

Recommended criteria for the execution phase – building construction

1. Product group

Services for the execution and construction of buildings

1.1. Limitation

Our recommendation on the use of environmental criteria for construction and property management is based on the contracts covered by the regulations on public procurement.

The Regulations on public procurement (FOA) do not apply to contracts concerning the purchase or leasing of land, existing buildings or other real estate, or concerning rights to such property. The basis for this exception is that the procurement will generally depend on geographical location and will therefore not concern cross-border trade. According to the wording of the regulations, the only exception is the leasing of existing buildings. Contracts established for buildings which are to be erected at a later date or which are currently being erected will therefore as a general rule not be exempt from the regulations on public procurement. FAD has stated in its guidelines on public procurement that they cannot see any clear justification for the cut-off point as regards when the regulations will apply; cf. FOA Section 1 – 3, second paragraph, letter b. Practice from the European Court of Justice does not provide any guidance either, so the problem must therefore be considered unresolved¹.

Chapters 1-3 are identically worded sets of criteria for construction planning and project management.

2. Environmental impact - facts

The environmental impact associated with construction occurs in all phases of a building's lifecycle. The construction sector is often referred to as "the 40% sector", as it accounts for approximately 40% of society's resource and energy consumption.

Energy consumption in construction is approximately 82 TWh in a normal year (approx. 38% of the country's energy consumption) – comprising 47 TWh for residential buildings (57%) and 35 TWh for commercial buildings (43%). Electricity accounts for the overwhelming majority of energy consumption. New construction is using ever more energy per m² ². This can be attributed to the fact that the spatial efficiency of buildings has increased, but another probable reason is more technical installations and equipment. Today, approximately 20% of the energy consumption in Norwegian buildings goes towards climate control, whilst lighting accounts for approximately 15%.

¹ Veileder til reglene om offentlige anskaffelser, Part 2.2.2 p. 19

² Source: Enova: Bygningsnettverkets energistatistikk 2006

One study³ shows that in 2004 the building sector was responsible for the emission of 7.2 million tonnes of CO₂ equivalents; approximately 13.5% of the country's total emissions. Production of building materials accounted for approximately half of this, whilst operation of buildings is the next biggest contributor. According to the report, electricity, which is extensively used for heating, does not contribute to CO₂ emissions.

The building sector uses many materials – often in large volumes – in its production. Many of these materials contain substances that could constitute health, environmental or fire/explosion hazards. Products for building and facilities account for 19% of all declarable products⁴ in Norway. Many chemicals used in the building industry are also included on the official priority list of substances to be phased out or eliminated wherever possible. Hazardous substances can cause health-related (indoor-climate related) problems in the operational phase through degassing, especially from surfaces. Such substances may also present problems in the demolition phase (disposal phase), as debris containing such substances over the course of the building's lifetime can be classified as hazardous waste with associated requirements concerning handling (such as products containing brominated flame-retardants).

The building materials industry is increasingly international in scope, and more and more of the materials used in Norwegian buildings are imported. There is also a trend towards an increase in the use of industrially produced elements and modules. All these factors are resulting in increased transport, but industrial production will often result in reduced waste production (less cutting, active use of recycling schemes) whilst damage from moisture is reduced at the same time. Moisture and water damage account for approximately 70% of all building damage. Building faults cost an estimated NOK 12-15 billion annually⁵.

The building industry generates approximately 1.24 million tonnes of building waste⁶ a year, which requires management. The total amount of waste in Norway in 2005 was 9.5 million tonnes. Hazardous waste, which must be handled in an environmentally responsible and health-conscious manner, is reported to amount to approximately 7,200 tonnes, whilst electronic and electrical waste (EE waste) is reported to total approximately 3,300 tonnes.

Tropical forests are especially important for the planet's biological diversity and climate. A high proportion of these forest resources is used in a non-sustainable manner. There are currently no international or national certification schemes that can give adequate certainty that imported wood products have been lawfully and sustainably sourced.⁷

3. Proposed procurement process

³ Source: Byggsektorens klimagassutslipp. Notat for Byggemiljø, prepared by KanEnergi 2006, ver. April 2007

⁴ Product register: Product figures. Report 2000 – 2005.

