

Guide for Climate and Environmental Requirements in Municipal Public Procurement

Green Responsible Innovative Procurement (GRIP)

Version 1.0

Draft

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1. Purpose, objectives and guiding principles

By resolution of May 2022 (“Climate Decision Aachen”), the City of Aachen set itself the ambitious target of becoming climate-neutral by 2030. In this context, climate neutrality means net-zero emissions: greenhouse gas emissions are to be reduced to a minimum and the remaining unavoidable emissions compensated for. As early as 22 January 2020, the City Council of Aachen became the first city in Germany to resolve to comply with its proportionate remaining greenhouse gas budget of 16.3 million tonnes of CO₂ equivalent in order to keep global warming below two degrees Celsius.

The City of Aachen regards public procurement as a key instrument for fulfilling public tasks and, at the same time, as an effective means of achieving these climate action objectives. Municipal procurement has considerable potential to contribute to climate action. This potential is to be harnessed through new procurement rules that give greater priority to, and systematically integrate, environmental and climate protection criteria. This Guide implements the political requirements and makes climate action, resource conservation and sustainable innovation the standard in public procurement.

The Guide pursues four complementary objectives:

- First, it is intended to reduce, in a planned and measurable manner, the greenhouse gas emissions caused or influenced by procurement by the City of Aachen. In line with the Action Plan for the Climate City Contract, the aim is to achieve a reduction of at least 80% in CO₂ emissions by 2030 compared with the 2020 baseline, with a medium-term target of a 95% reduction compared with 1990. Public procurement makes a substantial contribution to this reduction pathway.
- Second, it is intended to strengthen economic efficiency over the life cycle by considering not only purchase prices but all relevant costs over the period of use. In the long term, this creates not only environmental but also economic benefits for the municipal administration.
- Third, it is intended to define transparent and reliable criteria for the market that enable competition and transformation, strengthen the resilience of the markets serving the City of Aachen and at the same time safeguard the city's climate ambition. Particular consideration is given to the interests of SMEs. The ecological transformation and climate-conscious public procurement open up new market opportunities for SMEs by creating incentives for innovation and strengthening regional value chains. Transparent and predictable requirements enable small and medium-sized enterprises in particular to adapt to changing market conditions at an early stage and develop competitive advantages.
- Fourth, it is intended to serve as a standardisation tool for procurement practitioners (specialist departments and procurement offices) and to simplify the implementation of climate-conscious procurement.

Because the climate policy leverage in this area is generally particularly significant, the City of Aachen places a particular focus on building and civil engineering, including planning. In this area, materiality, the use of machinery, energy efficiency and life-cycle impacts are particularly relevant. At the same time, this Guide also applies to supplies and services,

particularly where energy consumption, transport and operational emissions are major drivers.

This Guide is based on the current resolutions and decisions of the City of Aachen and will be continuously adapted to new political developments, scientific findings and technical standards.

2. Scope, binding nature and framework

This Guide shall be applied by all procuring bodies of the City of Aachen, including its municipal enterprises. Application follows a graduated internal threshold model that links the scope and level of detail of the climate-related assessment to the significance of the procurement:

- Level 1 (from EUR 40,000 excluding VAT): Simplified needs assessment and documentation of climate-relevant aspects; consideration of the negative list.
- Level 2 (from EUR 100,000 excluding VAT): Multi-stage needs analysis including climate assessment and economic efficiency assessment; application of a CO₂ shadow price from EUR 216,000.
- Level 3 (from the EU procurement thresholds): In-depth life-cycle assessment with detailed emissions accounting; comparison of alternatives mandatory; CO₂ shadow price as an award criterion.

The estimated contract value shall be determined in accordance with Section 3 VgV. For companies wholly owned by the City, application of the Guide is strongly recommended; the City will seek to establish binding implementation through corporate-law instruments (articles of association, rules of procedure).

Where additional or stricter requirements apply to specific projects, in particular under budgetary law, public procurement law or funding conditions, those requirements shall take precedence. Climate-related requirements may be imposed where they are objectively justified, formulated transparently and proportionate. Proportionality means that the additional requirements and the associated effort (for both the City and the market) must be in a reasonable relationship to the expected climate benefit. For municipal bodies, this includes not only potential additional costs in service delivery but also internal costs such as market analysis, preparation of evaluation matrices, verification of evidence and contract monitoring.

Exceptions to the requirements of this Guide are generally possible, but require written justification and approval by the head of the responsible organisational unit (commercial/technical) in agreement with Department 60 (Contract, Procurement and Funding Management). The justification shall be documented in the procurement file and should, where possible, include at least one or two alternative proposals for more climate-friendly procurement.

The City of Aachen is introducing climate-conscious procurement not as an exceptional case but as a standard process. Every procurement above the applicable threshold shall go through the following process stages:

- a documented needs assessment including a climate-related assessment and economic efficiency assessment (where appropriate, taking external environmental costs into account);
- implementation in accordance with public procurement law, in particular through appropriate design of the requirements in the specifications and the award criteria; and
- binding contractual requirements and an evidence/verification framework.

