ENVIRONMENTAL ASPECTS OF PUBLIC PROCUREMENT IN TRANSPORT SECTOR

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Each year European public authorities spend a significant amount of the EU gross domestic product in public procurement of goods, services and works related to transport. Public procurement, being a policy strategy instrument, must integrate environmental considerations in the contract award procedures. The paper analyses environmental impacts of transport, the environmental aspects of 2014 EU Procurement Directives and their capacity to contribute to the reduction of adverse environmental effects in the sector of transport. The new legislation should pursue various efficient alternatives competing to provide the most environmentally friendly solutions. The authors put forward the proposal for implementation and future development of procurement legislation and present barriers and recommendation in its implementation.

Key words: public procurement, transport sector, environmental aspects, legislation

1. INTRODUCTION

Public procurement is the purchase by governments and state-owned enterprises of goods, services and works. In 2011, on average, general government procurement spending represented 29% of total general government expenditures (or 13% of GDP) [1].

It was due to solid foundation of jurisprudence built up by the ECJ over the last 15 years that all levels of government in all the EU Member States could be brought to commit to European procurement law, despite heavy political resistance and its encroachment of the old status quo [2].

The paper analyses the concept of sustainable procurement, public procurement of innovation, the provisions of EU 2014 Procurement Directives related to the environment, the real costs of procurement, its role in reducing the environmental effects of transport sector, considers the barriers and puts forward the recommendations for implementation and future development of procurement policy.

2. SUSTAINABLE PROCUREMENT WITH PARTICULAR REFERENCES TO ENVIRONMENTAL PROTECTION

Sustainable public procurement (SPP) means making sure that the products and services that the organisation buys achieve value for money on a life cycle cost basis and generate benefits not only for said organisation, but also for the environment, society and the economy. SPP is used by both public and private sector organisations to ensure that their purchasing reflects broader goals linked to resource efficiency, climate change, social responsibility and economic resilience. These aspects are often interlinked, see Figure 1. At its most basic, SPP can mean buying energy efficient computers or fair trade coffee. At its most comprehensive it means systematically integrating sustainability considerations into all procurement activities, whether purchasing goods, services or works and regardless of the form which procurement takes (e.g. service contracts, centralised framework agreements or other 'non-traditional procurement approaches). Some examples would be a rainwater
harvesting system providing water for the fire engine, the use of blended fuel for vehicles made from used cooking oil, the criteria for reducing packaging, etc. [3].

Therefore, sustainable public procurement can have a role in indirectly stimulating social and environmental benefits through exerting pressure on suppliers to reduce their own impacts [4].

The principles of sustainable public procurement, primarily in the interest of fostering local employment and local business, could also be enforced by a document such as Code of Practice, like the one in Lewisham, UK [5] stating that the contractors, suppliers and service providers engaged to work for the Council must show a commitment to the borough, its residents and businesses.

![Fig 1.SPP goals](image)

### 3. PUBLIC PROCUREMENT OF INNOVATION

Public procurement can be a major source of innovation. Public procurement might allow to improve the service delivered to the local community and to increase the technological competitiveness of the local industrial and research system. In this context, regional foresight might help identify both long-term societal needs and the patterns of evolution of emerging technologies that can match these needs [6].

However, while public procurement is increasingly seen as an important potential instrument of innovation policy, according to Georghiu et al. [7] the evidence of its effectiveness is largely anecdotal. The main barriers (to innovation) reported by suppliers refer to the lack of interaction with procuring organisations, the use of over-specified tenders as opposed to outcome based specifications, low competences of procurers and a poor management of risk during the procurement process [8].

Innovative ideas are not – not yet – implemented due to an insufficient consideration of the impact, a lack of resources, regulations, policy and existing procurement frameworks, but also due to the uncertainty that comes with innovation. As a result, an organization could make a distinction between two types of innovation: small-scale innovations that can be obtained through regular procurement (requesting functional specifications and awarding based on most economically advantageous tender criteria) and larger, radical innovations that require a special procedure [9].