⁵ See [Byggekostnadsprogrammet](#).

⁶ Statistics Norway: [Avfallsregnskap for Norge](#).

⁷ See [Regjeringens handlingsplan for 2007 -2010 om miljø- og samfunnsansvar](#) in public procurement. Wood from tropical timber sources may not be used either in the building itself or in materials used during the construction period. Tropical timber refers to wood originating from the region between the tropics (23°N and 23°S), as well as all of Myanmar (Burma). It is currently not possible for a producer to evaluate in practice whether tropical timber originates from sustainable tropical timber sources with reliable certification; see also Regulation No. 895 of 4 July 2003 on special measures with respect to Burma (Myanmar), as subsequently amended.

Project management and construction of a building is a long-term and complicated process involving many suppliers. Aspects of the procurement take place early on in the process, long before everything that has to be procured is clarified in detail. Such procurements also involve sectors where there is generally a low level of competence regarding the environment.

The construction, operation and maintenance of public buildings requires substantial financial resources, and there is usually a requirement for investments in environmental measures to be measurable in the form of good administrative economy. Evaluation of the building's lifecycle costs (LCC) will be an essential (ref. Section 6 of the LOA) tool for establishing the costs of different options considered over the entire lifetime of the building. This will often produce results that demonstrate that environmental investments are worthwhile. Where environmental considerations, quality and economy in construction go hand-in-hand, it often proves that environmental considerations contribute to better quality and economy in construction.

The following are aspects that should be taken into consideration in order to ensure a good procurement process:

Political anchoring

In order to fulfil the role of owner and provide the necessary guidelines, there should be a politically anchored resolution (municipal and county councils) or a central management resolution (government or publicly owned enterprise) on environmentally friendly construction, refurbishment and operation of the building. The decision-makers should provide guidelines where it is clear and evident that there should be environmental requirements concerning the construction and operation of the building.

Assessing needs – involving users

At an early stage in the process, there should be an evaluation from an environmental and economic perspective as to how the spatial requirements can best be covered:

- What are the actual spatial requirements today and in the foreseeable future?
- What needs does the user have for the building in terms of future flexibility in building construction and technical installations?
- Is it possible to meet this need through means other than extensive refurbishment or new-build?
- Will it be possible to achieve an appropriate building change without total refurbishment?

A good needs assessment can be an effective way to avoid unnecessary construction or refurbishment, and thereby also unnecessary materials and resource usage.

User involvement will also be important in the process of determining the actual need. Experience shows that users who have taken the time to define their needs and views will have a greater understanding of the solutions that are eventually chosen. Here, it may also be desirable to review work processes and operations that will be carried out in the building.

It is important that users also have a certain minimum level of competence in understanding the building process and its opportunities and limitations. Those involved must have a knowledge and understanding of the environmental objectives in the project and be involved in their development wherever possible.

Good planning – setting environmental objectives early in the process

The construction and management of a building are, as previously mentioned, complex processes involving numerous actors with different roles. In order to achieve the best possible results in environmental terms, it is important to incorporate environmental conditions in all processes. The best results will be achieved at optimal cost by formulating concrete and measurable environmental objectives that are accounted for from the very beginning. Good planning in advance will also result in significant advantages concerning the subsequent maintenance and operation of the building.

The environmental objectives established for a given project will vary depending on scope, local circumstances, etc., but should be linked to the most important and relevant environmental conditions in the project.

A start-up meeting with the parties involved, during which the project's environmental objectives are clarified, will usually produce positive results.

Delineating responsibility and qualifications

It must be clearly stated who is responsible for ensuring that environmental requirements are established, and who is responsible for ensuring that the goals are followed up and achieved during the various phases of the building process.

It would be an advantage if the entire project management group were engaged at the same time, and as early as possible in the project. This lays the groundwork for close interdisciplinary cooperation concerning environmental issues from the very beginning.

4. Recommended requirements and criteria

The criteria for building and property management use a system that is slightly different from those used in other sets of criteria. This must be seen in the context of the construction industry's special position and contractual circumstances. There are many more contractual requirements for the sets of criteria for building and property management than for the other sets of criteria, whilst at the same time the qualification requirements and technical specifications are correspondingly reduced in scope.