3. Needs analysis and definition of the procurement subject

The needs analysis is generally the key lever both for the climate impact and for the economic efficiency of a procurement. The prior decision as to whether procurement is required at all, the scope in which procurement is to take place and the performance profile to be procured largely determine subsequent resource consumption, greenhouse gas emissions and total costs over the entire life cycle.

3.1 Goods/services not to be procured

The services and goods identified in the negative list (Annex x) may not be procured unless procurement of such a service or good is required in the urgent public interest. The urgent public interest shall be justified in writing, approved by the head of the responsible organisational unit (commercial/technical) in agreement with Department 60, and documented in the procurement file. An urgent public interest exists where it appears impossible to meet a functionally significant need within an appropriate scope and timeframe by procuring another service or good. The application for an exception should, where possible, include at least one or two alternative proposals for meeting the need in a more climate-friendly manner.

Alternative Version 2 (medium binding force): The services and goods named in the negative list should not be procured. A deviation is permissible where there is a particularly well-founded case. The justification shall be set out in writing, approved by the head of the responsible organisational unit (commercial/technical) in agreement with Department 60, and documented in the procurement file. A particularly well-founded case exists in particular where a functionally significant need cannot be met by procuring another service or good, or can only be met with disproportionate effort. The application for a deviation should, where possible, include at least one or two alternative proposals for meeting the need in a more climate-friendly manner.

Alternative Version 3 (low binding force): Application of the negative list is recommended. The services and goods named in the negative list may be excluded from procurement. Where the negative list is not applied, this shall be documented in the procurement file.

The negative list shall be reviewed regularly and adjusted as part of updates to the Guide, in particular where new scientific findings, technological developments or legal requirements make this necessary.

3.2 Definition of the procurement subject

The procurement subject shall be defined on the basis of a systematic assessment of whether and to what extent a need exists, which climate-friendly alternatives may be considered and how these are to be assessed economically. As a result, the procurement subject shall be defined in such a way that it meets the functional need while also complying with the requirements of climate action and economic efficiency. Further details on the individual assessment steps, in particular for construction works and for supplies and services, are set out in the Annex “Definition of the Procurement Subject” (Annex x).

3.3 Needs analysis

Before every procurement, a multi-stage needs analysis including an economic efficiency assessment shall be carried out and documented in a comprehensible manner. It comprises the assessment of the need, consideration of climate-friendly procurement, the economic efficiency assessment and the balancing of alternatives and relevant considerations. All assessment steps shall be considered from a life-cycle perspective from the outset. Procurement decisions should not be based solely on the purchase price, but should take into account the costs and climate impacts arising over the period of use.

Department 60 provides standardised templates and checklists for documentation. The assessment shall be carried out by the responsible specialist body; Department 36 (Climate and Environment) may be consulted in an advisory capacity for complex projects.

If the assessment steps result in several procurement options, preference shall be given, as part of the balancing process, to those services or solutions that achieve the objective of avoiding or reducing greenhouse gas emissions over the entire period of use to the greatest possible extent.

The effort and level of detail of the life-cycle, cost and climate assessment shall be proportionate to the climate relevance of the procurement. For standard procurements with a low emissions profile, a simplified assessment based on plausible assumptions is sufficient. For procurements with high climate relevance, particularly in building and civil engineering, and for energy-intensive facilities or goods, an in-depth life-cycle and emissions assessment is mandatory. This shall include at least a comparison of alternatives and documentation of key indicators. Further details are provided in the Annex “Definition of the Procurement Subject” (Annex x).

4. Climate-friendly procurement

Climate-friendly services and solutions shall be given priority in procurement where they meet the identified need and are economically reasonable. Additional expenditure must not be disproportionate to its contribution to greenhouse gas reduction. Assessment shall be carried out on a life-cycle basis.

First, the general climate impacts associated with the service or good to be procured shall be assessed and documented. The energy consumption of the service or good shall then be

determined, where this is possible with reasonable effort. Historical consumption values, operational experience and expert assessments by experienced staff may be taken into account. Ideally, greenhouse gas emissions over the entire life cycle of the service or good should be assessed, in particular emissions from production, use, maintenance, collection, recycling or disposal at the end of its useful life.

Depending on the procurement subject, this climate assessment (Life Cycle Assessment, LCA) may vary in level of detail, taking into account the appropriateness of the associated effort and effect. In all cases, it shall be documented in a comprehensible manner which emission sources were considered, which data basis was used and which assumptions were made. System boundaries and assessment periods shall be defined on a case-by-case basis but must be transparent and appropriate.

5. Economic efficiency assessment

The objective of the economic efficiency assessment is to determine the most economically efficient course of action. The decisive factor is a systematic comparison of alternatives over their period of use based on internal and external costs. The economic efficiency assessment shall be carried out in three consecutive steps and shall always adopt a life-cycle perspective. The level of detail shall follow the principle of proportionality and shall take particular account of financial significance, duration and binding effect, irreversibility and existing risks. An assessment is also required for smaller projects, although it may be carried out in simplified form. Further details are provided in the Annex "Definition of the Procurement Subject" (Annex x).

6. Balancing alternatives and relevant considerations

Climate action shall be systematically integrated into the needs analysis and economic efficiency assessment. Where possible, climate-related impacts should be monetised through a CO₂ shadow price and integrated into the economic efficiency assessment. Where all relevant climate impacts have been captured in this way, the resulting most economically efficient option should generally be selected.

