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Green Public Procurement Criteria for the design, construction and management of Office buildings

(Draft) GPP Office Buildings guidance document

Nicholas Dodd, Elena Garbarino, Oliver Wolf (JRC-IPTS)

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European Commission
Joint Research Centre
Institute for Prospective Technological Studies

Contact information
Nicholas Dodd
Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: jrc-ipts-office-buildings@ec.europa.eu
Tel.: +34 954 488 728
Fax: +34 954 488 300

https://ec.europa.eu/jrc
http://ipts.jrc.ec.europa.eu

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1 DEVELOPING GUIDANCE FOR THE PROCUREMENT OF OFFICE BUILDINGS

The aim of this document is to provide simplified guidance to procurers and project teams on how to procure an environmentally improved office building. The guidance has been structured to reflect the distinct phases of activity that may be involved, as well as the typical forms of contracts that are used.

1.1 Reflecting the complexity of the procurement process

Designing and procuring an office building with a reduced environmental impact, whether it be new-build or a major renovation, is a complex process. As was highlighted by the SCI (Sustainable Construction and Innovation through Procurement) Network in their guide for European Public Authorities, the form of procurement can have a significant influence on the outcome. This is because each type of contract brings with it distinct interactions between the procurer, the contracting authorities internal team, the building design team, the contractors used and the future occupants and facilities managers. Moreover, they each can have advantages and disadvantages in seeking to procure an improved environmental performance.

It is therefore important to identify the main points in the sequence of procurement activities where GPP criteria should be integrated. This guidance is structured to reflect the key activities and decision points in the procurement process, as well as some of the common contract forms that are used in the European Union. Specific reference is made to the International Federation of Consulting Engineers' (FIDIC) contracts for construction works (Red Book), design and build (Yellow Book) and design, build and operate (Gold Book).

1.2 Indicative sequence of procurement activities

The process of constructing a new office building or carrying out a major office renovation tends to consist of a distinct sequence of procurement activities. Each contract relates indicatively to distinct phases of activity as a project proceeds:

- Preliminary scoping and feasibility;
- Detailed design and applications for permits;
- Strip-out, demolition and site preparation works;
- Construction of the building or major renovation works;
- Installation of energy systems and the supply of energy services;
- Completion and handover;
- Facilities management.

Depending on the procurement route adopted, some of these contracts may be awarded to the same contractor but in most cases they are let separately. Some contracts may be integrated in a design and build (DB) or a design, build and operate (DBO) arrangement, with the detailed design process, the main construction contract, the installation of energy services and even facilities management all potentially co-ordinated by one contractor.

The following sections describe each of these phases in turn, highlighting factors to consider in seeking to incorporate GPP criteria into contracts.

1.2.1 Preliminary scoping and feasibility

Early decisions will be made about the siting of the building at this stage. It may entail a decision between renovating or demolishing an existing site (see Section 1.2.1.3), or it may be a choice between several locations within the public estate. This stage would generally involve the estates department and capital programmes.

1.2.1.1 Creating the project definition

The project definition clearly sets out the strategic aims of the building project. Its objective is usually to create a clear brief for the internal project team, including the procurer. The project definition should include the environmental priorities of the contracting authority, as reflected in policies and plans, at a corporate level and in local planning policies. It can also be used to bring together initial information about the site and summarise the design requirements of the relevant departments that will occupy the building.

1.2.1.2 Choosing the site and location

One of the first considerations relating to the siting of the project will be whether an existing building is to be selected for renovation in order to improve performance or whether a new building will be constructed. An appraisal of different options may be necessary to inform decision-making (see 1.2.1.3)

The location of an office building will also have a significant influence on the mode of travel for people working in the building and the consequential environmental impact. This may be the subject of an Environmental Impact Assessment (see 1.2.1.3).

In general, locations that are better served by public transport (measured in terms of the level of connectivity), car club services for daytime business travel and local strategic cycle networks, as well as being near to local shops and services, have been shown to reduce the workforce's dependence on private car use. It is therefore recommended to carry out a scoping analysis of the locational options and projected travel patterns.