### 4. ENVIRONMENTAL ASPECTS OF EU 2014 PROCUREMENT DIRECTIVE

EU 2014 Procurement Directives provide for some new options for implementing environmental protection put forward hereinbelow.

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4.1 Principles

Article 18(2) of Directive 2014/24/EU [10] sets out that „Member States shall take appropriate measures to ensure that in the performance of public contracts economic operators comply with applicable obligations in the fields of environmental, social and labour law established by Union law, national law, collective agreements or by the international environmental, social and labour law provisions listed in Annex X.“

Recital 37 clarifies the scope of Article 18(2) stating „it is of particular importance that Member States and contracting authorities take relevant measures to ensure compliance with obligations in the fields of environmental, social and labour law that apply at the place where the works are executed or the services provided and result from laws, regulations, decrees and decisions, at both national and Union level, as well as from collective agreements, provided that such rules, and their application, comply with Union law“.

4.2 Technical specifications

Technical specifications² define the characteristics required of a works, service or supply. They can include requirements relating to a specific production process, such as taking account of environmental or social aspects.

If, for example, a contracting authority wants to favour local products over ‘exotic’ products, it can include costs of transport in the costs, while ensuring that it does not discriminate between operators. It can stipulate in the technical specifications that purchased products should not contain toxic chemicals or that they should be produced using environmentally efficient machinery creating minimum waste. However, the technical specifications cannot stipulate that the product must be fair trade or that a minimum price must be paid to the producer. In other words, ethical dimensions cannot be defined at this stage [11].

For works contracts, specifications can relate to, for example the performance of the constructed works (e.g. energy performance of a building, accessibility for disabled people, indoor climate), the way in which the works are carried out (e.g. minimising of waste and noise from construction sites, optimising material delivery schedules to lessen traffic disruption, energy/water efficiency of machinery), and the materials used in construction (e.g. use of renewable and/or recycled materials, restriction of harmful or unrecyclable materials, efficient use of material) [3].

Labels³ may be used as part of procurement to define the technical specifications, and also award criteria or contract performance clauses and to verify compliance with those.

4.3 Choice of participants

The Directive in Article 56 provides that contracting authorities may decide not to award a contract to the tenderer submitting the most economically advantageous tender (MEAT) where they have established that the latter has not complied with the obligations laid down by Union legislation on social and labour law or environmental law or with the international provisions on social and environmental law listed in Annex X to Directive 2014/24/EU.

However, with the phrase “may decide” inserted therein, the disparity between an ambitious principle and its optional application reduces the scope of the provision”[11].

4.4 Contract award criteria

With regard to Article 67, the contracting authorities must base the award of public contracts on the most economically advantageous tender, 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, which shall be assessed on the basis of criteria, including qualitative, environmental and/or social aspects, linked to the subject-matter of the public contract in question. Such criteria may comprise, for

² 2014/24/EU - Article 42
³ 2014/24/EU - Article 43
instance: quality, accessibility, and social, environmental and innovative characteristics; organisation, qualification and experience of staff, where the quality of staff can have a significant impact on the level of performance of the contract; and after-sales service, technical assistance and delivery conditions. Consequently, the ‘lowest cost’ concept has been preferred to the ‘lowest price’ concept in order to expand the options available to contracting authorities, by allowing them to base their decision on a more comprehensive assessment than just price [11].

However, the Directive also states that „Member States may provide that contracting authorities may not use price only or cost only as the sole award criterion...“

As with specifications, award criteria can relate to production processes or any other stage of the life cycle – for example the way in which raw materials are sourced, energy or water consumption during use, and the end-of-life recyclability or biodegradability of a product [3].

4.5 Life-cycle costing

Article 68 of Directive 2014/24/EU enshrines a concept which did not exist in Directive 2004/18/EC, namely life-cycle costing (LCC) in works and services. The aim is to send a political signal to public purchasers. The life-cycle concept covers all internal costs borne during the life-cycle of works, supplies or services, such as costs imputed to environmental externalities, which include pollution caused by the extraction of raw materials or collection and recycling costs. This measure is aimed to improve environmental protection and aid the fight against climate change.

