

Life Cycle Costing – Good practices from the EU



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● Overview of presentation

- 1.) Introduction to ICLEI and its sustainable procurement work
- 2.) Definition of Life-Cycle Costing (LCC), LCC and sustainable public procurement (SPP)
- 3.) LCC in light of the new EU Directives on public procurement
- 4.) When an LCC analysis can be used in procurement
- 5.) LCC tools available - some recommendations
- 6.) Good practices



ICLEI is **leading global network** of 12 mega-cities, 100 super-cities and urban region, 450 large cities and 450 small and medium -sized cities and towns

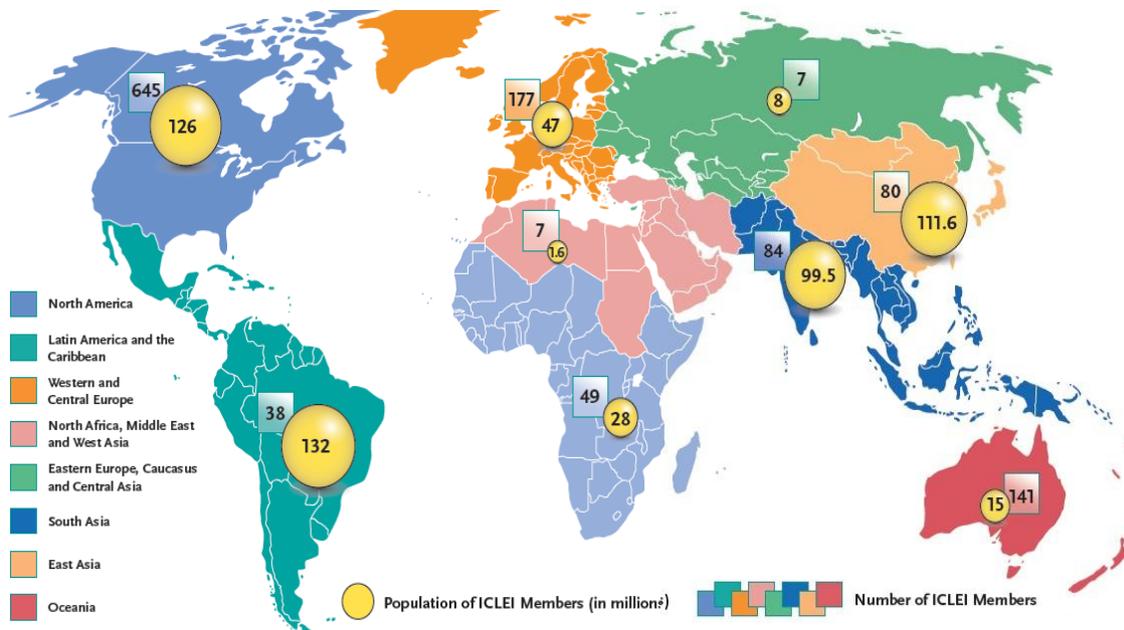
Mission is to build and serve a worldwide movement of local governments to achieve tangible improvements in global sustainability with special focus on environmental conditions through cumulative local actions



Our members

Global Membership

660 Million – 8.3% of world population in 85 countries



European Membership

180 local government members in 38 countries

What does Sustainable Public Procurement mean?

- Meeting your organisation's needs for goods, services and works in a way which optimises their environmental, social and economic impacts throughout their life cycle – from cradle to grave.



● ICLEI's Sustainable Procurement Work

- ICLEI's *seeks to* is to provide professional information, advice, networking opportunities, training and tools to public authorities wanting to implement high quality, cost effective sustainable procurement practices.

- **Key Achievements**
 - Involved in over 100 projects and initiatives on SPP
 - Trained over 1000 people
 - Produced SPP guidance on construction, energy efficiency, timber, textiles, biofuels, clean vehicles, catering, pre-procurement, among others
 - Developed the EC's GPP toolkit and first 10 GPP criteria
 - Developed the EC's Buying Green Handbook, on behalf of DG ENV
 - Deliver the European Commission's GPP Help Desk, on behalf of DG ENV
 - **Developed an LCC - CO₂ emissions calculation tool**

● Definition of Life-Cycle Costing (LCC)

- An approach which evaluates the costs of an asset throughout its life-cycle
(DG Environment definition)
- A methodology for the systematic economic evaluation of the life cycle costs over the period of analysis, as defined in the agreed scope
(ISO15686 - Life planning – building and construction assets)