Subdivision of criteria according to building life phase

The planning and building process can be divided into many phases and many different contract forms are utilised. We have chosen to formulate four sets of criteria that will collectively cover the entire lifecycle of the building.

For building and property management, we differentiate between:

- Planning and project management, including planning in connection with rebuilding/refurbishment.
- Construction and rebuilding/refurbishment of buildings.
- Building maintenance.
- Management and operation - service agreements.

It is a prerequisite for the use of 1) and 2) that the project is covered by the requirements of the Norwegian Planning and Building Act (PBA) concerning applications for planning permission. These criteria will also be used on large-scale rebuilds and refurbishments that require such approval. Small-scale projects and rebuilds not requiring such approval are defined here as building maintenance.

The initiation phase, in which the very first thoughts and ideas for a new building take shape, is not included here. Services will also be procured for this phase in respect of individual buildings.

General preconditions

The following are established as general preconditions for the project:

- There should be a minimum of one, but preferably more, measurable environmental goals⁸ for the project.
- Calculations of the lifecycle costs (LCC) must be carried out for different options for the building and technical installations.

⁸ For example, requirements concerning waste reduction in the building process or material selection.

- It is an obvious precondition for the delegation of all tasks that the supplier is familiar with and follows all relevant laws and regulations⁹. The proposed criteria described below are requirements that extend further than the minimum regulatory requirements.

It is recommended that documentation that is obtained should wherever possible be supplied in accordance with Norsk Standard NS 3450 "Project documents for buildings and facilities. Editing and content of documentation for competitive tendering" (4th edition January 2006).

4.1 Purpose of the contract

Purchase of services for the execution phase – building construction.

Environmental requirements and criteria that are established should be included in the documentation for competitive tendering for public procurement. This will serve as part of the documentation for competitive tendering together with other requirements and criteria.

The fundamental principle of proportionality presented in Section 3-1, fifth paragraph of the Regulations on public procurement (FOA) means that the environmental requirements and criteria that are established must be in relation to the contract that is being established. According to the fundamental principles, the requirements must be relevant for the actual contract and the documentation requirements established should also be in relation to the contract.

This means that some of the environmental requirements and criteria proposed must be adapted to the actual procurement. This also means that documentation requirements and scope must be adapted to the size and type of contract. Some contracts can be complex even if the contract value is not large. This means that there must be a concrete evaluation as to whether or not the proposed requirements and criteria are appropriate for the planned procurement.

This will be a fundamental requirement for all contractors¹⁰ from sole-trader contractors through to large contracting companies.

The execution phase includes construction of the building and technical installations and associated external areas. It is assumed that there are contractual texts, etc. The exact contract model that is chosen is

⁹ Applicable rules include:

- Planning and Building Act (PBA); ACT 1985-06-14 No. 77: <http://www.lovddata.no/all/hl-19850614-077.html>
- TEK – Regulations on requirements for construction and construction products (TEK); FOR 1997-01-22, most recently amended on 26 January 2007: <http://www.lovddata.no/cgi-wift/ldles?doc=/sf/sf/sf-19970122-0033.html>
- Act on control of products and consumer services (Product Control Act); LOV-1976-06-11-79: http://www.lovddata.no/cgi-wift/wiftldles?doc=/usr/www/lovddata/all/nl-19760611-079.html&emne=produktkontroll*&& including substitution requirements
- Regulations on restrictions on the use of chemicals constituting a health and environmental hazard and other products (Product Regulations); FOR-2004-06-01-922: <http://www.lovddata.no/cgi-wift/ldles?doc=/sf/sf/sf-20040601-0922.html>
- Regulations on recycling and handling of waste (Waste Regulations); FOR-2004-06-01-930: <http://www.lovddata.no/cgi-wift/ldles?doc=/sf/sf/sf-20040601-0930.html>

¹⁰ The term "contractor" is used in this set of criteria, but in all other sets of criteria the term "supplier" is used in equivalent expressions.

not taken into account, but it is assumed that the set of criteria will be used regardless of the contract model.

