



F: Building Construction/ Renovation



1 Key environmental impacts

Impact	Approach
The consumption of energy for heating, cooling, ventilation, hot water, and electricity, and resulting CO2 emissions	Ensure high energy efficiency standards Encourage the use of localised renewable energy sources (RES) ^[1]
The consumption of natural resources	Encourage the use of sustainably harvested resources
Emission of toxic substances during the production or disposal of building materials leading to air and water pollution	Encourage the use of non-toxic building materials
Negative health impacts on building users due to building materials containing toxic substances	Encourage the use of non-toxic building materials

[1] "Localised RES" means RES generating capacity within the building site itself (e.g. solar panels, biomass boilers, wind turbines etc.)

2 Procura⁺ Guidelines

Given the very different national regulatory frameworks and other conditions across the EU, it is not possible to set universal standards to be used in the procurement of building construction works in all circumstances. Instead a series of concrete guidelines have been developed providing alternative approaches which may be used. The public authority wishing to use these guidelines will need to determine which alternative is most appropriate for their situation. The guidelines principally apply to the energy performance of buildings and the use of sustainable building materials.

A great deal of further information on this topic and the guidelines developed can be found in the detailed chapter on building construction/renovation in the attached CD-ROM (also available for download at www.procuraplus.org). It is advisable to study this more detailed chapter before beginning activities.

2.1. Thematic sections

These guidelines are split into 5 thematic sections:

1. Energy consumption
2. Use of renewable energy sources (RES)^[2]
3. Use of sustainable building materials
4. Monitoring and user aspects
5. Experience of the architect

In each section a number of **alternative (sometimes complementary) approaches** are presented for addressing the main issue.

2.2. Construction process

Furthermore the guidance indicates where in the construction process the tendering criteria can be applied. Either:

- A) Preliminary design/architects' competition
- B) Tendering of the building construction
- C) Tendering of the building services – “Building services” are: heating, ventilation, air conditioning and refrigeration (HVACR). A specialist building services company may be contracted to design and install (and sometimes maintain) these services for the building.

The above mentioned tendering stages have been identified as the most common stages of procurement in the European building sector. However, this scheme may vary, both in terms of the exact stages gone through and the number of competitive tendering rounds. **If there is only one tendering round including all stages, all approaches and criteria should be addressed in this tendering stage.**

^[2] RES: Renewable Energy Sources. The following energy sources are considered as RES:

- Solar energy:
 - Passive
 - Active (thermal, electrical)
- Biomass (wood, energy plants, biogas)
- Environmental and process heat (heat pumps, heat recovery)
- Geothermal power
- Small water power stations

2.3. Tendering stages

Each proposed option also indicates where in a specific tendering procedure the criteria should be inserted.

In many cases the criteria are designed for inclusion in the **Technical Specifications** for the work to be carried out – i.e. they set minimum standards which the bidding companies must meet.

Some criteria are designed for use in the **Award/evaluation stage**, where different offers which meet the minimum standards are compared. At this stage environmental performance can be used as one of the evaluation criteria, together with other aspects such as price. The weighting given to the environmental performance criteria suggested below must be determined by the contracting authority, but it is recommended that this is at least 10-20%. In some cases several environmental performance criteria could be introduced at the award/evaluation stage (e.g. for net energy consumption (option 1.A.2) and use of solar panels (2.A.1) during the architects' competition). The award points given in the options below are simply examples to be used for guidance.

2.4. Renovation work

The criteria presented below are designed to be used for both the construction of new buildings and also major renovation work. The procedure and tendering stages followed for renovation work will again vary across Europe, and also depending on the type of renovation work. This must be taken into account in defining where to include the criteria. Criteria, which are not applicable for renovation work, are clearly mentioned below.

2.5. Numbering of the Options

The options presented below are numbered to indicate which thematic issue is being addressed (the first digit), and which stage of the construction process they should be applied at (the second digit). The last number is to differentiate between different options covering the same thematic area and to be used at the same stage.

i.e. Option 1.A.1 relates to Energy consumption (number 1), and should be used during the preliminary design/architects' competition (letter A).

Option 3.B.2 relates to the use of sustainable building materials (3), and should be used during the tendering for the building construction (letter B).

For further notes on the implementation of each Option please see the detailed chapter in the attached CD-ROM.



A – Preliminary design/architects' competition

1. Energy consumption

1.A.1 – Minimum standards for net energy demand

Specifications/ minimum standards:

- Net energy demand must not exceed X

(Optional) evaluation/award criteria:

- Additional points awarded for net energy demand better than the minimum standard

Example:

- 10 (out of 100) points will be awarded to the offer with the lowest net energy demand, for other offers every 1% increase in consumption reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

1.A.2 – Competition around net energy demand

Evaluation/award criteria:

- Additional points awarded for net energy demand

Example:

- 10 (out of 100) points will be awarded to the offer with the lowest net energy demand, for other offers every 1% increase in consumption reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

1.A.3 – Minimum standards for U-Values and/or shape/volume ratio

Specifications/ minimum standards

- The shape to heated gross volume ratio must not exceed X.