Another important consideration relates to whether the site is greenfield or brownfield. Choosing a greenfield site may result in the loss of productive agricultural land. On brownfield sites the previous uses require consideration, especially if they were industrial, as they may incur additional resources to remediate and/or remove contaminated top soils as well as to make safe any below ground basements and workings.

1.2.1.3 Concept design and options appraisal

Before moving into the detailed design phase (see Section 1.2.2), an appraisal of different options is usually carried out in order to inform the business case for the project. This may include decision-making about whether to renovate an existing building or construct a new building.

An outline design concept for the building form, structure and services would usually be developed at this stage. This could include the identification of building(s) renovation options (see below). Design concepts and options would then be appraised for their costs based on industry standard yardsticks, schedules of rates and initial assumptions about how the building will be constructed or renovated.

Establishing environmental performance objectives

It is important that minimum technical requirements and possible areas of focus for award criteria are established during this preliminary phase. This will ensure that they are clearly communicated throughout the tendering process and will help building a common understanding. Initially the focus could be on strategic environmental requirements, for example, related to energy performance and the target lifespan of the building. The scope could then be broadened in later procurements steps.

Renovation or new-build?

The decision to retain and renovate an existing building or to demolish and/or construct a new building may be finely balanced in terms of the costs and environmental benefits. The renovation of a building can have significant environmental benefits as a result of avoided impacts from the manufacturing of new construction materials. For example, the entire structural frame of a building could be re-used in situ. This may however be outweighed by the potential life cycle cost savings from the improvements in energy efficiency obtainable from a new building.

It is therefore important to first appraise whether, given the physical form and structure of the existing building, the building's environmental performance and, if necessary, internal working environment can be improved sufficiently in order to meet the contracting authorities requirements. For instance, certain features of a building such as heat loss from structural elements (so-called 'thermal bridging') may preclude a cost effective level of improvement when compared to the minimum local legal requirements or the GPP criteria.

Given the emerging market for energy efficient building renovation, external expertise could be used to identify state-of-the-art and cost effective solutions.

Environmental planning considerations

Where the decision is made to construct a new building (or buildings), environmental planning issues relating to the site would be subject to a screening decision. This would be used to determine whether the project is significant enough to be subject to an Environmental Impact Assessment under Article 4(2) Annex II of the EIA Directive 2011/92/EU. This could include, for example, the assessment of traffic impacts, air quality, noise and water and waste management.

Putting the team together: preliminary stages

At the preliminary stage the aim should be to draw upon internal expertise to support the procurer. Using internal expertise will ensure greater ownership of the project. The internal project team will in this way be better informed when managing external contractors, being able to maintain better control over the environmental specifications it requires.

Where possible, personnel with relevant expertise should be identified and assigned to the project. This might include, for example, representatives from estates, capital projects, finance, highways, energy and environmental management. Some authorities may also have in-house architects and designers.

Experience also suggests that the involvement of end-users of the building, for example representatives from departments as well as future facilities managers, can help to ensure that the building is designed to meet their needs and, particularly if new and unfamiliar systems are incorporated, is practical to operate and maintain.

Preliminary appraisals and outline designs may be carried out in-house with support from external consultants to make up gaps in expertise. Support to be procured could include Environmental Impact Assessments, Transport Assessments, Life Cycle Costing and renovation options appraisals.

Early assumptions about capital and life cycle costs

At this stage, initial assumptions about the cost of environmental improvements can be integrated into the cost planning for the project. Life Cycle Costing (LCC) is a technique that can be used to inform decisions on the cost and benefit of requiring specific GPP criteria (see the description of LCC below).

Reference office building concepts used internally to appraise the possible costs may be included in the Invitation To Tender (ITT) for design teams and construction contracts. Provided that they include a bill of construction materials, they could be used as the basis for comparative assessments of environmental improvement options for the construction.

