCC was very worried about bids coming in over budget and/or very close to their budget thus it was decided to put more emphasis on the price score. Only one of the eight bids submitted came in over budget thus this did not turn out to be a major issue.

Overall the approach and tendering used was the correct route. The company awarded the contract supply a good quality LED lighting solution, a credible installation service and a competitive price. This price (£77,100) offers CCC a significant saving in relation to the budget they had for this project (£120,000) and a tentative quote they had requested very early on in the process (£110,000).

6. Outlook

Dependent upon the success of this installation and funding available for future projects CCC may consider looking at replacing other city centre car parks with an LED lighting solution.

ESPO working in partnership with Pro5 and other UK procurement bodies will establish a new Framework Contract that will be available for the entire UK public sector to use. We will also consult with the other UK Partners, Bromley and Global to Local, to ensure a joined up approach.

7. Contact

Kevin Willsher, Assistant Director, ESPO, k.willsher@espo.org
Martin Lawson, ESPO, m.lawson@espo.org

Municipality of Kolding

1. Summary

In conjunction with Kolding Municipality's vision and objectives in the energy and climate field, work is ongoing to make a strong contribution through different projects. One of the projects deals with cooperation with manufacturers in the pre-procurement phase: SMART SPP.

In the project, Kolding Municipality chose to focus on energy-efficient LED replacement light sources to replace existing incandescent bulbs, halogen bulbs and halogen spotlights. It is expected that using LED technology will lead to light sources that are considerably more energy-efficient than the existing ones.

Kolding Kommune

2. Background

With its 8,000 employees, Kolding Municipality is the largest business in the Municipality. Kolding Municipality wants to be one of Denmark's leading municipalities within the climate and energy field by the year 2021.

Energy Kolding is the overall initiative that will capture, develop, organise and implement innovative ideas and projects in the field. Within Energy Kolding, citizens and private and public businesses, organisations and research and training institutions will cooperate on the reduction of energy consumption and put into practice initiatives whose objective is to fulfil the following overall objective: "CO_2 *emissions must be reduced by 75% by 2021 compared to 1990, measured per Kolding Municipality inhabitant*".

1997 saw the adoption of the Municipality's first energy action plan, which contained ambitious goals for the period 1998–2006. The ambitions of the goals were certainly not unachievable, however: the goals were already achieved two years before the end of the plan and the CO_2 reduction markedly exceeded the desired goal as early as 2006. The Municipality's Energy Action Plan II was adopted in 2007 and its objective was to reduce electricity consumption by 8% during 2008-2015. Kolding Municipality also entered into a 'curve breaker agreement' with the Electricity Savings Fund, which undertook to reduce electricity consumption by 2% per year until 2010.

The SMART SPP project with the promotion of new, innovative, energy-efficient products is very well suited to the Municipality's overall goals.

3. Experiences from the SMART SPP approach to driving sustainable innovation

3.1 Activity A – identifying appropriate product groups

In Kolding Municipality, lighting constitutes an important part of the overall energy consumption. It was therefore obvious to look at whether the lighting could be made more energy efficient. In the first round, the focus was on energy-efficient light sources to replace the fluorescent tubes hanging in the Municipality's many institutions. LED light sources could constitute an obvious option as a replacement, since the technology is already in existence.

3.2 Activity B – setting up a project team

A project group was formed consisting of two employees, the Municipality's energy coordinator and an employee who is responsible for green acquisitions. A project employee was appointed to assist the project group with the project funds. It quickly became apparent that the project group that was formed did not have the requisite technical knowledge of LED light sources and their capacities, so the Danish Lighting Centre was hired to assist with the project by providing technical competence in lighting. A follow-up group consisting of relevant leaders in the Municipality's organisation was also formed.

3.3 Activity C – defining your needs

The Danish Lighting Centre was consulted on the choice of product group, and they were able to state that the development of efficient LED fluorescent tubes was not imminent. They recommended instead a focus on LED light sources as a replacement for traditional incandescent bulbs, halogen bulbs and halogen spotlights, since this was already a tried and tested technology where there was rapid development in the direction of more energy-efficient light sources.

A number of functional requirements for the LED light sources were developed:

- There must be a significant reduction in CO_2 emissions and in energy costs, that is, they must be significantly more energy-efficient than the current ones
- They must be able to directly replace the existing light sources without, for example, changing installations
- They must emit the same light as the existing light sources with regard to light colour and light strength and the dissemination of the light.

