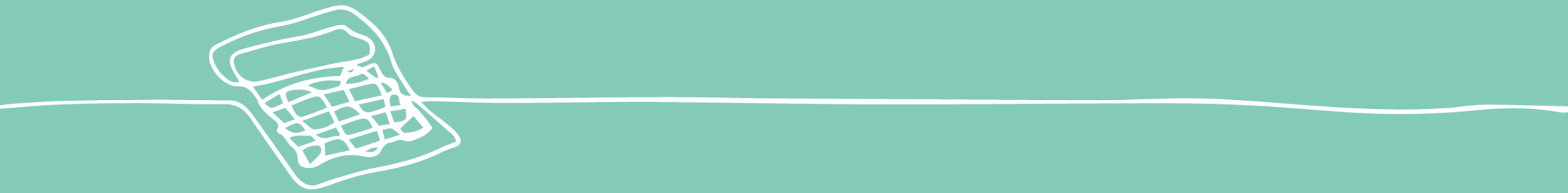

3. Submission guidance

Submission guidance for Places for Everyone policies JP-S2 and JP-S3

March 2025

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Etude

Levitt Bernstein
People.Design

Net Zero guidance – A suite of three guides

This document is part of a suite of three Net Zero guidance documents prepared by the Greater Manchester Combined Authority, Levitt Bernstein and Etude.

'Submission guidance' focuses on what to submit as part of a planning application to cover the energy and carbon statement element of a submission.

Although it can be read independently from the other documents, the reader may find it useful to refer to all three parts as they provide additional guidance.

Three key guidance documents:

1 Design guidance for Net Zero

Design considerations to meet policy JP-S2 and TANZ net zero standard, and linked to JP-S3.

- Definition of net zero
- Net zero operational carbon design 2
- Designing for low embodied carbon
- Case studies
- Signposts to industry guidance

2 Low carbon heat

Design considerations to meet policy JP-S3, linked to JP-S2.

- Heating systems for net zero 1
- Examples of low carbon heating solutions
- Heat network opportunity areas/zones
- How to assess heating systems
- Required justification for non-connection

3 Submission guidance

Planning submission guidance influenced by JP-S2, JP-S3 and linked to TANZ.

- Submission requirements – Energy and Carbon Proforma and Energy and Carbon Statements
- Content of energy and carbon statements 1 2
- Calculations and results guidance
- Approved compliance routes

Energy and Carbon Proforma

Contents

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Interactive navigation

To move through this guide with ease, use the interactive buttons in the top right hand corner of each page. A return to contents button is also available should you lose your way.

Explainer

Guidance context

The *Submission Guidance* is the third of a set of three documents:

1. Design guidance for net zero
2. Low carbon heat
3. Submission guidance

The purpose of this guidance

The purpose of the *Submission Guidance is to* set out planning submission and calculation guidance for new build planning applications of varying scales, sectors and types. This guide sets out the metrics and targets to be met, explains how and when to use the 'Energy and Carbon Proforma' and what information to include in 'Energy and Carbon Statements'. It also explains the type of energy modelling expected for the various application types.

Links to other documents

Pulling together the calculations and outputs required for planning submissions is a process driven exercise. However, meeting the required energy and carbon targets relies on buildings being designed that way for the outset and the guidance on low carbon heat being followed. See guidance on designing for net zero 1 and low carbon heat 2 for more information.

Who this guidance is aimed at

This guide is aimed at applicants to provide clarity on planning submission requirements of varying scales, sectors and types. related to energy and carbon in buildings.

How this guidance relates to GMCA policies

The *Submission Guidance* focuses on meeting the expectations and intent of policy JP-S2 sections (2) and (5), JP-S3 section (2) as well as linking to Truly Affordable Net Zero (TANZ) requirements.

For further information on Low Carbon Heat Appraisals refer to document 2

Policies covered by the suite of documents:

JP-S2 – Carbon and Energy

- (2) Use of lifecycle carbon tools
- (5) Net zero operational carbon – meeting set targets and following the energy hierarchy:
  - Minimise energy demand;
  - Maximise energy efficiency;
  - Use renewable energy;
  - Use low carbon energy; and
  - Utilise other energy sources.

JP-S3 – Low Carbon Heat

- (2) Expectation for connection in the 'Heat and Energy Network Opportunity Areas'

Truly Affordable Net Zero (TANZ)

- Link the requirements of TANZ with planning policy

1

A better understanding of energy and carbon through the planning submission

Submitting more accurate energy and carbon data

To ensure transparency and delivery against the intent of policy, applicants should submit the relevant predictive energy and carbon data together with an explanation of how development has achieved the level of performance stated.