Accordingly, the LCC will cover, insofar as these are relevant, the ‘cost of emissions of greenhouse gases and of other pollutant emissions and other climate change mitigation costs’ (Article 68(1)(b)). This is clearly a powerful lever to change the production and consumption habits of public authorities [1].

Article 68(2) reads further: „Where contracting authorities assess the costs using a life-cycle costing approach, they shall indicate in the procurement documents the data to be provided by the tenderers and the method which the contracting authority will use to determine the life-cycle costs on the basis of those data. “The method used for the assessment of costs imputed to environmental externalities must fulfil certain conditions.

Finally, it is stated that „whenever a common method for the calculation of life-cycle costs has been made mandatory by a legislative act of the Union, that common method shall be applied for the assessment of life-cycle costs. A list of such legislative acts, and where necessary the delegated acts supplementing them, is set out in Annex XIII. The Commission shall be empowered to adopt delegated acts in accordance with Article 87 concerning the update of that list, when an update of the list is necessary due to the adoption of new legislation making a common method mandatory or the repeal or modification of existing legal acts.“

It should be noted that social protection and employment promotion have not been included in the calculation of the life-cycle cost [11].

4.6 Abnormally low tenders

Article 69 lays down that it will be compulsory to reject an abnormally low tender in cases where the contracting authority finds that the abnormally low price or costs are due to failures to comply with obligations arising from Union law or national law compatible with Union legislation in the field of social and labour law or environmental law, or international labour law provisions.

4.7 Procurement procedures

Four procedures allowed under the 2014 Directives offer enhanced flexibility [3]:

• When procuring research and development (R&D) services, it is possible to make use of an exemption to the Directives and apply pre-commercial procurement (Recital 47).
• The innovation partnership procedure is specifically designed to cover the full innovation cycle from R&D through to piloting and purchase on a commercial scale of new products or services.

• The competitive dialogue procedure allows meeting with bidders to progressively refine the requirements, especially where it is not possible to write a specification in advance. Norwegian Directorate of Public Roads opted to use a competitive dialogue in order to explore innovative solutions for the design, construction and operation of a low environmental impact vessel [12]. Uttam et al. [13] applied it to an infrastructure project that includes the construction of a bridge, tunnel, underpass as well as pedestrian and bike path.

• The competitive procedure with negotiation gives public sector more freedom to negotiate with bidders where contracts involve elements of design or innovation or in other defined circumstances.

4.8 Encouraging SMEs to bid

Article 46 sets out that “contracting authorities shall, except in respect of contracts whose division has been made mandatory pursuant to paragraph 4 of this Article, provide an indication of the main reasons for their decision not to subdivide into lots, which shall be included in the procurement documents or the individual report referred to in Article 84.”

Dividing contracts into smaller lots may make contract requirements more achievable to small and medium-size companies (and less attractive to bigger companies). Under the 2014 Directives it is required to explain why a contract has not been divided into lots [3].

4.9 Variants

Allowing some flexibility around specifications can be a good way of encouraging the market to propose innovative and sustainable solutions. One means of doing this is to allow variants: solutions which meet your minimum requirements but in a different way to that envisioned in the detailed technical specifications. This method also helps to minimise the risk of a low number of compliant bids or unfeasibly high prices. For example, if the purchaser of vehicles is uncertain whether electric, hybrid or alternative-fuelled options may be suitable, it may be allowed to propose those as variants. The minimum requirements in terms of safety, ergonomics, features and warranties would be specified in tender documents. Variant bids would then be assessed against the same award criteria as applied to non-variant bids, allowing to compare costs, quality and environmental performance and make a decision about which fuel/propulsion technology is best see [3].

4.10 Trials and demonstrations

If new products or methods are being proposed as part of the contract, it may make sense to have a trial period or request samples prior to making a decision on awarding the contract.

4.11 Exclusion criteria based on compliance with fundamental labour and environmental law

The 2014 Directives have clarified that technical specifications can relate to sustainability impacts at any stage of the life cycle of a product and it is not necessary for them to define qualities of the finished product only.

