Chapter 13
Innovative Public Procurement Processes to Implement Sustainable Mobility Policies

Dan Caraman, Ștefan Roșeanu, Isolda Constantin, and Cristiana Dâmboianu

Abstract Investment in goods, services and works is demanding for any local authority in both time and money. The new legislative framework related to procurement across the EU brings a major shift in terms of procedures and requires a reconsideration of public authorities' organisation and capacities. The contracting authorities need to make more strategic decisions in relation to public procurement, to include environmental and social objectives and innovation potential in their selection. This paradigm shift requires changing the mentality and traditional ways of working of managers and professionals in LAs, to enable them to prepare long-term procurement strategies and action plans. Public procurement planning is an on-going process. New procurement procedures should build on the experience gained in the organisation by implementing similar projects, on the experience gained by the market and wider socio-economic changes. This chapter introduces innovative processes in procurement suitable for small–medium LAs wishing to finance sustainable transport measures. These include pre-commercial procurement, procurement of innovative solutions, joint procurement, whole life cycle costs-driven procurement, external transport costs. To further develop capacity in LAs to handle procurement issues, the SUITS Consortium has prepared online guidelines on innovative procurement, which were piloted prior to release in Alba Iulia. The integrated decision support tool is freely accessible from https://www.suits-project.eu/ids-tool/ and provides more detailed information on the contents of this chapter.

13.1 Introduction

As outlined in Chap. 2 (and see [1–8]), European cities are faced with a series of common challenges relating to transport and mobility, which together creates a negative effect on the European economy and on the quality of life of European citizens.

D. Caraman · Ș. Roșeanu (✉) · I. Constantin · C. Dâmboianu
Integral Consulting R&D, Bucharest, Romania
e-mail: stefan.roseanu@integralconsulting.ro

A. Woodcock et al. (eds.), *Capacity Building in Local Authorities for Sustainable Transport Planning*, Smart Innovation, Systems and Technologies 319,
https://doi.org/10.1007/978-981-19-6962-1_13

The Transport White Paper [1] proposes strategic objectives to be met by 2050. To reduce congestion and emissions, the paper calls for cities to follow a mixed strategy involving land-use planning, pricing schemes, efficient public transport services and infrastructure for non-motorised modes and charging of clean vehicles. It specifically encourages cities to develop SUMPs bringing all these elements together.

To rise to these challenges, far reaching, city-wide joint actions are needed by local authorities, transport operators, local business, logistic suppliers, landlords, estate developers, stakeholders and citizens. This volume has shown that there are a wide range of tools available to assist cities to develop efficient and effective interventions to benefit citizens. Public procurement reform plays a very important role in reaching these objectives:

- Every year, over 250,000 public authorities in the EU spend around 14% of GDP on the purchase of services, works and supplies. In many sectors such as energy, transport, waste management, social protection and the provision of health or education services, public authorities are the principal buyers. Transparent, fair and competitive public procurement across the EU's Single Market generates business opportunities, drives economic growth and creates jobs [2].
- The estimated value of tenders published in TED excluding utilities and defence 'shows an increase of 9.2%, from 319.66 in 2014 to 349.18 billion in 2015. […] Excluding utilities and defence, significant increases were in Romania (33%), Estonia (31%), Slovenia (24%), UK (23%) and Malta (21%)' [3].

The principles and legal framework of public procurement within the EU are mainly defined under directives 2014/24/EU [4], 2014/25/EU [5], 2014/23/EU [6] which enhance the efficiency of the public procurement system in Europe and foresee more intelligent rules and electronic procedures. At the same time, these new rules allow the authorities to use public procurement to try to achieve more far-reaching political objectives, such as the social, environmental and innovation objectives. Based on these directives, each member state has implemented a legislative package and methodologies providing a legal framework through which public procurement procedures must be conducted. In brief:

European Directives (17/2004/CE [7] and 18/2004/CE [8]) were developed as the first European regulatory step taken regarding procurement procedures. Research projects financed under European programmes, after 2004, pointed out innovative aspects with a view to a new approach to public procurement and included criteria such as energy consumption, environmental impact and life cycle costs [9–11].

This fuelled the need for reform in public procurement, which was seen as essential in domains of public interest, for instance transport, mobility, energy and innovation. In these areas of long-term development, evolution is rapid and supplies and services have a determining role in sustainable development and in enhancing life quality. As a result of the EC undertakings, as well as of the aspects pointed out through such research works, the following materials were produced:

- Directive 2009/33/CE [12] promotion of clean and energy-efficient road transport vehicles, amended by Directive of the European Parliament and of the Council 2019/1161 [13].
- Regulation (EC) no 1370/2007 [14], public passenger transport services by rail and by road.
- Directive 2014/24/EU on public procurement [4], replacing directive 2004/18/EC [8].
- Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors [5], replacing directive 2004/17/EC [7].
- Directive 2014/23/EU on the award of concession contracts [6], which does not directly replace a previous Directive.

