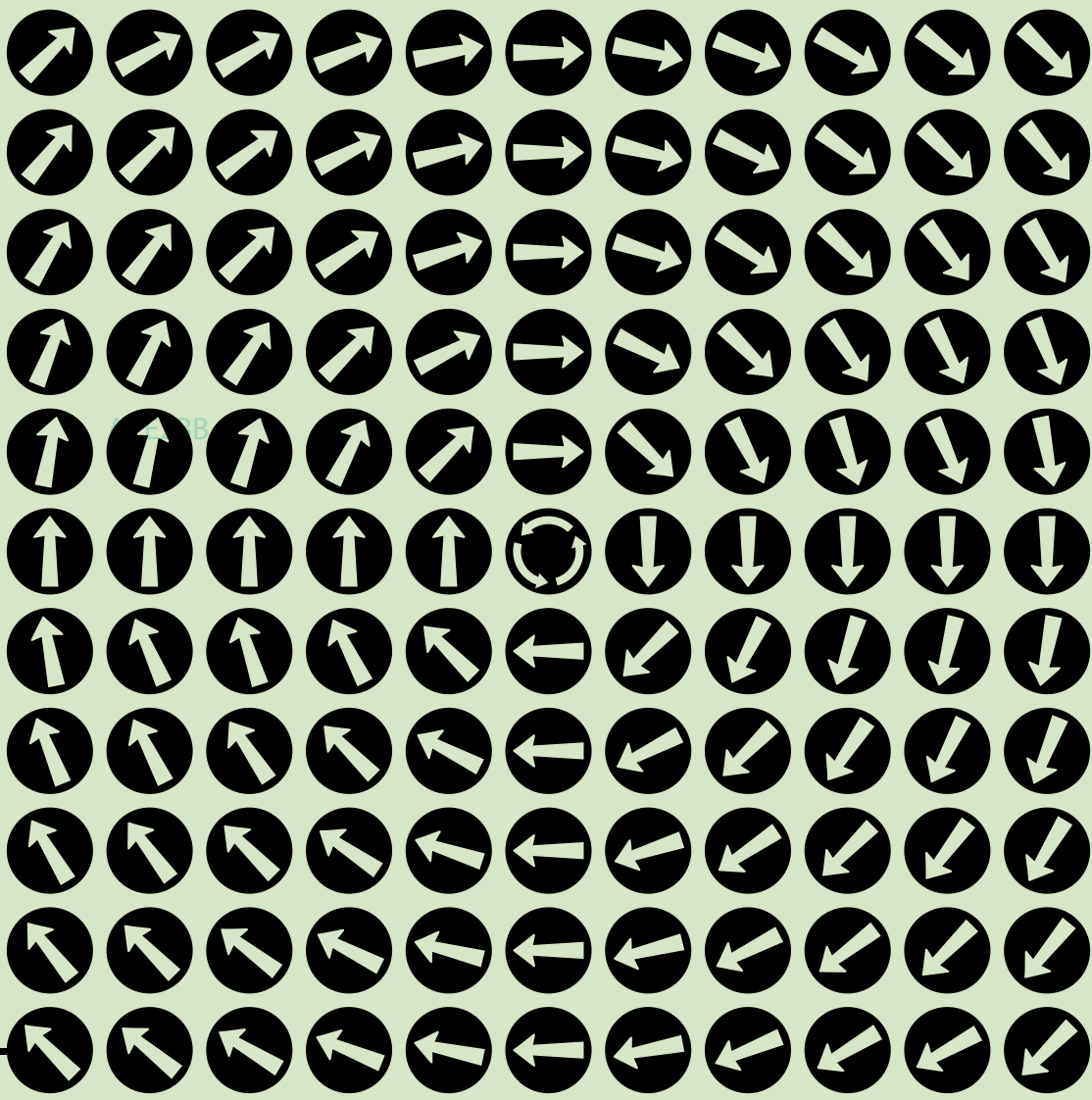


**METHODOLOGICAL MANUAL
FOR GREEN AND CIRCULAR PUBLIC
PROCUREMENT IN THE CITY OF KOŠICE**



Authors:

Juraj Tkáč – creatio eu, s.r.o.

Ivana Maleš – Inštitút cirkulárnej ekonomiky, o.z.

Contributors:

Adriana Šebešová – mesto Košice

Martin Šustrík – mesto Košice

Zuzana Špuntová

Graphic design:

Maroš Juhás, Creative Industry Košice, n.o.

Proofreading:

Mária Klapaková

**METHODOLOGICAL MANUAL
FOR GREEN AND CIRCULAR PUBLIC
PROCUREMENT IN THE CITY OF KOŠICE**

Project Partners:

City of Oslo, Norway

City of Aachen, Germany

City of Košice, Slovakia

SINTEF AS, Norway

Creative Industry Košice, n. o., Slovakia

Funding Source:

NetZeroCities Enabling City Transformation Programme (ECT),
the European Union's Horizon Europe programme,
GRIP (Green Responsible Innovative Procurement) project.

Statement:

The content of this output reflects the views of the authors only. The European Commission is not responsible for any use that may be made of the information contained herein.

Published by:

Creative Industry Košice, n. o., v roku 2026.



Financovaný
Európskou úniou

**NET
ZERO
CITIES**

CONTENTS

STRATEGIC IMPERATIVE, NEEDS ASSESSMENT AND THE PRACTICAL PURPOSE OF THE MANUAL	6
INFORMATION AND COMMUNICATION TECHNOLOGIES – PERSONAL COMPUTERS AND MONITORS	16
INFORMATION AND COMMUNICATION TECHNOLOGIES – DISPLAY DEVICES	32
INFORMATION AND COMMUNICATION TECHNOLOGIES – MOBILE DEVICES (SMARTPHONES AND TABLETS)	44
INFORMATION AND COMMUNICATION TECHNOLOGIES – SERVERS, DATA CENTRES AND NETWORK INFRASTRUCTURE	56
CLEANING PRODUCTS AND CLEANING SERVICES	66
CONSTRUCTION AND RECONSTRUCTION OF ROAD INFRASTRUCTURE	78
CONSTRUCTION AND BUILDING RENOVATION	98
PRELIMINARY MARKET CONSULTATIONS AS A TOOL FOR ELIMINATING MARKET BARRIERS AND THE FEAR OF FAILURE	111

STRATEGIC IMPERATIVE, NEEDS ASSESSMENT AND THE PRACTICAL PURPOSE OF THE MANUAL

1

1.1 The GRIP project's mission and the strategic context of the City of Košice

Public procurement within European local authorities has long since ceased to be merely a routine administrative process for procuring goods and services. From a macroeconomic and strategic perspective, it is one of the most powerful instruments of economic policy. For the city of Košice, as Slovakia's second-largest city and a major regional public investor, the allocation of public resources represents enormous potential for shaping the local market. The GRIP (Green Responsible Innovative Procurement) project comes at a critical time, as the city of Košice faces challenges linked to climate change, the modernisation of outdated infrastructure and the need to transition to a circular economy.

Within the international GRIP project consortium, the city of Košice plays a specific and irreplaceable role. Whilst Oslo in Norway acts as a 'mentor', with a highly developed institutional and financial framework for green procurement, and Aachen in Germany as an 'adopter' of this know-how within a strict legislative environment, Košice fulfils the role of a 'Living Lab'. The aim of this strategic constellation is to test a fundamental hypothesis:

is it possible to successfully implement ambitious elements of green public procurement (GPP) even in cities and regions facing objective budgetary constraints, staff shortages, and where the market remains heavily distorted by a 'lowest price' culture?

The mission of the GRIP project in Košice is therefore deeply transformative. It is not merely a matter of meeting European quotas on a one-off basis, but of systematically building the internal capacities of the city council and municipal

enterprises. The project builds on collaboration with Creative Industry Košice (CIKE), which brings a vital element of innovation and design thinking to a rigid bureaucratic environment. The main purpose of this methodological handbook is to translate these ambitious strategic goals into everyday practice.

The manual is a direct response to the city's need to align its procurement practices with long-term climate goals, in a way that safeguards public finances and stimulates the local market to offer innovative, low-emission and circular solutions.

1.2 From theoretical concepts to an operational tool (purpose of the manual)

A key finding that preceded the drafting of this document was the fact that existing methodologies and guidelines on green public procurement (whether at national or European level) are often counterproductive for the average procurement officer. They are characterised by their excessive length, over-theoretical nature and frequent use of technical jargon. For a public procurement officer operating under constant time pressure, under the pressure to meet budget expenditure milestones and facing the constant threat of an audit by the Public Procurement Office (ÚVO), the Supreme Audit Office (NKÚ), a government audit, or other supervisory bodies, a theoretical handbook represents more of an administrative obstacle than a help. This manual was therefore designed from the outset with a completely different philosophy.

Its aim is not to be a theoretical textbook on environmental studies, but a practical toolkit for employees of the City of Košice and its budgetary or subsidised organisations.

1. Ensuring legal certainty and minimising risk

The purchaser is not, and cannot be, an expert on the chemical composition of cleaning products or on the recyclability of asphalt mixtures. The manual therefore provides them with tried-and-tested and legally unassailable wording that refers directly to European legislation or internationally recognised eco-labels (EU Ecolabel, Energy Star, TCO Certified, etc.). This minimises the risk of discriminatory tender conditions.

2. Providing practical, easy-to-apply recommendations

At the heart of the manual are specific, precisely worded clauses for contractual terms, technical specifications and conditions of participation. Staff preparing public procurement procedures can simply copy and paste these blocks of text into their tender documents. This drastically reduces the administrative burden and the time required to prepare a green procurement procedure.

3. The transition to a 'green by default' strategy

Previous attempts at green procurement have often foundered on complex scoring systems, where committees had to carry out complicated calculations of the percentage of recycled materials, leading to errors and objections. This manual teaches procurers to integrate green parameters directly into *the minimum technical requirements*. The city thus guarantees that it will purchase a 100% eco-friendly product, whilst the tender process continues to be conducted transparently and simply on the basis of the lowest price – but only amongst those suppliers who have met the strict green standard.

1.3 Empirical analysis of the current situation: findings from the feasibility study

This manual was not drawn up in isolation ‘behind a desk’, but is a direct reflection of the objective reality within the Košice City Council. During the preparatory phase of the GRIP project, a detailed feasibility study was carried out, a fundamental part of which was an in-depth questionnaire survey. This survey covered nine key public bodies in Košice, ranging from the City Council itself, through the city’s districts, to large municipal enterprises responsible for the management of green spaces, culture and infrastructure.

The results of the analysis identified a deeply rooted phenomenon which we refer to, for the purposes of this study, as the **‘paradox of intention and reality’**. As many as 8 out of 9 organisations surveyed explicitly declared a high level of motivation and a willingness to participate in pilot green procurement schemes. Institutional awareness of the need for climate action therefore exists. However, when we move to the level of executive reality, the findings are alarming: all organisations unanimously stated that the lowest price remains the absolutely dominant (and often the sole) criterion when selecting a supplier.

Environmental criteria are applied in fewer than 10 per cent of cases, even for commodities where green offerings are the norm on the market (e.g. ICT).

This state of systemic paralysis is caused by three critical barriers, to which this manual responds directly and specifically.

Barrier No. 1: perceived financial unsustainability (the 'green premium' myth)

The most frequently cited obstacle is the fear that green procurement will bankrupt a city's tight budget. Procurement officers are convinced that an environmentally friendly product is, by definition, more expensive.

The handbook systematically dismantles this barrier. A pilot project for the procurement of IT equipment in Košice empirically demonstrated that, with the right market requirements in place, the city can procure state-of-the-art and environmentally certified equipment at a price lower than the estimated contract value. Furthermore, the manual introduces tools for assessing life-cycle costs (LCC), thereby providing purchasers with economic arguments demonstrating that savings on running costs (energy, lifespan, reduced waste disposal charges) outweigh any higher initial price.

Barrier No. 2: knowledge and capacity gaps (fear of making mistakes)

Procurement staff are primarily lawyers and economists. **Formulating non-discriminatory yet stringent environmental requirements causes them professional uncertainty.** The fear that an incorrectly set criterion will lead to the tender being cancelled or a fine being imposed naturally pushes them back into the comfort zone of the 'lowest price'. By providing pre-prepared text modules and model contracts, this manual relieves procurement officers of the burden of devising parameters and provides them with institutional cover.

Barrier No. 3: market constraints (fear of an unsuccessful tender)

The third most common concern was dominated by the assumption that strict environmental requirements would deter local suppliers. The manual addresses this issue by introducing a standardised procedure for preliminary market consultations (PMC). Procurement officers will learn to engage in open dialogue with the market even before the tender is announced. In this way, they will ascertain suppliers' actual capabilities, adapt the requirements accordingly, and ensure that competition remains broad and effective.

1.4 Strategic prioritisation: identified procurement categories for maximum impact

Applying green procurement to all types of purchases simultaneously would lead to a breakdown of processes in an environment with little experience of this approach. The GRIP project roadmap has therefore selected priority sectors based on a thorough analysis. The selection was made based on the intersection of two factors: the magnitude of the negative environmental impact (where we can achieve the greatest change) and market readiness (where we can achieve results most quickly and without risk).

This manual is structured to cover the following four priority categories in detail:

1. Procurement of information and communication technologies (ICT): quick wins in the global market

The procurement of computers, monitors and printers represents an ideal area for so-called 'quick wins', i.e. easily implementable solutions. The ICT market is highly globalised

and standardised; renowned manufacturers have long held advanced environmental certifications. The manual advises Košice's procurement officers not to demand complex technical specifications, but simply to make participation in the tender conditional on certificates such as Energy Star 8.0, TCO Certified or EPEAT. This immediately guarantees high energy efficiency. A key innovation in this chapter is the model take-back clauses, which oblige the supplier to collect and recycle end-of-life equipment free of charge. This means the city does not incur any additional costs for the future disposal of this disused equipment.

2. Cleaning products and cleaning services: health protection and prevention of greenwashing

When it comes to cleaning services, local authorities often face the problem of merely going through the motions when it comes to fulfilling green pledges. The handbook for this area sets out two pragmatic models. The first involves separating logistics from service delivery – the city centrally procures certified, more environmentally friendly cleaning products (e.g. those bearing the EU Ecolabel) on its own behalf, thereby gaining absolute control over which chemicals are used on its premises, and subsequently contracts out only the labour. The second model focuses on the use of innovative technologies (smart dispensers, mechanical cleaning with microfibres), which radically reduce the volume of cleaning products and water consumed, thereby directly generating operational cost savings.

3. Construction and building refurbishment: tackling the biggest polluter

Globally, the construction sector accounts for almost 40 percent of CO₂ emissions and produces 3 billion tonnes

of waste annually. At city level, green requirements in construction raise the greatest concerns about budget overruns. The manual therefore offers rational approaches focused on circularity – it defines precise requirements for selective demolition and maximising the recycling rate of construction waste (with the aim of achieving and exceeding the 70 per cent recovery rate required by current legislation). At the same time, it introduces innovative contractual models, such as fixed-budget Design & Build, which shift responsibility for the energy efficiency of the design and the minimisation of future repairs to the contractor, thereby enabling the city to fix its expenditure and protect itself against constant contract amendments.

4. Construction and reconstruction of roads: preventing technological lock-in

Road maintenance and construction consume vast amounts of public funds and primary raw materials. A key problem identified by the Roadmap is the tendency of contracting authorities to attempt to 'green' a project only at the stage of selecting a contractor. This leads to the so-called 'technological lock-in' (lock-in effect) – if the designer has not specified the use of recycled materials in the project documentation, the construction company cannot use them without lengthy amendments to the planning permission, unless otherwise stipulated in the tender documentation or the planning permission itself. The manual therefore shifts the focus of green procurement to the project preparation phase. It provides clauses for the selection of designers, which oblige them to propose the use of milled asphalt (R-material) using in-situ methods. For the actual construction work itself, the manual subsequently sets out strict requirements for more environmentally friendly, low-emission and noise-reduced construction machinery operating within the city limits.