Where climate-related aspects have not been fully taken into account within the economic efficiency analysis, an additional balancing exercise shall be carried out. This completes the needs analysis and economic efficiency assessment and shall be based on an overall assessment of all relevant results. In particular, the following shall be considered:

- fitness for purpose in meeting the functional need;
- life-cycle costs, including the climate costs applied;
- climate impacts over the period of use; and
- legal, organisational, staffing and risk-related considerations.

Where several alternatives meet the need in a comparable manner and are economically reasonable, preference shall be given to solutions that cause lower climate impacts over the entire period of use. Deviations from this principle shall be justified and the decision shall be documented in a comprehensible manner.

When defining climate- and environment-related requirements, consideration shall be given to the extent to which corresponding solutions are already available on the market. Where climate-friendly technologies are available and economically viable, appropriate minimum requirements shall be established as specifications for the procurement subject. Where the market only partially meets these requirements, or where there are relevant differences in the ambition level and capabilities of suppliers, climate-relevant aspects shall be taken into account through award criteria, with due consideration of SME interests. Further details are provided in the Annex “Definition of the Procurement Subject” (Annex x).

7. Procurement procedure

The City implements climate action in a manner that complies with public procurement law and integrates climate considerations into competition. Climate aspects may be implemented as minimum requirements in the specifications (as the primary approach), as contract performance conditions (subsidiarily), or as award criteria (scorable and weighted). The combination selected depends on the definition of the procurement subject (needs analysis and economic efficiency assessment), the market, verifiability and proportionality.

Environmental and climate criteria may be included as minimum requirements in the specifications, as scorable award criteria or – additionally – as contract performance conditions. It is crucial that these provisions correspond to the procurement subject defined in the needs analysis and economic efficiency assessment. The specifications define the binding performance level – everything stipulated there must be met by every tender. Only services, qualities or effects beyond that level are scorable and therefore suitable for inclusion in the award criteria. Further details on the design of contractual conditions are set out in the section “Contractual Provisions, Evidence and Monitoring”.

8. General principles for climate criteria, evidence and verifiability

Climate-related requirements in the procurement procedure must have a substantive, objective and verifiable connection to the subject matter of the contract and must be formulated transparently. This applies both to minimum requirements and to award criteria. To be objectively justified, they should be based on the actual emissions impacts and emission-reduction potential and be designed in a comprehensible and proportionate manner.

9. Minimum requirements in the specifications

Binding minimum requirements define those climate-relevant characteristics that all tenders must meet without exception. They derive directly from the needs analysis and economic efficiency assessment and define the binding performance level of the procurement project. These requirements shall be reflected in the specifications as clearly and comprehensively as possible. They shall be specified through precise technical specifications and clear verification criteria and supported by suitable evidence that bidders must submit with their tender. This ensures that, during the technical evaluation of tenders, compliance of the

offered service with the specified requirements can be assessed objectively and transparently.

In municipal construction and transport, such minimum requirements concern in particular life-cycle greenhouse gas emissions, the use of low-emission technologies and energy standards. Typical applications include setting maximum permissible CO₂ emissions for construction materials or building structures, or mandating low-emission materials with Environmental Product Declarations (EPDs) as objective evidence.

An example wording for the specifications is:

“For all load-bearing and space-enclosing building components, construction materials with a valid Environmental Product Declaration (EPD in accordance with EN 15804 or equivalent) shall be used. The sum of material-related greenhouse gas emissions (GWP, modules A1–A3) must not exceed [...] kg CO₂e/m² GFA. Compliance shall be demonstrated by submitting the relevant EPDs and a consolidated CO₂ balance.”

Minimum requirements may likewise concern the use of zero-emission or low-emission machinery and vehicles during construction. This includes both construction equipment and transport vehicles and may – beyond statutory minimum standards – be adapted to municipal climate targets.

Example wording:

“All construction machinery and equipment used on the construction site must be operated emission-free (battery-electric or comparable). Transport vehicles must at least meet the Euro VI emissions standard; zero-emission drive systems are preferred. The bidder shall submit, with its tender, a list of the machinery and vehicles intended for use, including drive technology and technical data.”

or

“All machinery used on the construction site must be fossil-free. All vehicles used to transport bulk materials and waste to/from the construction site must at least meet the Euro VI emissions standard and use fossil-free fuels. The contractor shall take active measures to use emission-free solutions on the construction site as comprehensively as possible from the start of construction through commissioning. At the latest from [...], all machinery and equipment used on the construction site must be emission-free. The transition to emission-free machinery and equipment is included in the tender price. The contractor shall take active measures to reduce emissions from the transport of bulk materials. By [...], all vehicles used to transport bulk materials to/from construction sites must be emission-free (battery-electric or hydrogen-powered) or operated with biogas and must at least meet the requirements of the Euro VI standard. The transition to vehicles with the specified drive technologies is included in the tender price.”

Energy requirements for buildings or the use of renewable energy during the construction phase may likewise be designed as binding minimum standards. For example, it may be required that temporary construction-site electricity be supplied from renewable sources or that buildings meet specified efficiency indicators.