The effect of applying these legal changes is the public procurement reform briefly described in the guidelines [15].

In line with the article referring to the transposition and transitional provisions under the directives, member states were asked to introduce laws, regulations and administrative provisions necessary to comply with these directives by 18 April 2016. The new legal framework contributes to enhancing the efficiency of the public procurement system in Europe and foresees more intelligent rules and a larger number of electronic procedures.

13.2 Context of Procurement Research in the SUITS Project

The overall goal of SUITS is to support cities to improve their capacity to reduce congestion and pollution, to develop sustainable mobility, in order to increase the quality of life of citizens.

One of the key areas of SUITS concerns the gaps in capacity of local authorities in small and medium-sized cities in terms of knowledge and working practices to implement the new EU directives on finance and procurement. To address this, three guidelines have been created to provide decision support for the development of sustainable mobility. Together these aimed to:

- Provide a useful and efficient tool to apply innovative measures in procurement policies and procedures related to sustainable mobility development
- Enhance the administrative capacity of authorities and stakeholders in small and medium-sized cities with a view to facilitating sustainable mobility development.

Three documents have been created, accessible from https://www.suits-project.eu/, namely:

1. Guideline for applying innovative and sustainable financing approaches
2. Guideline to innovative public procurement (which is the topic of this chapter) and

3. Guideline for the development of bankable projects, new models and business partnerships

The guideline documents offer a general overview of the respective topic, with a series of annexes providing additional information, examples and selected references useful for understanding concepts (such as life cycle costs and external costs), the way to use them in the process of preparing strategies and public policy documents aimed at developing sustainable mobility.

The guidelines' goals are as follows:

- To provide a useful and efficient tool to apply innovative measures in procurement policies and procedures related to sustainable mobility development
- To enhance the administrative capacity of authorities and stakeholders in small and medium-sized cities with a view to facilitating sustainable mobility development.

In 2004, the European Directives (17/2004/CE [7] and 18/2004/CE [8]) were developed as the first European regulatory step taken regarding procurement procedures. Research projects financed under European programmes, after 2004, pointed out innovative aspects with a view to a new approach to public procurement and included criteria such as energy consumption, environmental impact and life cycle costs [9–11].

13.3 Innovative Public Procurement Processes for Sustainable Mobility

Transport is vital for mobility and economic development, but its development (by transport modes) is still chaotic or short term, and not in line with the White Paper on Transport, COM (2011) 144 final—Roadmap to a Single European Transport Area—Towards a competitive and resource-efficient transport system [1]. This is the case, especially when the external costs are not sufficiently quantified, and agreement has not been reached on their internalisation. External costs (e.g., gas emissions, noise pollution, accident costs, traffic congestion and parking, etc.) are not included in fares paid for travel but are paid by the entire society. EC considered that public procurement procedures are the most important lever that can bring about fast technical progress, in the desired direction, especially in the context of preparing long-term sustainable mobility policy. The following sections introduce some of the more innovative and recent public procurement processes around sustainable mobility.

13.3.1 Pre-commercial Procurement (PCP)

PCP refers to public procurement of research and development services, not including their implementation into the final commercial products. The challenge is to enable

public purchasers to collectively implement PCPs to close the gap between supply and demand for innovative ICTs. The objective is to bring radical improvements to the quality and efficiency of public services by encouraging the development and validation of breakthrough solutions through pre-commercial procurement [16].

PCP can be used when the market fails to provide solutions able to meet the purchasers' requirements. Procurement processes are used to get new solutions developed and tested, to meet long-term ambitions of the LA. PCP allows for a comparison across alternative approaches to solutions, by designing the solutions, developing and testing the model or prototype [15].

PCP directs innovative development towards public sector needs, allowing for a comparison or validation of the various approach solutions. PCP achieves market openings for SMEs and an acceptable management of innovation risk through small contracts, gradually growing in size [17].

In PCP, the public purchaser chooses not to keep the research and development (R&D) results exclusively for their own use. This approach is based on:

- Risk-benefit sharing according to market conditions (both for the public purchaser and for the companies involved in PCP),
- Competitive development in phases,
- Separation of the R&D phase from deployment of commercial volumes of end-products.

For instance, the phases may refer to defining the research, exploring the solutions, prototyping, piloting a small series of products or services to prove that they are ready for production and/or delivery at acceptable quality standards. On the other hand, contracted R&D activities do not include commercial development activities such as production in large quantities.

PCP procedures are organised stage by stage, evaluating each R&D stage to progressively select the best solutions. For the last stage, at least, two competitors are selected, to ensure a competitive market.

13.3.2 Procurement of Innovative Solutions (PPI)

PPI can be used when challenges of public interest can be approached through innovative solutions which are almost finalised and do not require research funding to develop new solutions. In this case, suppliers can purchase existing solutions to be delivered and tested at deadlines, integrating them into existing products and services. A PPI may still involve conformance testing before deployment [18].