1.5 Implementation philosophy and expected impact on the local ecosystem

The primary aim of this manual is to produce a document in which **pragmatism takes precedence over dogmatism**. The true measure of the success of the GRIP project in Košice will not be the number of staff trained in environmental theories, but the tangible number of successfully completed, trouble-free and legally unquestionable green public procurement contracts.

Public procurement procedures carried out on the basis of the insights provided in this manual can serve as examples of good practice for the entire public administration. At the same time, by systematically putting these requirements into practice, the city of Košice will begin to send a strong, transparent and, above all, predictable signal to the market regarding the consistent application of green public procurement principles. Suppliers, aware that the largest regional contracting authority systematically favours circular materials, eco-friendly machinery and certified technologies, will gain the necessary economic certainty to invest in their own green transition.

This methodological manual is therefore not merely a guide on 'how to procure differently'. It is a strategic risk management tool, a means of safeguarding public finances in the long term, and a key catalyst for building a sustainable, modern and climate-resilient city of Košice.

By placing the very best, tried-and-tested and immediately usable tools in the hands not only of public procurement officers, but of everyone involved in preparing public procurement procedures, potential excuses are removed and the door is opened to genuine systemic change.

INFORMATION AND COMMUNICA- TION TECHNOLOGIES – PERSONAL COMPUTERS AND MONITORS



2

2.1 Strategic importance and frequency of ICT procurement in the city of Košice

The category of computing equipment, specifically comprising personal computers, laptops and monitors, represents one of the most frequently and regularly procured commodities within the Košice City Council and its affiliated budgetary and subsidised organisations. This high frequency of purchases is a direct consequence of the need to ensure the smooth running of a modern local authority, the gradual computerisation and digitisation of services provided to citizens, as well as the natural obsolescence of hardware, both in terms of functionality and physical condition. In the context of public procurement, it is important to emphasise that the ICT sector is not merely an essential operating expense, but represents an area with exceptionally high potential for the rapid and effective application of green innovations.

The reason this segment was selected as the initial area of application for the implementation of green public procurement in Košice is the alarming environmental impact of computer hardware production. Precise data from life cycle assessment (LCA) environmental analyses clearly demonstrate that the production of new ICT hardware places an extremely heavy burden on natural resources.

Up to 80 per cent of the total negative environmental impacts, including greenhouse gas emissions and massive water consumption, do not arise during the actual use of a computer in an office, but rather during the extraction of rare minerals and its industrial manufacture. Every piece of equipment that is discarded prematurely or purchased unnecessarily therefore represents a huge environmental burden. At the same time, however, the IT market is one

of the most globalised and standardised markets of all. Global technology manufacturers have for many years been systematically adapting their product ranges to meet strict international environmental standards. For the City of Košice's procurement team, this represents a significant strategic advantage.

Unlike specific construction works, the procurement of ICT does not require the creation of complex and untested technical specifications from scratch.

Procurement officers can and must rely on internationally recognised certifications and standards, which transform abstract environmental goals into easily verifiable and legally sound requirements. This achieves so-called 'quick wins', whereby a city immediately reduces its carbon footprint without risking a restriction of competition.

2.2 Comprehensive options for green procurement in the ICT sector

In seeking the optimal balance between required performance, a limited budget and environmental protection, the city of Košice, as the purchaser, has at its disposal a comprehensive set of tools. These tools can be strategically divided into three main categories, which cover the entire life cycle of the equipment.

The first option, and the one requiring the least administrative effort, is to rely on recognised environmental labels and certifications. By taking this step, the purchaser shifts the burden of complex technical verification of chemical composition, energy efficiency and social standards from the shoulders of the city's officials to independent certification bodies, which have tested the product directly in laboratories.

The second option – which is fundamental from the perspective of the circular economy – is to focus on maximising the lifespan of the equipment being purchased and ensuring it is repairable. As already mentioned, the most environmentally friendly computer is the one that does not need to be manufactured at all. If a city can operate a laptop for five years instead of three without compromising on convenience, it radically reduces its carbon footprint whilst also saving significant funds on the purchase of new equipment. This objective is achieved by strictly requiring a modular design and an extended warranty with guaranteed availability of spare parts.

A third option is the active management of packaging logistics and the end-of-life of equipment. When making large bulk purchases, local authorities commonly face the problem of accumulating hundreds of kilograms of unnecessary cardboard, plastic packaging and, consequently, hazardous electronic waste from decommissioned machines. By incorporating the principles of the circular economy directly into purchase contracts, the purchaser can legally and effectively transfer the obligation to collect and recycle this material back to the supplier, who possesses the necessary logistical capacity.

2.3 Standardisation through certification and environmental labelling

An effective route to green procurement is to make participation in a tender conditional upon the submission of an internationally recognised certificate, or to award bonus points within the tender evaluation criteria to bids where the solution is based on a technical approach utilising products with an internationally recognised certificate.

The ICT sector is dominated by two globally recognised and most comprehensive standards, namely TCO Certified and EPEAT, whilst Energy Star certification focuses specifically on energy efficiency. These certificates do not guarantee just a single parameter, but cover dozens of stringent requirements.



TCO Certified is one of the world's strictest standards for the sustainability of IT products. A device that receives this seal must have demonstrated not only high energy efficiency, but also that no toxic halogenated flame retardants were used in its manufacture, that it features excellent display ergonomics to protect the user's eyesight, and that strict social and labour standards were adhered to during its manufacture in factories. TCO Certified is regularly updated to new generations; Generation 9 currently dominates the market and Generation 10 is on the horizon, so it is advisable to always require the latest available version.



The independent **EPEAT** (Electronic Product Environmental Assessment Tool) certification, administered by the Global Electronics Council, assesses the environmental impact of IT hardware using strict and measurable criteria. For a product to obtain certification, it must successfully pass an audit in key areas such as reducing climate impact, eliminating toxic substances, extending the lifespan of equipment and supporting the circular economy.

The assessment system is not based on impressions, but on precisely defined technical criteria (divided into mandatory and optional). Depending on the extent to which these criteria are met, products are classified into one of three levels:

Epeat Brozne

The product must meet **100% of the mandatory environmental criteria**. This level alone guarantees a high standard of quality – for example, the product must meet energy efficiency standards, limit the use of heavy metals, and ensure take-back for recycling.

Epeat Silver

The product meets all mandatory criteria and, **in addition, at least 50 per cent of the optional (stricter) parameters**. In practice, this means that the device offers added environmental value, such as a higher proportion of recycled plastics in its manufacture, longer availability of spare parts, better repairability or more environmentally friendly packaging.

Epeat Gold

The highest level, reserved for market leaders. The product meets all mandatory criteria and **at least 75 per cent of the optional criteria**.

For the needs of the City of Košice, we recommend the Silver level as the optimal requirement for public procurement. For the city's routine purchases, this level is entirely sufficient. It guarantees an above-standard environmental performance and a longer service life for the equipment, whilst not being so restrictive as to artificially reduce the number of potential bids from suppliers.

Slovak legislation, specifically **the Public Procurement Act**, strictly prohibits discrimination against economic operators. A contracting authority may therefore not, in public tenders, require exclusively one specific certificate without allowing for the submission of alternatives.

Any requirement for a specific eco-label (e.g. TCO Certified or EPEAT) must be accompanied by the phrase '**or equivalent**' in the tender documents.

In this context, the term '**equivalent**' refers to any credible evidence by which a tenderer demonstrates that the product they are offering meets exactly the same technical and environmental criteria as those required by the reference certificate. In practice, this most commonly involves:

- **Product Environmental Profile (PEP)** – a detailed technical declaration issued by the manufacturer itself, which provides a comprehensive overview of the product's environmental footprint throughout its entire life cycle.
- **Test report from an accredited independent laboratory** – an official document confirming that the product has successfully passed tests for the presence of toxic substances, energy efficiency and recyclability.

Significance for the city: Through this transparent approach, the city of Košice ensures fully legal and fair competition. It allows a wider range of suppliers to participate, which may lead to better price offers, whilst in no way compromising the city's high standards regarding the environmental performance and sustainability of the equipment being procured.

Proposed criteria for evaluating tenders

Criterion No. X: environmental characteristics and social sustainability of the goods (EPEAT certification), relative weighting of the criterion: [insert weighting, e.g. 10% or 10 points]

Rules for application and method of evaluating the criterion:

the contracting authority shall evaluate tenders on the basis of the best price-quality ratio, taking into account, in this criterion, the environmental and social characteristics relating to the subject matter of the contract in accordance with Section 44(4) of the Public Procurement Act. The subject of the evaluation is the tenderer's ability to supply IT products which, throughout their entire life cycle, minimise negative environmental impacts and respect social standards.

- **Allocation of points:** the tenderer will be awarded the full number of points under this criterion (i.e. [X] points) if, for the IT product offered (or for all IT products offered, where more than one is supplied), they submit a valid EPEAT product certificate of the current generation relevant to the product type in question, or its equivalent.
- **No points awarded:** if the tenderer fails to submit the required EPEAT certificate or its relevant equivalent in the tender, their tender **will not be excluded from the public procurement procedure**, but they will receive **0 points** under this evaluation criterion.

Method of demonstrating and recognising equivalence:

the tenderer shall submit, as part of their tender, a copy of a valid EPEAT certificate for the proposed equipment. In strict accordance with the principles of equal treatment and non-discrimination, the contracting authority shall also

recognise as equivalent certificates issued by the competent authorities of other Member States or equivalent certificates issued by independent bodies.

Any other relevant document submitted by the tenderer (e.g. detailed technical documentation from the manufacturer) shall be considered equivalent, provided it contains verifiable data confirming that the products offered unequivocally meet the comprehensive requirements for environmental and social sustainability, equivalent to those required for the issuance of an EPEAT reference certificate.

Method of verification and practical application:

when assessing compliance with this condition for participation, the contracting authority (purchaser) verifies whether the equipment models offered hold the required environmental certificate or its fully equivalent alternative.

The verification procedure is as follows:

- **Verification via the TCO certificate:** where a global TCO Certified sustainability certificate is submitted, the purchaser shall verify the authenticity and validity of the document via the official online database, the TCO Product Finder. To meet this condition, it is essential that the certification is valid on the date of submission of tenders.
- **Verification via equivalent evidence:** if a tenderer chooses to submit other evidence equivalent to quality assurance measures, they are required to include in their tender such technical documentation or test reports (e.g. from accredited laboratories) which clearly and indisputably demonstrate compliance with environmental management criteria at the required standard.

Benefits for the City of Košice: this procedure ensures that ordinary suppliers are also included in the process of awarding municipal contracts; however, bonus points will be awarded to tenderers whose technical proposals incorporate eco-labels.

2.4 Extended service life and modular reparability

The objective of this initiative is to dramatically slow down the replacement cycle of IT equipment in Košice City Council offices. A common and highly inefficient situation arises where a fully functional and high-performance laptop is decommissioned simply because its built-in battery has lost capacity after three years of operation, and the manufacturer has integrated it into the device's chassis using strong industrial adhesives in such a way that replacing it would result in damage to the entire machine and disproportionately high servicing costs. A similar problem arises when there is a need to increase the RAM due to the installation of a new operating system. If these components are permanently soldered to the motherboard, an upgrade is technically impossible and the entire device ends up as waste. By requiring modularity, the city is guarding against this so-called 'planned obsolescence' of hardware. The concurrent requirement for a longer warranty and a guarantee of spare parts availability shifts the risk of failure to the supplier, who is thus economically incentivised not to supply the city with the cheapest consumer-grade goods, but with professional-grade business equipment featuring a robust architecture.

EU Directive 2024/1799 on common rules to promote the repair of goods, which was finalised in July 2024 and will come into force in all Member States by July 2026, provides consumers with stronger rights to have their electronic goods repaired, including computers and IT equipment. Manufacturers are prohibited from blocking repairs via

software or hardware; they must ensure the availability of spare parts for at least 7 years after the product has been discontinued, and must offer repairs even after the warranty period has expired. Carrying out a repair automatically extends the warranty by 12 months. Labels providing information on reparability are already in use for smartphones and tablets, whilst similar ratings for computers and printers are still under development. Although the ' ' Directive represents a significant step forward, rules specific to computers are still being drawn up, meaning that the overall picture regarding IT equipment remains incomplete for the time being.

Proposed conditions for inclusion in technical specifications and contracts

All portable computers supplied must be designed to support the principles of the circular economy, specifically ease of repair and the possibility of hardware upgrades.

Random access memory (RAM) and internal storage (SSD) must not be permanently soldered to the motherboard, but must be housed in standardised slots allowing for their future replacement or expansion. The device's battery must not be secured using permanent adhesives. It must be possible for an authorised person to replace the battery using commonly available commercial tools without causing destruction or irreversible damage to the device's chassis. In the purchase contract, the supplier undertakes to provide an extended warranty for the devices lasting at least 48 months and also guarantees that original or fully compatible spare parts, in particular batteries, keyboards and power supplies, will remain commercially available for purchase for at least five years after the end of production of the relevant model range.

Method of verification and practical application

The burden of proof regarding compliance with the reparability criteria lies with the tenderer at the tender submission stage. The purchaser verifies compliance with the modular design by requesting a service manual, technical drawing (exploded view) or the manufacturer's official technical data sheet for the model in question. These documents, which form a standard part of the technical documentation for business-class products, provide a visual and textual description of how to access internal components. The purchaser will clearly see in them the use of screws instead of adhesive and the presence of memory slots. The guarantee of spare parts availability and the extended warranty are verified by means of an official declaration from the tenderer, which becomes an integral and legally enforceable part of the signed purchase contract. If the supplier refuses to supply a spare part within five years, they are in material breach of contract.

2.5 Circular economy and end-of-life management (take-back)

The aim of introducing the so-called 'take-back' clause, i.e. the obligation to take back goods, is to provide an elegant solution to the problem of electronic waste, which otherwise places an extreme strain on the budget and logistical capacities of the city of Košice. Every purchase of new equipment logically entails the disposal of the old equipment. Old computers and monitors contain toxic substances, require special handling, safe storage in dry premises and, finally, paid collection for recycling. At the same time, there is a huge security risk for the local authority associated with the residual sensitive data of citizens stored on the hard drives of decommissioned computers. By utilising this scheme, the purchaser agrees that the supplier of the new equipment – who, as a specialist

IT provider, holds the necessary certifications and has recycling partners – will take care of all the logistics and recycling of the old equipment. This ensures a seamless conclusion to the life cycle without any administrative or financial burden on the City Council's property department.

Draft contractual provision for take-back

The contracting parties have agreed to apply the principles of the circular economy in the form of a take-back service within a period of ... (to be specified depending on the terms of the contract; generally, a period of, for example, 14 days from the issue of the handover certificate for the delivery of the new equipment may be used, so that, for example, data migration can still take place on the original equipment). The Supplier undertakes, upon written request from the Customer, to collect and remove, free of charge, and to arrange, at its own expense, for the recycling, recovery or refurbishment of the Customer's decommissioned IT equipment in a quantity corresponding to the volume of the newly supplied equipment under this contract. This service includes the Supplier's unconditional obligation to ensure the permanent, certified and irreversible erasure of all electronic data on the hard drives of the equipment being collected, using software methods that comply with the secure erasure standards set out in ISO/IEC 27040 or an equivalent standard.

Method of verification and practical application

This provision is not assessed through scoring during the tender phase, but forms a direct and enforceable part of the contract's implementation phase. Verification of its fulfilment takes place through the signing of a physical handover and acceptance report on site. However, the key document safeguarding the contracting authority

is the subsequent delivery of a 'certificate of e-waste management', issued by an authorised producer responsibility organisation (PRO). In the context of cyber security, it is critical that, upon completion of the process, the purchaser obtains from the supplier a so-called 'certificate of secure data erasure' for each serial number of the hard drive being collected, generated by specialised software. This document protects the city from potential penalties for personal data breaches under the GDPR.

