Ene 04 Energy-optimised design

(All buildings)

Aim

To encourage analysis-driven optimisation of building design and systems, supporting reduced energy demand, lower climate impact and cost-effective performance over time.

Overview

Assessment type	Credits available	Applicable assessment criteria
Fully fitted	5	All (see ref 2.0)
Shell and core	5	All (see ref 2.0)
Shell only	3	1-6 (see ref 2.0)
Residential: Fully fitted	5	All (see ref 2.0)
Residential: Partially fitted	5	All (see ref 2.0)
EU taxonomy	-	None

Minimum standards

Rating level	Credits
-	None

Assessment type specific notes

Reference	Assessment type specific note
1.0	**Shell only** Optimisation of Technical installation systems (criterion 7 to 8) are not applicable for shell only buildings

Building type specific notes

Reference	Building type specific note
2.0	**Refurbishment** The Building form opimisation credit is not applicable to refurbishment projects, where no extensions, additional floor or changes to the building form or façade are included

Assessment criteria

This issue is split into three parts:

- Building form optimisation - one credit
- Building fabric optimisation - two credits
- Optimisation of technical installation systems - two credits

Building form optimisation – One credit

1 The project team carries out an analysis of the site and proposed development during the Concept Design stage to explore the effect of building form on energy demand and peak loads (see M1).

2 Demonstrate that the analysis has informed the building design and will lead to a reduction in building energy demand and peak loads for heating and cooling.

Building fabric optimisation – Two credits

Building fabric analysis – one credit

3 The project team carries out an analysis of the proposed development to explore the impact of alternative fabric specifications on the building's energy demand and peak loads for heating and cooling (see M2.1).

4 The analysis must consider each of the following:

4.a Thermal performance of the building fabric

4.b Window configuration (including daylight strategy)

4.c Calculated thermal bridges

4.d Thermal mass for heating and cooling storage

4.e Air tightness

Optimisation of building fabric – one credit

5 Achieve criterion 3 to 4.

6 The choice of building envelope must be based on the building fabric analysis as well as an analysis of the climate impact from heating and cooling demand, the climate impact of materials, and a life cycle cost (LCC) assessment, (see M2.2)

Optimisation of technical installation systems – Two credits

7 The project team carries out an analysis of the proposed development to explore the impact of alternative specifications of the building's technical installation systems on the building's energy demand and peak loads for heating and cooling (see M3.1).

8 The choice of technical installation systems must be based on an analysis of the building's technical installation systems, climate impact from energy use, climate impact of materials, and a life cycle cost (LCC) assessment, (see M3.2).

Checklists and tables

None

Methodology

M1: Building form optimisation

Building form analysis must be carried out at concept design stage, using appropriate early design stage energy modelling tools or calculation methods. This should be done by a Suitably qualified energy coordinator. It must be specific to the site location, weather and microclimate and should take account the expected building occupancy. The analysis must consider alternative design options that consider each of the following factors:

- Building layout
- Building orientation
- Building form
- Daylight strategy

Where site constraints mean that not all the points can be addressed, a suitably qualified energy coordinator must justify any exclusions.

It must be demonstrated how the building form analysis has influenced the building form to reduce energy demand and peak loads for space heating, space cooling, ventilation and lighting.

Where the building form analysis identifies no scope for reducing energy demand and peak loads , the credit cannot be awarded.

If the results of the building form analysis are compiled after concept design stage, the person that undertook the building form analysis must confirm that the outcome would not be different if the analysis had been carried out during the concept design stage.

M2: Building fabric optimisation

M2.1 Analysis of fabric performance

The analysis should consider the effect of different choices of construction, products and materials using energy modelling tools that take account of heat transfer characteristics, solar gains and the effect of thermal mass and other types of fabric thermal storage on heating and cooling.

The analysis should be an iterative process throughout the design stages.