PPI can thus be used when there is no need for procurement of new R&D to bring solutions to the market. This procedure sends a clear signal from a sizeable amount of early adopters/launch customers that they are willing to purchase and deploy the innovative solutions if they can be delivered to the desired quality, price and time.

The main differences between PCP and PPI processes are summarised below (Table 13.1).

Table 13.1 Main differences between PCP and PPI processes [18]

Category	PCP	PPI
Consortium	3 legal entities, minimum 2 of them public procurers	3 legal entities, minimum 2 of them public procurers
EU grants	90%	35%
When?	Requires R&D to get new solutions developed. Problem clear, but pros/cons of competing solutions not compared or validated yet No commitment to deploy yet	Requires solution which is almost on the market/already on the market in small quantity, but not meeting public sector requirements for large-scale deployment yet. No R&D involved
What?	Public sector buys R&D to steer development of solutions to its needs, gather knowledge about pros/cons of alternative solutions, to avoid supplier lock-in later	Public sector acts as launch customer/early adopter for innovative products and services that are new to the market
How?	Public sector buys R&D from several suppliers in parallel (comparing alternative solution approaches), in the form of competition evaluating progress after critical milestones, risks and benefits of R&D shared with suppliers to maximise incentives for wide commercialisation	Public sector acts as a facilitator establishing a buyer's group with critical mass that triggers industry to scale up its production chain to bring products on the market with the desired quality/price ratio within a specific time. After a test and/or certification, the buyers group purchases a significant volume of products
Eligible activities	• Joint procurement of the R&D services • Implementation of procurement contracts • Assessment of outcomes of the procurement • Confirmation of 'after PCP' strategy for dissemination/exploitation of results	• Joint procurement of innovative solutions • Implementation of procurement contracts • Assessment of outcomes of the procurement • Confirmation of 'after PPI' strategy for dissemination/exploitation of results

13.3.3 Joint Procurement Processes

Another direction that can be followed by public authorities in the preparation of procurement in the field of sustainable urban mobility is to organise public procurement procedures jointly. Joint public procurement means that procurement activities can be shared by two or more contracting authorities (CAs). The key defining feature is that there must be a single offer published by all participating authorities [18].

Joint procurement is not a completely new concept in the European Union legal and regulatory framework. The directive 2004/18/EC [8] and directive 2004/17/EC

[7] included provisions related to joint procurement procedures, and joint procurement agencies have been organised in the past in EU member states, for example public authorities in the UK, the Netherlands and Germany have been buying together for a number of years. However, in many European countries, especially in the South, there is often little or no experience in this area, as we can see in examples selected in Table 13.2 [3, 19]. The 2016 public procurement directives provide better clarifications and rules in setting the procedures.

However, the new directives are not intended to prescribe either joint or separate contract awards, and CAs have to evaluate which is the best way to organise the procurement process, given their past experience and situation [4, 20].

Centralised purchasing activities represent those conducted on a permanent basis, either for the acquisition of supplies and services intended for contracting authorities or for the award of public contracts or the conclusion of framework agreements for works, supplies or services intended for CAs [4].

In this situation, a central purchasing body is a CA providing centralised purchasing activities and, possibly, ancillary purchasing activities [4].

Contracting authorities rarely buy together, with only 11% of procedures carried out through joint procurement. This is a missed opportunity as buying in bulk can result in better prices and higher quality goods and services and help to exchange know-how between CAs [22]. ICLEI considered that joint procurement procedures may represent:

- an entry-door for introducing sustainable procurement
- a launching platform for customers for environmentally innovative solutions
- a solution to reduce the price of environmentally sound products and services
- a way to introduce new products into national markets
- a solution to standardise environmental demands
- a way of pooling environmental expertise
- a means of encouraging suppliers to develop new products [19].

Joint procurement procedures organised by CAs from the same member state can take different forms:

- CAs may coordinate their procurement through the preparation of common technical specifications that will be later procured by a number of CAs, each conducting a separate procurement procedure
- CAs jointly conduct one procurement procedure either by acting together or by entrusting one contracting authority with the management of the procurement on behalf of all contracting authorities.

When implementing joint procurement procedures, CAs are jointly responsible for fulfilling their obligations required by the public procurement directives. This applies also in cases where one contracting authority manages the procedure, acting on its own behalf and on behalf of the other contracting authorities.