In cooperation with the Danish Lighting Centre, we drew up the technical specifications for the desired light sources, such as the required lifetime, energy efficiency, colour temperature and light quality (RA value). The Danish Lighting Centre also helped us to work out which manufacturers and suppliers were available on the market.

3.4 Activity D – informing the market

In order to create awareness of the project and to inform the potential suppliers of the forthcoming invitation to tender for innovative, energy-efficient LED replacement light sources, they were invited to an information meeting. The invitation was sent to the market players identified by the Danish Lighting Centre. Information on the project and the meeting was also placed on the Municipality's website. This provided contact with several market players.

3.5 Activity E – engaging the market

The information meeting was held ten months before the actual invitation to tender. At the meeting, information was provided on the project and the forthcoming invitation to tender. The technical specifications were presented to the developers, manufacturers and suppliers who turned up. The response from those participating at the meeting was that the specifications were not particularly innovative. They could already be accommodated by almost all those on the market. The message from the market was that the technical specifications should be made more stringent if the ambition was to advance the introduction of energy-efficient and innovative technologies on the market.

New and more stringent technical specifications were drawn up. These are shown in Annex 4 (Table 4). We then invited people to a new meeting at which the new

specifications were presented. Further dialogue also took place with the market about options and restrictions where LED and the forthcoming invitation to tender were concerned. The market's feedback was that the new specifications were innovative. The market also indicated that there are no standards in existence for matters such as the calculation of the lifetime, etc. which can be referred to, since this is a new technology. They requested that the technical specifications and allocation criteria in the invitation to tender were very specific.

3.6 Activity F – tendering and contracting

In order to make Kolding a more attractive as a collaboration partner for the market, other municipalities were invited to join the invitation to tender. This would increase the purchase volume and ensure a greater turnover for the chosen supplier. A number of municipalities were invited to an information meeting about the project and to participate in the invitation to tender. The invitation was sent to the municipalities in Kolding's procurement cooperation group ('12 By Gruppens Indkøbscentral') plus other municipalities with ambitious targets in the energy and climate field. Six municipalities from the procurement cooperation chose to participate in the invitation to tender.

An open invitation procedure to tender for the economically most advantageous tender was selected as this was the tender model that best suited the timeframe for the SMART SPP project. This procedure ensured competition on the market to go beyond the minimum technical specifications, and supply the most energy-efficient tender. The evaluation criteria are shown in Annex 4 (Table 5). In order to make it more attractive for small and medium-sized businesses to submit a tender, the invitation to tender was divided into three sub-areas: low-voltage bulbs, 230 Volt halogen bulbs and 230 volt bulbs.

Two pilot projects were incorporated into the invitation to tender with full-scale replacement of existing light sources. This was performed in order to test out the technology, to use the results obtained to calculate the energy saving potential and as an incentive to attract interested suppliers.

The invitation to tender material included a spreadsheet indicating all of the light sources for which replacement light sources were required. The spreadsheet showed the sales figures for the traditional light sources. This spreadsheet acted as the tender list. The spreadsheet with the tender list was supplemented with a spreadsheet on which the tenderers could provide details of the lifetime, lumen output, wattage and RA value of their tendered light sources for use during the evaluation and allocation. These details were to be provided exclusively for the light sources that represented 60% of the sales. The remaining 40% consisted of many light sources with a very small turnover. The assessment was that it would be too costly for the tenderers to state the desired values for all light sources.

Midway through the invitation to tender period, potential bidders were invited to a questions and answers meeting at which they were able to ask additional questions about the invitation to tender material. There was also an opportunity to submit questions in writing. All questions and answers were placed on the municipality's website and were also sent to all interested parties.

4. Life-cycle costing and CO_2 emissions

The SMART SPP LCC CO_2 tool was drawn up to compare the offers submitted. The invitation to tender included more than 200 light sources for which we required tenders for replacement light sources. The tool cannot handle values for 200 products per tender. In order to be able to obtain the values that were to be used in the tool, it was necessary to set up an account in order to obtain values per tender.