Calculation of thermal bridges shall be carried out in accordance with SS-EN ISO 10211:2017. For early-stage assessments, SS-EN ISO 14683:2017 may be used. See also the SBUF report 'Avoid mistakes and pitfalls with thermal bridges'.

Where site constraints mean that some fabric performance considerations cannot be addressed, any exclusions must be clearly justified by a suitably qualified energy coordinator. Where none of the points can be addressed, the credit cannot be awarded.

M2.2: Optimising the building fabric

An evaluation of the building's energy demand and peak loads for heating and cooling, the climate impact of energy use, the climate impact of the building envelope, and the life cycle cost shall be carried out for different alternatives in accordance with the methodology in Man 02 and Mat 01.

Climate impact from heating and cooling demand, and materials shall be calculated using methodology for stage B6 in Mat 01.

The LCC analysis shall be performed using methodology presented in Man 02.

It shall be demonstrated, using appropriate examples from the design team, how the evaluation of energy demand, life cycle cost, climate impact in A1–A3, climate impact in B6, and any other critical value has been used for construction, product, and material choices in the building envelope.

M3: Optimisation of technical installation systems

M3.1 Analysis of alternative specifications of the building's technical installation systems

An analysis shall be carried out to reduce energy use and losses in the building's technical installation systems. The analysis shall include the following:

- Building technical installations that require electrical energy
- Ventilation systems
- Distribution systems for air, cooling, and heating
- Distribution losses, including DHW circulation losses

- Heat exchange within the building/site
- Supply systems for electricity, cooling, and heating

Building technical installations that require electrical energy shall be designed to limit power demand and ensure efficient energy use.

The design of distribution and circulation systems for air, heating, and cooling shall be analysed to achieve good indoor comfort, minimize energy and power demand, and reduce energy losses.

Insulation of pipes/ducts for distribution and circulation of heating and cooling shall be dimensioned according to the Industry Standard for Technical Insulation, Edition 2 (or later), published by the Swedish Association of Insulation Contractors.

Supply systems for electricity, heating, and cooling shall be selected considering local conditions and calculated power demand.

M3.2: Optimising the technical installation systems

An evaluation of the building's energy demand and peak loads, the climate impact of energy use, the climate impact from the technical installation systems, and the life cycle cost of these systems shall be carried out for different alternatives.

Energy demand and peak loads shall be calculated using one of the DSM software listed in Ene 01, and the modelling must be carried out by a suitably qualified energy cooridnator.

Climate impact from energy use, and materials shall be calculated using methodology for stage B6 in Mat 01.

The LCC analysis shall be performed using methodology presented in Man 02.

It shall be demonstrated, using appropriate examples from the design team, how the evaluation of energy demand, life cycle cost, climate impact in A1–A3, climate impact in B6, and any other critical value has been used for construction, product, and material choices in the building's technical installation systems.

Compliance notes

None

Evidence

Criteria	Interim design stage	Final post-construction stage
Building form optimisation		
1-2	A copy of the compliant building form analysis. Supporting documentary evidence to verify how it has influenced the final building form such as design drawings and specifications.	Final construction drawings or equivalent or assessor site inspection report and photographic evidence to show how the outcomes of building form analysis have been implemented within the final design.
Building fabric optimisation		
3-4	A copy of the analysis of building fabric.	An updated analysis reflecting any changs made.
6	Modelling results demonstrating the reduced energy demand for heating and cooling arising from the proposed fabric specification and, where relevant, that the fabric performance has been optimised as far as possible.	Final construction drawings or assessor site inspection report and photographic evidence to show how the outcomes of fabric performance analysis have been implemented within the final design.
Optimisation of Technical installation systems		
7	A copy of the analysis of technical installation systems.	An updated analysis reflecting any changes made
8	Modelling results demonstrating the reduced energy demand arising from the proposed technical installation systems.	Final construction drawings or assessor site inspection report and photographic evidence to show how the outcomes of technical installation systems analysis have been implemented within the final design.

Definitions

Suitably qualified energy coordinator

See definition in Ene 01

Additional information

None