To do this applicants are asked to complete and produce the following to demonstrate alignment with policy:

Energy and Carbon Proforma

A summary tool for applicants to complete and submit as part of outline and full planning applications. Planning officers will review the proforma and assess compliance with policy. This Excel tool is available to download and complete for residential and non-residential developments of varying scales. The data entered into the Energy and Carbon Proforma is expected to be backed by the relevant calculations, with further detail included in the Energy and Carbon Statement.

Energy and Carbon Statement

An Energy and Carbon Statement describes how a development meets the energy and carbon policies. Depending on the size of development it can be a short description as part of the design and access statement, through to a 20+ page report with appendices containing supplementary reports (overheating, embodied carbon and low carbon heat appraisal).

The statement is an opportunity to communicate how the proposed sustainability design strategies deliver an energy efficient development with reference to planning policy.

The descriptive elements of the statement are backed by relevant calculations.

The scale of the planning submission is expected to be proportionate to the scale of the development. Submission requirements vary depending on the stage/type of application (pre-app, outline planning application or full/reserved matters application), and by sector.

Submission expectations based on stage/type of application:

Pre-app – see also pre-application requirements

The development is at concept stage, massing and site layout is forming, the scale and type of development is firming up and early design concepts are developing. Expectations:

- Policy and supporting guidance should be discussed to ensure a common understanding of the energy and carbon requirements and future submission expectations.
- There will be an expectation that development will follow the energy hierarchy and go on to meet the relevant energy and carbon targets, with completion and submission of the Energy and Carbon Proforma and Energy and Carbon Statement as part of the outline and/or full or reserved matters application, unless otherwise agreed.

Outline submission – see also outline planning application requirements

The development will be partially designed with use classes defined, and indicative massing and layout set. Expectations:

- The energy and carbon expectations of a full planning application should be understood by the applicant, with commitments made to meet each of the targets relevant to the scale and type of development. Net zero design guidance 1 should have informed the layout and massing of the development. Some early sample energy and carbon calculations may have been carried out, but are not essential.
- There will be an expectation that development will follow the energy hierarchy and go on to meet the relevant energy and carbon targets, with completion and submission of the Energy and Carbon Proforma and Energy and Carbon Statement as part of the outline and reserved matters application, unless otherwise agreed.

Full / reserved matters submission – see also section 3

The development design has reached RIBA Stage 2-3. Expectations:

- The energy and carbon expectations and targets are met and demonstrated through the submission of an 'Energy and carbon proforma' and 'Energy and carbon statement'. Net zero design guidance 1 should have informed the design of the development. An appraisal of low carbon heat 2 should have been carried out (where relevant).
- Where expected the applicant should demonstrate that predictive energy calculations have been carried out.

Predicting energy and carbon and delivering outcomes through improved modelling

The Climate Change Committee's *UK Housing: Fit for the Future?* advises that urgent changes are needed to close the performance gap between design and as built. Recognising that Net Zero Carbon will only truly be achieved when the predictions of energy consumption in buildings more closely match the delivered outcomes.

Places for Everyone also has an expectation that new development will be Net Zero Carbon by taking into account total emissions (regulated and unregulated) from 2025 and to 'all emissions' from 2028. To achieve this aim, development must show ambition through design and construction and become more accurate and transparent in calculating and reporting expected performance. The current way of achieving this (by use of building regulation models) has so far failed to deliver.