Not all light sources have equal sales, so the accounts were worked out on the basis of weighted values. An example of a weighted lifetime calculation is shown in Annex 4 (Table 6)

The tool gives the procurement price per item. An average price was calculated based on the individual supplier's tender prices. The discount rate and the inflation rate were also found on Danske Nationalbank's website and Statistics Denmark's website. Prices for electricity consumption were obtained from the Municipality's electricity supplier.

The SMART SPP tool was used to calculate life-cycle expenses and CO_2 emissions. When allocating points, Kolding prepared their own table, which is shown as Annex 4 (Table 7). Points from here were keyed into the tool. The tool indicated which tender had the lowest lifetime expense and identified the economically most advantageous tenders in order of priority.

5. Conclusions and lessons learnt

The result from the tool showed that the tender with the lowest lifetime expense was not the economically most advantageous tender when taking into consideration the other allocation criteria, energy efficiency and light quality. It was also shown that it is important to have determined in advance how long the planning horizon should be. Too short a planning horizon cannot adequately take into account lifetime differences and cannot therefore indicate how frequently a light source has to be replaced.

Kolding's experiences demonstrate that when working with new technologies, you are dealing typically with a market that is not used to submitting tenders for public invitations to tender. The market is typically smaller businesses. The questions received regarding the invitation to tender material showed that the invitation to tender material was difficult to understand. It was also evident, after the contract had been allocated, that many tenderers did not understand the use of allocation criteria and the allocation of points.

It can therefore be recommended that the invitation to tender material should clearly show the way in which evaluation and allocation of points will take place, including which allocation table will be used. It can also be recommended that a meeting should be held with interested tenderers at which the invitation to tender material, the use of a tenders list and the evaluation criteria are reviewed.

For new technologies, there are neither ISO nor EN standards that can be referred to in the requirements specification or for the evaluation criteria. It is therefore important for the invitation to tender material to clearly show how the desired values will be stated, e.g. that the stated details apply to the bulb and not to the individual LED unit, where the surrounding temperature is 25°C and that a lifetime (L70) means the expected lifetime where the emission of light constitutes 70% of the bulb's lumen output. The dialogue with the market can provide an indication of how the individual values can be expressed.

The light quality (RA value) was weighted highly (20%) to ensure that tenders for light sources with a low price and poor quality were not received. Following the tender submission period, it became evident that there is no great variation in the RA value of the individual light sources. The weighted RA values for each tender varied between 80 and 86. This led to some inappropriate point intervals. Weighting the RA value so highly cannot therefore be recommended.

Before drawing up the invitation to tender material, not enough had been found out about the tool and its possibilities, including exactly which values should be keyed into the tool. This meant that it then became necessary to have several accounts in

order to obtain the desired values for the tool. A more thorough examination of the tool would have given the opportunity to set up the evaluation criteria in a way that used the tool in a more goal-orientated way.

6. Outlook

Kolding Municipality is participating in an environmental cooperation called Green Cities. In this cooperation, they are currently developing ideas for new projects. One of these is a project in which the SMART SPP progress method described in the Guide, "Encouraging energy-efficient innovation through procurement", will be used. Kolding is currently in the process of finding a suitable product area, but this will probably concern products in which the content of chemical products is problematic for both the work environment and the external environment.

7. Contact

Bente Møller Jessen, Municipality of Kolding, bmje@kolding.dk

Annex

Annex 1 – London Borough of Bromley

Table 1: List of performance-based specifications used

- *Why lighting-high usage ease to implement quick pay back*
- *Market near readiness*
- *Current situation standard fluorescent T5 tubes*
- *Defining needs*
- *Problematic*
- *Variable quality*
- *Lack of defined standards*
- *Stability of suppliers*
- *Suppliers approach*
- *Design and fit versus off the shelf*

Annex 2 – Municipality of Cascais

Table 2: Main performance specifications for purchasing LED public lighting.