Life Cycle Costing (LCC)

Life Cycle Costing is a technique that *'enables comparative cost assessments to be made over a specified period of time, taking into account all relevant economic factors both in terms of initial capital costs and future operational and asset replacement cost'* (Davis Langdon 2005). It is particularly relevant to achieving an improved environmental performance because higher initial capital costs may be required to achieve lower life cycle running costs. LCC exercises should be carried out with reference to ISO 15685-5 or equivalent.

Applying LCC requires specialist technical skills that should be procured by the contracting authority (if it does not exist in-house) to support initial appraisals and development of the Invitation To Tender (ITT) for main construction contract. Cost consultants will tend to be able to offer this expertise.

LCC can play a particularly significant role in Design, Build and Operate arrangements, which can be structured in order to incentivise the contractor to minimise long-term operating costs, including energy, water and waste management costs. It is also relevant to forms of Energy Services where a contractor is selected to renovate a building, usually recovering their capital investment from savings on the occupiers' energy bills. A number of tools and software programs are available to assist with Life Cycle Costing for new buildings and major renovations. Further information about LCC is available from the EU GPP website: http://ec.europa.eu/environment/gpp/lcc.htm

1.2.2 Detailed design and applications for permits

1.2.2.1 Specifying the design brief and performance requirements

Under conventional contracting arrangements

In a conventional contracting arrangement, a design is procured for the building project and a contractor is procured to construct this design (also referred to as an 'employer design' contact [1]) In the first step in this process a brief is therefore required, setting out the contracting authorities design requirements. These would usually be expressed in terms of GPP performance in order to provide designers with flexibility (for instance, energy use in terms of kWh/m^2), but they may also refer to specific GPP requirements (for instance, the use of timber from sustainably forestry). This brief would form the basis for the Invitation To Tender (ITT) for a design team, which could optionally be run as a design competition in order to encourage innovation.

Under integrated design and construction arrangements

Where design and construction are to be procured together (in ''design and build'' or ''design, build and operate'' contracts) the contracting authorities performance requirements assume a greater importance. This is because they will form the basis for the ITT for the main construction contractor and their design team. It is therefore important in these two types of contracts that GPP criteria are fully addressed within the performance requirements. It may be necessary to procure expertise at this stage in order to prepare the performance requirements.

Putting the team together: developing performance requirements and designs

As the project enters the detailed design stage, the contracting authority may wish to procure an external project manager with experience in innovative construction projects. The project manager's role could include supporting the development of the brief and/or the performance requirements as the basis for the ITT. They could also support the procurer by helping to troubleshoot issues or barriers to the implementation of GPP requirements.

Experience suggests that the core design team will require experience and expertise in a number of key areas which are identified in more detail in the GPP Selection Criteria:

- Architect: Knowledge and experience of designing and specifying environmentally improved buildings, ideally supported by evidence from post-occupancy surveys.
- Service engineers: Knowledge and experience of designing and specifying low energy heating, cooling, ventilation and lighting systems, ideally supported by evidence from post-occupancy surveys, as well as carrying out specialist analysis such as energy modelling.
- Specialist environmental consultants: Knowledge and experience in providing advice on innovation in areas such as materials sourcing, waste management and certification schemes, as well as the capacity to carry out specialist analysis such as LCA.
- Cost consultant: Knowledge and experience of environmentally improved specifications and construction systems, as well the capacity to carry out specialist analysis such as Life Cycle Costing (LCC).

It is important that experience and expertise is verified by references from clients and/or recognised certifications and qualifications. The criteria should be included in the ITT for all forms of contract.

1.2.2.2 Running a design contest for integrated design and build contracts

Where the design and build [2] are to be integrated in one contract, there tends to be less direct control over the final design. The performance requirements to be communicated to potential contractors are therefore important in formally specifying GPP requirements. These will then be used by the selected design and build contractor's design team to develop a detailed design as described in Section 1.2.4.