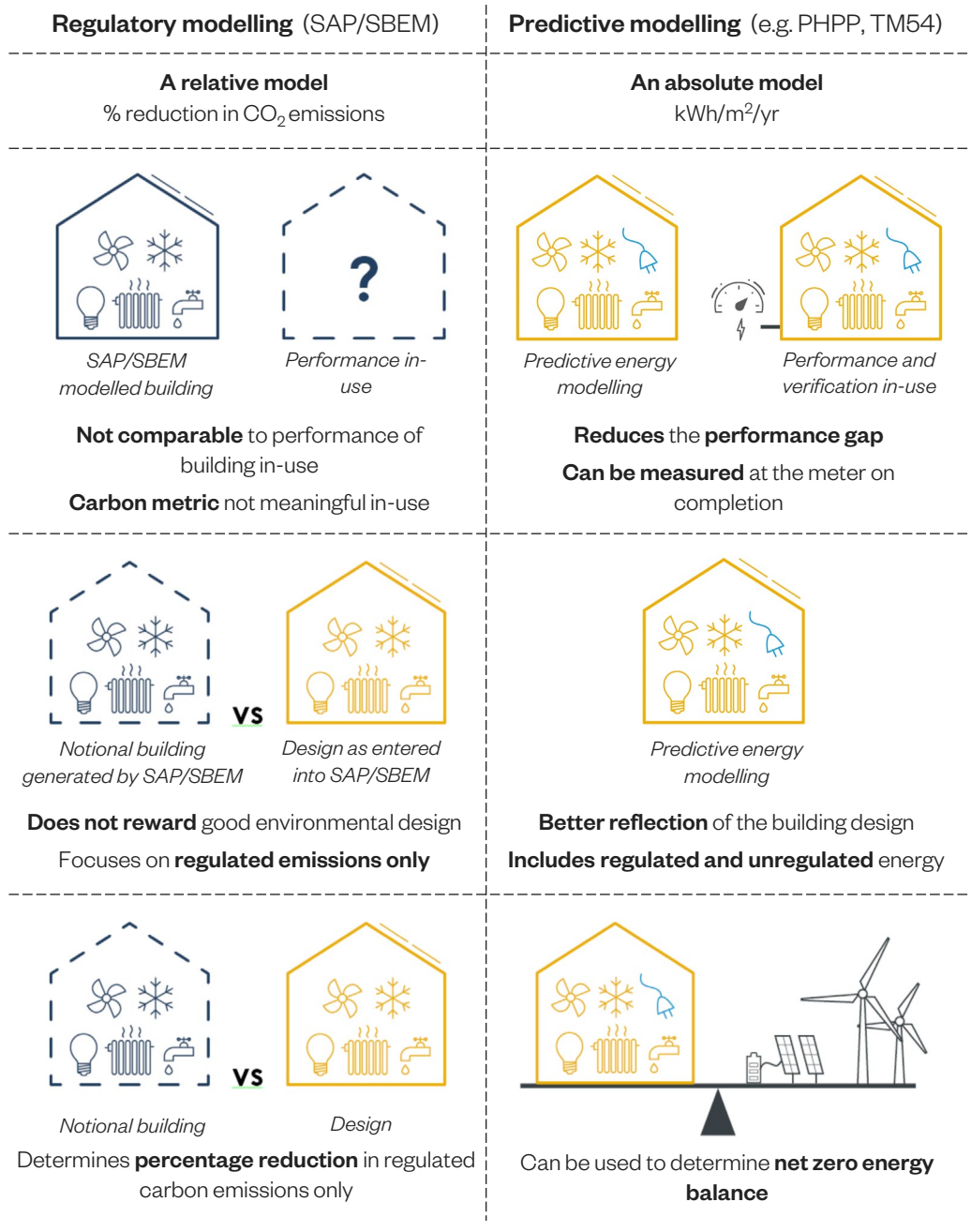
Predictive modelling is needed to better predict energy use

Building regulation tools such as the Standard Assessment Procedure (SAP) and Simplified Building Energy Model (SBEM) are frequently used to determine carbon reductions for building regulations compliance purposes and as a demonstration of performance for planning applications. However, it is widely understood by industry that SAP and SBEM were not designed to be accurate predictions of energy use and therefore, are not fit for use in designing net zero buildings. For this reason their use is best kept for building regulation compliance only.

To achieve Net Zero Carbon now and in the future, the built environment industry must move to the use of predictive energy modelling (e.g. Passivhaus Planning Package (PHPP), dynamic modelling using CIBSE TM54 methodology) that can assist in influencing the design and performance outcomes. Predictive modelling not only gives more accurate predictions of performance, but they can also better influence early design to ensure the thermal envelope and systems are better designed.

The future of regulatory calculations

The Future Homes Standard is set to introduce a new energy model for homes (Home Energy Model (HEM)) to replace SAP. However, until it is complete and introduced there remains a gap that only predictive modelling can fill. This is a challenge that needs to be addressed through more thorough planning application submissions.



Source: LETI

Submission requirements for scale and type of submission

Scale of planning submission proportionate to the scale of development

The energy and carbon submission requirements relate to the scale and type of development. As a consequence the scale of the planning submission is expected to be proportionate to the scale of the new development.