Significant challenges associated with the formulation of requirements can arise during the project planning process through to the construction phase, such as guidelines concerning material choice.

4.2. Qualification requirements^{11 12}

4.2.1. Requirements concerning environmental management

The main contractor must document that an environmental management system has been established, which at least consists of routines that account for the following elements:

- System for the company's environmental goals and environmental policy.
- Competence strategy concerning the environment.
- Procedure for delivery of the service in an environmentally responsible manner.

Documentation: Statement of existing routines documenting that the requirement is met. A self-declaration can be provided that describes how these routines work and how they are implemented. If the routines are described in the company's quality or environmental management system in accordance with Miljøfyrtårn, ISO 14001, EMAS or an equivalent third party-verified system, it is sufficient to provide a valid certificate.

4.2.2. Competence

Main contractors should document a knowledge of and experience in:

- Methods for building construction with air-tightness to avoid the unintentional through-flow of air (low leakage rate).
- A knowledge of clean, dry building standards¹³ and system for implementing this standard.

Documentation: Give references for up to three relevant projects carried out over the last five years with a statement of the project's name, size (m² and cost), construction client and date of completion.

A knowledge of methods for waste reduction and practical experience in waste sorting.

Documentation: From new-build: Quantified waste in kg/m² for up to three relevant projects with a statement of the project's name, size (m² and cost), construction client and date of completion.

Refurbishment/demolition: Quantified degree of waste sorting for three relevant projects with a statement of the project's name, size (and cost), construction client and date of completion.

Practical experience concerning the evaluation of hazardous chemicals with a view to substitution (replacement).

Documentation: Description of internal or external training systems used for training employees, as well as a description of the system used for evaluating chemicals and how these evaluations are documented to ensure that the substitution requirement is met.

¹¹ Qualification requirements are minimum requirements associated with the contractor's ability to deliver the procurement object in question. The purpose of establishing qualification requirements is partly to ensure that the contractor has the technical and organisational basis for completing the contract. The requirements that are established must be reasonable in relation to the procurement.

¹² It is important that the requirements that are established are not so stringent that they exclude too much of the market from the competition. For each project, it must therefore be evaluated what requirements may reasonably be established. The criteria should not be static, but continuously adapted to developments over time. Requirements that today might be so stringent that they restrict competition excessively may become common in the future.

¹³ Clean dry building, preventive health measures in buildings. CDB handbook from the Association of Consulting Engineers. 2. 2nd edition, 2007.

4.3. Technical specifications¹⁴

Requirements should be established here depending on the project management material.

- The building should be constructed in accordance with the project management documentation.

4.4 Award criteria¹⁵

4.4.1. Service quality

The contractor should state the following:

- Experience of projects where the construction client has established stringent requirements for waste sorting (60% or greater).
- Experience of waste management with waste sorting and reduction at the construction site.
- Where relevant: Experience of waste sorting on constricted worksites.
- Where relevant: Experience of projects involving requirements for the re-use of building materials.
- Experience of projects where thermal performance measurements have been carried out (good air-tightness – low leakage rate).
- Experience of logistics solutions on the building site with the storage of building materials that prevent the formation of moisture, etc.

Documentation: Brief description with references from completed projects where the elements in the requirements above have been included. In projects where specific target figures have been established, both the targets established and the actual figures achieved should be referenced.

Building site manager:

- The manager from the contractor on the building site should have experience of evaluating chemicals that constitute a hazard to health and the environment that may occur in a building context; alternatively, the contractor may have established other systems that ensure evaluation of materials used on the building site.
- The manager from the contractor on the building site should have experience of projects involving environmental requirements equivalent to those applicable in this tender.

Documentation: The contractor must submit a self-declaration (CV) that describes the manager's experience and competence.

¹⁴ The client must describe for the market what is to be purchased. FOA Section 4-3 g 2) gives a definition of what is meant by technical specifications in connection with building and installation contracts.