Requirement	*Specification*
Luminous efficiency (light source + electronic and electrical components + optics)	*≥ 80 lumen/W*
Overall useful lifespan (MTTF)	*≥ 65 000 hours*
Luminous flux depreciation at the end of the useful life of the lamp (L70)	*Max. 30 %*
Protection index	*≥ IP66*
Mechanical resistance of equipment	*≥ IK08*
Total harmony distortion (THD)	*≤ 20 %*
Power factor	*> 90 %*
Colour temperature	*Max. 4500 K*
Luminance	*min. 10 lux*
Access to components (in case of fault)	*Easy access to components and these can be replaced without difficulty.*
Luminous flux regulation capacity of lamp group	*Depending on luminosity available and programming*
Control and monitoring system	*Possibility of future expansion*

Annex 3 – Eastern Shires Purchasing Organisation (ESPO)

Table 3: List of performance-based specifications used in the Cambridge City Council Car Park Lighting Project

Regulations and Standards	
• *BS7671 (2008) IEE Regulations including all Guidance Notes* • *BS5266 Emergency Lighting* • *CIBSE (SLL) Lighting Guide* • *The Electricity Supply Regulations.* • *Health & Safety at Work Act* • *Health and Safety at Work Executive Recommendations* • *CDM Regulations* • *COSHH Regulations* • *Building Regulations (as applicable)* • *Local Bye-Laws and Regulations* • *Local Authority Regulations and Approvals* • *BS EN Product Specifications* • *British Standard Codes of Practice* • *CE Conformity*	
Design Information Requirements	
• *Input Voltage* • *Input Frequency* • *IP Rating* • *Operating Temperature* • *Total Unit Power Consumption* • *Lumen Output* • *LED Colour Temperature* • *LED Useable Lifespan* • *General Product Warranty*	*110V to 230V AC (+/- 10%)* *50Hz* *Minimum IP54* *Minimum -20'C to +50'C* *Max. 60w* *Min. 3500 Lm* *4000 to 4500 Kelvin (Neutral or Cool White)* *Min. 50,000hrs or 5.7yrs (Based upon max. 30% lumen depreciation)* *Min. 2yrs, 5 years expected*

Annex 4: Municipality of Kolding

Table 4: Technical specification

Product group	Energy efficiency (Lumen/Watt)	Lifetime L70 (timer)	Colour reproduction (RA index)	Colour temperature (degrees Kelvin)
Indoor general lighting	50	20 000	80	2700-3000
Indoor effect lighting	40	20 000	80	2700-3000
Outdoor lighting	50	20 000	75	3000-4000

Table 5: Award criteria

Sub-criterion	Weighting in %
Lifetime price, which will include an evaluation of • Procurement price • Lifetime • Operating expenses	55% divided by 35% 35% 30%
Energy efficiency (Lumen/Watt)	25%
Light quality (RA value)	20%

Table 6: Example of the calculation of weighted value for use in the tool

The example is the lifetime for the sub-area of low-voltage bulbs.

Replacement light source for	W	Base	Weighted number	Lifetime Hours (L70)	Weighted lifetime
10w 12v G4 clear or matt	10	G4	34	20000	680000
20w 12v GU5.3 Titan Ø50	20	GU5	24	35000	840000
20w 12v Ø50	20	G4	15	40000	600000
20w 12v G4 clear	20	GU5,3	15	35000	525000
35w 12v GU5,3 Titan Ø50	35	GU5	12	35000	420000
TOTAL			**100**		**3065000**
Weighted value					**30650**

The "weighted number" column is calculated on the basis of the turnover of the relevant traditional light source converted into hundredths.

The lifetime is the supplier's stated lifetime for his tendered replacement light sources.

The weighted lifetime column is obtained by: Weighted lifetime = (weighted number x lifetime).

The bottom row, "weighted value", which is marked in green, is obtained as follows: Weighted value = (sum weighted lifetime/ sum weighted number). This weighted value is used in the LCC-CO_2 tool.

Table 7: Evaluation and allocation

Evaluation	Supp, 1	Supp, 2	Supp, 3	Supp, 4	Supp, 5	Supp, 6	Supp, 7	Supp, 8
Procurement price	604,434	775,304	770,236	535,077	675,316	464,766	517,291	361,102
Weighted Lifetime	25,400	27,650	30,550	27,650	22,400	37,050	34,250	37,450
Weighted Watts	4.000	4.204	3.700	3.604	4.510	3.428	2.850	3.735
Operating costs (25 years)	1,369,635	1,439,487	1,266,913	1,234,041	1,544,264	1,173,778	975,865	1,278,897
Weighted Lm/W	50	66	76	47	40	66	52	60
Weighted RA	82	85	80	85	81	82	82	83

Conditions for the calculation of operating expenses	
Number of bulbs	5,115
number of hours per year	1,880
Electricity price (DKK)	0.3965
Distribution (DKK)	1.0278
Total electricity price (DKK per kWh)	1.4243