Development types covered

The submission requirements are tailored for residential and non-residential developments. The residential and non-residential definitions for the purpose of PfE energy and carbon assessments typically refers to the following use classes:

- **Residential:** dwellings (C3&C4), student accommodation and residential care (C2)
- **Non residential:** offices and industrial (E(g)), hotels (C1), retail (E(a)), schools (F1)

The submission requirements are also tailored by scale as follows:

- **Small minor:** extra large (XL) extensions (≥100m^2) and 1 home OR <100m^2 non-residential
- **Minor:** 2-9 homes OR 100-999m^2 non-residential
- **Major:** 10-149 homes OR 1,000-4,999m^2 non-residential
- **Large major:** +150 homes OR 5,000m^2 non-residential

Sui generis use classes and **other use classes** and **scales** of development not listed above should provide an assessment against the most appropriate development type to the best of abilities. The most relevant Energy and Carbon Proforma(s) for scale and type of development should be completed.

For **mixed use** developments the relevant Energy and Carbon Proforma(s) should be completed to cover all uses within the development. Where multiple small minor non-residential units exist on a development they may be treated as small minor where they do not share the same external building envelope (e.g. multiple retail units <100m^2 on the same site not sharing the same external envelope can utilise the 'Small minor' Energy and Carbon Proforma). Small scale non-residential uses sharing the same building envelope should be classed for the purposes of the Proforma based on the total gross internal floor area (GIA) of the building (e.g. five 90m^2 units within the same building envelope will use the 'Minor' Proforma).

Further guidance on submission requirements for type and scale of development are set out in the in section 3 of this report.

Breakdown of development types and scales for the purpose of energy and carbon submissions:

	Minor development		Major development	
	Small minor	Minor	Major	Large major
Residential	Single home and extra large (XL) extensions	2-9 homes	10-149 homes	+150 homes
Non-residential	<100m^2	100-999m^2	1,000-4,999m^2	+5,000m^2

Energy and Carbon Proforma – explained *(1/1)*

What is the Energy and Carbon Proforma

The Energy and Carbon Proforma is a tool to summarise the energy and carbon performance of a project. It requires information to be completed on the themes listed in the Energy and Carbon Framework .

Why the Energy and Carbon Proforma is important

The energy and carbon proforma eases communication between applicants and planning officers, helping to determine if the full potential of a project from an energy and carbon perspective has been reached. If it has not, the proforma helps to easily identify where the development could be improved. Focusing on design solutions alleviates the financial pressure of costly solutions, encouraging the viability of developments without compromising in emissions.

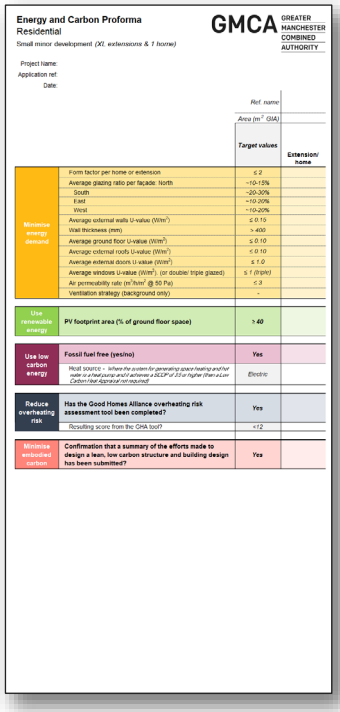
Content of the Energy and Carbon Proforma

There are six Energy and Carbon Proformas: three for residential developments and three for non-residential developments. The level of information required varies depending on type and size of development, but the overall structure remains the same, requiring data across the following themes:

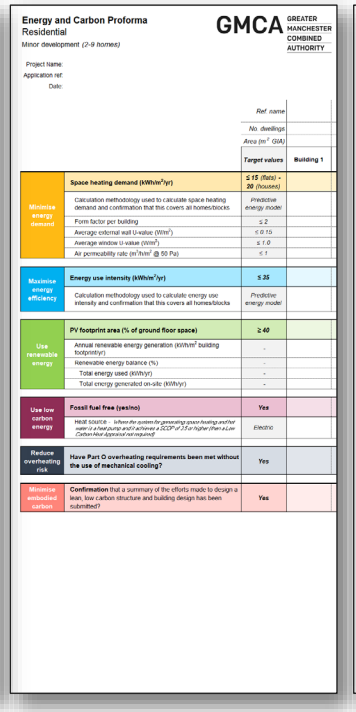
1. Minimise energy demand
2. Maximising energy efficiency (*omitted for small minor development)*
3. Use renewable energy
4. Use low carbon energy
5. Reduce overheating risk
6. Minimise embodied carbon
7. Offsets *(omitted for small minor development)*