1 Under the International Federation of Consulting Engineers (FIDIC) this would be equivalent to a Red Book contract.

2 Under the International Federation of Consulting Engineers (FIDIC) this would be equivalent to a Yellow Book contract.

There is, however, still the potential to influence the design before the contract is signed. The main design and build construction contractor can be procured on the basis of a design contest. This can bring a number of benefits, particularly if the contracting authority is unsure about the cost and risk of meeting GPP criteria. This can be run in two stages, moving from concept designs to detailed designs. This option is briefly discussed in the box below.

The value of design contests in stimulating innovative design solutions

Design contests are a valuable tool that can be used to bring forward innovative designs (and design teams) and cost effective solutions on a competitive basis in response to performance requirements.

Integrated design and build contracts can be procured in two stages, incorporating a design contest. At the first stage, a qualification and shortlisting can be made based on expertise and an outline design concept. At the second stage the final selection can be based on detailed designs that have been fully costed by bidders.

The benefit in both cases is that the contracting authority has the opportunity to ensure the selected design cost-effectively integrates GPP requirements.

1.2.2.3 Commencing detailed design

Detailed design is carried out by a design team, the members of which can either be individually selected, called down from a framework contract or selected on the basis of a design competition. The process varies according to the form of contract:

- In a *conventional construction contract*, where there is a separation between the designer and the construction contractor [3], the design team is instructed by the architect who is accountable to the contracting authority.
- In a *design and build or a design, build and operate contract*, the design team is usually controlled by the main construction contractor, although it may be possible to 'novate' (transfer) the contracting authority's design team to the chosen contractor.

As we described in Section 1.2.4, the core design team will generally include an architect, project manager, cost consultant, consulting engineers (civils, structures and services) and specialist environmental consultants. Technical tools used by this team to meet GPP requirements should include building energy modelling and Life Cycle Assessment (LCA) software (see the summary for LCA below).

Life Cycle Assessment (LCA)

Life Cycle Assessment is a tool that can be used to analyse the environmental impacts of different building designs and specifications. It is specified in the GPP criteria as a means of quantifying improvements in the environmental impacts of buildings. LCA analyses for office buildings should be carried out in accordance with ISO 14040 and ISO 14044.

Using LCA requires specialist technical skills that should be procured, if not available in-house, as part of the design team. This technical capability should go hand in hand with practical knowledge and experience of the available improvement options, their material composition, their availability in the supply chain and their cost and design implications.

If a GPP requirement to carry out an LCA of a building design is included, the technical expertise within the internal team and the procurement panel also becomes important. This is because bidders will need to follow pre-defined rules and guidance in order to ensure that they are comparable. Moreover, LCA reports submitted as part of bids will need to be subject to a critical review by an expert evaluator.

1.2.2.4 Applying for planning permission and building permits

The outcomes of the detailed design process (as described in Section 1.2.4) are important in seeking to meet GPP requirements. This is because they are generally used to demonstrate conformity with urban planning policies and to obtain building control permits, which usually require the submission of energy modelling showing that the building meets national minimum requirements for energy performance and, where

3 Under the International Federation of Consulting Engineers (FIDIC) this would be equivalent to a Red Book contract.

relevant, incorporates low or zero carbon energy generation technologies. Local urban planning policies may also contain their own environmental requirements. In each case there is likely to be an overlap with GPP criteria.

1.2.2.5 Preparation of the tender documentation in a conventional contract

The detailed design forms the basis for the tender specification which will be used to procure the main construction contractor. It is therefore important that it incorporates GPP requirements. This could include requirements relating to:

- Target design life and upgradeability/recyclability;
- Design performance, such as energy and water consumption,
- Material specifications, such as specific combinations of building elements identified by LCA analysis and timber from sustainably managed forestry,
- Execution of the contract, including site waste management, handover of Building Energy Management Systems and testing of the building fabric.

There is evidence that reference is increasingly being made by procurers to performance benchmarks associated with multi-criteria building certification schemes and assessment tools. Contracting authorities and their procurers may therefore have questions as to how these may relate to the EU GPP criteria .

The potential relationship between the EU GPP criteria and existing schemes and tools is discussed further in the box below.