A corresponding example wording could be:

“The construction-site electricity supply shall be provided entirely from renewable energy sources. Evidence shall be provided by submitting the relevant supply contracts or certificates. The building to be constructed must at least meet energy standard XX; compliance shall be demonstrated by appropriate calculations and planning documents.”

10. Scorable award criteria and evaluation logic

On the basis of the minimum requirements, the procurement authority may additionally define climate-relevant award criteria in order to differentiate tenders according to their added climate value. These award criteria apply where performance exceeds the minimum level. For construction works, the assessment may include the following criteria:

- Life-cycle costs including a CO₂ shadow price: Tenders are additionally assessed according to expected life-cycle emissions by applying a monetary shadow price to each tonne of CO₂ equivalent. An example design is set out in the Annex “CO₂ Shadow Price as an Award Criterion – Example Wording”.
- Innovative emission-reduction construction methods: Evidence of innovative construction materials or methods that demonstrably result in lower greenhouse gas emissions, assessed by qualitative scoring based on independent third-party declarations or EPDs.
- Construction-site organisation and logistics: criteria for low-emission construction-site logistics, e.g. reduced construction-site traffic and the use of digital planning tools to optimise material flows.

For transport services, award criteria may be designed as follows:

- Vehicle emissions performance beyond the minimum requirements: points awarded proportionally to the achievement of lower CO₂ emissions per kilometre than required by the minimum standard.
- Use of alternative, climate-friendly drive technologies.

11. Contractual provisions, evidence and monitoring

Climate-related requirements only have an effect if they are incorporated into the contract as binding performance conditions, described in a clearly measurable and verifiable manner, and designed so that compliance can be monitored during performance. Contract clauses shall therefore clearly specify (i) the point of reference (product/service/lot/partial service), (ii) the indicator (e.g. CO₂e per functional unit), (iii) the measurement and accounting rule (system boundaries, reference quantity, period), (iv) the form of evidence, and (v) the verification and legal-consequences mechanism. References to quality marks or certifications may be used to simplify verification. Common forms of evidence include:

- Product-related environmental information: product data sheet with environmental indicators; EPD (EN 15804 or ISO 14025); PCF/carbon footprint according to a recognised standard (e.g. ISO 14067), including methodology, system boundaries and data quality.

- Quality marks/labels (with equivalence): e.g. Blue Angel/EU Ecolabel (depending on the product), TCO/EPEAT (ICT), FSC/PEFC (wood/paper), as well as equivalent evidence.
- Delivery and origin documentation: delivery notes, batch/serial numbers, manufacturer declarations, chain-of-custody certificates, logistics/transport evidence (e.g. means of transport, utilisation rate, distance category).
- Performance-related evidence (services): deployment and material lists, energy/fuel records, maintenance/calibration logs, training records, disposal and recovery documentation.
- Construction works (in addition): construction-site logistics concept; equipment and machinery list including emissions/drive class; fuel/electricity consumption records; weighing tickets/disposal documentation; construction/daily reports with progress and relevant environmental parameters (only insofar as proportionate and verifiable).

When designing contractual provisions, the limits applicable to the City of Aachen as a public contracting authority regarding market-appropriate, proportionate and transparent contractual conditions must be observed.

In designing contracts, the City of Aachen is bound by the constitutional principle of proportionality, which governs all of the City's dealings with private parties even in the absence of an explicit statutory provision. Climate clauses, documentation obligations and sanctions shall be formulated so that they are objectively linked to the subject matter of the contract, practically feasible and verifiable, and do not unreasonably disadvantage the contractor contrary to good faith. Requirements must be suitable and necessary to ensure the legitimate purpose pursued through the service for an appropriate period. The agreed obligations must be proportionate to the amount of the benefit granted and the duration of the binding purpose. In particular, when enforcing contractual penalties, the City of Aachen must exercise its discretion and assess whether enforcement is necessary to safeguard the intended purpose or would constitute avoidable hardship.

The users/commissioning units are responsible for monitoring contract performance, receiving and reviewing evidence and initiating measures in the event of deviations.

12. Monitoring, reporting and updating the Guide

Department 36 (Climate and Environment) calculates the greenhouse gas emissions of the City of Aachen annually and records the implementation status of municipal climate action measures. As part of this reporting, the climate impacts of public procurement are also recorded and assessed. For this purpose, procuring bodies shall document, for procurements from EUR 100,000 excluding VAT, the estimated or calculated greenhouse gas emissions over the life cycle and the savings achieved through climate-conscious procurement compared with conventional alternatives.

Department 60 consolidates these data and submits an annual report on implementation of this Guide to the Executive Management Board. The report shall include in particular:

- number and volume of procurements carried out under this Guide;
- estimated greenhouse gas savings achieved through climate-conscious procurement;

- experience from implementation (good practices, challenges, need for optimisation);
- proposals for further development of the Guide and supporting tools.

The Climate City Contract of the City of Aachen is updated every two years. As part of this update, the procurement guidelines are also reviewed and, where necessary, adapted to new political decisions, legal requirements or technical standards.

13. Final provisions and updating

This Guide is to be understood as a living document. The intention is to review the document from a technical and legal perspective every two years. Adjustments are particularly necessary where the legal framework, technical standards or the scientific basis for assessing environmental costs (including CO₂ shadow prices) changes.