Residential

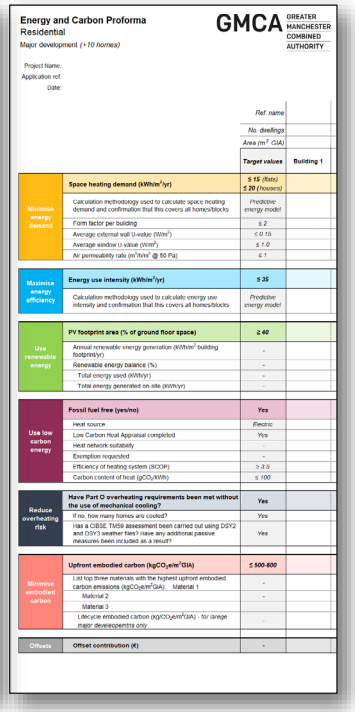
Small minor developments
Single home and XL extensions


Energy and Carbon Proforma
Residential
Small minor development (XL extensions & 1 home)
GMCA GREATER MANCHESTER COMBINED AUTHORITY

Minor developments
2-9 homes

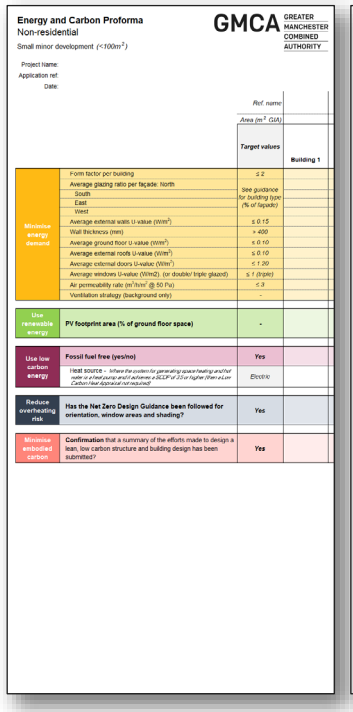

Energy and Carbon Proforma
Residential
Minor development (2-9 homes)
GMCA GREATER MANCHESTER COMBINED AUTHORITY

Major developments
+10 homes

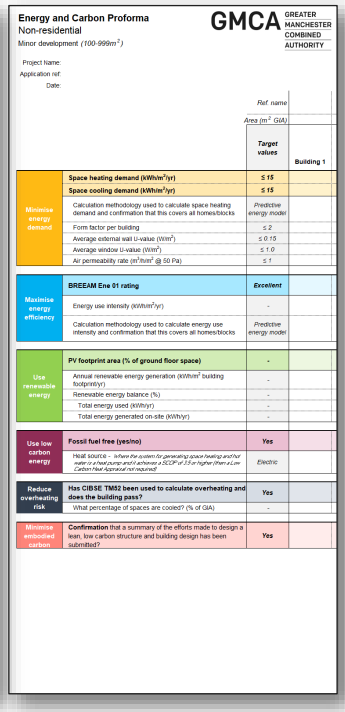

Energy and Carbon Proforma
Residential
Major development (+10 homes)
GMCA GREATER MANCHESTER COMBINED AUTHORITY

Non-residential

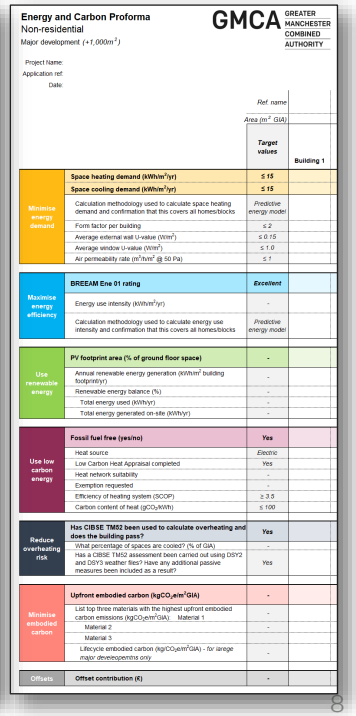
Small minor developments
<100m²


Energy and Carbon Proforma
Non-residential
Small minor development (<100m²)
GMCA GREATER MANCHESTER COMBINED AUTHORITY

