GPP In practice

Using LCA and CO_2 performance to assess bidders

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RIJKSWATERSTAAT, NETHERLANDS

Background

In 2010, the Dutch House of Commons decided that all public authorities in the Netherlands must implement 100% sustainable procurement as of 2015, which constitutes the inclusion of green criteria in all tenders.

The Netherlands also aims to achieve a 20% reduction in CO_2 emissions by 2020, compared to 1990 levels, and has a target of 14% renewable energy production by 2020, compared to 2% in 2010.

Rijkswaterstaat (RWS) is the Department of Public Works within the Dutch Ministry of Infrastructure and the Environment, which has an annual budget of 3.5 billion Euros. RWS is the biggest investor in infrastructure in the country. It employs around 8,500 people and manages the main waterways, coastal water systems and motorways in the Netherlands.

Procurement objectives

RWS aims to use green public procurement to challenge and encourage contractors and suppliers to provide added value through the delivery of sustainable working practices, green materials, energy efficiency and reduced carbon emissions.

In order to achieve these objectives, RWS uses functional specifications for infrastructure projects, together with tools to gauge bidders' commitments to reducing carbon emissions within projects and to assess the life cycle environmental impacts of the materials they propose to use. These commitments and impacts are monetised within the award phase of the tender and quoted prices are adjusted accordingly. The methods aim to stimulate and utilise the market's creative capacities more efficiently and allow contractors to work in a targeted way towards better quality, more innovative solutions.

Criteria used

Technical specifications:

Functional, performance-based specifications are used as part of RWS's infrastructure projects as often as possible so as to enable the market to provide innovative, effective solutions. They consist of a list of requirements along with a description of the relevant parameters of the system/product/service within which they must operate, including a maximum environmental impact threshold, described below.

Award criteria:

RWS selects the most economically advantageous tender (MEAT) by using a combination of price and quality aspects to determine which contractor offers the best value for money. Quality aspects include: design, project management capabilities, risk management and sustainability. RWS carefully draws up the criteria for the assessment of the quality aspects for the specific project and explains them in a 'tendering and assessment' document or a background document. This includes the objectives of RWS, the criteria on which the quality aspects are assessed and the maximum value (expressed as a maximum price) it assigns to these criteria. Two different tools are used to monetise environmental impacts related to infrastructure projects carried out for RWS. The resulting values are used to adjust the bidders' quotes in order to allow a more realistic comparison of project "costs", both environmental and economic.

The first tool is "DuboCalc", which is freely available software used to assess and monetise environmental impacts of a product/design based on life cycle analysis. The software calculates life cycle environmental impacts in 11 areas using a life cycle assessment (LCA) database, converting these impacts into an environmental cost indicator (ECI) value for the proposed design. The materials proposed by the successful bidder become contract requirements and the ECI value of the final product is checked upon completion of the work. Alongside the LCA of proposed design materials, a tool known as the "CO_2 performance ladder" is used to assess the efforts of a company to reduce CO_2 emissions caused by the project. The bidder chooses a level or "rung" of ambition, with one being the lowest and five the highest. Each rung yields a 1% reduction of the submission price. The measures corresponding to the ambition of the winner then become performance requirements of the contract. Contractors can show that they have delivered the level of performance required by achieving a "CO_2 Awareness Certificate", which is issued by Certified Authorities approved by the Council of Accreditation. This is required a year after the start of the contract in order to achieve sustainability outcomes with minimal costs and efforts. For general information on the CO_2 performance ladder click here, and for details of how to apply it within the tender process click here and see page 31 onwards.

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The Procurement Process:

A) RWS provides organisations who have expressed an interest in bidding with a document containing: the functional specifications including a maximum ECI value; the DuboCalc assessment tool; a description of how to use DuboCalc as a design tool; and the calculation procedure to monetise the ECI value.

B) Bidders submit an offer with a description of the solution: A project (e.g. civil engineering) design, which is optimised using DuboCalc as a design tool. This also includes a description of materials including the quantity, transport distances and working processes. At this time tenderers also submit their price quotes along with the ECI value generated by DuboCalc and which rung of the CO_2 performance ladder their offer would correspond to.

C) Each bidder's quote is then reduced according to the ECI values of their designs (the lower the environmental impact, the higher the ECI value (an inverse calculation)) and according to their level of commitment to reducing CO_2 emissions (the greater the ambition, the greater the price reduction). The project is awarded to the bidder with the lowest adjusted quoted price. By monetising efforts made to reduce environmental externalities in this way and deducting them from the quoted prices as part of the assessment, tenderers with the best quality offers have a higher chance of winning the tender.

For more written information on the use of these tools click here, or for a video explaining the use of DuboCalc here.

Results

Bidders were not put off by being asked to use the DuboCalc software, in fact many expressed eagerness and enthusiasm to apply the tool. RWS received feedback that it was an 'eye opener' for some designers to realise that DuboCalc leads to better designs, not only from an environmental point of view, but also in terms of cost reductions.

Examples of green design or work processes proposed and used in awarded contracts using DuboCalc and the CO_2 performance ladder include: recycled and reused materials, long life and low temperature asphalt, cement replacement in concrete, reduced concrete design of pillars and of bridges for pedestrians and cyclists, solar powered lighting and green electricity, low emission/efficient heavy duty vehicles and machinery, minimised transport of materials and fuel savings from driving courses for truck and dumper drivers.

Environmental impacts

There are a wide range of environmental impacts associated with road construction and other infrastructure projects such as building tunnels and bridges. The extraction and processing of raw materials using mining operations and refining ores can cause the physical disturbance of land and water courses and the pollution of land, water and air. The manufacturing and processing of materials such as concrete, cement, asphalt and bitumen have high energy requirements, especially as they are required in such high volumes. The transport of materials to and from site causes local air pollution and greenhouse gas (GHG) emissions and the construction phase itself can cause habitat destruction and a loss of biodiversity at the site. After a road has been completed, impacts include environmentally damaging rainwater run-off arising from tyre abrasion, fuels, lubricants and road surface treatments. When road surfaces need maintaining or replacing, waste materials from the surface layer is generated.

For these reasons, RWS have found ways to look at contractors' approaches to controlling overall emissions through the CO_2 performance ladder, as well as the wide range of environmental impacts associated with the materials included in the design through DuboCalc. The 11 environmental parameters used by the software cover impacts on: climate change, ozone layer depletion, human- , fresh water-, marine- and terrestrial toxicity, photochemical oxidation, abiotic depletion, depletion of fossil energy carriers, eutrophication and acidification.

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Lessons learned

- The road to successfully applying DuboCalc (and thus success of the procurement action) is presenting the project manager the quantified emission reductions, e.g. CO_2, which can be achieved in the project through the use of DuboCalc.
- Due to the relative complexity of the tool, RWS recommends that DuboCalc be applied to larger and more important projects, where it would lead to more significant results.
- DuboCalc is useful for the contracting authority to improve the quality of the terms and conditions of the contract, but is also useful in traditional contracting formats. It is also a good measure for sustainable material and energy use.
- Application of DuboCalc requires expertise (environment, materials and civil engineering) and customisation, improper use inevitably leads to failure.
- DuboCalc is only useful provided there is a design stage. If this is not the case, the CO_2 performance ladder is the best approach to use.

For more information, please see background reports and European GPP criteria for Construction and Street Lighting.

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