Contract conditions

- The U-Values must not exceed X.

(Optional) evaluation/award criteria:

- Additional points awarded for shape/volume ratio (Not applicable for renovation projects)

Example:

- 10 (out of 100) points will be awarded to the offer with the best shape/volume ratio, for other offers every 1% increase in ratio reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

1.A.4 – Competition around Shape/volume ratio

Evaluation/award criteria:

- Additional points awarded for shape/volume ratio (Not applicable for renovation projects)

Example:

- 10 (out of 100) points will be awarded to the offer with the best shape/volume ratio, for other offers every 1% increase in ratio reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

2. Use of RES

2.A.1 – Minimum use of solar power

Specifications/minimum standards:

- A minimum of X% of net energy/hot water/space heating/cooling/electricity demand must be provided by X solar panels

5. Experience of the architect

5.A.1 – Selection based on experience with sustainable building design

Selection criteria: The architect must have sufficient past experience with sustainable building design. Each applicant is required to submit a 2-page document outlining past experience in the following areas (indicative list):

- Energy efficient construction design. Including if available specific energy demand per m² space including heating, cooling, lighting for a previous construction
- Airtightness and air exchange systems with heat recovery
- The use of RES and co-generation
- Bioclimatic architecture, to achieve energy efficiency, thermal and optical comfort, avoiding mechanical systems, e.g. light supply with daylight systems
- Use of LCA tools in design
- Use of sustainable building materials
- Achievement of good indoor air quality standard

5.A.2 – Compulsory use of LCA tool during design

Contract condition:

- In carrying out the design work ...<Insert name of selected LCA tool> ... must be used.



B – Tendering for the building construction

1. Energy consumption

1.B.1 – Competition around U-Values – evaluation on price and U-Values

Evaluation/award criteria:

- Additional points awarded for U-Values

Example:

- 10 (out of 100) points will be awarded to the offer with the best U-Values, for other offers every 1% increase in U-Values reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

3. Use of sustainable building materials

3.B.1 – Exclusion of certain materials

Specification/minimum standard:

The tenderer must declare that the following materials/substances will not be used in the construction:

- Recycled timber not accompanied by test documents from an independent third party that they contain no hazardous substances (as defined by national regulations).
- Products which contain hydrofluorocarbons (HFCs)
- Products which contain sulphurhexafluoride (SF₆)
- Indoor paints and varnishes with a content of solvents^[3] higher than
 - for wall paints (according to EN 13300): 30 g/l (minus water)
 - for other paints with a spreading rate of at least 15 m²/l at a hiding power of 98% opacity: 250 g/l (minus water)
 - for all other products (including paints that are not wall paints and that have a spreading rate of less than 15 m²/l, varnishes, woodstains, floor coatings and floor paints, and related products): 180g/l (minus water).
- All virgin wood from forests and plantations shall originate from forests and plantations that are managed so as to implement the principles and measures aimed at ensuring sustainable forest management.

In Europe, the principles and measures referred to above shall at least correspond to those of the Pan-European Operational Level Guidelines for Sustainable Forest Management, as endorsed by the Lisbon Ministerial Conference on the Protection of Forests in Europe (2-4 June 1998). Outside Europe they shall at least correspond to the UNCED Forest Principles (Rio de Janeiro, June 1992) and, where applicable, to the criteria or guidelines for sustainable forest management as adopted under the respective international and regional initiatives (ITTO, Montreal Process, Tarapoto Process, UNEP/FAO Dry-Zone Africa Initiative).

Verification for timber:

Where virgin wood from certified forests or plantations is used, the applicant shall provide an appropriate certificate(s), for example the FSC (Forest Stewardship Council) Label, together with supporting documentation showing that the certification scheme correctly assesses the above-mentioned principles and measures of sustainable forest management.

For virgin wood from forests that are not certified as being from sustainably managed forests or plantations, the applicant shall provide the appropriate declarations, charter, code of conduct or statement, verifying that the above requirements are met.

3.B.2 – Minimum quantity of sustainable building materials

Specifications/ minimum standards:

- The tenderer must declare that a minimum of X% of materials to be used in construction (by value) must be produced in compliance with the standards underlying a Type 1 ecolabel according to ISO standard 14024.

Verification:

- Products carrying a type 1 ecolabel will be deemed in compliance of these criteria. Alternatively credible documentation that the standards of a given type 1 ecolabel are met will also be accepted.

(Optional) evaluation/award criteria:

- Additional points awarded for the percentage of materials used in construction (by value) produced in compliance with the standards underlying a Type 1 ecolabel according to ISO standard 14024, above the minimum standard set in the specifications.