Formula for the calculation of operating expenses

Operating expense = ((weighted Watts x(number of bulbs x hours per day x days per week x weeks per year)/1000)x total electricity price)

Allocation of points	Supp. 1	Supp. 2	Supp. 3	Supp. 4	Supp. 5	Supp. 6	Supp. 7	Supp. 8	Max. point
Procurement price	11.50	8.97	9.02	12.99	10.29	14.96	13.44	19.25	19.25
Weighted Lifetime	5.96	8.44	11.64	8.44	2.65	18.81	15.72	19.25	19.25
Operating costs	11.76	11.19	12.71	13.05	10.43	13.72	16.50	12.59	16.50
Lm/W	6.94	18.06	25.00	4.86	0.00	18.06	8.33	13.89	25.00
RA	8.00	20.00	0.00	20.00	4.00	8.00	8.00	12.00	20.00
Total	44.16	66.65	58.37	59.34	27.37	73.54	61.99	76.98	100.00

Formulae for the calculation of points for lifetime, Lm/W and RA

The highest value gives the maximum points. If the value is equal to the minimum requirement, 0 points are given.

Points are allocated according to the formula for a linear function y = ax+b, where x gives the number of points, y gives the lifetime, Lm/W or RA, b = minimum requirement, and a = (best value – minimum requirement)/(max. point – zero)

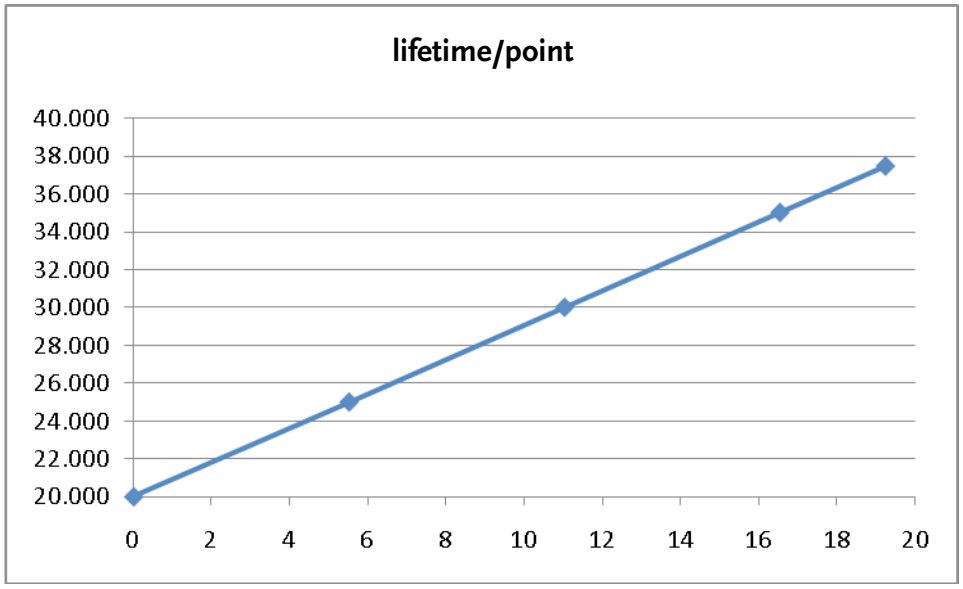
Point = (y – b)/a

The relationship between the lifetime and the point allocation is shown in the figure below.

Formulae for the calculation of points for procurement and operation

Point = max point x (lowest value)/tenderer value)

Figure 1: Relationship between lifetime and point allocation calculated according to the formula above.



SMART SPP – innovation through sustainable procurement

Running from September 2008 until August 2011 "SMART SPP – innovation through sustainable procurement" is a three year project which promotes the introduction of new, innovative low carbon emission technologies and integrated solutions onto the European market. This is being done through encouraging early market engagement between public authority procurers and suppliers and developers of new innovative products and services in the pre-procurement phase of public tendering.

SMART SPP is an initiative of the Procura+ Campaign, run by ICLEI – Local Governments for Sustainability and designed to help support public authorities across Europe in implementing Sustainable Procurement and help promote their achievements.

For more information visit *www.procuraplus.org*

An initiative of: Procura+ Sustainable Procurement Campaign

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