- **Four main cost categories:**

- Acquisition costs
- Operational costs
- Maintenance costs
- End-of-life disposal related costs



LCC methodology

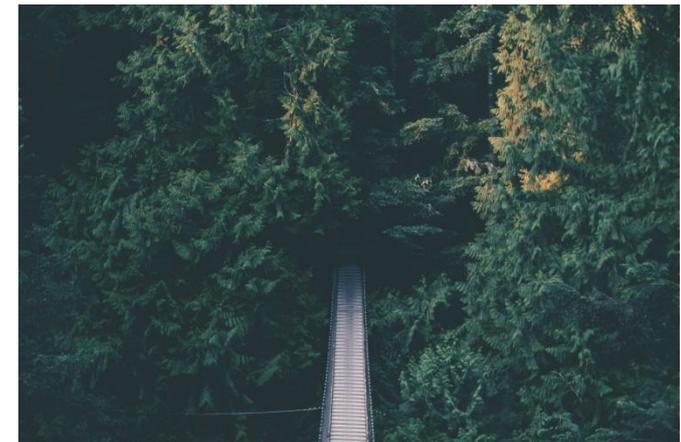
+1 : External Environmental Costs → Environmental LCC methodology

- **Life-Cycle Assessment (LCA)**

- Standardised methodology (ISO14040), compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle
- "Cradle-to-grave" analysis (economic and social aspects are typically outside its scope)

● LCC and sustainable public procurement

- Implication of LCC demonstrates that public decisions are based not only on the purchase price but on the whole life-cycle costs and may reflect environmental considerations
- Making better decisions when considering broader sustainability issues
- Best value for money \longrightarrow Best value across the asset life cycle
- LCC when implementing SPP policies – country specific
- LCC should be considered as key component of SPP
- Challenges...
 - sustainable assets - typically - higher purchase costs
 - availability of existing LCC tools?
 - how to apply LCC tools?



LCC and the New Public Procurement Directives – main relevance (1)

- LCC is one of the novelties in the new directives
- MEAT shall be identified on the basis of the price or cost, using a cost-effectiveness approach, such as life-cycle costing... and may include the best price-quality ratio
- Costs categories over the life cycle of the products (Art. 68)
 - ❖ **Costs borne by the contracting authority:** acquisition costs, costs of use, maintenance costs, end of life costs
 - ❖ **Costs imputed to environmental externalities** linked to the product, work, services during its life cycle (i.e. climate change mitigation costs)

The method used for the assessment of these costs:

- has to be based on objectively verifiable, non-discriminatory, criteria,
- has to be accessible for all parties,
- the necessary data required can be provided with reasonable effort by normally diligent economic operators



LCC and the New Public Procurement Directives – main relevance (2)

- Life-cycle costing is optional
- In case of a common EU methodology the LCC becomes mandatory, e.g. EU Clean Vehicles Directive – methodology for the monetisation of the environmental and energy impacts
- Where LCC is used during the tender procedure, the calculation method and the data to be provided by tenderers have to be set out in the procurement documents, i.e. transparency is essential
- Specific issues to be considered when comparing LCC costs:
 - Lifespan (*frequency of replacement*)
 - Discount rate
 - Data availability to estimate future cost



When should an LCC approach/calculation be used?

Definition of needs

- i.e. option evaluation before procuring

Tendering stage

- i.e. comparing different offers

Post tendering stage

- i.e. gather, assess information for planning

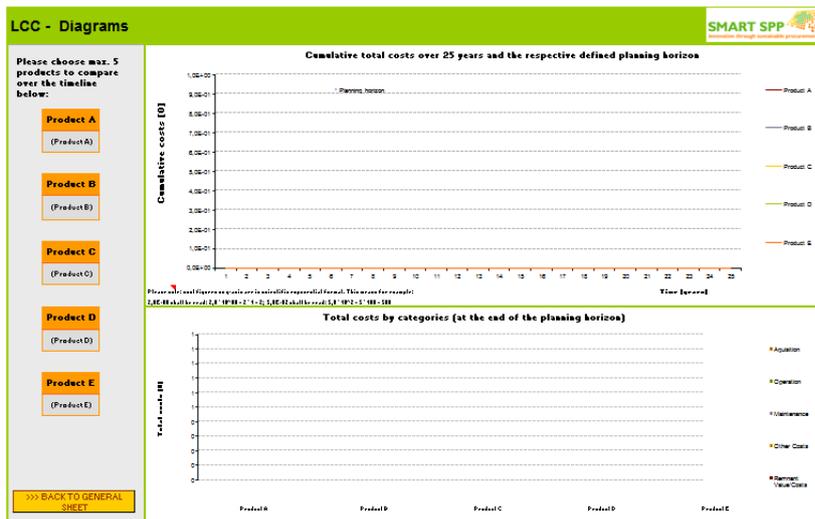


● List of available LCC tools (*non-exhaustive*)