2.6 Packaging logistics and the elimination of single-use plastic waste

In the case of large-scale capital purchases, where the city council or a major municipal enterprise buys, for example, a hundred computers in a single delivery, an unexpected and largely overlooked logistical problem arises. A standard packaged laptop means a hundred huge cardboard boxes, a hundred polystyrene shock-absorbing inserts, two hundred plastic bags for cables and mice, and tens of kilograms of bundled plastic film. This municipal waste, generated in the course of a single day of installation, fills the bins of the entire office, and the city has to pay for its special collection. The solution is to require so-called bulk packaging and a clause on the take-back of packaging. With bulk packaging, the manufacturer packs, for example, 5 or 10 laptops into a single, specially adapted box. Cables are not placed in separate plastic bags but are neatly bundled together in a single box. The aim is to achieve an immediate and effortless reduction in unnecessary municipal waste by tens of per cent.

EU Regulation 2025/40 on packaging and packaging waste (PPWR), which was formally adopted in December 2024 and has been in force since February 2025, replaces the old Packaging Directive from the 1990s.

This Regulation sets out sustainability and labelling requirements across the entire life cycle of packaging, from production through use to waste management, thereby supporting the EU's circular economy objectives.

It applies to all companies placing packaging on the EU market, regardless of size, and includes manufacturers, importers and online retailers. Key requirements include ensuring that all packaging is recyclable by 2030, the mandatory use of recycled content, the minimisation of unnecessary packaging, and a ban on packaging that comes into contact with food and contains PFAS (so-called 'forever chemicals') above specified limits.

Most of the provisions will come into force on 12 August 2026, whilst certain requirements – such as targets for recycled content and harmonised labelling – will be phased in gradually until 2040.

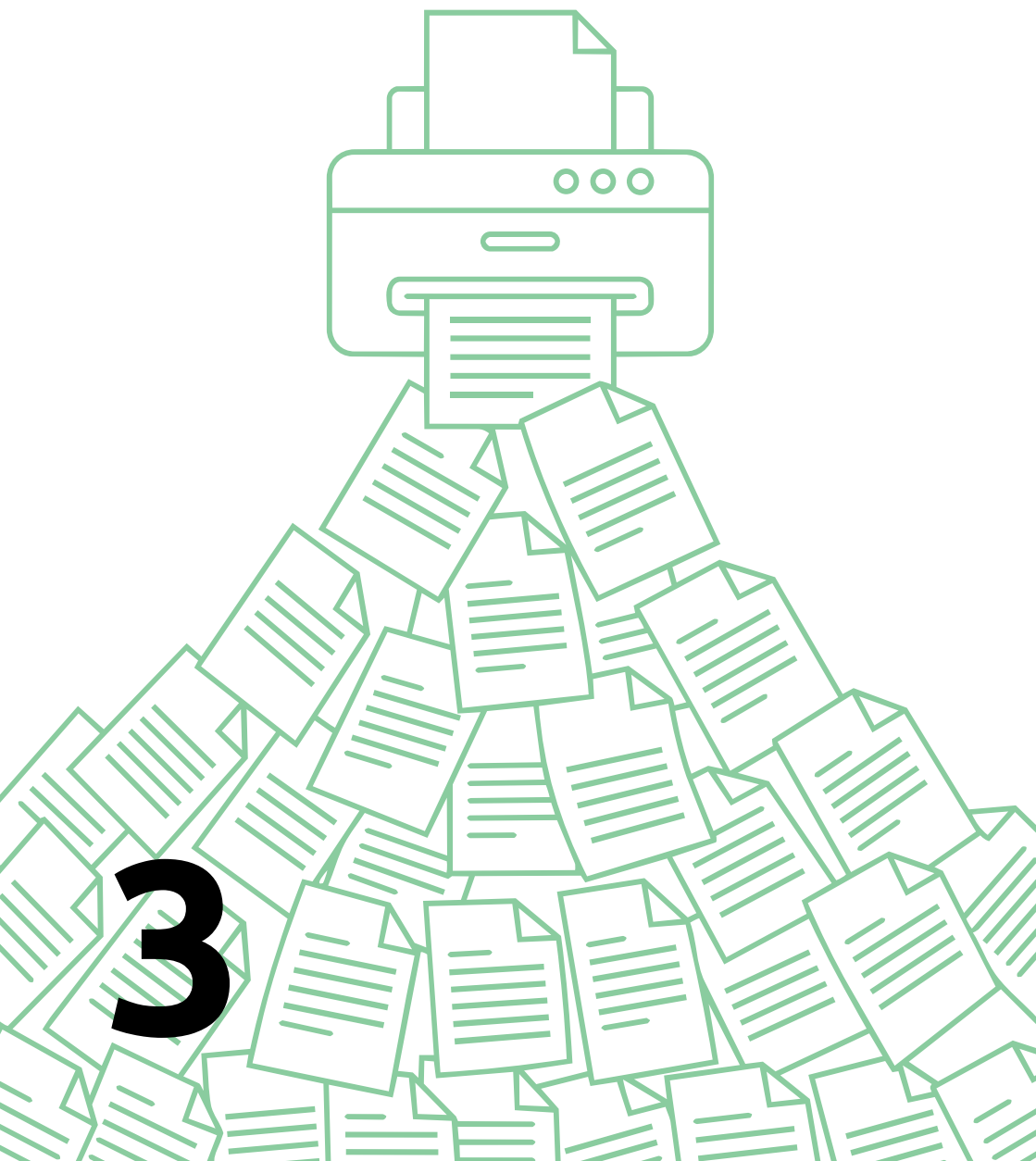
Draft contractual provision for logistics

With a view to minimising the negative environmental impacts associated with the generation of packaging waste, the supplier undertakes to deliver the goods primarily using bulk packaging, provided that the manufacturer's production programme for the relevant model range permits this. At the same time, the supplier undertakes, immediately following the installation or physical handover of the subject of the contract at the place of performance, to take back absolutely all transport and product packaging materials, including cardboard boxes, pallets and plastic fillers, remove them from the customer's premises and, at its own expense, ensure their proper recycling in accordance with the applicable waste management legislation.

Method of verification and practical application

The verification process for the application of this environmental requirement consists solely of a physical inspection and check carried out by the city's staff directly upon receipt of the goods at the City Hall. The person authorised to accept the subject matter of the contract (e.g. an employee of the IT department) will only be able to sign the handover report once the supplier has removed all empty packaging from the building and loaded it onto their delivery vehicle. Through this simple and entirely cost-free procedural step, the city immediately and effectively addresses the problem of unnecessary waste accumulation in office spaces and reduces the costs of its own municipal services.

INFORMATION AND COMMUNICATION TECHNOLOGIES – DISPLAY DEVICES



3.1 Strategic importance and specific features of procurement in the city of Košice

The category of imaging equipment, comprising printers, photocopiers and multifunction devices (MFPs), constitutes critical infrastructure for the performance of local government functions within the Košice City Council and its organisations. Despite the widespread digitisation of processes, records management and communication with citizens still require the production of a significant volume of physical documents. From the perspective of environmental impact and public finance management, this segment presents a specific challenge, namely the so-called 'technological lock-in' paradox. The average lifespan of this equipment within the Košice local authority exceeds five years, during which time the cumulative costs of electricity, toner purchases and the disposal of hazardous waste become a dominant item, exceeding the initial purchase price of the hardware. Green public procurement in this area therefore not only pursues environmental objectives but also acts as a strategic tool for the long-term stabilisation of the city's budgetary expenditure by eliminating hidden operating costs and protecting the health of employees in the office environment.

3.2 Comprehensive options for the green procurement of display equipment

The procurer in the city of Košice has at its disposal, within this category, a set of complementary strategies covering the entire life cycle of the equipment.

The cornerstone is a focus on operational safety and the energy efficiency of the hardware itself, which is achieved through the use of independent emissions certifications.

The second pillar is the systematic enforcement of energy-efficient operation through technical parameters that directly reduce office paper consumption. The third and most innovative pillar introduced by this manual is the shift from evaluating the lowest purchase price to assessing total life-cycle costs.

This mathematical approach enables the purchaser to legally prioritise higher-quality and more energy-efficient equipment, which is more expensive at the time of purchase but will save the city of Košice significant funds on energy bills and consumables over five years of operation.

3.3 Health protection and energy efficiency through certification

To ensure a safe working environment for staff, as well as for other people present on the contracting authority's premises, and to minimise energy consumption, it is essential to require compliance with strict emission and energy standards in the technical specifications.

The gold standard for this category is the Blue Angel eco-label in accordance with specification DE-UZ 219, which guarantees strict limits on emissions of ultrafine particles and ozone into the air, low noise levels and the inclusion of deep sleep modes. The model tender conditions stipulate that the contracting authority requires all equipment offered to meet the environmental and emissions criteria corresponding to Blue Angel certification, or another equivalent Type I environmental label. In the absence of an eco-label, the tenderer shall demonstrate to that these requirements are met by submitting the manufacturer's technical documentation and test reports from an accredited laboratory, which

precisely confirm compliance with the identical limits for energy consumption and emissions of harmful substances. The purchaser will verify this parameter by carrying out a quick check in the official online catalogue of the relevant certification body.



Good for me.
Good for the environment.

3.4 Hardware-based waste prevention and compatibility with recycled materials

The City of Košice must, through its technical requirements, eliminate unnecessary waste of primary raw materials, particularly paper. The model technical specification therefore strictly requires that every device be equipped as standard with a module for automatic double-sided printing, with the drivers set to their factory defaults and pre-configured for duplex mode. A key element of circularity is the requirement for full and guaranteed support for printing on 100 per cent recycled paper complying with the EN 12281 standard, without the risk of more frequent breakdowns or loss of warranty. This specification protects the city from discriminatory practices by manufacturers who, in the past, have rejected claims on the grounds of the use of eco-friendly paper. The purchaser verifies compliance with this requirement by checking the manufacturer's technical data sheet, where the duplex unit must be listed as a standard component of the device and support for recycled media must be explicitly stated in the user manual.

3.5 Circular economy and contractual management of toner cartridges

The problem of the accumulation of empty toner cartridges classified as hazardous waste is addressed by the manual through a non-negotiable contractual take-back clause. This contractual provision obliges the supplier to collect all used cartridges free of charge and to ensure their certified refurbishment or material recovery. In this way, the city of Košice transfers both the environmental and financial responsibility for waste management to a specialist supplier. Compliance is verified during the implementation phase by checking the certificates received confirming the environmentally sound disposal of waste, thereby guaranteeing that the toner cartridges do not end up in landfill. At the same time, from a data security perspective, the contract includes a requirement for the certified erasure of internal hard drives in equipment prior to its disposal (if the equipment stores printing-related information), which is verified by the submission of a certificate confirming the secure erasure of data (e.g. in accordance with the AfB standard – <https://www.afb-group.sk/it-remarking/odovzdanie-it-hardveru/likvidacia-udajov/> or in accordance with another equivalent standard).

3.6 Cyber security and end-of-life management of hardware

Modern multifunctional devices in the city of Košice handle citizens' sensitive data; therefore, the process of decommissioning them poses a high security risk. Upon the end of the operational life of the supplied devices, the supplier is contractually obliged to collect them free of charge and ensure their environmentally sound disposal. However, prior to collection for recycling, the supplier is under

an unconditional obligation to ensure the permanent and certified erasure of all electronic data on the devices' internal hard drives using specialised software, or to remove the storage media by physically destroying them at the city's expense. This contractual mechanism ensures compliance with the GDPR and protects the city's reputation whilst fulfilling the objectives of the circular economy. Verification is carried out by obtaining individual data erasure certificates for each serial number of the collected machine, thereby providing the city with legally watertight evidence for the supervisory authorities.

3.7 Practical application of the LCC calculator in tender documents

In line with a value-for-money approach, it is crucial for procurers in Košice to integrate the calculation of total life-cycle costs (Life Cycle Cost – LCC) into the evaluation process. This procedure allows for an objective comparison of tenders, where a low purchase price for equipment may be offset by extremely expensive consumables or disproportionate energy consumption. The purchaser will include the following mathematical formula in the tender documents to calculate the total comparative price. The total life-cycle cost (LCC) is calculated as the sum of the purchase price of the equipment excluding VAT and the operating costs over a period of 5 years. Operating costs include electricity costs, calculated as the guaranteed consumption in sleep and standby modes as specified in the technical data sheet, multiplied by a coefficient of 8 hours' operation per day over 250 working days per year, and multiplied by the current price of electricity per kilowatt-hour applicable in the city of Košice. Added to this are the costs of consumables, expressed as the price of original or certified remanufactured toner required to print a fixed volume of 100,000 pages at 5% coverage in accordance

with the ISO/IEC 19752 standard. The purchaser will publish in advance, in the tender documents, the fixed variables, namely the number of years, the number of pages, the price of electricity and the number of working days, whilst the tenderer will insert into the formula the consumption figures and material prices guaranteed by them. This transparent model guarantees the procurement of the most cost-effective technology for the city and safeguards the process against subjective assessment, whilst the accuracy of the tenderer's input data is verified by cross-checking against the attached Energy Star technical data sheet and the tenderer's official price list for consumables.

Below we present a sample LCC calculation for hardware. This calculation sets out a method for assessing the total life-cycle costs (**LCC – Life Cycle Costing**) when purchasing IT equipment, rather than simply evaluating the lowest purchase price.

Global mathematical LCC model for IT hardware

The total life-cycle value of hardware (e.g. laptops, desktop computers, monitors, servers) takes into account the costs associated with the purchase, 5 years of active operation and the estimated residual value of the equipment at the end of its planned service life.

The basic mathematical model is defined as follows:

$$LCC = C_{\text{nákup}} + C_{\text{energia_5r}} + C_{\text{servis_5r}} - V_{\text{zostatková}}$$

Definition of variables:

LCC total calculated life-cycle costs
of the hardware excluding VAT
(the value actually assessed in the tender),

$C_{\text{nákup}}$	unit purchase price of the hardware excluding VAT (fixed investment component),
$C_{\text{energia 5r}}$	operating costs for electricity consumption over a period of 5 years (60 months),
$C_{\text{servis 5r}}$	costs of premium service and technical support over 5 years (unless included directly in the purchase price),
$V_{\text{zostatková}}$	estimated residual/resale value of the hardware after 5 years of operation (this is deducted, as it represents future revenue for the city).

Calculation of energy operating costs

The calculation of IT equipment's energy consumption must reflect the actual time when an employee is working on the device (active mode) and the time when the device is in power-saving mode (sleep/idle mode).

Formula for calculating the energy costs per unit:

$$C_{\text{energia_5r}} = 5 \times D_{\text{rok}} \times \left[\left(\frac{P_{\text{aktív}} \times t_{\text{aktív}}}{1000} \right) + \left(\frac{P_{\text{spánok}} \times t_{\text{spánok}}}{1000} \right) \right] \times Price_{\text{kWh}}$$

Constants and parameters fixed by the purchaser:

5	the number of years in the equipment's monitored life cycle,
D_{rok}	number of working days in a year (set at 250 days by default),
t_{aktiv}	number of hours in active mode per day (set at 8 hours by default),
$t_{\text{spánok}}$	number of hours in sleep mode during a working day (set at 16 hours by default),
$Price_{\text{kWh}}$	the unit price per 1 kWh of electricity excluding VAT, as set by the city for calculation purposes (e.g. €0.20/kWh).

Values declared by the tenderer in the tender:

P_{aktiv}	average power consumption of the device in active mode (in watts) declared on the basis of technical documentation or certification (e.g. Energy Star/EPEAT),
$P_{\text{spánok}}$	the device's power consumption in sleep/standby mode (in watts).

Practical example: evaluation of a tender for the supply of 100 laptops

Let us imagine a situation where the city of Košice is procuring 100 executive laptops for the needs of the city council and its affiliated organisations. Two tenderers have submitted bids.