4.12 Public-public cooperation

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4 2014/24/EU - Article 31
5 2014/24/EU - Article 30
6 2014/24/EU - Article 29
7 2014/24/EU - Article 45
8 2014/24/EU - Articles 18, 57 and Annex X
The Directives provide for the first time explicit legislative rules determining which contracts can be concluded between public sector entities without applying public procurement procedures. These rules are based on European Court of Justice case-law, but also take into account the need, often expressed by procurement practitioners, for improved legal certainty and they involve in-house relationships, cooperation between contracting authorities and transfer of a public task [14].

5. THE REAL COST OF PROCUREMENT

Assessing the real costs of procurement means calculating the total cost of an asset, from the point of purchase right through to the use phase and including the end-of-life costs, see Figure 2. Unfortunately, most public sector organisations are still faced with budgets which prioritise upfront purchase price over longer-term costs, and which may ignore social or environmental costs altogether. These problems can be exacerbated if one organisation purchases a product, service or work but another is responsible for its operation, maintenance and disposal. Such a scenario presents the so-called 'split incentive' problem [3].

As explained in item 4.5 hereof, the 2014 Directives\(^9\) specify that following costs may be taken into account, whether they are borne by the contracting authority or other users [3]:

(I) Costs relating to acquisition;
(II) Costs of use, such as consumption of energy and other resources;
(III) Maintenance costs;
(IV) End of life costs, such as collection and recycling costs;
(V) Costs imputed to environmental externalities linked to the product, service or work during its life cycle (e.g. greenhouse gases and other pollutant emissions, or other climate change mitigation costs) if their monetary value can be determined and verified, see Figure 3.

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\(^9\) 2014/24/EU - Article 68

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Fig. 2. The process of life-cycle costing (LCC) involves assessing costs arising from an asset over its life cycle and evaluating alternatives that have an impact on this cost of ownership [15].
The aim is to strongly encourage procurers to "think outside the (price) box" in the context of sustainable public procurement. It is quite evident that buying green can save money, particularly when an LCC approach is taken during the procurement process. In a quote attributed to Einstein, we are warned that "not everything that can be counted counts and not everything that counts can be counted". In advocating the use of LCC, it is however important to acknowledge that the science of LCC is far from perfect. The success of LCC is dependent on its scope (meaning the inclusion of environmental externalities or/and other externalities) and the methodology used (which in many cases is incomplete and based on experts' perceptions, not on hard scientific evidence) [4].

Life cycle costing (LCC) is sometimes confused with life cycle assessment (LCA) – however they are very different. Where LCC calculates the costs of a product throughout its life cycle (which can include giving a monetary value to environmental externalities), LCA assesses the environmental impacts, such as greenhouse gas emissions, over the life cycle [3, 17]. Therefore, LCA and LCC are two different sciences and are governed by considerably different considerations [18].

An environmental LCC methodology takes into account four main cost categories plus external environmental costs, as shown in Figure 3. The latter may come from LCA analyses on environmental impacts, which measure for example the external costs of global warming contribution associated with emissions of different greenhouse gases. Environmental costs can be calculated also in respect of acidification (grams of SO\textsubscript{2}, NO\textsubscript{X} and NH\textsubscript{3}), eutrophication (grams of NO\textsubscript{X} and NH\textsubscript{3}), land use (m\textsuperscript{2}*year) or other measurable impacts [16].

6. TRANSPORT SECTOR

Transport sector must take part in the collective effort to limit the rise in average global temperature by suggesting improvements in the design of the materials used but also the organisation of transport itself [19].

European legislation requires the tailpipe emissions of CO\textsubscript{2} to be measured during the type approval procedures for new vehicles. This approach, known as tank to wheel (TTW) only counts the CO\textsubscript{2} emissions produced when fuel is burned by the vehicle engine. This however is a poor indicator of climate impact as much of that impact actually occurs during the production of the fuel – especially for alternative vehicle fuels [20].