The City of Aachen shall ensure that the applicable minimum values, standard assumptions and evidence lists are published centrally so that all procurement offices can work consistently. The annual CO₂ accounting by Department 36 and the biennial update of the Climate City Contract provide important data foundations for this purpose.

14. Negative list (Annex x)

- Construction materials containing partially halogenated chlorofluorocarbons and partially halogenated hydrofluorocarbons, or manufactured using these substances;
- Multi-split/VRF air-conditioning units with a rated cooling capacity of more than 10 kilowatts (liquid chillers may be used as an alternative);
- Liquid chillers with a rated cooling capacity of more than 10 kilowatts using refrigerants with GWP $\geq$ 150;
- Refrigeration and freezing equipment (including refrigerators, ice-cream freezers and vending machines such as bottle coolers) and other stationary and mobile refrigeration and air-conditioning systems using halogenated refrigerants (where alternatives are available on the market);
- Aerosol cans (such as refrigeration, cleaning or insect sprays) with halogenated propellants (such as R1234ze(E));
- Devices for heating (except necessary heating for winter construction measures) and cooling outdoor air in unenclosed spaces (e.g. gas patio heaters, comparable electric radiant heaters, air-conditioning units);
- Devices used exclusively to prepare hot beverages by filling them with food portions that are available to end consumers only as individually packaged units in sales packages containing several such units, such as coffee capsule machines;
- Mineral water, beer, juices, milk and soft drinks in single-use packaging (except carton packaging, pouch packaging and stand-up film pouches), including single-use packaging subject to a mandatory deposit;
- Single-use tableware and cutlery in canteens and cafeterias and at large events;
- Products containing added synthetic polymer microparticles ("microplastics") as defined in Annex XVII of the REACH Regulation as amended by European Commission Regulation (EU) 2023/2055;

- Mobile machinery and equipment that does not comply with EU Stage V emissions requirements under Regulation (EU) 2016/1628;
- Products whose cardboard transport packaging does not contain at least 85% recycled material by mass, provided that the bidder/applicant has sufficient influence over the design of the transport packaging;
- Medium-voltage switchgear containing sulphur hexafluoride;
- Heavy-metal-based paints (lead, cadmium, chromium VI and their compounds);
- Leaf blowers that are not electrically powered;
- Electricity generated from nuclear sources;
- Vehicle mileage involving vehicles covered by the regulation governing the designation of low-emission vehicles, as amended from time to time, that are not assigned to pollutant group four, i.e. that are not eligible for the so-called green environmental badge;
- Wood and wood products that are not demonstrably sourced from legal and sustainable forest management. Evidence shall be provided by the bidder through an FSC certificate or equivalent evidence in the form of a comparable certificate or individual supporting documents. Comparable certificates or individual evidence shall be accepted where the bidder demonstrates that the criteria applicable to the relevant country of origin meet the FSC criteria.

15. Definition of the procurement subject (Annex x)

Needs analysis

Assessment step 1 – Establishing a functional need

As a first step, it shall be established whether a functional need actually exists and whether it can already be met using existing resources. In particular, it shall be assessed whether the required service can be provided using existing staff, facilities or equipment, existing IT, or through organisational adjustments or restructuring.

For services, it shall additionally be justified why external procurement is necessary. Commissioning external third parties may be considered where the required specialist, methodological or project knowledge is not available internally, cannot be developed within the available timeframe, constitutes specialist knowledge that will not be required on a long-term basis, or where there is an urgent need for action. In this context, it shall always be assessed and documented whether other departments or organisational units can be involved in delivering the service.

Key questions at this stage are whether there is a need for a product or service, whether that need continues to exist, what objective is to be achieved and which approaches to solutions are fundamentally conceivable.

Assessment step 2 – Reduction assessment

At the second stage, a systematic reduction assessment shall be carried out. The objective is to limit the procurement subject to what is actually required. For this purpose, the procurement subject shall be broken down into its individual service and equipment

components, and each component shall be assessed as to whether it is essential to meet the identified functional need.

Unnecessary additional functions, mere comfort features without functional benefit or over-dimensioning shall be consistently excluded. This reduction serves both budgetary efficiency and the reduction of life-cycle costs and climate impacts.

Assessment step 3 – Efficiency prioritisation

At the third stage, efficiency shall be prioritised. When designing the procurement subject, priority should, in cases of doubt, be given to energy efficiency, emissions reduction, durability and repairability. The decisive factor is not solely technical performance, but efficiency over the entire period of use.

In this context, it shall be assessed whether individual functions can be prioritised. Less important functions may be performed with lower capacity or speed provided that the functional need continues to be met. This can reduce investment and operating costs and create scope for more efficient or lower-emission solutions.

Climate-friendly procurement

Specific requirements for construction procurements

Construction works cause substantial greenhouse gas emissions, for example through the manufacture of materials, energy-intensive construction-site processes and the subsequent operation of buildings and infrastructure. The City intends to implement systematic climate management for building and civil engineering projects, for example through materiality, machinery, energy efficiency and life-cycle indicators.

Where possible, several alternatives should be compared. The comparison of alternatives should begin as early as possible, and no later than service phase 2 (preliminary planning) under HOAI. The alternatives must not be designed in a way that artificially restricts the results.