Parameter	City's fixed requirements	Tenderer A (cheaper purchase)	Tenderer B (cost-effective hardware)
Number of units	100		
Unit price $C_{\text{nákup}}$		850, 00 € excluding VAT	920, 00 € excluding VAT
Power cons. – active $P_{\text{aktív}}$		45 W	25 W
Power cons. – sleep mode $P_{\text{spánok}}$		4 W	1 W
Electricity price $Price_{\text{kWh}}$	0, 20 €/kWh		
Warranty and servicing C_{servis}	5 years (included in the price)	0, 00 €	0, 00 €
Residual value $V_{\text{zostatková}}$		50, 00 €	80, 00 €

Step 1: Calculation of 5-year energy consumption per laptop

Calculation for Tenderer A:

$$C_{\text{energia_A}} = 5 \times 250 \times \left[\left(\frac{45 \times 8}{1000} \right) + \left(\frac{4 \times 16}{1000} \right) \right] \times 0,20$$

$$C_{\text{energia_A}} = 1250 \times [0,360 + 0,064] \times 0,20$$

$$C_{\text{energia_A}} = 1250 \times 0,424 \times 0,20 = \mathbf{106,00 \text{ €}}$$

Calculation for Tenderer B:

$$C_{\text{energia_B}} = 5 \times 250 \times \left[\left(\frac{25 \times 8}{1000} \right) + \left(\frac{1 \times 16}{1000} \right) \right] \times 0,20$$

$$C_{\text{energia_B}} = 1250 \times [0,200 + 0,016] \times 0,20$$

$$C_{\text{energia_B}} = 1250 \times 0,216 \times 0,20 = \mathbf{54,00 \text{ €}}$$

Step 2: Final calculation of total LCC (for 100 laptops)

We substitute the operating costs and residual values obtained into the overall formula and multiply by the total number of units ($N = 100$).

Calculation for Bidder A:

$$LCC_{\text{celkom_A}} = 100 \times (C_{\text{nákup_A}} + C_{\text{energia_A}} + C_{\text{servis_A}} - V_{\text{zostatková_A}})$$

$$LCC_{\text{celkom_A}} = 100 \times (850,00 + 106,00 + 0,00 - 50,00)$$

$$LCC_{\text{celkom_A}} = 100 \times 906,00 = \mathbf{90\,600,00 \text{ € bez DPH}}$$

Calculation for Bidder B:

$$LCC_{\text{celkom}_B} = 100 \times (C_{\text{nákup}_B} + C_{\text{energia}_B} + C_{\text{servis}_B} - V_{\text{zostatková}_B})$$

$$LCC_{\text{celkom}_B} = 100 \times (920,00 + 54,00 + 0,00 - 80,00)$$

$$LCC_{\text{celkom}_B} = 100 \times 894,00 = \mathbf{89\,400,00\,€ \text{ bez DPH}}$$

Evaluation of the tender by the purchaser

If the City of Košice were to make its decision solely on the basis of the lowest purchase price, Bidder A would be the winner with a total bid of €85,000.00 (compared to Bidder B's bid of €92,000.00). However, by applying the LCC calculator, the city took into account the actual costs it will incur over a 5-year period. The result showed:

- 1. energy savings:** Bidder B's more energy-efficient hardware will save the city up to **€5,200.00** on electricity for the entire fleet of laptops,
- 2. residual value:** Bidder B's higher-quality construction and battery (often associated with EPEAT Silver/Gold certification) allow the hardware to be sold or handed over at a higher value after 5 years, thereby enabling the city to recoup **€3,000.00** more than with Model A.

Tenderer B is declared the winner of the public procurement procedure with a total LCC value of €89,400.00 excluding VAT.

Through this purchase, the City of Košice will not only save money in the long term, but will also meet its green and sustainable procurement objectives.

**INFORMATION
AND COMMUNICATION
TECHNOLOGIES – MOBILE DEVICES
(SMARTPHONES AND TABLETS)**



4

4.1 Strategic importance and specific features of procurement in the City of Košice

The category of mobile devices, primarily comprising smartphones and tablets, has undergone dramatic development within the Košice City Council and its municipal enterprises over the last decade. From being an exclusively communication tool for senior management, these devices have become an absolutely essential and widely used work tool for hundreds of staff in the field, ranging from municipal police officers and social services workers to urban green space technicians, or other personnel responsible for public order. Administrative staff also routinely use these devices. This widespread adoption has led to a rapid increase in the frequency of procurement of these devices, whilst their life cycle is alarmingly short compared to standard personal computers. Whilst the City of Košice is able to keep an office computer in operation for 5–7 years, smartphones are usually decommissioned after just 2–3 years of use.

From an environmental and strategic perspective, this short replacement cycle places an enormous strain on the environment. Precise data from environmental life cycle assessments (LCA) unequivocally demonstrate that the production of new ICT hardware in the mobile device sector places an extremely heavy burden on natural resources. The carbon footprint of manufacturing a single new standard smartphone stands at over 83 kg of carbon dioxide equivalent (CO₂e), whilst its water footprint reaches an alarming total of over 12,000 litres of water. Up to 80 per cent of the total negative environmental impacts throughout the device's life cycle do not arise during its charging and use by city officials, but rather during the extraction of rare minerals (such as cobalt,

lithium and tantalum) and the industrial manufacturing process itself within Asian supply chains.

This data leads to a simple conclusion for the city of Košice. Any premature disposal of a functional mobile device due to a weak battery or a missing software update constitutes a waste of public funds and a disregard for climate commitments. Green public procurement in the mobile device sector must therefore not focus on marginal differences in electricity consumption during charging, but must be radically and uncompromisingly aimed at maximising the device's economic and physical lifespan and ensuring safe circular disposal at the end of its functional cycle.

4.2 Comprehensive options for the green procurement of mobile devices

The green procurement framework for the smartphone and tablet sector offers the City of Košice's procurement officers several innovative approaches that fundamentally shift the perspective on the 'lowest price' criterion.

The first and most important approach is to combat planned obsolescence through strict requirements for repairability and long-term software support.

Mobile devices in the local government sector must not be viewed as consumer goods with a limited lifespan. It is precisely through the technical specifications that the purchaser must ensure that the manufacturer is both capable and willing to supply key replacement parts (particularly batteries and displays) and, above all, security updates for the operating system for a period of at least 4 or 5 years. From a cyber security perspective, the City of Košice

cannot continue to use devices without security patches, even if they function flawlessly from a physical standpoint.

The second approach is standardisation through international certifications and environmental labels.

As with laptops, strict criteria such as TCO Certified for Smartphones or EPEAT for mobile phones already exist for smartphones; these assess, on behalf of the purchaser, the absence of toxic substances in production, compliance with ethical working conditions in the mining of rare minerals, and a guarantee of a basic level of repairability.

A third approach is to eliminate unnecessary electronic waste right from the point of purchase.

With the introduction of European legislation standardising charging connectors to the USB-C standard, the city of Košice now has thousands of compatible chargers at its disposal. Purchasers can, and should, innovatively demand that devices be supplied without included mains adaptors and headphones, thereby directly reducing the volume of plastic supplied, minimising transport packaging and putting pressure on manufacturers to lower the purchase price. This approach is fully in line with the principle of waste prevention. This also includes an uncompromising approach to end-of-life management in the form of a contractual take-back requirement, with an emphasis on the certified erasure of sensitive data.

4.3 Protection against planned obsolescence: reparability and software support

The most effective way for the city of Košice to reduce its carbon footprint in the mobile device sector is to ensure that purchased smartphones remain in service for five years rather than the standard two. This objective cannot be achieved by simply appealing to staff, but requires strict and binding rules in the tender documents. The main stumbling block for mobile devices is the degradation of lithium batteries. After five hundred charging cycles, the battery physically loses its capacity. If it cannot be replaced, an otherwise perfect smartphone becomes unusable electronic waste. The second major stumbling block is the software. Devices that stop receiving updates from the manufacturer after two years pose an extreme security risk to the city council's internal networks and, under the GDPR, must be decommissioned by its IT department.

Proposed conditions for participation to be included in the technical specifications:

The contracting authority requires that all mobile devices offered (smartphones and tablets) meet strict criteria for long-term sustainability and reparability. The supplier or manufacturer of the device must publicly and contractually guarantee the provision of free operating system security updates (Security Patches) and at least two generational updates to the operating system itself (OS Upgrades) for a period of at least 48 months (4 years) from the date on which the specific device model is launched on the market. The devices must be designed in such a way that the replacement of the built-in battery and display panel can be carried out by a specialist service centre without causing destruction or irreparable damage to the device's

casing. The supplier undertakes to ensure the commercial availability of original or certified compatible replacement batteries for the supplied models throughout the entire period of guaranteed software support.

Rationale and method of verification in practice:

With this proposal, the city of Košice transforms the smartphone from a consumer good into a long-term asset. Investing in a device with guaranteed 4-year support brings the city enormous economic savings, as the institution spreads the initial procurement costs over a period twice as long. From a security perspective, the IT department gains the assurance that devices in the field will not be vulnerable to new cyber threats. The purchaser verifies this key parameter in a highly transparent manner. During the tender submission phase, the tenderer submits an official public statement from the manufacturer (often published on the brand's website under the 'Security Update Support' section or similar), in which the manufacturer precisely defines the lifecycle policy for the relevant model range. If the tenderer fails to provide evidence of this guarantee in the form of an official manufacturer's document, their tender is excluded on the grounds of failing to meet the contracting authority's minimum security and environmental requirements. The availability of spare parts is confirmed by a binding declaration of honour from the supplier, which forms part of the penalty clause in the purchase contract.

4.4 Standardisation and environmental certification of mobile devices

As with personal computers, it would be administratively unfeasible for Košice City Council staff to require detailed breakdowns of the chemical composition of printed circuit

boards or proof of the origin of cobalt in batteries for smartphones. These extremely complex parameters, relating to the presence of heavy metals and so-called 'conflict minerals' mined under conditions that violate human rights, are addressed by the purchaser elegantly and effectively through existing international standards.

Draft terms and conditions of participation

In accordance with Section 34(1)(m) of Act No. 343/2015 Coll. on Public Procurement, that the tenderer demonstrate their technical and professional competence by submitting certificates issued by independent bodies with recognised competence, confirming that the mobile equipment offered complies with technical standards ensuring environmental and social quality. In order to minimise the risks associated with the negative impacts of mineral extraction and to guarantee the absence of hazardous chemicals, the tenderer shall, in its tender, submit a valid TCO Certified certificate for smartphones or demonstrate that the model offered is actively registered in the international EPEAT register for the mobile phone category at a minimum of Bronze level. In accordance with the principle of non-discrimination, the contracting authority shall also unconditionally accept equivalent certificates issued by the competent authorities of Member States or other relevant evidence submitted by the tenderer which is equivalent to the quality assurance measures required by the reference certification schemes. Such equivalence is considered to include, in particular, a detailed product sustainability report issued by the manufacturer, which clearly and verifiably declares compliance with the criteria for transparent management of chemical substances and the use of responsible supply chains for conflict minerals, such as, in particular, cobalt, lithium and tantalum.

The EU Battery Regulation (EU 2023/1542) has been in force since 2024 and fundamentally changes the rules governing the manufacture, sale, use and recycling of batteries. It applies uniformly across all Member States and covers manufacturers, importers, retailers and consumers – it applies to batteries both as stand-alone products and as batteries incorporated into equipment.

Key requirements for electronic equipment include:

- removability and replaceability: from February 2027, portable batteries in electronic products must be designed so that the end user can remove and replace them. This directly addresses the issue of devices with batteries that are glued in place or otherwise inaccessible,
- CE marking: from August 2024, all batteries sold in the EU must bear the CE marking, or this marking must be displayed on the packaging if the battery is too small,
- from August 2026, new labels providing information on capacity, chemical composition and hazards will be mandatory.

From 2031, minimum requirements for the content of recycled materials will apply, including 6% lithium, 16% cobalt and 6% nickel, which will be further increased by 2036.

Justification and method of verification in practice:

This scheme shifts the extremely onerous burden of proof in the areas of human rights and toxicology from the shoulders of the purchaser in Košice to independent auditing

bodies. A TCO or EPEAT certificate means that the manufacturer has undergone a rigorous audit of its supply chain and demonstrated a commitment to reducing its carbon footprint. Verification takes just a few minutes for the purchaser. Upon submission of a quote specifying the exact make and model of the smartphone, the administrator checks the availability of this certificate in the publicly accessible online databases of the certification bodies (TCO Product Finder, EPEAT Registry). If a tenderer invokes the principle of equivalence and submits a sustainability report (which is now routinely published by all major premium smartphone manufacturers), the purchaser will assess whether this report objectively contains declarations regarding the elimination of PVC and brominated flame retardants, and compliance with the RoHS Directive. In this way, the city will gain legal and moral assurance regarding the quality of the equipment being procured.

4.5 Reduction of electronic waste: absence of chargers and circular economy clauses

The most immediate manifestation of waste in the procurement of mobile devices is the accumulation of unnecessary accessories. With the market's transition to the universal USB-C connector standard, the city of Košice objectively has no need to receive a new mains adapter (charger) and wired headphones with every new smartphone, as the sockets in its offices are already full of them. These so-called 'bundled items' constitute a huge volume of unnecessary electronic waste, make transport more expensive due to the larger size of the packaging, and increase the price of the device itself. Eliminating these accessories from the requirements is an immediate and effortless environmental win. At the same time, the end-of-life stage for purchased equipment must be addressed through

a mandatory take-back scheme, which protects both municipal data and the waste disposal budget.

Proposed contractual provision for waste reduction and take-back:

In order to minimise the generation of unnecessary electronic waste and to apply the principles of the circular economy, the contracting authority expressly requires that the mobile devices supplied do not contain mains charging adaptors (so-called wall chargers) or wired headphones in their retail packaging, provided that the manufacturer's commercial policy for the model in question permits this. At the same time, the contracting parties have agreed to implement a free take-back service. The supplier undertakes, upon expiry of the service life of the devices currently being supplied (or upon the immediate decommissioning of the customer's previous-generation equipment in a quantity equal to the current delivery), to collect and remove these at its own expense. An absolute condition for the collection of this mobile equipment is the Supplier's subsequent obligation to ensure the irreversible and permanent erasure of all internal memory of the equipment entrusted to it, using certified software algorithms that prevent any forensic data recovery. The devices will subsequently be prioritised for certified refurbishment or handed over to an authorised recycling company for the recovery of precious metals.

Justification and method of verification in practice:

Through this comprehensive contractual mechanism, the City of Košice immediately prevents the generation of kilograms of unnecessary plastic and electronic waste in the form of unused chargers and packaging, whilst also providing a long-term solution to the problem of the accumulation of old and hazardous equipment in the property department's storage facilities.

Verification of the requirement for the absence of chargers is carried out by a visual inspection of the contents of the packaging immediately upon receipt of the goods from the supplier. If a supplier delivers standard packaging containing chargers, the city has fulfilled its obligation to require a more environmentally friendly alternative; however, manufacturers are now routinely adapting to this standard of their own accord. Verification of the take-back service takes place during the implementation and final phases of the contract.

An employee of the city's IT department hands over the old smartphones against a signed receipt. Essential and legally required evidence for the city is the subsequent receipt of the so-called Data Erasure Certificate, which must be issued individually for each unique IMEI number of the handed-over smartphone. In this way, the city declares compliance with personal data processing requirements, and the supplier subsequently sends confirmation that the device has been handed over for recycling, thereby bringing the entire cycle to a close in an environmentally sound and secure manner.



INFORMATION AND COMMUNICATION TECHNOLOGIES – SERVERS, DATA CENTRES AND NETWORK INFRASTRUCTURE

5

5.1 Strategic importance and the invisible ecological footprint in the city of Košice

The category of servers, data storage systems and network infrastructure components (switches, routers) represents a specific and often overlooked area of public procurement. Unlike personal computers or smartphones, which employees of Košice City Council come into physical contact with on a daily basis, this technology is hidden from the view of officials and citizens in air-conditioned server rooms. Despite this 'invisibility', it is precisely the data centre infrastructure that forms the absolute backbone of a modern local authority's operations. Without it, administrative information systems, electronic communication, the municipal police's CCTV systems and the components of the emerging Smart City Košice concept would not function. Despite the fact that, from an IT architecture perspective, Košice City Council is built on a cloud-based solution, it cannot be ruled out that a potential partial project in the future may run on servers.