The impact of transport on the environment was, until recently, viewed mainly in terms of atmospheric pollution and noise emissions. Transport has a wide-ranging impact on the environment ranging from operational pollution, land-use, congestion and the risks inherent to the transport of dangerous goods. The measures should pursue the reduction of transport intensity and emission, reduction of land use, and the choice of carrier under considerations of sustainable aspects [21]. The development of urban transport should give priority to collective and “soft” transport [19] and to
adequate link-up between the different stages of urban journeys as well as to easy access to and from inter-urban transport [22].

Therefore, in transport sector, environmental aspects of public procurement should be considered in three major areas: transport means (vehicles, ships, etc.), construction of infrastructure (with particular reference to land use) and also logistics services provided in supplying the goods, services and executing the works.

Vehicles are purchased or used by many public authorities, and will play a role in the delivery of other contracts such as for construction, landscaping, waste management, social care, facilities management and highways maintenance. Savings on fuel and, in many cases, vehicle tax, can be substantial when cleaner and more efficient vehicles are chosen. Further savings can be realised by rationalising fleet requirements and making the most of eco-driving and innovative technologies such as telematics and satellite navigation to reduce wear and tear and unnecessary mileage [3].

An example of how environmental externalities may be included in LCC is given by the Clean Vehicles Directive (2009/33/EC) [23]. Under this Directive, contracting authorities and entities are obliged to take energy consumption and emissions into account in their purchases of road transport vehicles [16].

The Republic of Croatia transposed into its legal system the Clean Vehicles Directive by way of the Act Promoting Clean and Energy Efficient Road Traffic Vehicles [24] on the basis of which were adopted the Ordinance on methodology for calculating operative costs throughout a period of exploitation of road transport vehicle [25] and the Ordinance on standards used in procedures of public procurement of road transport vehicles [26] laying down that upon purchase of vehicles the contracting authorities shall consider energy effects and environmental effects throughout the period of exploitation of a vehicle with regard to energy consumption, CO₂ emissions, NOₓ emissions, emissions of non-methane hydrocarbons and particles emissions.

Ship life cycle management is elaborated in [27]. Gratsos et al. [28] indicate that ships built with corrosion allowances, which are truly adequate for the ship's design life, when all factors have been taken into account, have a lower life cycle cost per annum for the maintenance of the integrity of their structure. This despite the fact that they would carry a slightly smaller quantity of cargo and therefore their income over time would be marginally less. Furthermore these ships are more reliable performers having a lower average annual downtime.

An important benefit with ship transportation is the limited need for land areas. Methods to calculate the land use requirements for ship transportation and the pollution contribution from ports should be established. Furthermore, methods have to be developed to allocate the environmental impact of port activities to ship transportation. The scrapping phase has to be addressed. These problems are important to address to enable consistent comparison of alternative transportation modes [29]. The advantages of short sea shipping compared to road transport and integral environmental effect of shipping are analysed in [30].

Public sector has a lot of power to influence practices in the construction industry and obtain better environmental, social and economic outcomes [3]. An example of construction of a low-carbon motorway exit is presented in [31].

Available research on sustainable procurement intensively focuses on international product suppliers and less on service suppliers such as logistics services providers. However, in addition to their well-known economic role, logistics processes have a strong impact on the environment (e.g. transportation-induced greenhouse gas emissions, noise and land consumption) and social issues (e.g. transport safety and physically draining occupations) [32].

7. BARRIERS AND RECOMMENDATION

Just as spatial planning refers to the methods used by public sector to influence the future distribution of activities in space [33] and which may determine transport modes available in the future and whether public transport will be preferred or not, so can the policy enshrined in public procurement laws and implementation thereof significantly affect the transport sector.