- [SMART SPP LCC and CO₂ Emissions tool](#) (*separate slide*)
- [Clean Fleets project LCC Tool](#) (*separate slide*)
- [European Commission LCC tool](#) (*separate slide*)
- [Umwelt Bundesamt: Berechnungswerkzeug für Lebenszykluskosten \(Life-cycle Costing calculation tool - in German\)](#)
 - Product Groups: PC, Monitor, Server, Dishwasher, Refrigerator
- [National Agency for Public Procurement, Sweden](#) (in English and Swedish)
 - Household appliances (washing machines, freezers, dishwashers, fridges)
 - Professional refrigerators and freezer
 - Indoor lighting, Outdoor lighting
 - Vehicles
- [Danish Ministry of Environment and Food LCC tool](#) (in English and Danish)
 - Self-service machines
 - Bulbs and lighting system
 - Office IT equipment
 - Refrigerators and freezers
 - Bidet toilet seats
- [Buy Smart+ project LCC tool](#)

SMART SPP LCC and CO₂ Emissions tool (1)

- Tool to calculate LCC and important emissions (CO₂, carbon dioxide, mono-nitrogen oxides and nitrogen-dioxide, sulfur dioxide, non-methane hydrocarbon) – User Guide and Excel Tool (available in English and Spanish)
- Very flexible tool that can be applied for a range of products and services, and can also be used for the various phases of the public procurement procedure, e.g. pre-procurement (such as for market engagement).
- Involvement of all departments with budgetary responsibilities is crucial
- Suppliers have to provide evidence to support the costing and the information on pollutant emissions that they submit



LCC & CO₂ - Calculation for Procurement Activities
A user guide has been developed to help you use this tool. You can download it at www.smart-spp.eu.

General Information Input

Tender ID

Information to be specified by the procurer

Your location [country] [CHOOSE] → Currency

Planning horizon [years]

Discount rate (nominal) [%]

Inflation rate [%]

CO₂ emission factors [Click to specify emission factors]

Information to be specified by the supplier

| Product Offers | Product A | Product B | Product C | Product D | Product E | Comments / Explanation |
|---|-----------|-----------|-----------|-----------|-----------|------------------------|
| Personal offer ID <input type="text"/> | | | | | | |
| Number of units to be purchased/leased <input type="text"/> | | | | | | |
| Lifespan <input type="text"/> [years] | | | | | | |

Life-cycle Costing (LCC) Information Input

Discount rate [%]

Inflation rate [%]

Acquisition Costs

Purchase price [€/unit]

Specify annual investment costs >> [€/unit]

Installation costs for all units [€]

Initial one-off costs [€]

Operation Costs

Total operating costs per year [€/unit/year]

Specify detailed operating costs >> [€/unit/year]

Maintenance Costs

Total maintenance costs per year [€/unit/year]

Specify detailed maintenance costs >> [€/unit/year]

Other Costs

Annual taxes / fees / subsidies or other costs [€/unit/year]

Residual Value / End-of-Life Costs

Residual value / End-of-life-costs [€/unit]

CO₂-specific Information Input

SMART SPP LCC and CO₂ Emissions tool (2)

Additionally, cells are colour-coded to help identify how to use them.

Red cells contain comments (draw your cursor over it to view them)

In **white cells** you have to input data

Click on +/- button to expand and reduce extra rows and columns.

LCC & CO₂ - Calculation for Procurement Activities

General Information Input

Example tender: Street Lighting

Product Offers

Life-cycle Costing (LCC) Information Input

Acquisition Costs

| | Product A | Product B | Product C | Product D | Product E | Comments / Options |
|-------------|-----------|-----------|-----------|-----------|-----------|--------------------|
| Lamp Inst.A | 20 | 20 | | | | |
| Lamp Inst.B | | 20 | | | | |

Grey cells contain text or calculation results. These files are protected and can not be altered!

In **orange cells** you can select an option from the dropdown menu

Click on **light orange** – the links will bring you to other sheets where you can continue your input (and back again).