In terms of the allocation of public funds and the impact on the environment, the procurement of servers differs fundamentally from that of standard IT equipment. Whilst the largest carbon footprint for a laptop arises during its manufacture, with servers the environmental and financial burden shifts directly to the operational phase. These devices run continuously, 24 hours a day, 7 days a week. They generate massive direct electricity consumption for the computing power itself and, at the same time, emit enormous amounts of heat, which requires further, often even higher, electricity consumption for the cooling and air-conditioning of server rooms. The total cost of ownership (TCO) in this category therefore far exceeds the purchase price of the hardware itself over a five-year period.

For a purchaser in the city of Košice, this implies a clear strategic imperative – procuring the cheapest server without taking its energy efficiency into account is, ultimately, an extremely costly decision for the city's budget. Green public procurement in the data centre sector is not about environmental activism, but about rigorous, precise management of operating costs (reducing electricity bills) and maximising the resilience of the city's critical infrastructure against cyber and physical failures.

5.2 Comprehensive options for the green procurement of network infrastructure

The architecture of green public procurement in the server and data storage sector provides procurers with innovative tools that directly link IT architecture to sustainability requirements.

The first and most effective approach is to radically reduce electricity losses.

This is achieved by strictly requiring power supplies with certified efficiency (the 80 PLUS standard) and by defining extended thermal tolerances for equipment (ASHRAE standards). If the city of Košice procures servers capable of operating safely at an ambient temperature of 27 °C instead of the traditional 20 °C, this means that the air-conditioning units in the server rooms can operate at a significantly lower capacity, thereby enabling the city to save tens of thousands of euros a year in operating costs, both immediately and in the long term.

The second approach is hardware modularity and virtualisation.

Instead of purchasing a large number of small, single-purpose and underutilised physical servers, the city should move towards purchasing a smaller number of high-performance machines designed for virtualisation, thereby drastically reducing the consumption of raw materials. These machines must be designed to be modular (using hot-swap technology), which allows a faulty hard drive or power supply to be replaced whilst the system is fully operational, without the need to interrupt services for citizens.

A third approach, which is directly linked to cybersecurity guidelines, is the circular management of equipment at the end of its life cycle.

The City of Košice's data centres contain the most sensitive data of individuals and legal entities (information on building permit proceedings, residents' tax data, personnel files, etc.). The recycling of this equipment must be unconditionally linked to the certified, and often physical, destruction of data storage media, whilst the server chassis itself – which contains valuable metals (gold, platinum, copper) – must be returned by the supplier to the circular economy.

5.3 Energy efficiency of power supplies and cooling optimisation (ASHRAE)



Energy savings in data centres rest on two pillars: minimising the energy lost by a server when converting alternating current to direct current within its power supply, and minimising the energy required to dissipate the heat generated by that server.

The enterprise IT equipment market now commonly offers power supplies with an efficiency of over 94 per cent (labeled as 80 PLUS Platinum or Titanium). In parallel, ASHRAE (the American Society of Heating, Refrigerating and Air-Conditioning Engineers) has defined environmental classes for IT equipment. By requiring ASHRAE Class A2 or A3, the city ensures that it is purchasing hardware with sufficiently high-quality internal airflow and cooling systems that it is not necessary to overcool the server room to low temperatures for its operation.

However, the application of this approach must be considered in the context of limited budgets, as it may result in higher initial investment costs. It is therefore necessary to verify in advance the price difference associated with adopting this approach.

Proposed minimum requirement to be included in the technical specification:

With a view to minimising operating costs and electricity consumption, the contracting authority requires that all server equipment and disk arrays supplied must meet strict energy efficiency standards. The equipment must comply with the currently applicable requirements of the ENERGY STAR programme for enterprise servers or an equivalent environmental standard. All installed power supplies must be certified to at least the 80 PLUS Platinum (or Titanium) levels, which guarantees energy efficiency of over 94 per cent at 50 per cent load. At the same time, the contracting authority requires that all supplied hardware be fully certified and guaranteed by the manufacturer for continuous and safe operation within an extended ambient temperature range in accordance with ASHRAE TC 9.9, at least in Class A2 (support for continuous operation at an inlet temperature

of up to 35 °C), without loss of warranty and without triggering hardware warning alarms.

Justification and method of practical verification:

This proposal is the cornerstone of modern IT operations management at the City Council. Purchasing lower-class power supplies (e.g. Bronze) would mean that up to a fifth of the expensively purchased electricity would simply be converted into heat in the server room. The requirement for the ASHRAE standard protects the city from outages during the summer months, when air conditioning systems in server rooms may be overloaded. Verification of these technical details is straightforward for the city's procurement officer and IT technicians. Compliance with the 80 PLUS standard is verified by checking the certificate in the public Clearesult database (80 PLUS registry) or in the manufacturer's technical data sheet. Compliance with the ASHRAE standard is always precisely and mandatorily stated in the manufacturer's official document entitled 'Technical Specifications' or 'QuickSpecs' under the 'Operating Environment' section. Tenderers must attach these technical data sheets to their tender, thereby providing the city with irrefutable evidence.

5.4 Extended service life, operational continuity and modularity

Unlike standard office equipment, a server failure for the City of Košice would bring the provision of services to hundreds of employees and thousands of citizens to a standstill.

Equipment procured in this category must be designed for high availability. From the perspective of the circular economy, it is therefore essential to contractually require suppliers to provide technologies that allow faulty components to be

replaced whilst the system is fully operational (known as 'hot-swap') and to demand an unprecedentedly long and guaranteed support period from the manufacturer. A server that has lost support effectively becomes unusable scrap, even if it is still physically functional.

Proposed contractual provision and technical specification for long-term sustainability:

In order to guarantee a return on investment and extend the infrastructure's lifecycle, the contracting authority requires that all supplied server solutions and disk arrays feature a fully modular architecture. Key components, namely hard drives, cooling fans and power supplies, must support Hot-Swap technology (replacement whilst the system is running without the need to switch off the equipment or interrupt application operations). In the purchase contract, the supplier undertakes to provide premium, manufacturer-guaranteed on-site service support (repairs carried out directly at the customer's installation site) with an NBD (Next Business Day) response time for the entire solution supplied, for a period of at least 60 months (5 years). Throughout this period, the supplier must ensure free access to critical firmware updates, security patches and spare parts for the supplied model range.

Justification and method of verification in practice:

With this proposal, the purchaser directly eliminates the purchase of cheap, unprofessional components which are commonly found on the market but have no place in the infrastructure of a regional capital. Hot-swap technology ensures that the IT department can replace a failing data drive before it fails completely, thereby preventing catastrophic data loss, whilst the server itself remains switched

on throughout the repair and continues to serve citizens. The 5-year warranty locks in the city's investment horizon and transfers the financial risk of faults to the market. Compliance with the hot-swap requirements is verified by checking the official technical data sheet from the equipment manufacturer, which is attached to the tender. The provision of a 60-month warranty and software support becomes an integral and enforceable part of the purchase contract (Service Agreement/SLA – Service Level Agreement). Upon handover of the work, the supplier is generally obliged to provide a so-called Care Pack or registration certificate directly from the global manufacturer, confirming ongoing 5-year support for the specified server serial numbers.

5.5 Cyber security and circularity (server take-back)

The process of decommissioning servers and disk arrays poses the highest possible risk to the Košice City Council in terms of information leaks and the protection of personal data. These devices contain terabytes of extremely sensitive data. The traditional model, whereby old servers were simply handed over to a local waste collector, is absolutely unacceptable in the era of strict cyber security and the GDPR. Green procurement in this sector therefore places data protection on the same level as material recycling. The solution is to include a strict take-back clause, which requires the supplier to take back the old infrastructure, subject to the condition that data storage media are disposed of in a certified and auditable manner.

Draft contractual provision for secure take-back and circularity:

In accordance with the principles of the circular economy and cybersecurity policy, the supplier undertakes, upon

the end of operation of the supplied equipment (or upon the current decommissioning of the client's infrastructure being replaced), to carry out its free take-back and ensure its recycling. An absolute and mandatory condition prior to any further handling of the equipment is the Supplier's obligation to ensure the irreversible destruction of all stored data. The contracting parties have agreed that all internal storage media (HDDs, SSDs) must either undergo multiple certified software overwrites in accordance with the relevant standard, or must be dismantled on site at the customer's premises and subjected to physical destruction (shredding), after which the residual material will undergo material recycling. The remaining server components (chassis, motherboards, coolers) will be handed over by the supplier to European circular economy processes, primarily for refurbishment or the extraction of valuable and critical raw materials

Justification and method of verification in practice:

This contractual arrangement combines the city's environmental responsibility (the safe management of a huge volume of heavy metals and e-waste) with water-tight protection of internal data. A supplier of enterprise IT solutions typically has contracts with specialist audit firms that specialise in IT asset disposal (ITAD). For the purchaser and the cyber security department of the City of Košice, verification of this process relies on two critical documents, the provision of which is a condition for the payment of the final invoice or the return of the security deposit. The first is the 'Certificate of Data Destruction', which lists in detail every single hard drive serial number and the method by which the drive was destroyed. The second is a "certificate of environmentally sound management of electronic waste", which will provide the city of Košice with formal documentation for its environmental audits and enable it to communicate its responsible and green approach to the public.

CLEANING PRODUCTS AND CLEANING SERVICES

6

6.1 Strategic importance and specific features of cleaning services in the city of Košice

In the context of the operations of Košice City Council, municipal enterprises, schools and social care facilities, the category of cleaning products and cleaning services represents one of the most prominent areas of public procurement.

Although the financial value of these contracts may not, at first glance, rival that of major construction projects, their environmental and, above all, health impacts can be relatively significant. Cleaning services are carried out inside buildings on a daily basis, and thousands of civil servants, teachers, children and residents of Košice come into direct physical contact with the results of this work, particularly with residual chemical vapours.

A fundamental problem with the traditional model for procuring cleaning services is the so-called 'black-box' approach. In the past, procurers would generally define only the desired outcome – namely, a visually clean office – and leave the entire logistics, selection and purchase of cleaning products entirely to the contracted service provider. As the primary – and often the only – evaluation criterion was the lowest price, contractors were economically compelled to maximise their profit margin by purchasing the cheapest, most aggressive and most environmentally harmful industrial chemicals. This phenomenon directly led to the release of volatile organic compounds into indoor air, the emergence of so-called 'sick building syndrome', and a threat to the health of the cleaning company staff themselves, who were often socially vulnerable. Furthermore, attempts to integrate environmental requirements into tenders structured in this way almost always ended in 'greenwashing', where a contractor would declare

in their tender that they were using environmentally friendly products, yet covertly used aggressive chlorinated and toxic alternatives, as the contracting authority lacked the capacity to physically monitor this process.

For the City of Košice's procurement officers, this objective reality highlights the necessity for a radical change in the procurement paradigm. Green public procurement in this sector can no longer be based on trust and vague promises from suppliers.

A new strategic approach must strictly separate the logistics of material procurement from the actual provision of the service; it must enforce the use of innovative dosing technologies to reduce consumption; and, above all, it must introduce rigorous contract management based on measurable data and physical inspections.

Only through such a comprehensive approach will cleaning services become a genuine tool for protecting public health and the environment. The model for the procurement of cleaning products set out in this chapter can also be applied where an organisation carries out cleaning using its own staff.

6.2 Model for the centralised procurement of certified cleaning products (separation of logistics from service provision)

The most effective and legally soundest tool for the complete elimination of greenwashing is the procedural separation of the procurement of cleaning products from the procurement of labour. In this innovative model, the city of Košice (or its central procurement organisation) conducts a separate public procurement procedure exclusively for the supply of cleaning and hygiene products for all its buildings. In this tender,

the city strictly defines rigorous environmental standards. Subsequently, the city launches a second, separate public tender for the actual provision of cleaning services. In this tender, the contractor no longer competes on the price of cleaning products, but provides solely the staff, cleaning machinery and know-how, whilst being contractually obliged to use only those cleaning products that the City Council itself physically delivers to its warehouses.

This approach brings enormous synergistic benefits for the city of Košice. The purchaser gains 100 per cent and unquestionable control over the chemical profile of its buildings. At the same time, this model serves as a prime example of support for small and medium-sized enterprises in the Košice region. Smaller local cleaning firms were often unable to participate in large tenders because they could not finance the purchase of supplies and expensive eco-friendly products months in advance. By removing material costs from the contract, financial barriers to market entry are radically reduced, which stimulates competition and leads to better price offers for the actual work performed.

From the perspective of optimising storage and logistics capacities, the use of a Dynamic Purchasing System (DPS) is highly recommended for the centralised procurement of cleaning products. Through the DPS, the city of Košice will establish a qualified pool of suppliers who have demonstrated their ability to supply environmentally certified cleaning products. As a result, the city does not need to build its own huge central warehouses and tie up funds in them for months in advance. The relevant municipal enterprises and organisations can place smaller, operational orders (so-called calls for tenders) within the framework of the already established DNS, precisely in line with their current consumption, with delivery directly to their local workplaces. This flexible 'just-in-time' mechanism

guarantees consistently up-to-date, competitive market prices whilst relieving the city council of costly logistics.

Draft terms and conditions for participation in centralised procurement of goods:

In accordance with Section 34(1)(m) of Act No. 343/2015 Coll. on Public Procurement, that the tenderer demonstrate their technical and professional competence by submitting certificates issued by independent institutions confirming that the supplied products comply with specified environmental and health requirements to minimise the impact on aquatic ecosystems and indoor air quality. In order to fulfil this condition, the tenderer shall submit, as part of their tender, evidence that all supplied all-purpose cleaning products, sanitary facilities cleaning products and window cleaning products are certified with the official EU Ecolabel in accordance with the applicable Regulation (EU) No 66/2010 of the European Parliament and of the Council on the EU Ecolabel.

In strict accordance with the principle of equal treatment, the contracting authority shall also recognise Type I environmental labels in accordance with ISO 14024 as equivalent, such as the Nordic Swan, the German Blue Angel, the Austrian Umweltzeichen or the Slovak 'environmentally suitable product' label. If, for objective reasons, a tenderer does not hold the aforementioned certificates, they are obliged to demonstrate compliance with environmental standards by other relevant and equivalent evidence, in particular by submitting technical data sheets and product safety data sheets. This documentation must clearly and unequivocally demonstrate to the purchaser that the product offered contains no phosphates, microplastics, triclosan or nanosilver, and that none of its components is classified as carcinogenic, mutagenic or toxic

to reproduction within the meaning of Regulation No 1272/2008 on the classification, labelling and packaging of substances and mixtures.

Justification and method of verification in practice:



The inclusion of EU Ecolabel certification provides the procurement officer with a guarantee that the products are not only environmentally friendly but also fully functional, as this label also mandatorily tests cleaning efficacy in comparison with conventional cleaning products. Verification during the tender evaluation process is extremely quick and fool-proof. The tenderer submits the exact trade name of the product and a valid EU Ecolabel certificate as part of their tender. The purchaser verifies this information via the European Commission's official online catalogue (ECAT – EU Ecolabel Catalogue). This step definitively concludes the chemical verification process for the City of Košice even before the contract is signed, as the city will subsequently own these verified goods directly and distribute them to the cleaning staff.

6.3 Innovative technologies for a radical reduction in water and chemical consumption

Buying an environmentally certified cleaning product is only the first step. Even the most eco-friendly chemicals cause environmental damage if used in excessive, inappropriate quantities. Practice in many offices reveals a complete failure when it comes to dosing, with cleaning staff pouring concentrated solutions into buckets using the 'eyeball'

method (the 'glug-glug' method). This leads to massive over-use, a waste of municipal funds, sticky floors and the need for repeated rinsing with clean water. Green public procurement in Košice must contractually prohibit this inefficiency and prevent it through technological means.

Purchasing eco-certified cleaning products is only the first step towards true sustainability. Even the most eco-friendly chemicals cause environmental damage and harm the ecosystem if used in excessive, inappropriate quantities. An analysis of real-world practice reveals a complete failure in manual dosing, where cleaning staff pour concentrated solutions into buckets by eye (the so-called 'glug-glug' method). The theoretical assumption that the service provider will monitor consumption themselves for financial reasons fails in practice. Cleaning staff are not concerned with their employer's profit margin and often labour under the misconception that 'the more foam and fragrance, the more effective the cleaning'. Without the installation of a technological barrier in the form of a locked dispenser, the management of the cleaning company has no means of effectively monitoring this human factor.