As an orientation value, the Global Warming Potential (GWP) of the alternatives considered shall be determined and presented using a project-appropriate reference unit (e.g. per square metre of gross floor area, component-specific in building construction – application of the BKI Construction Atlas KA2 recommended – or per functional unit in civil engineering, such as per kilometre of road or cubic metre of structure).

In addition, where available and meaningful, non-renewable primary energy demand should also be taken into account during the operational phase.

Departments 60 and 36 provide working aids, databases and advisory services to support emissions calculations. External planners shall be contractually required to prepare the necessary comparisons of alternatives and emissions balances; the associated costs shall be remunerated as necessary planning services.

Construction and materiality

For all construction projects where planning decisions can be made or influenced, an early assessment should determine whether more climate-friendly alternatives are possible.

Different structural and material solutions should already be developed during the basic assessment and preliminary planning stages. In particular, the following questions should be asked:

- What technically suitable alternatives are fundamentally available?
- Are there alternatives with lower greenhouse gas emissions over the entire life cycle?
- Can emissions be reduced through other construction methods, materials or system solutions, or by refurbishing existing buildings already owned by the City?

Use of machinery and transport

For the use of machinery (construction machinery), it shall be assessed how emissions can be reduced. Key questions may include:

- Can lower-emission or more efficient machinery be used?
- Can idle times be avoided and construction processes optimised?
- Are alternative drive systems (e.g. electric or hybrid) available and economically reasonable?

For transport/transport machinery, it shall be assessed how emissions can be reduced. Key questions may include:

- How frequently do these transport operations take place and over what distances?
- Can deliveries be consolidated or better coordinated in terms of timing?
- Are alternative logistics concepts possible (e.g. intermediate storage, local suppliers, changed delivery times)?
- Can low-emission or zero-emission vehicles be used?
- Can empty runs be avoided or reduced?
- Are there practical alternatives with lower energy consumption or lower climate impacts?

It should also be considered whether and to what extent zero-emission or biogas solutions are economically and technically feasible and whether they offer advantages over conventional transport solutions.

Energy efficiency during operation

Since a large share of emissions from buildings and building-related facilities occurs during subsequent operation, this must already be taken into account in planning and procurement decisions. The following questions should be considered:

- What impact do the selected solutions have on energy consumption over the entire period of use?
- Is there a risk of lock-in effects caused by technology that is inexpensive today but inefficient in the long term?
- What requirements are necessary to ensure permanently efficient operation?

Specific requirements for supplies and services

For supplies and services, climate impacts often arise through operational energy consumption, transport volumes and the way in which the service is delivered. In these

areas, the following questions should therefore be systematically assessed and, where relevant, translated into requirements:

- What energy is consumed during operation?
- What transport is required, how frequently and over what distances?
- Can deliveries be consolidated?
- Is alternative logistics possible?
- Can services be delivered remotely or with fewer journeys?

Economic efficiency analysis

Assessment step 1 – Identifying alternative courses of action

First, all realistic courses of action shall be identified. In particular, it shall be assessed whether options other than purchasing should be considered, such as leasing, renting, repair or continued use of existing products, purchasing used or refurbished products, or, for services, internal service provision instead of external procurement. Legal conditions, organisational and staffing feasibility and risks, in particular supply dependencies and failure risks, shall be taken into account.

Assessment step 2 – Comparison of internal costs (life-cycle costs)

The economic efficiency assessment shall generally be conducted as a comparison of life-cycle costs. For each alternative, the internal costs affecting the budget over the entire period of use shall be recorded and presented in a comparable manner. These include, in particular, acquisition and commissioning costs, energy or fuel, operation, maintenance, spare parts or consumables, licence costs for IT, staffing costs, downtime costs where quantifiable, and disposal or dismantling costs.

The purpose of life-cycle cost assessment is to evaluate alternatives not according to the lowest purchase price but according to the expected total costs over the period of use.

Assessment step 3 – Application of a CO₂ shadow price

In addition to internal costs, external costs, in particular climate-related costs, of the respective alternative shall be taken into account where this is possible with reasonable effort. Reasonable effort does not exist where reliable and robust support for emissions determination is unavailable or where the measure is expected to have total costs of less than EUR 216,000 excluding VAT.

For construction, supply and service contracts from the applicable contract value threshold, a CO₂ shadow price shall be applied. It corresponds to the value recommended by the German Environment Agency per tonne of CO₂ equivalent over the life cycle of the measure and is updated annually.

For 2026, the binding minimum value is EUR 320 per tonne of CO₂e. Depending on the significance of the climate impact and the respective market conditions, different CO₂ shadow prices may be applied to different partial services.

The CO₂ shadow price is applied by multiplying the emissions determined or estimated over the life cycle of an alternative by the specified value. The resulting CO₂ costs shall be added to the life-cycle costs or presented transparently as a separate evaluation parameter.

The current CO₂ shadow prices are determined annually by Department 36 on the basis of German Environment Agency recommendations and published on the City's intranet page for climate-conscious procurement.