Finally, **Error alerts** are red text.

Tenders Evaluation

Compulsary Technical Specifications

| Product ID | Product A | Product B |
|---|-------------|-------------|
| Have all compulsory requirements been met (Yes/No)? | Lamp_Inst.A | Lamp_Inst.B |
| | Yes | Yes |

Every offer has to comply with the compulsory criteria of the tender. Every offer that does not comply will be automatically excluded.

Award Criteria

| Award criteria | Max. Points | Product A | Product B |
|---|-------------|---------------|---------------|
| LCC results [EUR] | | Lamp_Inst.A | Lamp_Inst.B |
| | | 41,314 | 39,743 |
| CO ₂ results [kg CO ₂] | | | |
| | | 13,127 | 4,087 |
| Award category 1 | | 0 | 0 |
| Award category 2 | | 0 | 0 |
| Award category 3 | | 0 | 0 |
| Award category 4 | | 0 | 0 |
| Award category 5 | | 0 | 0 |
| Special case: LCC results, including CO ₂ cost | | not specified | not specified |

Click expansion button left to view more diagrams on CO₂ results.

Weighting of award criteria:

| Criteria | Share (%) |
|-------------------------------------|-----------|
| Costs (LCC) criterion | 80% |
| CO ₂ emissions criterion | 20% |

Evaluation Results

Unweighted Evaluation Results (LCC/CO₂):

| | Product A | Product B |
|--|-------------|-------------|
| Overall Evaluation Results (default calc. method) | Lamp_Inst.A | Lamp_Inst.B |
| Have all compulsory requirements been met? | Yes | Yes |
| Which is the total points for each offer? | 83.15 | 100.00 |
| Ranking of the offers (number 1 is the economically most advantageous offer) | 2 | 1 |

Overall Evaluation Results (alternative method)

| | Product A | Product B |
|---|-------------|-------------|
| Overall Evaluation Results (alternative method) | Lamp_Inst.A | Lamp_Inst.B |

Particularly upon request from UK stakeholders, the tool also offers you the option of assigning a monetary value to CO₂. In this case, the CO₂ cost will be included in the LCC following the default calculation method outlined above.

By using the default calculation method, the tool automatically calculates the economically most advantageous offer and highlights it in green.

Clean Fleets LCC Tool

| GENERAL CONDITIONS | | | | |
|---|-----------------------|---------------------|--------------------|----------------------|
| Contract length/period of vehicle ownership | Year | 10 | | |
| Discount rate | % | 2 | | |
| Number of bidders | | 2 | | |
| ACQUISITION COSTS | | | | |
| Name of bidder/vehicle model | Mercedes Citaro 10.5m | | Volvo Hybrid 10.5m | |
| Number of vehicles | | 10 | | 10 |
| Purchase price | /unit | 217.800,00 | /unit | 310.000,00 |
| (or) Lease price | /unit/year | | /unit/year | |
| COSTS OF ACQUISITION / UNIT | | 217.800,00 | | 310.000,00 |
| OPERATING COSTS PER VEHICLE | | | | |
| Annual use of vehicle | km | 80.000 | km | 80.000 |
| Type of Fuel | | Diesel | | Diesel |
| Fuel consumption per vehicle | /100km | 41,9 | /100km | 32,6 |
| Fuel price | /l | 1,22 | /l | 1,22 |
| Add a second fuel type (PHEVs, dual fuel)? | | No | | No |
| Type of Fuel | | | | Petrol |
| Fuel consumption per vehicle | #VALUE! | | /100km | 250 |
| Fuel price | /l | | /l | 1 |
| OPERATING COSTS / UNIT | | 363.903,20 | | 283.027,49 |
| MAINTENANCE COSTS PER VEHICLE | | | | |
| Estimated annual maintenance costs | /unit/year | | /unit/year | |
| (or) Annual service agreement | /unit/year | | /unit/year | |
| MAINTENANCE COSTS / UNIT | | - | | - |
| TAXES AND OTHER COSTS/SUBSIDIES PER VEHICLE | | | | |
| Vehicle tax | /unit/year | | /unit/year | |
| Insurance costs | /unit/year | | /unit/year | |
| Infrastructure - one off investment costs | | | | |
| (or) Infrastructure - annual costs | /year | | /year | |
| Other costs/subsidies (<i>costo con left + to expand</i>) | | | | |
| ALL OTHER COSTS AND SAVINGS / UNIT | | - | | - |
| EMISSIONS (OPERATIONAL LIFETIME COST - OLC) PER VEHICLE - OPTIONAL SECTION | | | | |
| Do you wish to apply the operational lifetime cost methodology from the Clean Vehicles Directive? | | Yes | | |
| CO ₂ Emissions | g/km | 1 | g/km | 864 |
| Lifetime cost of CO₂ emissions / unit | | 26,64 | | 20.736,00 |
| NO _x (Nitrous oxides) | g/km | 0,24 | g/km | 0,24 |
| PM (Particular Matter) | g/km | 0,0029 | g/km | 0,0029 |
| NMHC (Non-methane hydrocarbons) | g/km | 0,007 | g/km | 0,007 |
| ifetime cost of pollutant emissions / unit | | 1.052,24 | | 1.052,24 |
| Reference Fuel | | Diesel | | Diesel |
| (Cheapest of petrol or diesel before tax) | | | | |
| Cost of Reference Fuel (before tax) | /l | 1,01 | /l | 1,01 |
| ifetime cost of energy consumption / unit | | 338.552,00 | | 2.058.963,56 |
| ERATION LIFETIME COST (OLC) / UNIT | | 339.630,88 | | 2.080.751,80 |
| END OF LIFE | | | | |
| Remnant value (at end of contract period) | /unit | | /unit | |
| | | | | |
| TOTAL LCC PER UNIT | | 921.334,08 | | 2.673.779,29 |
| TOTAL LCC | | 9.213.340,81 | | 26.737.792,90 |