Working with existing building certification schemes and assessment tools

A number of existing building assessment and certification schemes are in operation across the EU. These include schemes that are being used across Member States together with a range of assessment tools that have been developed at a national or regional level. The more mature schemes and tools can provide a familiar reference point for private sector partners and contractors, and are generally third party verified.

The EU GPP criteria address the key areas of environmental impact along the life cycle of an office building, as well as addressing issues relating to health and comfort in the working environment. Existing schemes and tools tend to have areas of overlap with the EU GPP criteria, however the equivalence and weighting of the criteria can vary.

The contracting authority may also require the bidder to carry out a Life Cycle Cost assessment. Bids may then be compared on the basis of the 'Most Economically Advantageous Tender' (MEAT) considering life cycle costs. This should include the long-term cost of maintenance, utilities and waste management. It is recommended that the LCC is assessed as a global figure (i.e. all lifetime costs added together) and not as a separately weighted award criterion.

1.2.3 Strip-out, demolition and site preparation works

A range of works contracts may be required to prepare a building for renovation or a site for new construction. In either case the GPP criteria require that contractors carry out a pre-demolition/strip-out audit in order to determine what can be re-used, recycled or recovered.

This audit could take place at an earlier stage in order to maximise opportunities for the potential re-use of major structural elements of the building and to inform the decision to renovate or demolish (see Section 1.2.1.3).

The materials, products and elements identified shall then be itemised in a Strip-out *or* Demolition Bill of Quantities [4]. A waste management plan shall identify how recovery for re-use or recycling will be maximised.

4 European Commission, *Reference document on best environmental management practices in the building and construction sector*, JRC-IPTS, September 2012 see Chapter 7, Building end of life

1.2.3.1 Stripping out of buildings for renovation

The strip-out and selective demolition of existing structures on the site, including buildings intended for major renovation, may be let as a separate contract prior to the main construction contract. At this stage it should be specified that, based on the findings of a strip-out audit, materials shall be recovered for re-use and recycling according to a plan, with monitoring systems implemented to verify performance. The works should be carried out in accordance with the detailed design for the major renovation.

1.2.3.2 Demolition and clearance of sites

The demolition of existing structures on the site, as well as excavations and backfilling, may be let as a separate contract prior to the main construction contract. The specialist treatment of hazardous waste and contaminated land may also be contracted separately. At this stage it should be specified that, based on the findings of a demolition audit, materials shall be recovered for re-use and recycling according to a plan and in a closed loop if possible. Monitoring systems shall be implemented to verify compliance and, in the case of award criteria being set, the level of performance.

1.2.4 Construction of the building or major renovation works

1.2.4.1 Selecting the main construction contractor

Conventional contracts

In a conventional contract (also referred as employer design), a 'lump sum' is usually agreed with the selected main construction contractor. This price is usually based on the contractor's competitive response to the detailed tender specification but, allowing for some uncertainty during the build programme, it is not usually a fixed price.

In single stage tender it is important that the contractor has a clear understanding of the GPP performance requirements and has the capability to respond to them. The potential to include award criteria should already have been explored earlier in the process by the design team, but the nature of the contract will still allow for contractors to identify cost effective and innovative responses.

A main contractor may also be procured through a two stage tender process. In this process a main contractor is selected with whom a pre-construction agreement is signed. In the second stage the contracting authority and the main contractor tender most of the main sub-contracts in order to firm up the pricing of the project. This can in-turn allow for greater involvement by the contracting authority in selection of sub-contractors.

Integrated design and build contracts

In a contract with integrated design and build, the contractor will have been selected at an earlier stage on the basis of their capabilities and their design team's response to the contracting authority's performance requirements. The main advantage of this contract form is that it integrates the design team and the construction contractor, which can help to minimise risk and uncertainty in delivering innovative specifications. It also affords the contractor greater flexibility in meeting the performance requirements, but this places a strong emphasis on ensuring that performance requirements are carefully defined.