The responsibility is linked only to the procedure implemented by the respective CA, and, only where parts of the procurement procedure are jointly conducted by CAs, the joint responsibility is applicable only to those parts of the procedure that

Table 13.2 Joint procurement process approach in EU member states

Countries	Total procurement (Mil. EUR)	Procurement (% GDP)	Joint purchase (%)	Central purchasing
Malta	700	10	71	Yes
United Kingdom	274,600	14	21	Yes
Belgium	52,010	14	15	Yes
Cyprus	1,090	7	15	No
Latvia	2,660	11	15	No
Denmark	33,800	14	14	Yes
Slovenia	4,450	13	12	No
Sweden	68,680	16	10	Yes
Finland	34,460	18	10	Yes
Italy	157,230	10	10	Yes
Hungary	13,730	14	10	Yes
Ireland	15,540	9	9	Yes
Croatia	5,300	12	9	Yes
Slovakia	8,480	12	6	Yes
Lithuania	3,420	10	6	Yes
France	306,980	15	5	Yes
Austria	35,180	11	5	Yes
Czech Republic	21,480	14	5	No
Luxembourg	5,470	12	5	No
Germany	401,730	15	4	Yes
Estonia	2,450	13	4	Yes
The Netherlands	136,320	23	3	No
Poland	46,970	12	3	No
Spain	99,600	10	2	Yes
Portugal	17,290	10	2	Yes
Romania	15,980	11	1	No
Bulgaria	4,810	12	1	Yes
Greece	16,230	9	0	No

Source Directorate-General for Regional and Urban Policy (European Commission), PWC, Stock-taking of administrative capacity, systems and practices across the EU to ensure the compliance and quality of public procurement involving European Structural and Investment (ESI) Funds. Final report–Study, EU publications, Brussels, 2016, 8.2. Appendix 2: Individual country profiles (p. 112) [21]

have been carried out together. For the procedures or part of procedures, one CA is implementing separately; the respective CA is fully responsible [4, 20].

13.3.4 Life Cycle Costs (LCC)-Driven Procurement

The 'Life Cycle Costs (LCC)' concept defines the accumulated costs of a product throughout its whole life cycle (from product design to its disposal).

Lifetime expenses can be assessed on the basis of statistical, probabilistic data and mathematical models, which take into account the components of the LCC: purchase price, energy costs, operating and maintenance costs (labour, consumables, spare parts, repairs, upgrades, training, logistical expenses, etc.), decommissioning at the end of the period, opportunity costs (improving operational safety, reducing consumption and pollution, etc.), inflation, labour costs, fuel, exchange rate, penalties due to unavailability and accidents, etc. As illustrated in Figs. 13.1 and 13.2, acquisition costs play a small ratio during the life cycle of major transport assets (it is less than 23% for railway rolling stock or about 43% for electric buses).

The concept (as well as the modalities of approach, calculation, applications) is defined through standard EN60300-3–3:2004 [23], reviewed through IEC 60,300–3-3 Ed. 3.0 b:2017 [24].

Calculations can be complex and specific to each application. For products and services with a long life having major impacts on the environment, cost and quality of life (such as infrastructures for urban rail transport), the LCC criterion is a more appropriate criterion than the purchase price.

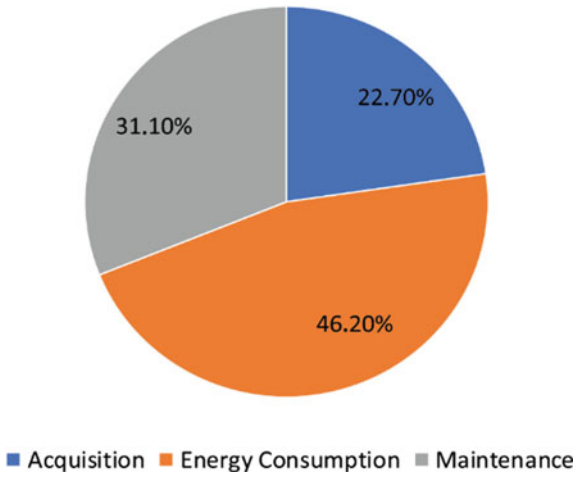

Fig. 13.1 LCC for locomotives used for passenger service [25]

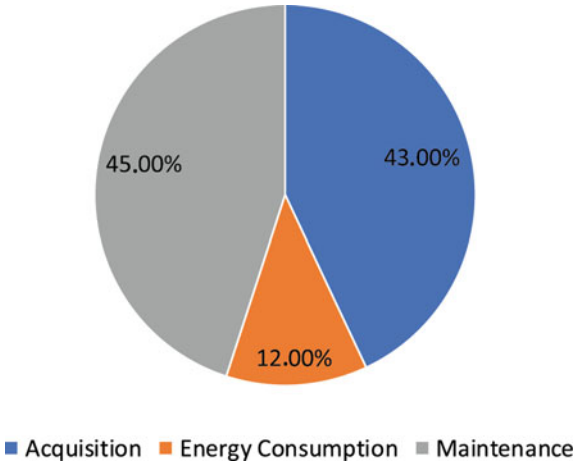

Fig. 13.2 LCC for electric bus with 250 kWh on-board [26]

When LAs do not have the respective competency to calculate LCC, they can transfer this responsibility to suppliers through the objectives set in procurement documents. It is not necessary for the purchaser to be concerned about their performance and to set this as their objective.

However, it has been found that car transport can be drastically diminished (due to huge external costs, compared to other modes of transport) from the perspective of sustainable development strategies. That is why the EC considered that public procurement procedures are the most important lever for accelerating technical progress in the desired direction.