Example:

- 5 (out of 100) points will be awarded to the offer with highest percentage, for other offers every 1% decrease in percentage decreases the number of points by 1%.
- 95 (out of 100 points) will be awarded for other aspects including price

3.B.3 – Competition around the use of sustainable building materials

Evaluation/award criteria:

- Additional points awarded for the percentage of materials used in construction (by value) produced in compliance with the standards underlying a Type 1 ecolabel according to ISO standard 14024.

Example:

- 5 (out of 100) points will be awarded to the offer with highest percentage, for other offers every 1% decrease in percentage decreases the number of points by 1%.
- 95 (out of 100 points) will be awarded for other aspects including price

4. Monitoring and end user aspects

4.B.1 – Compulsory blower door test

Specifications/ minimum standards:

- Where mechanical ventilation is included in the building, the winning bidder must ensure that a Blower Door Test is carried out at ...<Insert appropriate building stage>.... This must be repeated until the appropriate standard is achieved



C – Tendering for the building services

1. Energy consumption

1.C.1 – Minimum standards for primary/final energy consumption

Specifications/ minimum standards:

- Final/primary energy consumption must not exceed X

(Optional) evaluation/award criteria:

- Additional points awarded for final/primary energy consumption better than the minimum standard

Example:

- 10 (out of 100) points will be awarded to the offer with the lowest energy consumption, for other offers every 1% increase in consumption reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

1.C.2 – Competition around primary/final energy consumption

Evaluation/award criteria:

- Additional points awarded for final/primary energy consumption

Example:

- 10 (out of 100) points will be awarded to the offer with the lowest energy consumption, for other offers every 1% increase in consumption reduces the number of points by 1%.
- 90 (out of 100 points) will be awarded for other aspects including price

2. Use of RES

2.C.1 – Minimum percentage of localised RES

Specifications/ minimum standards:

- A minimum of X% of (primary, final or net) energy consumption must be provided by localised renewable energy sources.

(Optional) evaluation/award criteria:

- Additional points awarded for the percentage of (primary, final or net) energy consumption provided by localised renewable energy sources, above the minimum standard set in the specifications.

Example:

- 10 (out of 100) points will be awarded to the bid with the highest percentage, for other bids every 1% decrease in the offer reduces the number of points by 0.5.
- 90 (out of 100 points) will be awarded for other aspects including price

2.C.2 – Competition around percentage of localised RES

Evaluation/award criteria:

- Additional points awarded for the percentage of (primary, final or net) energy consumption provided by localised renewable energy sources.

Example:

- 10 (out of 100) points will be awarded to the bid with the highest percentage, for other bids every 1% decrease in the offer reduces the number of points by 0.5.
- 90 (out of 100 points) will be awarded for other aspects including price

4. Monitoring and end user aspects

4.C.1 – Regular book keeping

Specifications/ minimum standards:

- An independent company must be contracted to provide a regular bookkeeping service for the first three years, who will provide the building manager with monthly figures on energy consumption for heating, cooling, ventilation, hot water, and electricity

4.C.2 – Energy consumption display panel

Specifications/ minimum standards:

- A display panel must be installed prominently in the building indicating daily energy consumption for the whole building.

4.C.3 – Training session for building manager

Specifications/ minimum standards:

- A training session must be given to the building manager on the energy efficient use of the building following completion of construction/renovation.

3 Further ideas

- **Infrastructure** – Provide adequate (preferably) existing technical and social infrastructure as basis for urban development.
- **Life cycle costs** – In almost all cases, running and maintenance costs by far exceed construction costs. Considering construction costs only therefore means higher financial efforts during the life span. Ask for life cycle costs.
Alternative cost models (e.g. third party financing, energy performance contracting) offer ways to overcome the gap between construction costs and life cycle costs.
- **User involvement** – User behaviour plays a crucial role in the energy and ecological performance of buildings. Facilitate user involvement starting in the first project stages, especially for the renovation of residential projects.
- **Renovation work** – Force renewal of the existing building stock, hereby achieving highest savings of energy, material, land, technical and social infrastructure.
- **Reuse of wasteland** – Encourage the recycling of wasteland (e.g. brownfield sites) for new construction.
- **Site density** – Minimise land use by encouraging high site density, but also considering architectural and social aspects.
- **Microclimate and site design** – Look at climatic and topographic aspects in all project stages, especially in the project development and the design stage.
- **Indoor quality** – Thermal comfort, daylight or good lighting systems, humidity and noise control are fundamental requirements for occupant comfort.
- **Sewage and rainwater management** – Ecological sewage systems (reuse of wastewater, water saving armatures, etc) and the use of rainwater may also affect financial savings as well as ecological aspects.
- **Integral planning** – Sustainable construction relies on a continuous dialogue and co-operation between all actors involved in the design and construction process as well as in the use and maintenance of the building.