However, this manual over-dosing does not only result in a loss for the supplier; above all, it represents a significant hidden cost for the city. If staff over-dose the cleaning products, the floors remain sticky and have to be repeatedly rinsed with clean water, thereby wasting water resources. Furthermore, new dirt adheres much more quickly to a sticky surface, leading to undesirable chemical build-up and the gradual degradation of surfaces (e.g. linoleum or tiles). As a result of this 'by eye' approach, the city of Košice will sooner or later end up paying thousands of euros extra for necessary deep mechanical cleaning or for the premature replacement of damaged floor coverings. Green public procurement in Košice

must contractually prohibit this inefficiency and prevent it through technological means.

The solution lies in strictly requiring innovative dosing systems and a transition to mechanical cleaning methods. In the technical specifications for cleaning services (or in the specific terms and conditions of the contract), the purchaser shall stipulate the service provider's obligation to install automated, lockable dosing stations in cleaning rooms (sink areas), connected directly to the water supply. These stations are purely mechanical and guarantee the precise mixing of the concentrate with water to within an optimal tenth of a per cent, a process in which cleaning staff have no opportunity to physically intervene.

At the same time, the contracting authority must require the extensive use of professional microfibre cloths. Thanks to its physical structure, modern microfibre removes up to 99% of dirt and bacteria from surfaces using only clean water. This completely eliminates the need for surface cleaning chemicals during routine dusting and the cleaning of officials' desks, which brings the city further operational savings and significantly reduces its overall environmental footprint.

Proposed minimum requirement for inclusion in the technical specifications (for the procurement of services):

The cleaning service provider is obliged, when carrying out work in the client's buildings, to apply procedures aimed at minimising the consumption of chemicals and drinking water. For this reason, the contracting authority strictly requires the installation and exclusive use of lockable, mechanical, automated dosing systems for the preparation of any working solutions from concentrated cleaning agents.

Any manual, uncontrolled pouring of concentrates by operating staff is strictly prohibited on the client's premises. The contractor further undertakes to ensure the daily cleaning of standard office surfaces (desks, furniture, glass door panels) using only certified microfibre cloths in combination with clean water, thereby guaranteeing the complete elimination of aerosolised chemical cleaning agents from the Client's employees' breathing zone.

Rationale and method of verification in practice:

This innovative approach protects the city's budget from waste and significantly reduces the carbon footprint associated with the transport of hundreds of litres of water in ready-made solutions, as the city now uses only highly effective concentrates.

Verification of these requirements is a matter of visual physical inspection for the purchaser and the building manager of the City of Košice. Compliance with the condition regarding the installation of dispensers is verified immediately after the contract is signed and the premises are handed over to the contractor. The authorised building manager will physically inspect each cleaning room. If a lockable dispenser connected to a water tap is not installed on the wall, the service provider has breached the contract and must not commence work. Similarly, staff cleaning trolleys are visually inspected, with particular attention paid to the presence of colour-coded microfibre cloths.

6.4 Contract management and physical checks: Audit-Driven Procurement

Even the best-written technical specification loses all meaning if the contracting authority lacks the tools to enforce it in real time. The central problem with public procurement of services is the absence of contract management during the implementation phase. Contractors are often aware that, once they have secured a contract, the contracting authority's oversight will be limited to the formal acceptance of invoices.

This manual therefore introduces the concept of 'Audit-Driven Procurement', which incorporates precise measurement directly into the text of the purchase contract in the form of Key Performance Indicators (KPIs).

The City of Košice must incorporate a requirement for software-based and data-driven consumption reporting into its contracts with cleaning companies. The contractor may no longer simply invoice a flat-rate monthly sum, but must attach reports from analytical software (Facility Management Software – FMS) to the invoice. These reports must accurately demonstrate the consumption of water and cleaning chemicals, calculated per a clearly defined floor area of the buildings (e.g. in grams of cleaning chemicals per m² per month). An even more important element of this management approach is the institutionalisation of unannounced physical audits carried out directly in the cleaning staff's lockers, with the introduction of strict financial penalties for the discovery of unauthorised cleaning chemicals.

Proposed contractual provision for KPIs and penalty mechanisms:

The contracting parties have agreed to introduce precise monitoring of environmental performance. The service provider is obliged to attach to each monthly invoice an electronic report on the actual physical consumption of concentrated cleaning agents (in litres or kilograms) and the consumption of dosed water for the relevant calendar month. The client (the City of Košice) reserves the unconditional right, through its authorised employees, to carry out a physical inspection (audit) at any time and without prior notice in all the Provider's storage areas and on the Provider's cleaning trolleys located on the Client's premises. Should the client's inspection body physically find, within these premises, any cleaning or disinfectant product that has not been approved in advance by the client or that does not comply with the contractually agreed environmental certifications (EU Ecolabel), this finding shall be deemed a gross breach of contract. The client shall impose a contractual penalty of €500 for each such individual finding; upon the third repeated breach, the client shall be entitled to immediately and unilaterally terminate the contract on the grounds of the provider's fault.

Justification and method of verification in practice:

The introduction of this strict system of sanctions and controls completely alters the power dynamics in the relationship between the city and the supplier. Faced with the threat of a heavy fine and the loss of a lucrative contract, the supplier simply cannot afford to secretly bring cheap, harsh and uncertified cleaning products from retail outlets into the building. Verification in practice does not require complex analytical skills. The building manager at Košice City Council carries out a random inspection of the cleaning staff's storage area (). They open a cupboard and check the plastic bottles inside. If a bottle does not bear the label of an approved supplied product or does not have the certification logo on the label, the manager takes photographs, draws up a brief audit report and forwards it to the city's legal department, which automatically deducts a contractual penalty from the supplier's next invoice. This procedure is highly effective, verifiable and acts as a definitive barrier against greenwashing in the services sector.

CONSTRUCTION AND RECONSTRUCTION OF ROAD INFRASTRUCTURE

7

7.1 Strategic importance and overcoming technological lock-in

The construction, modernisation and day-to-day maintenance of the extensive network of local roads represent one of the most significant cost items in the City of Košice's budget. From the perspective of environmental impact, this sector is absolutely critical.

Road construction consumes vast quantities of primary natural raw materials, particularly crushed aggregate and petroleum bitumen, and generates thousands of tonnes of milled-off old asphalt. In the traditional linear procurement model, this milled material is often treated and reported as construction waste, for which the city even pays high fees to send to landfill. From the perspective of a modern circular economy, however, it is an extremely valuable secondary raw material, the reuse of which brings about an immediate and drastic reduction in both the carbon footprint and financial costs.

A key finding from the analytical phase of the GRIP project, supported by examples of good practice from developed European countries such as the Netherlands and Sweden, is the identification of the central problem in 'greening' this sector. This problem is known as 'technological lock-in', or the lock-in effect. In public procurement, this phenomenon occurs when the contracting authority attempts to implement green and innovative requirements only at the final stage – that is, during the tender process itself to select a contractor for the construction works.

However, if, during the earlier phase of project preparation, the authorised designer conservatively proposed a solution using only primary materials, the construction firm participating in the tender no longer has the legal or technical scope to offer innovative materials or recycled materials.

Any change would constitute a deviation from the valid building permit and would require a lengthy amendment procedure. The result is that, despite the willingness of construction firms, the city of Košice is procuring outdated and environmentally unfriendly solutions. It goes without saying, however, that examples of good practice (not only from abroad) must be aligned not only with Slovak legislation but also with the actual circumstances of the project itself. It is therefore not possible to apply this model manually using a 'copy and paste' approach; rather, it is up to the designer to assess and incorporate recycling requirements into the relevant construction project. On the other hand, if the contracting authority does not specify such requirements, it is highly likely that the designer will not come up with such a solution of their own accord.

For this reason, this methodological manual radically changes the existing approach. The focus of green public procurement in road construction is shifting to the earliest possible stage. Green requirements must be uncompromisingly integrated right from the selection of the designer and into the terms of reference for the design documentation. Subsequently, for the implementation phase, the manual moves away from vague formulations such as 'to the greatest extent possible' and introduces precise, measurable and strictly verifiable minimum proportions of recycled materials and emission standards. Through this approach, the city gains control over the entire life cycle of the road, from the design documentation right through to final approval.

7.2 Integrating circularity into the preparation of design documentation (Design & Engineering)

The key to sustainable roads in Košice is a contractual requirement for designers to move beyond the comfort zone of simply replicating old technical solutions. As the investor, the City of Košice must, when awarding contracts for the preparation of design documentation for planning permission and construction, explicitly require the application of circular principles. The designer must be contractually obliged not only to assess, but primarily to propose the use of recycled materials, provided that the geological and traffic engineering conditions of the street in question do not objectively preclude this. Through this step, the city will obtain design documentation that is 'ready-to-tender' for a modern and environmentally friendly tender for a contractor.

Proposed conditions for the commissioning of project documentation (technical specifications of the works):

The contracting authority strictly requires that the contractor preparing the project documentation must apply the principles of the circular economy when designing the structural layers of the carriageway. The designer is obliged to include a separate chapter in the technical report containing an environmental and economic assessment of the material composition, in which they must, as a matter of priority and in a demonstrable manner, propose the use of cold in-situ recycling technology for the road structural layers, utilising existing road material. In the event of insufficient subgrade bearing capacity or other objective obstacles to the in-situ method, the designer is obliged to propose, in a binding manner, the use of asphalt mixtures produced at reduced temperatures (warm asphalt mixtures) in the bill of quantities and technical specifications for the future contractor and to

specify precisely the minimum proportion of recycled asphalt material (R-material) in the wearing and base courses in accordance with the applicable technical conditions of the Ministry of Transport of the Slovak Republic. Any failure to utilise these technologies must be precisely justified by the designer on technical grounds and supported by laboratory tests of the original material.

Justification and method of verification in practice:

By setting out these requirements, the City of Košice shifts the analytical burden onto the designer, who is a paid expert. This eliminates the aforementioned 'lock-in' effect, whereby the city ends up with a project 'on the shelf' that is already environmentally obsolete at the time of handover. Verification of this requirement takes place during the handover of the completed work (project documentation) by a representative of the Investment Department of Košice City Council. The designated officer will take delivery of the technical report and bill of quantities and check for the presence of the required section. If the designer has proposed construction using only virgin materials without providing laboratory evidence that the old road cannot be recycled, the client will not accept the work and will return it for revision on the grounds of non-compliance with the contractual brief.

7.3 Functional Specifications and Design and Build Models Utilising Environmental Criteria

For larger-scale reconstructions of major transport arteries in Košice, it is highly effective to utilise the innovative 'Design and Build' contract model, combined with a so-called functional brief. Instead of the procurement officer specifying in detail the thickness of every single layer of asphalt and the chemical composition of the material, they simply

define the functional requirements: for example, the required load-bearing capacity of the carriageway, resistance to rutting caused by through traffic, and a guaranteed service life of the structure for 20 years. At the same time, an environmental evaluation criterion inspired by the Dutch 'shadow prices' is introduced into the tender. The contractor is thus granted complete technological freedom. The contractor's own experts will design the ideal mix and process to achieve the highest quality with the lowest carbon footprint, for which they will receive points in the tender.

Proposed evaluation criterion for the Design and Build model (MEAT):

The contracting authority will evaluate tenders on the basis of the best price-quality ratio. The price criterion (total price for the works) will be weighted at 60%. The second, qualitative criterion, weighted at 40%, will be the declared level of environmental impact and carbon footprint of the construction materials used per square metre of carriageway.

In their tender, the tenderer shall submit a detailed technical procedure and a material balance. The full number of points for this criterion will be awarded to the tenderer who contractually guarantees and demonstrates the technical capability to utilise on-site (in-situ) at least 80 per cent of the volume of the original material from the existing road and to use exclusively low-emission asphalt mixtures for new asphalt surfacing, produced at temperatures reduced by at least 30°C compared with standard mixtures. Tenderers guaranteeing a lower percentage of circularity will receive a proportionate share of the points in accordance with the mathematical formula defined in the tender documents.

Model for the Evaluation of Tenders (MEAT)

The contracting authority will evaluate tenders on the basis of the best price-quality ratio. In total, the successful tenderer may score a maximum of **100 points**.

Definition of criteria and their weightings

Criterion No. 1: total tender price for the execution of the works in €

- Weighting: 90% (maximum 90 points)
- The total final price for the design and construction of the works, including all costs, will be assessed

Criterion No. 2: environmental index of the road structure (ENV)

- Weighting: 10% (maximum 10 points)
- The extent to which environmentally friendly practices are incorporated is assessed. This index is calculated as the sum of two values (maximum 10 points):

Part A) Proportion of recycled material (max. 5 points): the percentage of reused original road material (in-situ) or recycled asphalt granulate in the new layers,

Part B) Use of low-temperature technology (max. 5 points): a commitment to produce and lay asphalt layers as a low-temperature mix (WMA) with a temperature reduced by at least 30°C compared to standard mixes, which significantly reduces emissions and gas consumption during production.

Method of demonstrating compliance with the criterion by the tenderer (in the tender)

The tenderer is required to submit the following documents in their tender. The absence of these documents or their incompleteness will result in no points being awarded for the relevant part of the criterion (the tenderer will receive 0 points), whilst the tender will remain in the competition and be assessed under the price criterion.

- 1. Form ENV (Annex to the tender documents):**
a table in which the tenderer must specify the exact values to which they are contractually bound (guaranteed % of recycled material and commitment to low-temperature asphalt: YES/NO).
- 2. Confirmation from the manufacturer of asphalt mixtures (coating plant):** *if the tenderer does not own a coating plant, they shall submit a preliminary agreement or a letter of acceptance from the mixture manufacturer, clearly stating that this specific plant will supply materials for the Košice city construction project. This confirmation must include a declaration of the plant's technical suitability issued by its operator, confirming that the technological equipment (coating line) possesses the technology to dose recycled granulate up to the declared percentage and is equipped with apparatus for the production of low-temperature asphalts (e.g. an asphalt foaming system or additive dosing system).

3. Technical documentation for mixtures:

- **for recycled material (Part A):** the tenderer shall submit an initial type test of the mixture (preliminary test in accordance with STN EN 13108) for the types of mixture it intends to use, where the manufacturer guarantees the permitted range of recycled asphalt granulate (RAP) addition,
- **for low-temperature asphalt (Part B):** the tenderer shall submit the manufacturer's technical data sheet for the low-temperature asphalt mixture (Warm Mix Asphalt – WMA) or the technical data sheet for the chemical/wax additive (e.g. Sasobit, zeolites, liquid additives) to be added to the mixture in order to reduce the mixing and laying temperatures by the required minimum of 30°C.

Method of evaluating the criterion by the contracting authority (evaluation committee)

The evaluation committee shall review the submitted documents and award points for Criterion No. 2 (environmental index ENV) according to the following scale:

Part A) Proportion of recycled material (max. 5 points):

- if the tender includes a certificate from the packaging line and a type test confirming a proportion of **60 per cent or more = 5 points**,
- if the tender includes a certificate for the packaging line and a type test for a proportion of **between 30% and 59% = 3 points**,

- if the guaranteed proportion is less than 30%, or if the packaging line documents are missing = **0 points**,
- if the guaranteed proportion is less than 30%, or if the packaging line documents are missing = **0 points**,

Part B) Low-temperature technology (max. 5 points):

- if the tenderer has submitted a commitment (YES) and provided a technical data sheet for a WMA mixture or additive to reduce temperatures = **5 points**,
- if the tenderer does not use a low-temperature mixture in the contract (NO), or has not provided the technical data sheet for the additive = **0 points**.

The committee will add up the points from Part A and Part B. This total (max. 10 points) will be added to the points awarded for price.