LCC-driven procurement calls for compliance with the basic principles of any public procurement: non-discrimination, equal treatment, mutual recognition, transparency, proportionality and responsibility.

Given the laboriousness of LCC calculations (Fig. 13.3) and the fact that these have to be done on a case by case basis, as part of the tendering process, the LA should request the LCC results from the tenderers. The tenderers are specialised in the research and design of the respective product, have operational data and are used to making such calculations as part of the product's future development. In the case of a complex product, the suppliers request such data from the sub-suppliers. Meeting the requirements of such a procurement procedure allows competitive suppliers the opportunity to develop innovative products and solutions and show their long-term benefits, which will make them more attractive to investors.

In order to prepare the procurement procedure, the contracting authority should carry out the following specific operations:

- Break down LCC into cost elements—according to EN 60300-3-3/2017, the specific character of the respective product
- Set unit prices to be used in the calculation: electric energy, fuel, emissions, labour, spare parts

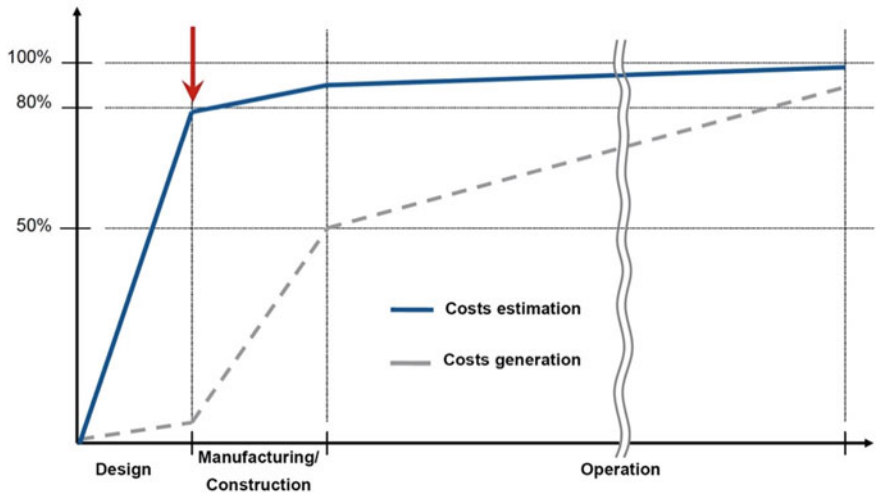

Fig. 13.3 Life cycle of public transport systems and subsystems *Source* Leuven et al. 'Urban Track Project. Final Publishable Activity Report', European Transport Network Alliance 2020, N/A, 2010, p. 70 [18]

- Set a calculation methodology so that LCC may be calculated in the same way by all the tenderers
- Set standardised forms for tendering the required data so that the tenders may be easier to compare to one another
- Set the conditions for data check, with the support of simulation tests, acceptance tests, LCC periodic tests throughout the life cycle or over determined periods of time
- Set the nature of collaboration with the supplier for these checks
- Set the supplier's liability in case of deviations of the data as measured from those provided
- Set, through the award and contract documentation, a bonus–malus policy regarding the results of the periodic checks, the application of subsequent innovative solutions, the collaboration modality, etc.

These activities are quite specialised. If the contracting authority does not have staff with the necessary experience to carry out these activities, they may wish to enlist the help of specialised consultants.

13.3.5 External Transport Costs

External transport costs refer to the transport-generated costs impacting and incurred by the whole society. These include costs such as those caused by traffic congestion, road accidents, air pollution, climatic changes from greenhouse gases (GHG), noise,

transport infrastructure wear and tear [27], as well as socio-economic factors related to transport poverty (where life chances are restricted due to inadequacies in transport provision).

The internalisation of external costs is aimed at ensuring fairer competition amongst transport modes [28], with over 93% of the overall external costs are generated by car transport [29, 30], as well as the reduction of the costs incurred by the whole society, in line with the 'polluter pays' and 'user pays' principles [31].

For prices to reflect the internal costs, it is necessary to evaluate the value of each category of external cost [32].

Back in 2011, the European Commission adopted a detailed strategy called '**Transport 2050'** transposed through the White Paper on Transports COM (2011) 144 final [31]. The strategy sets a very ambitious framework to support sustainable mobility measures:

- **Creating a fair financial environment: a novel approach to transport taxes.** Transport charges and taxes must be restructured in the direction of wider application of the 'polluter pays' and 'user pays' principle. Infrastructure costs should be applied to motor cars.
- A second stage concerns **internalisation of the costs applicable to all motor cars,** in order to cover both infrastructure costs and the social costs of congestion, CO_2 emissions (if not included in the fuel tax), local pollution, noise and accidents.
- Total transport external costs (all modes) for the EU28, in 2016, were as follows: € 987 billion (6.6% of GDP) [33].
- These costs are distributed across the main categories of external costs as follows: accidents—29%; congestions—27%; air pollution—14%; climatic changes—14% [33]. Out of the overall external costs, 93% is generated by car transport.
- **Traffic congestion** cost Europe (in 2016) approximately € 270 billion, 1.9% of the gross domestic product per year [33]. Congestion costs will increase by about 50% by 2050 [31]. Apart from social and time costs, traffic congestions significantly increase CO_2 and greenhouse gas (GHG) emissions, noise, harmful effects on health.
- Urban mobility accounts for 40% of all CO_2 emissions of road transport and up to 70% of other pollutants from transport [34].
    - The social costs of accidents and noise would continue to increase. In 2012, the European average was 55 deaths for 1 million inhabitants, with as much as almost 100 deaths per million of inhabitants in some countries. Every year, some 1.3 million people die as a result of road traffic crashes worldwide—more than 3,500 deaths each day [35]. The social cost was estimated at EUR 250 billion in 2012, approx. 2% of the EU's GDP [36].

        69% of road accidents take place in cities [31, 30].

        97% of transport fatalities (all transport modes) occur in road accidents.
- Transport accounts for approximately one quarter of the overall greenhouse gas emissions (GHG) in Europe. Out of the overall traffic emissions in 2014, car transport accounted for **72.8%,** whilst rail transport accounted for 0.6% [37].

Understanding the concept of external transport costs can lead to two types of action:

1. Development of a strategy to develop sustainable mobility based on minimising external costs. Sustainable urban transport will be mainly achieved by developing high performing and attractive public transport based on high-capacity, safe, fast vehicles unlikely to cause traffic congestion and featuring a low emission level [underground trains, light rail, trams]. This principal means of transport will be completed with buses and electric trolleybuses. To achieve this, citizens' awareness needs to be raised about walking, bike and scooter riding for any type of journey. Such policy will result in a reduction of car journeys and a significant reduction in the actual external costs incurred by society. Many studies, projects [38] and European directives [39, 40] set the principles and modalities to develop such strategies.
2. Applying measures which take into account external costs. Guidelines for applying the internalisation of external costs were set through the European Commission Communication COM (2008) 435 final [41], together with the technical annex referring to strategy—SEC (2008) 2207 [32], with the document SEC (2008) 2208 [42]—impact assessment of the internalisation of external costs and SEC (2008) 2209 [43]—summary of the Impact assessment of the internalisation of external costs.

The main economic tools used for the internalisation of external costs are levies, taxes (or utilisation tariffs) and, under certain circumstances [44], emission rights trading.

A good knowledge of the particularities of each external cost, of the parameters it depends on, and of the local conditions are necessary and important in order to analyse the adequate economic tools. The economic tools should be applied in a differentiated way so that cost internalisation may be efficient, support fair competition amongst transport modes and protect the good operation of the domestic market. The general internalisation principle is as follows: 'pricing at the social marginal cost' in keeping with the 'polluter pays' and 'user pays' principles.

Besides the numerous studies dedicated to external costs and their internalisation, we recommend the European Commission's synthesis documents [32, 42, 45, 46], 'Guidelines to Innovative Financing' [46], as well as the other selected documents referred to in the bibliography.

13.4 Conclusions

In most urban centres that manage urban transport systems, the ownership right is exercised by the local public authorities and managed by the transport operator. Due to the restriction of the activity of some of the systems and also in the context of the construction of 'Chinese walls' between the administrative function and the operating one, the technical capacity of the public authority has diminished, which

has a negative impact on the preparation and implementation of investment projects in urban road and light rail transport infrastructures.

The increased appetite for new investments, manifested in the post-2010 period, overlaps a reform of the national and European public procurement systems manifested by the package of European directives in 2014. The European Commission has agreed to finance various projects, research that will contribute to the promotion of innovative measures in the field of public procurement with a role in implementing sustainable urban mobility measures. Within the Horizon 2020 research programme, the SUITS research and innovation project represents a research vector in the field, whilst the Guideline on Innovative Public Procurement (https://www.suits-project.eu/innovative-procurement/) will help local public authorities to increase their administrative capacity in the field of sustainable mobility.

In the case of LCC, the correct sharing of responsibility between the contracting authority and the bidders can contribute with significant reductions in financial effort during the 30–50 years of project implementation, thus supporting the applied research in the transport systems investment field.

Using R&D activities in preparing the procurement procedures is the only modality to progress by applying innovative solutions to develop a sustainable modality, to the major benefit of the whole society.

The described procedures can be complemented with local specific elements able to foster the development of partnerships with R&D companies (particularly SMEs and small entrepreneurs), under competitive conditions, which should allow for the main requirements to be identified and carried out in the perspective of future public procurements.

Innovative partnerships and the described procedures include elements which are different from those in the usual procurements. With a view to their efficient and correct development, public administrations should understand their importance and prepare an operational and management team able to carry out the required activities in a creative way and with much determination.

Joint acquisitions can be carried out either through the voluntary association of several local public authorities with common interests or through the organisation of centralised procurement agencies. Such procedures allow standardisation of some key elements of the urban transport system, characterised, otherwise, by excessive localisation and apparently customised technical solutions. This standardisation allows for economies of scale, whilst leaving the responsibility for implementation at the level of each authority participating in the process.