Balancing alternatives and relevant considerations

Specific requirements for construction works

Construction and materiality; operation

As a general rule, where technical performance is comparable, preference shall be given to the option with the lowest life-cycle emissions. The rule criterion is: alternatives whose Global Warming Potential (GWP) is more than 20% above the value of the technically suitable alternative with the lowest emissions shall generally not be preferred unless compelling technical, safety-related, budgetary or legal reasons dictate otherwise. Deviations shall be justified and documented.

Operation

Short-term cost-effective solutions that lead to higher emissions or energy consumption in the long term should be avoided. Planning and construction services shall be formulated in such a way that later retrofitting, inefficient building-services technology or emissions-intensive operating practices are avoided as far as possible.

Where appropriate, requirements for monitoring, operational optimisation and energy management may also be included as part of the service or as a contractual condition.

Specific requirements for machinery use and transport services in the supply and service sector

In the area of transport (supply and service sector) and machinery use in construction (construction and transport machinery), vehicle technologies, fuels used, the design of transport logistics, consolidation of deliveries and measures to reduce empty runs shall be taken into account in the balancing exercise. Where low-emission vehicle technologies, alternative fuels or organisational measures to optimise construction-site logistics are available on the market and economically viable, they should be defined as minimum requirements for the procurement subject. Where the market only partially meets these requirements or there are relevant differences in suppliers' ambition levels, the corresponding aspects shall be taken into account through award criteria.

These include, in particular, qualitative or quantitative requirements for emissions reduction, transport logistics efficiency and construction-site organisation.

16. CO₂ shadow price as an award criterion (Annex x)

Award criteria

The contract shall be awarded, pursuant to Section 127(1), first sentence, of the German Act against Restraints of Competition (GWB), to the most economically advantageous tender.

The following individual criteria shall be applied with the following percentage weighting:

- (1) Costs, consisting of: (x %)
 - a. Price (acquisition costs)
 - b. Life-cycle costs
 - c. CO₂ shadow price
- (2) [Qualitative award criteria] (x %)

Explanation of the award criteria

Costs (x %)

The tender with the lowest offered costs in accordance with the “Costs” form shall receive the best score.

For the “Costs” criterion, the calculated total costs (internal and external costs) of providing the services to be procured shall be assessed. The calculated total costs consist of the sum of the price (acquisition costs), life-cycle costs and external environmental costs in accordance with the “Costs” form.

Price

“Price” means the acquisition costs of the service offered by the bidder. The relevant amount is the gross tender price offered within the specifications/bill of quantities (final tender total in accordance with the specifications/bill of quantities), taking into account unconditional price reductions on the invoiced amount and on the prices for ordered services to be established on the basis of the price calculation for the contractual service.

Life-cycle costs

The assessment of life-cycle costs shall include exclusively those costs incurred after completion of the construction works during the assessment period defined in the “Costs” form and relating to the items specified in that form. Life-cycle costs comprise the usage-related costs of the service offered, as transparently presented by the bidder, and consist – in accordance with the “Costs” form – of the following cost categories:

- [Operating costs: ongoing costs for the intended operation of the construction works, in particular energy and utility consumption, insofar as these can be clearly attributed to the service offered.]
- [Maintenance and servicing costs: costs for regular maintenance, inspection, servicing, repair and scheduled renewal measures for components or systems within the assessment period.]
- [Replacement and dismantling costs: costs for replacing wear-related components and for dismantling and disposal, insofar as these arise during the assessment period.]

Life-cycle costs shall be determined as the sum of the expected costs for the items considered over the assessment period in accordance with the calculation method specified in the “Costs” form. Service lives, replacement intervals, cost assumptions and any discounting parameters to be applied shall be based on the specifications of the “Costs” form. Bidders shall present the life-cycle costs used in full, transparently and verifiably on the basis of the information required in the “Costs” form. Unsupported cost assumptions or cost assumptions deviating from the mandatory requirements of the “Costs” form shall not be taken into account.

CO₂ shadow price

The contracting authority shall identify specific construction materials and building components as items relevant to the evaluation in the “Costs” form.

For each item relevant to the evaluation, the contracting authority shall specify a reference value for Global Warming Potential. This describes the GWP assigned by the contracting authority to the respective material or building-component item.

These item-specific reference values serve exclusively as a benchmark within the tender evaluation and may be undercut by the bidder.

The bidder is entitled to offer functionally equivalent alternative solutions for items relevant to the evaluation where this results in a reduction in GWP. Alternatives shall be considered functionally equivalent if, with regard to technical performance, durability, building-physics properties, fitness for purpose and fulfilment of the planning requirements, they are at least equivalent and comply with the recognised rules of technology.

Only the items identified as relevant to the evaluation shall be taken into account. Based on the values demonstrated by the bidder for these items, the cumulative Global Warming Potential (GWP100) attributable to these items in the service offered shall be calculated in kilograms of CO₂ equivalent (kg CO₂e). This cumulative GWP is hereinafter referred to as the “total GWP” and represents the aggregated greenhouse gas impact of all construction materials and building components relevant to the evaluation.