As regards EU procurement directives, it may be regretted, for example, that several provisions are optional and have been left to the discretion of the Member State or contracting authority. It may also be regretted that the level playing field has not been kept watertight and that a form of competition
between the least stringent legislation has been made possible. The result of the Directive’s transposition must be assessed at the end of the next legislative period, in 2019, on the basis of a robust ex post impact analysis, which takes account of the reality on the ground and which allows the results effectively achieved to be measured [11]. As the procurement Directives are principally concerned with how to buy, rather than what to buy, contracting authorities have a considerable amount of scope in determining the subject matter or title of their tender and should benefit therefrom. The examples of subject matter could be provision of sustainable catering services for schools, supply of low emission vehicles, construction of low energy office building, etc. [3].

Borg et al. [34] hold that there is the lack of investment culture in the sense that mission statement of public administration is directed by service provision, while investments aimed at yielding direct future economic returns are not a natural part of this culture. This is reflected at the decision-making level, where priority is directed to improving service levels, and within administrations which often lack the skills to undertake simple cost benefit analyses.

Sustainable public procurement needs to be made simple. Public procurement is full of procedures and red tape as it is, so we must not add more [18]. Apart from lack of understanding of the sustainability issue by policy makers and those responsible in the contracting authorities, existing LCC tools are either very complex for ordinary user, not user-friendly, or are sometimes not available online because there is a problem in its financing, meaning that the knowhow is available only at a fee.

Also, the question is how feasible is to expect procurers to have advanced multi-disciplinary skills? Currently, a large majority of procurement professionals across the world tend to hail from academic backgrounds that lean towards business administration, international relations, political sciences, social sciences, history and the arts [18].

Many procurement officers confuse „green procurement“ with energy efficient procurement. One may question whether it is allowed for a school to purchase locally produced food on legal grounds (to minimise the energy needed for transportation). But it is, in legal terms, easy to specify energy efficient equipment since such equipment can be compared and evaluated on their technical and economic performance. The problem is that of defining the correct and relevant evaluation criteria, hence the need for purchasing guidelines [34].

The criteria for EU green public procurement are provided as voluntary instrument elaborated for several goods/services/works, such as passenger cars directly purchased or contracted under leasing/renting systems, public transport vehicles and services, and waste collection trucks and services, while for sectors associated with transport, such as construction, road construction those are currently under revision [35].

The „buy national“, especially „buy local“ programs certainly constitute sustainable public procurement initiatives as they support less international transport, less packaging, and support the creation and expansion of „green jobs“ and „green industries“.

Mitigation strategies that effectively incorporate LCA into transportation planning should involve the following [36]: changing analytical and decision criteria for project selection, improving the capability to compare different transportation modes to one another in planning and project financing processes, improving the capability to conduct analysis of complex environmental impacts into transportation planning before project selection occurs (i.e. not only in post-decisional environmental impact assessments, improving analytical integration across different spatial and temporal scales, and creating purchasing strategies that emphasize the use of products and materials with higher recycled content and establish relationships with suppliers that have instituted efficiency measures.

Finally, accounting for social costs and benefits is particularly challenging. For example, costs such as unemployment benefits that would have been necessary without the procurement of a given asset, or health care costs that would have been necessary if environmentally preferable alternatives would not be been procured, are particularly challenging to forecast [18].

8. CONCLUSION

Transport is the sector that in many ways exerts an impact on the environment – through production and operation of vehicles, construction and maintenance of infrastructure, and the transport component integrated in the delivery of goods, provision of services and performance of works.
Although there are now various instruments available for pursuing the procurement that will affect the environment less, there are still many complex obstacles in the way.

The first one is that in preparation stage seldom there occurs any analysis of various possible alternatives in transport projects, particularly with regard to their integral impact on the environment. Besides pollution and greenhouse gas production, particular attention should be paid to materials consumption, land use, and the consumption of water and energy.

The application of available LCC calculation models still requires multiskilled professionals of multidisciplinary background. Also, not always very clear and unambiguous wording of procurement legislation requires much skills to apply just procedure for achieving the desired environmental and sustainability goals.

Sustainability aspects should support public-public partnerships and „buy local“ programmes, and certainly less the public-private partnerships involving design, build, operate and maintain contracts. The costs of environmental protection and environmentally-friendly operations will hardly be borne by private sector.

9. LITERATURE


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