Active cooperation with the research and industrial environment is important for local authorities who want to implement modern sustainable mobility solutions so that the bidding for technical solutions meets the implementation horizon of 30–50 years and avoids obsolete technologies, with negative impact on the public budget.

Such innovative procedures require selection and training of the personnel in charge. This objective can be achieved by means of adequate decision-making support tools in aid of innovative and sustainable financing, the implementation

of schemes for innovative procurement and of development of new business models and partnerships.

The SUITS Project Consortium has researched and prepared Guidelines to Innovative Procurements to help decision-makers in S–M cities in relation to the development of sustainable mobility. The results of the guidelines are part of an integrated decision support tool.

References

1. European Commission, White Paper on Transport, COM: 144 final—Roadmap to a Single European Transport Area—Towards a Competitive and Resource Efficient Transport System. European Commission, Brussels (2011)
2. European Commission: DG GROW, Public Procurement. https://ec.europa.eu/growth/single-market/public-procurement_en (n/a). Last accessed 04 March 2018
3. European Parliament, Council of the European Union: Directive 2014/24/EU of the European Parliament and of the council of 26 February 2014 on public procurement and repealing directive 2004/18/EC Text with EEA relevance. Off. J. Eur. Union **57**(L94), 65–242 (2014c)
4. European Parliament, Council of the European Union: Directive 2014/25/EU of the European Parliament and of the council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC. Off. J. Eur. Union **57**(L94), 243–374 (2014b)
5. European Parliament, Council of the European Union: Directive 2014/23/EU of the European Parliament and of the council of 26 February 2014 on the award of concession contracts. Off. J. Eur. Union **57**(L94), 1–64 (2014a)
6. European Parliament, Council of the European Union: Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors. Off. J. Eur. Union **47**(L134), 1–113 (2004a).
7. European Parliament, Council of the European Union: Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts. Off J Eur Union **47**(L134), 114–240 (2004b)
8. European Commission–Inteligent Energy Europe: Energy efficiency and environmental criteria in the awarding of regional rail transport vehicles and services (ECORAILS). https://ec.europa.eu/energy/intelligent/projects/en/projects/ecorails. Last accessed 2 Oct 2019
9. UIC–International Union of Railways: PROSPER (Procedures for Rolling Stock Procurement with Environmental Requirements). https://www.railway-energy.org/static/PROSPER__Procedures_for_Rolling_Stock_Procurement_with_Environmental_Requirements__32.php (2003). Last accessed 14 June 2019
10. UNIFE–the Association of European Railway Industries: "Railenergy," Adam Foster Web Engineering. http://www.railenergy.org/. Last accessed 14 June 2019
11. European Parliament, Council of the European Union: Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles. Off. J. Eur. Union **52**(L120):5–12 (2009)
12. European Parliament, Council of the European Union: Directive (EU) 2019/1161 of the European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles. Off. J. Eur. Union **62**(L188), 116–130 (2019)
13. European Parliament, Council of the European Union: Regulation (EC) No 1370/2007 of the European Parliament and of the council of 23 October 2007 on public passenger transport