Minor developments
100-999m²

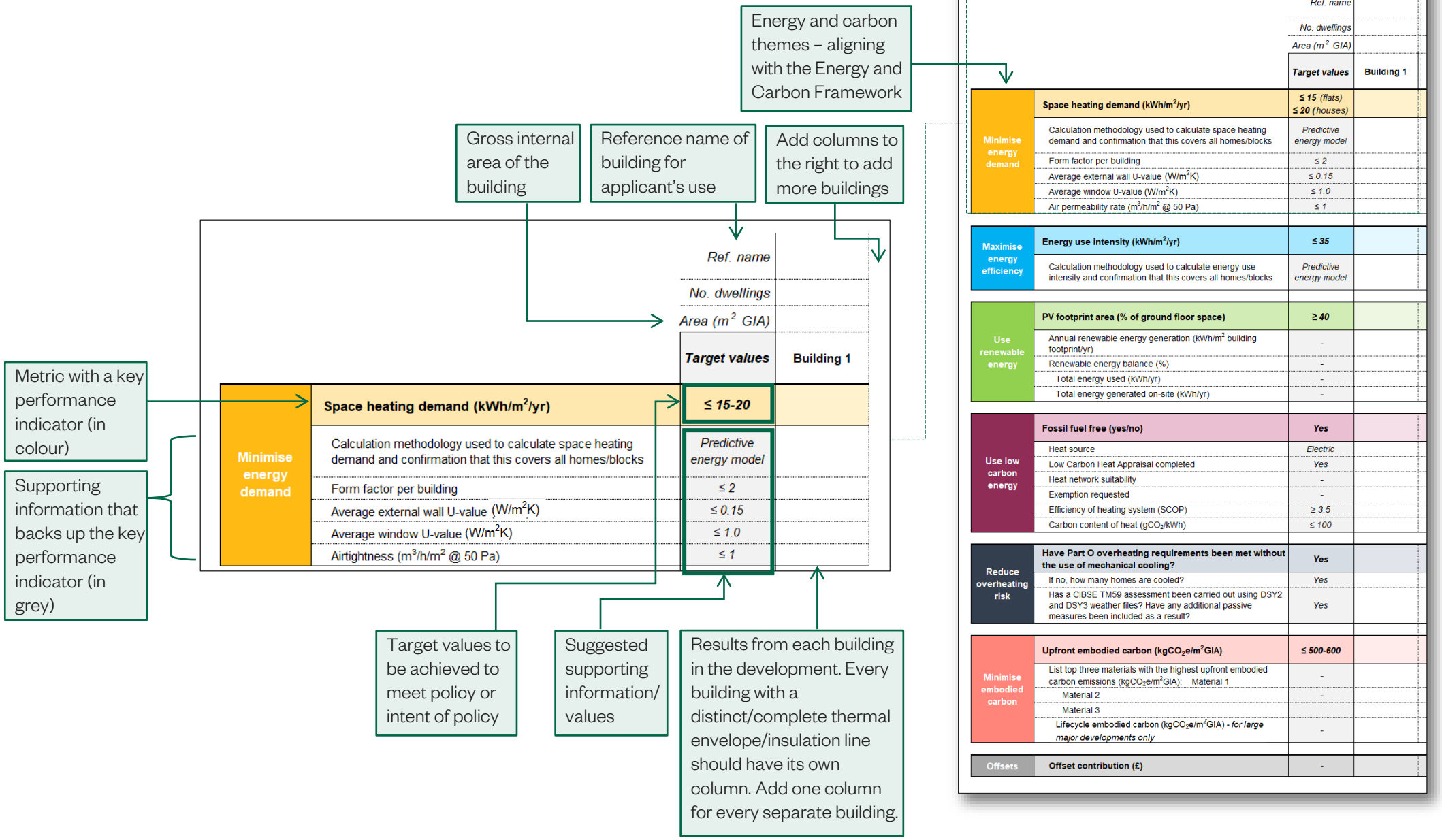

Energy and Carbon Proforma
Non-residential
Minor development (100-999m²)
GMCA GREATER MANCHESTER COMBINED AUTHORITY

Major developments
+1,000m²


Energy and Carbon Proforma
Non-residential
Major development (+1,000m²)
GMCA GREATER MANCHESTER COMBINED AUTHORITY

Energy and Carbon Proforma – explained *(2/2)*

This page explains how the Energy and Carbon Proforma is set out.