Method of verification and inspection during implementation (contractual guarantees)

On-site inspections are carried out by the City of Košice's building inspectorate:

1. **approval of the mix design prior to concreting:** before commencing asphalt laying, the contractor shall submit to the city the final production mix design linked to the implementation project, which shall specify the verified weight percentage of the aggregate,

- 2. checking delivery notes from the coating line:**
the building inspector regularly checks and archives delivery notes directly from the coating line's weighing system. Each delivery note must record the temperature of the asphalt mix at the time of loading (a drop of at least 30°C from the standard temperature of approximately 160–170°C is verified; in other words, the low-temperature mix is transported at a temperature of around 130°C).
- 3. Contractual penalty:**
if the contractor fails to comply with the percentage of recycled material or the temperature to which they have committed and on the basis of which they have been awarded points, they will be subject to a contractual penalty amounting to 5 per cent of the total value of the works contract.

Mathematical formulas for calculating points (suitable for MS Word)

Formula for Criterion No. 1 (price):

points for price = (lowest tender price / tender price of the tenderer being assessed) × 90

Calculation for Criterion No. 2 (environment – ENV):

points for ENV = points for Part A (0, 3 or 5 points)
+ points for Part B (0 or 5 points)

Practical example of point calculation in practice

The committee is evaluating 3 tenderers:

- **Tenderer A (conventional company):** offered the lowest price of **€1,000,000**. In the environmental questionnaire, they stated a recycled content of less than 30% and indicated that they would not use WMA technology (NO). They did not provide any environmental documentation,
- **Tenderer B (a greener alternative):** offered a price of **€1,040,000**. They provided confirmation of the production line and a type test for 65 per cent recycled material. They also provided a commitment to low-temperature asphalt (YES) together with a technical data sheet for the additive,
- **Tenderer C (middle ground):** Offered a price of **€1,020,000**. Submitted a type test for 40% recycled material. However, for low-temperature asphalt, they opted for the 'NO' option and did not submit any technical data sheet for it.

Detailed calculation of points for individual tenderers:

Tenderer A:

- Criterion No. 1 (price) = $(1,000,000/1,000,000) \times 90$
= 90.00 points
- Criterion No. 2 (environment – ENV):
Part A recycled content below 30 per cent/no documentation) = 0 points
Part B (low-temperature technology – NO/no documentation) = 0 points

- Total for Criterion No. 2 = 0 + 0 = 0.00 points
- **Overall score for Tender A = 90.00 + 0.00 = 90.00 points**

Tenderer B:

- Criterion No. 1 (price) = $(1,000,000/1,040,000) \times 90$
= 86.54 points
- Criterion No. 2 (environment – ENV):
Part A (proportion of recycled material over 60% + supporting documents) = 5 points
Part B (low-temperature technology – YES + supporting technical data sheet) = 5 points
- Total for Criterion No. 2 = 5 + 5 = 10.00 points
- **Overall score for Tender B = 86.54 + 10.00 = 96.54 points**

Tenderer C:

- Criterion No. 1 (price) = $(1,000,000/1,020,000) \times 90$
= 88.24 points
- Criterion No. 2 (environment – ENV):
Part A (40% recycled content + supporting documents) = 3 points
Part B (low-temperature technology – NIE/no supporting documents) = 0 points
- Total for Criterion No. 2 = 3 + 0 = 3 points
- **Overall evaluation of tender C = 88.24 + 3.00 = 91.24 points**

Tender result:

Tenderer B is declared the winner of the public procurement procedure **with a total of 96.54 points**.

Although it was €40,000 more expensive than the cheapest tenderer, Tenderer A, the declared parameters should result in a longer service life for the road surface itself.

Justification and method of verification in practice

This approach unlocks the innovative potential of the private sector. Construction firms have access to state-of-the-art technologies, but in tenders based on the lowest price, they have no incentive to use them. Through this criterion, the city of Košice mathematically places a contractor with an innovative mobile crusher and recycling machine on an equal footing with a contractor who quarries primary stone, as the more environmentally friendly approach earns additional points. Verification takes place on two levels. During the tender stage, an expert committee assesses the tenderer's technical proposal, in which they must clearly explain their procedure and technical basis. During the implementation phase, the investor's site supervisor takes charge, recording the type of machinery used in the site log on a daily basis and physically checking that the material is being milled and immediately mixed back into the sub-base exactly as the tenderer committed to in their tender. Any breach of this technical commitment will result in the imposition of substantial contractual penalties for failure to meet the quality performance parameters.

7.4 Precise material requirements for implementation, without vague wording

The weakest point of many past attempts at green public procurement was the use of phrases that completely undermined enforceability in practice. Clauses containing phrases such as 'to the greatest extent possible' or 'where possible' give the city no legal leverage whatsoever.

A contractor could simply state that the maximum extent possible for them on a given day was 0 per cent, as they had no spare capacity. This manual therefore sets out precise, strict mathematical thresholds, which become an uncompromising condition for the acceptance of the work delivered and a condition for the payment of invoices by Košice City Council. These minimum standards are set so as to comply without issue with the applicable Slovak technical standards, thereby eliminating any argument by contractors regarding reduced quality.

Proposal for precise technical and contractual requirements for routine repairs and construction

With a view to reducing the consumption of primary natural resources and protecting the climate, the contracting authority sets binding minimum thresholds for the use of recycled materials in new asphalt mixes. The contractor contractually undertakes and guarantees that all hot-mix asphalt mixtures supplied and incorporated into the wearing and base courses of the carriageway will contain certified R-material (milled asphalt surfacing). For the base asphalt layers, the client sets a fixed requirement for the minimum weight percentage of R-material at 30 per cent of the total weight of the supplied mix. For the wearing courses, the client sets the minimum weight percentage of R-material at 15 per cent. The use of mixtures with zero or a lower than prescribed proportion

of recycled material is permitted only with the prior written approval of the client's technical supervisor, and exclusively on the basis of verifiable laboratory findings confirming the presence of hazardous substances (e.g. tar) in the original road surface, the recycling of which is prohibited by legislation.

Justification and method of verification in practice

With this provision, the city of Košice is sending a clear signal to supply chains and operators of asphalt mixing plants in the region that production without recycled materials is no longer acceptable for public contracts. The specified percentages are safe from a technological point of view and are routinely manageable for modern asphalt mixing plants. The verification method is strictly documentary and watertight. The city's authorised construction supervisor requires the site manager to provide, for every single delivery of asphalt, a so-called delivery note from the mixing plant and a certificate of the mixture's composition, known as a proof test (initial type test – ITT). This document, issued by a certified laboratory at the asphalt mix production plant, specifies the mix formulation precisely to the nearest tenth of a per cent, including the proportion of added R-material. If the certificate supplied shows a value below the contractually stipulated 30 per cent, the site supervisor shall immediately halt the laying of the asphalt and refuse to accept the entire delivery of asphalt at the contractor's expense.

7.5 Reducing the negative impact of construction machinery and protecting air quality in the city

Road reconstruction works in Košice often take place in the immediate vicinity of residential areas, schools and within the historic city centre itself. The use of outdated construction machinery, from which plumes of black smoke escape, is in direct conflict with efforts to improve air quality in the city. Off-road vehicles such as heavy excavators, loaders, road milling machines and the lorries themselves transporting rubble represent a massive local source of nitrogen oxides and fine particulate matter. Green public procurement here therefore focuses not only on the global climate, but primarily on protecting the health of Košice's residents and reducing noise from diesel engines during the ongoing construction work.

Proposed conditions for participation in the tender documentation (technical and professional competence)

The contracting authority requires proof of technical and professional competence within the meaning of Section 34(1)(j) of Act No. 343/2015 Coll. on Public Procurement by submitting details of the machinery, operational or technical equipment available to the tenderer for the performance of the construction works. The contracting authority defines the minimum level of this standard in terms of air quality protection as follows: in order to perform the contract, the tenderer must have at its disposal heavy goods vehicles of category N3 intended for the removal of milled material and the delivery of asphalt mixtures, which comply with the EURO VI emission standard as a minimum. At the same time, the tenderer must have heavy non-road mobile machinery equipped with internal combustion engines with a power output exceeding 50 kW, in particular

wheeled and tracked excavators, front-end loaders and road milling machines, which comply with emission limits for pollutants at a minimum of Stage IV or the stricter Stage V, in accordance with the applicable European Directive on emissions from non-road mobile machinery.

Method of demonstrating compliance with the participation condition

The tenderer shall demonstrate compliance with this condition by submitting a signed list of the key construction machinery and lorries at their disposal which they will deploy in the performance of the contract. For each vehicle and machine on the list, the tenderer shall attach to the tender a photocopy of the vehicle registration certificate (technical certificate), a certificate of conformity (CE certificate) or another equivalent technical document issued by the manufacturer, from which the relevant emission class of the machine in question is clearly and unambiguously evident. In accordance with the principle of proportionality and with a view to not restricting competition, the contracting authority explicitly declares that, when assessing this condition of participation, it will not examine the validity of the regular technical and emissions inspection (STK/EK) as at the date of submission of tenders in relation to the technical documents submitted. This approach fully respects the objective market reality, in which economic operators may, for economic reasons, have part of their fleet temporarily taken out of service without valid inspections, whilst the sole decisive factor for successfully meeting the condition of participation is the demonstration of the machine's design emission class itself.

Contractual condition and physical verification during the implementation phase

The full legislative and operational compliance of the verified machinery is subsequently carried over into the implementation phase as a strict condition for the performance of the contract. In the works contract, the contractor undertakes that all machinery actually deployed on the construction site within the built-up area of the city of Košice will not only comply with the tendered emission standards, but will also, without exception, have undergone the technical and emission inspections required by current legislation. The city's building inspectorate has the unrestricted right to carry out a physical inspection of manufacturer's plates and technical certificates directly on the construction site prior to the commencement of works. Should any non-compliance be identified, the deployment of machinery with a lower emission standard or machinery unfit for operation shall be deemed a material breach of contract. In such a case, the building inspector shall make an entry in the site logbook, immediately prevent the machine in question from continuing work, remove it from the construction site, and the city shall impose the relevant contractual penalty on the contractor.

CONSTRUCTION AND BUILDING RENOVATION



8.1 Strategic context and overcoming the fear of cost overruns in the city of Košice

The sector of construction and comprehensive building refurbishment (of schools, government offices, cultural institutions and social care facilities) represents by far the most challenging, yet also the most important, category of public procurement for Košice City Council and its organisations.

This sector is under enormous pressure in terms of sustainability, as construction and the operation of buildings in the European Union account for approximately 40 per cent of total energy consumption and 36 per cent of greenhouse gas emissions.

In the context of Slovak local authorities, including Košice, the procurement of construction works has historically been burdened by a deep-rooted fear of cost overruns. Contracting authorities subconsciously opt for lowest-price tenders and the bills of quantities drawn up by designers in an effort to maintain control over a tight budget. However, the resulting practice shows exactly the opposite: this model leads to so-called ‘underbidding’ in tenders, which construction firms subsequently compensate for by exerting pressure for constant contract amendments (additional work) and by using the cheapest materials with a short lifespan. The city of Košice thus procures projects ‘cheaply’ at the outset, but in the following decades pays enormous sums for high energy consumption and constant repairs to substandard buildings.

This methodological handbook takes a different approach to green construction. Sustainable and circular construction is not presented here as a luxury environmental extra, but as a robust tool for financial management and risk control.

The handbook provides procurers with innovative contract formats and procedures that shift responsibility for long-term quality, energy efficiency and waste management from officials directly to the contractor, through clearly measurable and enforceable contractual clauses.

However, given the limited financial resources of public procurers, before the public procurement procedure is actually launched, when using green public procurement in accordance with this chapter of the manual, the designer should provide a financial estimate of the difference between 'standard' public procurement and one of the models set out in this chapter. Selective demolition and precise management of construction waste should ultimately reduce the cost of construction works.

8.2 Selective demolition and precise management of construction waste

Every major refurbishment or new build begins with demolition work. Traditionally, this involved rough demolition, where the entire building was demolished and a mixture of concrete, bricks, glass, timber and plastics was taken to a landfill site as construction waste, for which the city of Košice paid disposal fees.

Green public procurement is transforming this process into **selective demolition**. The contractor is contractually obliged to 'dismantle' the building in such a way as to maximise the purity of the individual material streams. Although the Waste Act No. 79/2015 Z.z. (Annex No. 3, Part VI) sets a target of 70 per cent recycling of non-hazardous construction waste for the demolition of buildings with an area of more than 300 m², the modern procurement officer for the City of Košice is able to raise this bar significantly

higher through contractual agreements. The motivation lies in the fact that sorted, clean concrete aggregate or scrap metal has a positive market value, thereby making it possible to realistically reduce the cost of demolition work for the city.

Proposed contractual provision for selective demolition

The contracting authority requires the application of circular economy principles when removing existing structures. The contractor undertakes contractually to carry out demolition work using the selective demolition method, whilst ensuring the primary sorting of construction waste (in particular the separation of concrete, bricks, metals, glass, timber and plastics) directly on site. The contractor undertakes to achieve a material recovery (recycling) rate for the resulting construction and demolition waste of at least 85 per cent by weight of the total volume of waste produced (with the exception of hazardous waste, which must be disposed of professionally in accordance with applicable legislation). A condition for the approval of the statement of works carried out and the subsequent payment of each invoice relating to demolition and earthworks is the unconditional submission of certified weighing slips issued by an authorised supplier or waste recovery facility, which accurately and specifically confirm the receipt, type, catalogue number and weight of the sorted construction waste originating from the construction site in question.

Rationale and method of verification in practice

By setting a high target of 85% recycling, the city protects natural resources and prevents the illegal dumping of rubble at fly-tips around Košice, where contractors seek to save on landfill costs. The key to the success of this provision lies

in its procedural link to invoicing. Contractors cannot simply cover the waste with soil anywhere, as otherwise the Košice City Building Inspectorate will not approve their invoice. Verification takes place directly on site and in the office. The building inspector visually checks for the presence of separate containers for waste sorting directly on site. Subsequently, when checking the invoice, the clerk cross-checks the invoiced volume of rubble against the attached weighing slips from a certified processor (e.g. a company with a concrete crusher). This completes a watertight chain of control.

8.3 Innovative contract formats: fixed price (fixed budget)

One of the most innovative approaches to transforming the risk of cost overruns into a tool for green quality is the fixed-budget procurement model (Fixed Price). This is an example where the contracting authority has a limited budget that is quite clearly insufficient to meet its needs. An example might be a limited budget for repairing potholes. This budget is not enough to repair all the potholes, and so the contracting authority seeks a solution whereby as many potholes as possible are repaired for a set amount.

This approach completely changes the dynamics of the tender. The City of Košice first defines a fixed sum allocated for the reconstruction (e.g. exactly €2,500,000), and this sum becomes both a fixed ceiling and a fixed price.

Bidders in the tender therefore do not compete by undercutting the price, but by demonstrating what added environmental and qualitative value they can deliver to the city for this guaranteed sum.

Proposal for evaluation criteria for a fixed-price procurement model (MEAT)

In this public procurement procedure, the price for the execution of the works is fixed by the contracting authority at [X € excluding VAT] and is not subject to competitive tendering. The evaluation of tenders focuses exclusively on the scope and quality of the proposed energy, environmental and technological solutions provided within this fixed price (MEAT criterion with a weighting of 100%).

Tenderers will be awarded points on the basis of the 'technical and environmental study of the solution' they submit, with points being awarded for:

- 1. guarantee of energy efficiency:** points are awarded to a proposal which, following refurbishment, demonstrably guarantees that the building's overall primary energy indicator will reach Class A0 level, or demonstrates the highest percentage saving in energy consumption compared with the building's original reference condition (weighting 40%),
- 2. integration of renewable energy sources (RES):** points are awarded for the design and integration of photovoltaic panels, heat pumps or solar water heating into the overall solution within a fixed budget (weighting 30%),
- 3. water retention measures and blue-green infrastructure elements:** points for the design of green roofs, rainwater retention tanks for toilet flushing or permeable car park surfaces (weighting 30%).