services by rail and by road and repealing Council Regulations (EEC) Nos 1191/69 and 1107/70. Off. J. Eur. Union **50**(L315), 1–13 (2007)
14. Caraman, D., Constantin, I., Damboianu, C., Roseanu, S.: Guidelines to Innovative Procurement. Integral Consulting R&D, Bucharest (2019)
15. Tsanidis, V.: Policy Framework in Innovation Procurement. European Commission–DG CNECT
16. Leuven, A.V., Corre, F.L., Schnieders, I., Thijssen, D., Schreiter, H., Wragge, V., Vanhonacker, T., Hamoller, G., Janig, N., Rodriguez, N., Jong, M.D., Rupp, T.: Urban Track Project. Final Publishable Activity Report. European Transport Network Alliance (2010)
17. European Commission: Funding & tender opportunities. Horizon 2020 Framework Programme (H2020). European Commission, Brussels (2017)
18. ICLEI–Local Governments for Sustainability, „Joint procurement. Fact sheet," European Commission, DG Environment-G2, Bruxelles (2008)
19. Organisation for Economic Co-operation and Development: Centralised and decentralised public procurement. SIGMA Papers **29**, 2–17 (2000)
20. PWC: Stock-taking of administrative capacity, systems and practices across the EU to ensure the compliance and quality of public procurement involving European Structural and Investment (ESI) Funds. Final report: country profiles. European Commission–Directorate-General for Regional and Urban Policy, Brussels (2016)
21. European Commission–DG GROW: Public procurement strategy. http://ec.europa.eu/growth/single-market/public-procurement/strategy_en. Last accessed 18 July 2018
22. CENELEC–European Commitee for Electrotechnical Standardization: EN 60300–3–3 :2004. Part 3–3: Application Guide. Life Cycle Costing. CENELEC–European Commitee for Electrotechnical Standardization, Bruxelles (2004)
23. IEC–International Electrotechnical Commission: IEC 60300–3–3 Ed.3.0 b:2017. Part 3–3: Application Guide. Life Cycle Costing. IEC–International Electrotechnical Commission (2017)
24. UIC–International Union of Railways: LCC-driven procurement. http://www.railway-energy.org/static/LCC_driven_procurement_87.php (2002). Last accessed 25 Feb 2018
25. O'Donovan, A., Frith, J., McKerracher, C.: Electric Buses in Cities–Driving Towards Cleaner Air and Lower CO2. Bloomberg New Energy Finance (2018)
26. Korzhenevych, A., Dehnen, N., Bröcker, J., Holtkamp, M., Meier, H., Gibson, G., Varma, A.. Cox, V.: Update of the Handbook on External Costs of Transport. Final Report. Ricardo-AEA, London (2014)
27. Commission of the European Communities: COM/95/0691 final–towards fair and efficient pricing in transport policy–options for internalising the external cost of transport in the European Union–Green Paper. Commission of the European Communities, Brussels
28. Essen, H.V., Schroten, A., Otten, M., Sutter, D., Schreyer, C., Zandonella, R., Maibach, M., Doll, C.: External Costs of Transport in Europe. Update Study for 2008. CE Delft, Infras, Fraunhofer ISI, Delft (2011)
29. European Transport Safety Council: 13th Annual Road Safety Performance Index (PIN) Report. https://etsc.eu/13th-annual-road-safety-performance-index-pin-report/. (2019). Last accessed 10 July 2019
30. European Commission: COM/2011/0144 final—WHITE PAPER Roadmap to a Single European Transport Area—Towards a competitive and resource efficient transport system. European Commission, Brussels (2011)
31. European Commission: SEC/2008/2207 final–Stratégie pour une mise en œuvre de l'internalisation des coûts externs–Annexe technique à la stratégie pour une mise en œuvre de l'internalisation des coûts externs. European Commission, Brussels (2008)
32. Essen, H.V: Sustainable Transport Infrastructure Charging and Internalisation of Transport Externalities. CE Delft, Delft (2018)
33. European Commission–DG MOVE: Clean transport, Urban transport. Urban mobility. https://ec.europa.eu/transport/themes/urban/urban_mobility_en (2019). Last accessed 15 Aug 2019

34. Economic Commission for Europe Inland Transport Committee: Informal Document no. 6 Secretariat. Final. (2011)
35. European Transport Safety Council (ETSC): Police Reform and Consequences for Road Safety. European Transport Safety Council (2012)
36. European Commission–Secretariat-General: COM/2016/0501 final–A European Strategy for Low-Emission Mobility. European Commission, Brussels (2016)
37. Rupprecht, S., Brand, L., Böhler-Baedeker, S., Brunner, L.M., Colclough, A., Dragutescu, A., Horvat, M., Durlin, T., Werland, S., Rudolph, F.: Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan, 2nd edn, Final Draft for SUMP Conference. Rupprecht Consult–Forschung & Beratung GmbH (2019)
38. European Commision: COM/2013/0913 final - Together towards competitive and resource-efficient urban mobility. European Commision, Brussels (2013)
39. European Commission: ANNEX 1—Annex. A Concept for Sustainable Urban Mobility Plans to Communication Together towards competitive and resource-efficient urban mobility. European Commission, Brussels (2013)
40. European Commision: COM/2008/0435 final–Strategy for the Internalisation of External Costs. European Commision, Brussels (2008)
41. European Commission: SEC/2008/2208 final–Strategy for an Internalisation of External Costs and the Proposal for a Directive of the European Parliament and of the Council Amending Directive 1999/62/EC on the Charging of Heavy Goods Vehicles for the Use of certain infra. European Commission, Brussels (2008a)
42. European Commission: SEC/2008/2209 Final–Strategy for an Internalisation of External Costs and the Proposal for a Directive of the European Parliament and of the Council Amending Directive 1999/62/EC on the Charging of Heavy Goods Vehicles for the Use of Certain Infra. European Commission, Brussels (2008b)
43. European Parliament, Council of the European Union: Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814. Off. J. Eur. Union 61(L 76), 3–27 (2018)
44. European Commission–DG MOVE: COM/2017/0653 Final–Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Amending Directive 2009/33/EU on the Promotion of Clean and Energy-Efficient Road Transport Vehicles. European Commission–DG MOVE, Brussels (2017b)
45. European Commission–DG MOVE: COM/2017/0653 Final–ANNEX to the Proposal for a Directive of the European Parliament and of the Council Amending Directive 2009/33/EC on the Promotion of Clean and Energy-Efficient Road Transport Vehicles. European Commission, Brussels (2017a)
46. Lugovoi, A., Parker, A.: Guidelines to Innovative Financing, Appendix C1–Congestion Charge. ARCADIS, UK; SUITS Project (2019)