The cumulative GWP100 shall be determined exclusively for product stages A1–A3 of the items relevant to the evaluation offered by the bidder, because the “Costs” form contains only items whose GWP can be clearly assigned to these product stages. The accounting shall be carried out in accordance with the applicable accounting rules of the Quality Seal for Sustainable Buildings (QNG), in particular Annex 3 of the “Guideline for Federal Funding for Efficient Buildings – Climate-Friendly New Construction (KFN)”, for residential buildings pursuant to Annex 3.1.1 and for non-residential buildings pursuant to Annex 3.2.1.1 (version of 1 March 2023 or current version). ^{**}[Clarification of scope or alternative accounting rules for other project types.]^{**}

For monetary valuation, the pricing baseline shall be the total GWP resulting from the sum of the item-specific reference values specified by the contracting authority. This pricing baseline is based on a CO₂ price of zero euros. The bidder’s demonstrated total GWP shall be monetised using a project-specific CO₂ price of [...] euros per 1,000 kg CO₂e. If the bidder’s

total GWP is below the pricing baseline, this results mathematically in a negative cost amount (CO₂ shadow price).

Qualitative award criteria (x %)

[...]

Evaluation framework

Award criterion | Weighting (%) | (Max.) score for individual criterion | Product: weighting × points (in brackets: points achieved)

Costs (x %) | 100 (x)

Qualitative award criteria (x %) | 100 (x)

TOTAL: (100 points)

The table illustrates the calculation method for the evaluation. A maximum of 100 points is awarded for each individual criterion, which are then multiplied by the weighting. This produces the score for the specific tender at the level of the individual criteria. The scores are added together to produce the total score for the tender (maximum 100 points). The bidder's tender with the highest score according to the published criteria constitutes the most economically advantageous tender.

Evaluation of the individual criteria

Costs

The bidder with the lowest calculated total costs offered receives 100 points, which are transferred to column 3 (score for the individual criterion) of the table above. Tenders whose calculated total costs are equal to or exceed twice the lowest calculated total costs offered receive zero points. Intermediate values are interpolated linearly. Linear interpolation shall be carried out according to the following formula:

The product of the score for the individual criterion × the weighting of the evaluation criterion produces the score achieved for the criterion in accordance with column 4 of the table above.

Qualitative award criteria

[...]

17. Contract (Annex x)

§ X Climate action and environmental provisions

(1) The contractor undertakes to comply with all environmental requirements of this contract and with the environmental legislation applicable from time to time. The contractor shall take appropriate organisational and technical measures to minimise environmental impacts associated with performance of the contract. At the contractor's substantiated request, the contracting authority may permit exceptions to individual or all environmental requirements where compliance is objectively impossible or unreasonable in the individual case.

Exceptions must be made in writing and must specify, in particular, the duration and scope of the deviation.

(2) Machinery and vehicle technologies and fuel types

- a. The contractor is obliged to use exclusively the machinery and vehicle technologies and fuel types specified in the tender (see Tender Annex XX) and to comply at least with the minimum requirements set out in the procurement documents. New vehicles or fuels introduced during the contract term must have environmental and climate protection characteristics that are at least equivalent to or better than those originally agreed. Deviations from the contractual requirements are permissible only where they are objectively impossible to fulfil due to unforeseeable circumstances outside the contractor's sphere of influence and the contractor demonstrates that no reasonable substitute solutions are available. Each deviation requires the contracting authority's prior written consent.
- b. Throughout the entire contract term, the contractor shall maintain verifiable documentation of the fuels procured and used and submit it to the contracting authority upon request. The documentation must include at least information on manufacturer, supplier, quantity, origin and certification. The contractor undertakes to use biofuels that comply with the applicable sustainability criteria of the European Union. Compliance with these criteria must be demonstrated by the contractor at any time. If the contractor is working on several projects in parallel, the quantity of fossil-free fuel required for this contract shall be recorded separately and documented transparently. Where the contractor uses biogas vehicles or machinery, the admixture of natural gas is permissible only if 100% pure biogas is not available on the market. The contracting authority shall be informed of this immediately in writing.
- c. Idling of machinery and vehicles is prohibited at all sites of the contracting authority.

(3) Greenhouse gas potential

If the contractor has offered a specific greenhouse gas potential for individual components, materials or services, or if the contracting authority has expressly specified a maximum greenhouse gas potential for the contractor's services in the contract, this shall form a binding part of the contract. The calculation methods, emission factors and evidence specified in the contract shall be decisive for determining greenhouse gas potential; alternatively, the recognised standards applicable at the time of performance shall apply (in particular DIN EN 15804 and GWP according to IPCC).

(6) Contractual penalty

If the contractor culpably breaches one or more obligations under this clause or fails to perform the service in accordance with the contract, the contracting authority shall be entitled to demand an appropriate contractual penalty for each working day on which the breach continues. The contractual penalty shall amount to:

- a. [XX]‰ of the contract value per working day;
- b. for each commenced additional tonne (t) of CO₂e by which the total greenhouse gas potential of the services actually performed by the contractor exceeds the greenhouse gas potential agreed or offered under the contract, EUR [●].

The contractual penalty shall be capped at a total of 5% of the contract value stated in the letter of award (excluding VAT). If the invoiced amount decreases during the contract compared with the contract value, the contractual penalty shall be capped at a total of 5% of the invoiced amount. Assertion of the contractual penalty shall not affect further statutory or contractual claims, in particular claims for damages. Any contractual penalty paid shall be credited against any claim for damages.