¹⁵ The award criteria must be associated with the contract object. The award criteria are the client's wishes, according to which the tenders will be ranked. The main criteria should be given a weighting as a %, so that the contractors can get an idea of what the client wants and thereby better meet these wishes. Each award criterion should be stated in concrete terms. Criteria associated with the environment will be one of several criteria. Other criteria will usually include price and quality. As a general rule, the client will also be relatively free to choose what award criteria are to be included and what weighting these criteria are to be given.

4.5. Contract requirements¹⁶

NS 8405 dated..... shall apply as the general contract provisions, with the addition of what follows below:

The contractor must fulfil the following requirements:

- Satisfactory systems for evaluating hazardous chemicals with the aim of substitution (replacement) must be established.
- Substances containing more than 0.1% by weight of substances included in the list drawn up by the Norwegian Pollution Control Authority (SFT) and the National Office of Building Technology and Administration (BE) for the Building, Facility and Property sector ¹⁷ may not be used.
- The building's tightness must be documented through measurements (thermal imagery in accordance with NS-EN 13187) once the wall structures/outer walls are complete, and again prior to handover.
- When handing over the building, the users should be given training in the efficient operation and maintenance of energy systems, waste management systems and waste handling.
- Administrative, operating and maintenance documentation of technical installations and operations must be provided in an operating manual presented upon hand-over. (Electronic versions are acceptable).
- The administrative, operating and maintenance documentation must include information on environmental properties for the materials used, especially the content of substances hazardous to health and the environment, preferably in the form of an environmental product declaration.
- Routines must be established for measuring humidity before the structures are sealed (in accordance with NS-EN...).
- Waste management – There should be a waste management plan for the construction period, covering the sorting of waste according to source and the scope of re-use/recycling. Source-sorting percentage: xx% ¹⁸ (percentage rate set according to local conditions). Since 2008, regulations have been in place which require a minimum of 60% source-sorting ¹⁹. (The goal in the National action plan for Building and institutional waste (NHP) is 80% source-sorting by 2012.)
- Contractors should request EPDs (environmental declarations) for all building materials.
- Rigging and operation must be organised so as to reduce the risk of environmental accidents (such as discharge into water, earth or air). Fuel tanks and refilling locations must be secured against leakage into the ground, e.g. by being placed on a solid surface. Absorbent material should be available at the refilling locations.
- The spreading of irritant dust and noise from construction activity into the surrounding areas must be prevented.
- If the project involves demolition, document the necessary approval, competence and experience in demolition or secure routines that ensure that the subcontractors are in possession of these.

¹⁶ The client should specify in the invitation to tender documentation what contract standards will be used. As a general rule, the client should use contract standards; cf. FOA Section 3-11 first paragraph. FOA Section 4-1c) presents a more detailed definition of building and facility contracts.

¹⁷ Memo <http://www.byggemiljo.no/article364.html>

¹⁸ Percentage of source-sorting should be specified as the total quantity of waste that is generated, excluding building pit (fill), including demolition.

¹⁹ [New chapter 15](#) in the [Waste Regulations](#)

These supplementary requirements may be included in the contract:

Energy:

- Fossil fuels may not be used to meet the heating requirements during the construction period.

Logistics:

- A logistics plan must be formulated and implemented, which places an emphasis on minimising the transportation associated with construction materials and masses to and from the construction site.
- Packaging must be sorted and returned to the supplier.

Machinery:

- An environmentally friendly, easily degradable hydraulic oil must be used.
- Machinery and lorries to be used must meet Euro 4 requirements on exhaust emissions.

5. Background material

References to background material and sources are included in footnotes throughout the document.

Background to the work

In June 2007, the Norwegian Government launched an action plan for environmentally and socially aware procurement. State procurements in particular are being targeted and the environmental policy is designed to give state-owned bodies guidelines and assistance in the task of establishing sound environmental requirements. The action plan came into force on 1 January 2008 and places an emphasis on environmental requirements for project planning and the erection of buildings and property management. A set of recommended criteria must be prepared for the selected product/service areas. The task of preparing these criteria has been delegated to the Panel for environmentally aware procurement with GRIP as secretariat. For construction and property management, four sets of criteria will be developed as mentioned previously to cover project planning, construction, maintenance, operations and service agreements.