Design, Building and Operate (DBO) contracts

In a Design, Build and Operate contract [5] that include project financing, the risks associated with the project are transferred to the operator (the contractor), who is usually responsible for the building over a 20-30 year timeframe or 'concession'. The contracting authority sets out its functional requirements for the building in a specification. Bidders are invited from potential operators with the appropriate financial strength and technical capabilities. Operators are usually a consortia or Special Purpose Vehicle (SPV) bringing together construction contractors, investors, specialist sub-contractors and services providers. Once a bidder is selected, a contract is agreed which includes the financial arrangement for use of the building by the contracting authority.

5 Under the International Federation of Consulting Engineers (FIDIC) this would be equivalent to a Design, Build and Operate contract.

A potential advantage of a DBO arrangement is that facilities management and the ongoing performance monitoring of the building are integrated within the contract. Life Cycle Costing therefore become an important consideration because the contractor will seek to minimise running costs. This can be further incentivised in how the operating fee is structured. For example, a formula can be agreed for energy use in which savings are shared and increases are penalised.

The disadvantage is that the contractor will seek to minimise upfront investment costs. GPP requirements such as those relating to construction materials should therefore be prioritised during contractor selection. The DBO consortium's knowledge and experience of how to appraise and manage the supply chain to meet GPP requirements is important. DBO contractors that are experienced in meeting environmental specifications may, for instance, have developed cost effective construction systems and energy services.

Renovations carried out as 'energy services'

A relatively new form of design, build and operate contract that is attracting increasing interest is where renovations are carried out under a so-called Energy Performance Contract arrangement with a so-called Energy Services Company (ESCo). These third party ESCo's are invited to bid to provide a package of renovation works to reduce the energy consumption and/or CO_2 emissions of a building [6]. These works would tend to include physical measures such as new windows and insulation but could also include energy generation and supply technologies such as solar photovoltaics or biomass heating.

The works would be designed, installed and financed by the successful bidder on the basis of the energy savings that will be made by the building occupier over a medium to long-term time frame. The contracting authority would then contract to pay service charges calculated on the basis of the capital works carried out and the avoided energy costs.

1.2.4.2 Monitoring and reporting of progress on site

A number of GPP criteria require the contractor to monitor performance and report on progress as the build progresses. Site waste management, for example, requires ongoing data collection to determine how much waste has been recovered for re-use and/or recycling, before final reporting upon completion of the building. It is therefore important that requirements such as these are clearly communicated in the Invitation To Tender (ITT) and that agreement is reached on any interim monitoring as construction progresses.

1.2.5 Installation of energy services

The installation of mechanical and electrical services to supply power, heat and cooling to an office building can be procured in a number of different ways. These options are briefly discussed in this section.

1.2.5.1 Selecting energy service contractors

In many cases the design and installation of energy services to supply heating and cooling to the building will be integrated within the responsibilities of the design team and the construction contractor respectively. A separate procurement exercise is therefore not required.

There is, however, increasing public sector interest in the procurement of third party providers such as Energy Services Company (ESCo) under Energy Performance Contracting (EPC) arrangements [7]. In this case the design, installation and operation of renewable or high efficiency energy generating equipment to supply the building become the responsibility of a specialist contractor.

ESCo arrangements may be extended to include the financing of the energy supply equipment or even a complete package of renovation works to a building, financed by energy savings made by the building owner. The procurement of an ESCo to carry out renovation packages was briefly discussed in Section 1.2.4.1.

6 *See for example* Berlin Energy Agency, Germany, http://www.berliner-e-agentur.de/en/consulting-information/energy-saving-partnerships-berlin *and* RE:FIT, London, http://www.refit.org.uk/what-refit/

7 Under the International Federation of Consulting Engineers (FIDIC) this would be equivalent to a Silver Book contract.

Whilst this requires an additional procurement exercise, it creates an opportunity to invite the market to bring forward low or zero carbon emission solutions . The main potential advantages are lower upfront capital costs and the transfer of risk to the contractor. Examples of technologies that could be provided under this arrangement include cogeneration, district heating and cooling, biomass heating and solar photovoltaics.