Rationale and method of verification in practice

With this model, the city of Košice caps its expenditure – it knows exactly how much it will pay. At the same time, it cuts out speculators who would always offer absurdly low prices just to win the contract, only to subsequently paralyse the project by blackmailing the client over contract amendments. Verification during the tender process is carried out by an expert committee, which assesses the bidders' technical documentation and energy calculations. The verification procedure during the implementation phase is set out in the contract: upon completion of the work, the contractor is obliged to submit an energy performance certificate for the building demonstrating the promised A0 rating, and all promised green features must be physically installed. Should a tenderer fail to meet the parameters promised in their tender, strict contractual penalties will apply.

8.4 Transfer of responsibility: the Design & Build contract format

Under the traditional construction model (where the city first commissions a designer and then a contractor), the city faces a huge risk. If a fault is discovered on site, the contractor blames the poor design and the designer blames the poor execution. The city pays both, and the construction comes to a standstill. The **Design & Build (D&B)** model cuts through this Gordian knot: the city commissions a single entity to design the building, obtain the necessary permits and subsequently construct it.

From the perspective of green construction, this is an invaluable tool. If the contractor draws up the design themselves, they are highly motivated to propose technologies and materials that will allow them to build efficiently, quickly

and flawlessly. If the contract also includes a guarantee covering energy consumption for the first five years following handover of the building, the contractor will not dare to purchase the cheapest and ineffective insulation, as they would have to cover the shortfall on the City of Košice's gas or electricity bills themselves during the guarantee period.

Proposal for a minimum functional requirement to be included in the terms of reference for D&B

'The contracting authority is awarding the contract in the form of a functional brief (Design & Build). The contractor assumes full responsibility for the preparation of all stages of the design documentation, the engineering work and the subsequent complete construction of the building to energy class A0, with an emphasis on maximising the use of renewable energy sources.

*The contract includes a commitment by the contractor to provide an extended warranty for defects in the works for a period of at least 60 months and, concurrently, **an Energy Performance Guarantee for a period of 36 to 60 months** from the date of commissioning. The contractor guarantees that, under standardised operating conditions (as defined in the contract), the building will not exceed the designed annual energy consumption for heating, cooling, ventilation and domestic hot water.*

*The contractor is obliged, as part of the project, to design and implement **a sub-metering system (BMS/MaR)** which technically separates the consumption of the building's fixed systems from that caused by users (e.g. appliances on socket circuits, specific IT infrastructure). In the event of a demonstrable failure to achieve the guaranteed parameters due to a defect in the design or implementation, the contractor*

shall pay the client a contractual penalty equal to the financial difference arising from the excess consumption, or shall implement corrective technical measures at its own expense.”

Justification and method of verification in practice

Upon completion of the works, the contractor shall hand over the energy performance certificate and the as-built project documentation. For the three years following the handover of the building, the property manager of the City of Košice shall analyse the actual energy bills. Thanks to the smart measurement and control (MaR) system, the city will not compare the total invoice from energy suppliers with the contractor's figures. Heat consumption for heating, electricity consumption for heat pumps, ventilation systems and lighting will be measured separately. If officials leave windows open in winter or plug in hundreds of their own appliances, the system will record this and this 'excess consumption' will be deducted from the contractor's performance guarantee assessment.

8.5 Technical integration of CO₂e emission limits and contractual control of materials

The effective implementation of green features in construction requires close methodological cooperation between the City of Košice's procurement officer and the designer right from the early stages of preparing the project documentation, thereby preventing later complications in public procurement. As part of the terms of reference for the designer, the procuring authority will define the obligation to identify key construction materials with the greatest impact on climate change, such as, typically, concrete mixes, steel reinforcement or massive thermal insulation systems. The designer will then incorporate these identified materials into the bill

of quantities not as general items, but as items with clearly defined emission limit values, specifying precisely the maximum permissible global warming potential (GWP) value expressed in kilograms of carbon dioxide equivalent per unit of material. This approach transforms the perception of sustainability from a formal administrative requirement into a specific technical parameter of the material, which is equivalent, for example, to the compressive strength of concrete, and provides the market with absolute certainty when evaluating tenders.

In line with the decision-making practice of the Public Procurement Office and with the aim of eliminating any risk of discrimination, the purchaser does not require the submission of specific environmental certificates directly in the tender as a condition of participation, as certification is, in principle, voluntary. Instead, the purchaser incorporates the obligation for the designer to comply with the specified emission limits directly into the draft works contract as a specific performance condition, thereby shifting the burden of proof to the successful contractor during the implementation phase.

Draft model contractual provision for the implementation phase

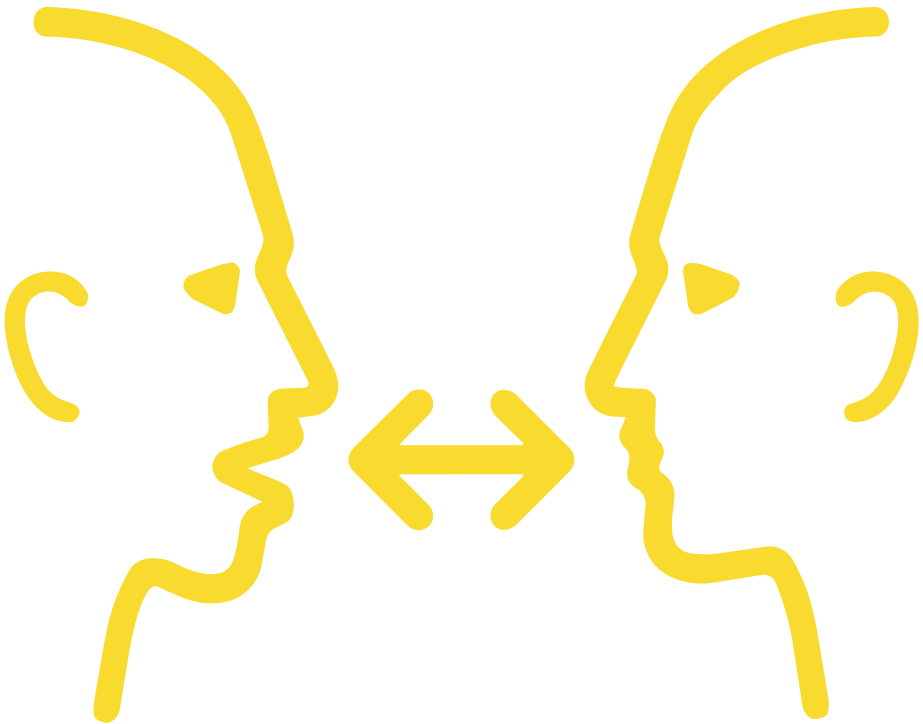
The Contractor undertakes and guarantees that, in carrying out the subject matter of the contract, it will use only those materials which comply with the maximum permissible global warming potential limits defined by the designer in the approved bill of quantities. Prior to the physical installation of any such item into the building structure, the Contractor is obliged to submit to the Client's site supervisor evidence of its environmental characteristics, primarily in the form of a valid Type III Environmental Product Declaration (EPD certificate) drawn up in accordance with standard EN 15804.

The client expressly declares that, in the absence of an EPD certificate from a specific manufacturer, it will unreservedly accept other equivalent evidence, such as, in particular, the manufacturer's technical data sheet, an authorised calculation of the carbon footprint of a production batch, or a report from an independent testing laboratory, provided that such equivalent evidence indisputably and precisely demonstrates compliance with the CO₂e emission limit value for the material in question. The installation of any material subject to this condition without the prior written consent of the building inspector is strictly prohibited and shall be deemed a material breach of contract.

Justification and method of contractual verification in practice

This procedurally sound model ensures that the City of Košice does not exclude tenderers from the competition due to missing 'documentation' at the time of submitting a tender, thereby protecting itself against objections, whilst at the same time uncompromisingly insisting on compliance with environmental quality standards throughout the entire construction process. In practice, the control mechanism is entirely in the hands of the City of Košice's building inspectorate, which acts as the quality guarantor. Well in advance of the planned concreting or installation, the contractor must submit a so-called 'material data sheet' to the building inspectorate for approval; a mandatory annex to this is the EPD certificate or the aforementioned equivalent emissions calculation from the building materials manufacturer. The building inspectorate will compare the GWP value in the certificate with the limit value specified in the bill of quantities. If the supplied material does not meet the limit, or if the contractor refuses to submit the relevant evidence, the building inspectorate will immediately halt work on the structure in question and will not authorise its completion. Should the contractor install the material without authorisation, the building inspector will not record such an item in the list of works carried out, thereby preventing it from being invoiced and paid for from public funds. This precise contractual and financial pressure is the most effective tool for turning the environmental objectives of the GRIP project into a tangible reality on construction sites in Košice.

PRELIMINARY MARKET CONSULTATIONS AS A TOOL FOR ELIMINATING MARKET BARRIERS AND THE FEAR OF FAILURE



9.1 The strategic importance of market dialogue in the context of the city of Košice

According to the results of analytical studies, the implementation of innovative and stringent environmental measures in public procurement in the city of Košice faces one particularly strong psychological and procedural barrier. This obstacle is the so-called fear of a 'empty tender'. Many procurers understandably fear that setting stringent environmental requirements – such as a high proportion of recycled materials in asphalt, strict certification of equipment, or the requirement for Environmental Product Declarations (EPDs) in the construction sector, will deter local suppliers and lead to the cancellation of the entire public procurement process. Preliminary market consultations, legitimately enshrined in Section 25 of the Public Procurement Act, represent the perfect strategic and legally sound tool for addressing this issue. Through this mechanism, the city of Košice does not speculate or make assumptions about current market capacities, but instead initiates a formalised dialogue with independent experts and market participants themselves, even before the actual call for tenders is issued. The aim of this approach is to enable procurers to test their bold green hypotheses in practice, to obtain feedback on realistic technological possibilities, and subsequently to set tender conditions that are as ambitious as possible, whilst remaining objectively achievable and not restricting fair competition.

9.2 Legal framework and prevention of distortion of competition

When utilising the mechanism of preparatory market consultations, it is an absolute priority for the City of Košice to strictly adhere to the fundamental principles of public procurement, in particular the principles of transparency, equal

treatment and non-discrimination. The purpose of market consultations is under no circumstances to give preferential treatment to a specific supplier or to unfairly tailor the description of the subject matter of the contract to a single preferred entity. The Public Procurement Act requires the contracting authority to take appropriate measures to prevent distortion of competition, which in practice means, above all, perfect information symmetry. All relevant information, technical findings and parameters exchanged between the City of Košice's procurement officer and the involved suppliers during consultations – and which subsequently influence the content of the tender documents – must subsequently be published in full and without delay, and made available to all other potential tenderers who did not participate in the consultations. This methodological step fully protects the City of Košice against any potential challenges to the tender by supervisory authorities and against objections on grounds of discrimination.

9.3 The preparation phase and variability in the formats of market consultations

The success of market consultations is closely linked to the chosen method of implementation, with the City of Košice's procurement officer adapting the format to the specific nature and complexity of the contract. The simplest method is an exclusively written format using electronic questionnaires and email communication, which is suitable for quickly verifying the availability of standard green certificates. For more complex contracts, such as major building refurbishments or sophisticated IT solutions, both international and national practice clearly favours face-to-face or remote online meetings. It is recommended that these meetings take the form primarily of one-to-one discussions with individual suppliers, as this approach best protects companies' trade

secrets, encourages them to openly share innovative know-how and, above all, effectively prevents the risk of collusive behaviour or the formation of illegal cartel agreements, which would otherwise be a risk during mass meetings where several competitors sit around the same table. In the case of specific supplies, such as automated dispensing systems for cleaning products or the testing of energy-saving technology, market consultation may even take the form of a physical, practical demonstration and testing of samples directly on the council's premises, thereby giving the purchaser a tangible idea of the quality of the future supply.

9.4 Strategic formulation of questions for green procurement

The quality and accuracy of responses from the market are directly proportional to the quality and depth of the questions asked; the purchaser must not limit themselves to abstract environmental visions, but must confront the market with tough technical and procedural questions. Key areas of discussion include, in particular, enquiries aimed at identifying conditions that would objectively prevent the market from participating or that would disproportionately and unjustifiably increase the price of the final solution. The purchaser asks suppliers directly whether a sufficient number of EPD certificates for the construction materials under consideration, which form the subject of the contract, are actually available on the local market, whether suppliers are able to guarantee a continuous supply of low-emission asphalt within the required timeframe, and what the objective price difference is between conventional linear demolition and the method of selective demolition with a high rate of subsequent recycling. It is equally important to consult the market regarding the optimal setting of evaluation criteria, whereby the purchaser ascertains what other non-price

quality parameters the companies themselves would consider fair and verifiable. At the same time, the purchaser should enquire about the optimal duration of the tender submission period, as the preparation of a high-quality 'green' tender supported by extensive certification requires considerably more time on the part of companies than the pricing of a standard bill of quantities.

9.5 Recording the dialogue, evaluation and putting the conclusions into practice

The final and absolutely crucial stage of the entire process is the translation of the findings into concrete and legally binding public procurement parameters. The outcome and tangible result of market consultations is by no means the selection of a specific supplier, but rather the precise setting of tender conditions so that the tender is both commercially attractive and environmentally rigorous. Based on data from companies, the City of Košice's procurement officer will finalise the description of the subject matter of the contract, reassess and objectively determine the estimated contract value so that it reflects the actual market prices of environmental innovations, and, above all, will exclude from the tender documentation any conditions that have been shown during the dialogue to be discriminatory or unfeasible in Slovak practice. If, on the other hand, the market confirms high capacity and readiness, the procuring authority will gain maximum certainty and will introduce the strictest environmental standards. The purchaser must meticulously record all these findings, the information obtained and the adjustments made in the form of comprehensive written minutes. This final report then becomes an important public document, which the purchaser is obliged to publish on the contracting authority's profile together with the tender documents,

thereby ensuring that all findings obtained during the consultations are available to absolutely all potential tenderers at the same time and to the same extent, without distinction.

9.6 Draft model notice of the commencement of pre-tender consultations for direct use

To minimise the administrative workload of public procurement officers in the city of Košice, this manual provides a pre-drafted text for the notice, which simply needs to be adapted to the specific subject matter of the planned procurement and published on the contracting authority's profile or sent directly to selected market participants.

Draft text for a notice of the commencement of a pre-tender consultation

The City of Košice, as a contracting authority, hereby announces, pursuant to Section 25 of Act No. 343/2015 of the Collection of Laws on Public Procurement, its intention to carry out preparatory market consultations regarding a forthcoming above-threshold contract with the working title [INSERT CONTRACT TITLE]. The aim of this process is to familiarise economic operators with the contracting authority's innovative and environmental objectives, to verify the objectivity, feasibility and appropriateness of the envisaged performance requirements, and to obtain feedback on current market opportunities. The contracting authority plans to incorporate strict circular economy and carbon footprint reduction elements into the technical specifications and contract performance conditions. For this reason, the contracting authority is turning to the relevant market with a request for expert opinions, particularly on the following issues:

[INSERT QUESTION 1, e.g.: What specific obstacles do you perceive in relation to the requirement to achieve an 85% recycling rate for construction waste directly on site?],

[INSERT QUESTION 2, e.g.: What is the anticipated impact on price of implementing technology for the take-back of electrical and electronic waste and the secure erasure of data on the total value of the ICT contract?].

Participation in the preparatory market consultations is entirely voluntary, free of charge and does not give rise to any entitlement to financial remuneration; furthermore, participation or non-participation in this process does not preclude or otherwise restrict an economic operator's ability to submit a tender in the subsequent public procurement procedure.

Rationale and practical application

By publishing this standardised notice, the City of Košice is proactively fulfilling its obligation to act transparently towards the market and creating a safe space for testing innovations. Thanks to the precisely and purposefully formulated questions in the body of the notice, the contracting authority directly guides suppliers towards the topic of green solutions, thereby preventing unnecessary and unstructured commercial discussions and obtaining precisely the hard data it needs to compile a bill of quantities without error, set the estimated contract value or formulate the conditions for participation. From the perspective of the Public Procurement Office's audit practice, this model procedure is fully accepted and recommended, and provides officials with a strong safeguard against any allegations of unprofessional or discriminatory management of green procurement.



Financovaný
Európskou úniou

**NET
ZERO
CITIES**