What is this tool?

- an Excel spreadsheet
- series of pre-set formulas included
- used to determine LCC (cars, vans)
- possible to include operational lifetime costs
- prescribed by the Clean Vehicles Directive

What does it take into account?

- acquisition
- maintenance
- taxes and other costs
- OLC environmental costs
- remnant value
- infrastructure costs

European Commission Life-Cycle Costing tool

- Application of LCC among public authorities is limited —————> the EC is developing an LCC tool for specific products
- Application of the tool:
 - Indirect costs (i.e. insurance cost, cost of money etc.) are excluded from the tool
 - Discount rates have to be inserted by the users
 - Energy and consumable price have to be inserted by the users
- Four environmental impact categories are applied: Human Health, Ecosystem, Research Availability, Climate Change —————> ReCIPe method for the calculation of the impacts
- Please note that the tool is still in the process of development. It should be available sometime in 2016
- [More information is available from the webinar organised earlier this year](#)



Some good practice examples (1)

1. Saving on energy – Municipality of Kolding (Denmark)

- Energy-efficient LED replacement light sources to replace existing bulbs
- *SMART SPP LCC and CO₂ tool* was used to compare the offers
- Discount rate and inflation rate based on the data from National Bank and Statistical Office, Prices and CO₂ emission factors for electricity consumption from the Municipality's electricity supplier
- Challenge: more than 200 light sources procured, tool cannot handle so many values, weighted lifetime calculation has been used to obtain values per tender
- 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
- The tool indicated which tender had the lowest lifetime expense and identified the economically most advantageous tenders in order of priority

Some good practice examples (2)

2. Cost-efficient vehicle procurement – Berlin (Germany)

- German Police purchases “clean” police cars
- Under Clean Vehicles Directive CAs are obliged to take energy consumption and emission into account in the procurement
- Two steps award process:
 - Assessment of technical aspects (40% of total points) and LCC (60% of total points), which includes financial and environmental costs
 - The highest scoring bid from step 1, with the bids which scored up to 10% less points, were then compared purely on the basis of their purchase price, awarding the tender then to the lowest bid
- The environmental costs were calculated based on a) fuel consumption, b) energy consumption, c) CO₂ emissions, d) NO_x, e) non-methane hydrocarbons and f) particulate matter.

● Links to more good practice from the European Commission

- [An Energy Service Company \(ESCO\) used to cut energy use in municipal buildings in Vantaa, Finland](#)
- [Furniture & white goods for public housing projects - VISESA, Basque Country, Spain](#)
- [Environmentally-friendly office IT equipment Stockholm, Sweden](#)
- [Purchasing energy-efficient outdoor lighting in Cascais, Portugal](#)
- [Green electricity and vehicles, National Public Procurement Agency, Slovenia](#)
- [Using LCA and CO₂ performance to access bidders – Rijkswaterstaat, The Netherlands](#)



Thank you for your attention!

Further questions?

Or do you know about other good practices?

Just get in contact with us!

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