1.2.5.2 The installation and commissioning of energy services

Experience internationally with the operation of low energy office buildings shows that innovative new forms of heating, cooling and ventilation systems can, if not designed, installed, commissioned and operated correctly, lead to higher than predicted energy use [8]. A GPP criterion has therefore been included that specifically addresses this issue. This criterion can be incorporated into the ITT for either the construction contractor or an energy services provider.

1.2.6 Practical completion and handover

1.2.6.1 The building manual and handover training

The building manual should be completed as part of the handover process. An upgrading plan to maintain, for example, high levels of energy efficiency during the service life of the building may also form part of a DBO contract. If a Building Energy Management System and other forms of intelligent control systems such as for lighting are specified, training on how they work, supplemented by information in the building manual, should be provided by the contractor and/or their design team.

1.2.6.2 Testing of the building fabric

Achieving an air tight and contiguous building fabric is a critical step in seeking to reduce heating and cooling demands. Experience in Europe with low energy office buildings suggests that this requires careful detailing by the architect and quality control on the construction site [9]. Designers and contractors can potentially be selected based on their track record as evidenced by performance data and surveys of completed buildings.

Prefabricated building systems are also a demonstrated means of ensuring quality and precision [10]. They can also bring additional environmental benefits such as, for example, reductions in factory and site waste.

The GPP criteria may therefore include technical specifications for testing the integrity of the building fabric using thermal imaging and air pressure tests. These requirements can be incorporated into the ITT for the construction contractor.

1.2.7 Facilities management

1.2.7.1 The role of the facilities manager

The ongoing management and maintenance of the office building may be carried out by the public authority or may be let as a separate contract to a specialist company. This would tend to include the operation of energy, water and waste management systems. The relevant GPP requirements should therefore be incorporated into the ITT.

8 IEA (2004) *Commissioning tools for improved energy performance*, ECBCS Annex 40 project, http://www.iea-ebc.org/projects/completed-projects/ebc-annex-40/

9 See for example Hannover *quality control scheme*, EU Concerto project, http://www.concerto-act2.eu/fichier/t_download/51/download_fichier_en_quality.assurance_en_130322.ds_act2.pdf

10 WRAP, *Current practices and future potential in modern methods of construction*, Final report, UK, January 2007

1.2.7.2 Incentivising energy management

In Design, Build and Operate arrangements, the role of facilities manager is assumed by the contractor over a 20-30 year time frame. GPP contract performance criteria relating to the management of energy, water and waste should therefore be incorporated into the main contract with the DBO operator. These criteria also propose incentives and penalty clauses.

1.2.8 Post Occupancy Evaluation

1.2.8.1 Learning lessons from the project

The implementation of new specifications to improve the environmental performance of a building is often a learning process for design teams. Studies in a number of countries have shown that there can be significant value in diagnosing and sharing the lessons from what worked and what did not on building projects [11]. This is often termed a Post Occupancy Evaluation (POE).

A POE is generally carried out a minimum of one year after the building has been fully occupied. It tends to focus on the functional and technical performance of the building, as well as the management process. A POE generally consists of:

- Data collection to compare design and actual performance;
- Interviews with occupiers to evaluate their experience of using the building and aspects of the design and specification;
- Interviews with the design team to evaluate project performance as a whole, with a focus on the integration of environmental performance specifications.

Best practice would be for a POE to be carried out by a third party, which could be a University or specialist consultancy, and using a standardised methodology such as BUS (Building User Survey) [12].

The value of carrying out a POE is potentially two-fold. In the short-term, it can help optimising the performance of a building and identifying any remedial measures. In the medium-term, the learning can be used to make improvements to the design, specification, management and procurement processes on future projects. This is particularly important for the public sector where this learning can be carried forward to subsequent capital projects in order to obtain better value and performance.

11 See for example EnOB, *Research for energy optimised building*, Germany http://www.enob.info/en/analysis/analysis/details/workplace-satisfaction-and-comfort/

12 BUS methodology, http://www.busmethodology.org.uk/