Energy and Carbon Proforma
Residential
Major development *(+10 homes)*

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Project Name:
Application ref:
Date:

		Ref. name	
		No. dwellings	
		Area (m² GIA)	
		Target values	**Building 1**
Minimise energy demand	**Space heating demand (kWh/m²/yr)**	**≤ 15** *(flats)* **≤ 20** *(houses)*	
	Calculation methodology used to calculate space heating demand and confirmation that this covers all homes/blocks	*Predictive energy model*	
	Form factor per building	≤ 2	
	Average external wall U-value (W/m²K)	≤ 0.15	
	Average window U-value (W/m²K)	≤ 1.0	
	Air permeability rate (m³/h/m² @ 50 Pa)	≤ 1	
Maximise energy efficiency	**Energy use intensity (kWh/m²/yr)**	**≤ 35**	
	Calculation methodology used to calculate energy use intensity and confirmation that this covers all homes/blocks	*Predictive energy model*	
Use renewable energy	**PV footprint area (% of ground floor space)**	**≥ 40**	
	Annual renewable energy generation (kWh/m² building footprint/yr)	-	
	Renewable energy balance (%)	-	
	Total energy used (kWh/yr)	-	
	Total energy generated on-site (kWh/yr)	-	
Use low carbon energy	**Fossil fuel free (yes/no)**	**Yes**	
	Heat source	*Electric*	
	Low Carbon Heat Appraisal completed	*Yes*	
	Heat network suitability	-	
	Exemption requested	-	
	Efficiency of heating system (SCOP)	≥ 3.5	
	Carbon content of heat (gCO_2/kWh)	≤ 100	
Reduce overheating risk	**Have Part O overheating requirements been met without the use of mechanical cooling?**	**Yes**	
	If no, how many homes are cooled?	*Yes*	
	Has a CIBSE TM59 assessment been carried out using DSY2 and DSY3 weather files? Have any additional passive measures been included as a result?	*Yes*	
Minimise embodied carbon	**Upfront embodied carbon ($kgCO_2e/m^2GIA$)**	**≤ 500-600**	
	List top three materials with the highest upfront embodied carbon emissions ($kgCO_2e/m^2GIA$): Material 1	-	
	Material 2	-	
	Material 3		
	Lifecycle embodied carbon ($kgCO_2e/m^2GIA$) - *for large major developments only*	-	
Offsets	**Offset contribution (£)**	**-**	

Energy and Carbon Statement - explained

What is the Energy and Carbon Statement

The Energy and Carbon Statement should be a concise summary of the key design features that affect the energy consumption and carbon emissions of the proposed building(s). It should describe how a development meets the Places for Everyone policies. Energy and carbon statements are an opportunity to communicate to the local planning authority how the proposed sustainability design strategies deliver an energy efficient building to meet the intent of planning policy. They also provide an opportunity to describe how energy and carbon savings have been implemented throughout the design of building fabric and systems.

Why energy and carbon statements are important

Energy and carbon statements provide transparency on the development's commitment to reduce environmental impact, stating the forecasted energy consumption and carbon emissions of a proposed building.

They are an essential tool used by Planning Officers to assess the suitability and compliance of the adopted design solutions against the local planning policies.

Content of an energy and carbon statement

Energy and carbon statements can vary in length and depth depending on the complexity and size of a development, however, the overall structure remains similar. Section 3 of this document provides a content guidance breakdown for energy statements depending on type and size of development. In general, statements should seek to be concise and clear, being specific to the local area and development with firm commitments made.

The suggested content has been structured in this guide and is designed to work alongside the 'Energy and Carbon Proforma', to align with the energy hierarchy defined in the *Places for Everyone Joint Development Plan.* Energy and carbon statements should be specific to the development and avoid generic pages or statements, therefore, being as clear and concise as possible.

When are Energy and Carbon Statements required

Small minor developments are not required to submit an Energy and Carbon Statement. Instead relevant information regarding the energy efficiency of the development can be included in the design and access statement.

Contents

Main headings in contents of an Energy and Carbon Statement

2

Energy and carbon requirements

Places for Everyone energy hierarchy

Energy Hierarchy

Places for Everyone defines the energy hierarchy in policy JP-S2 Carbon and Energy, section 5. It sets out the order of importance for reducing total operational energy.

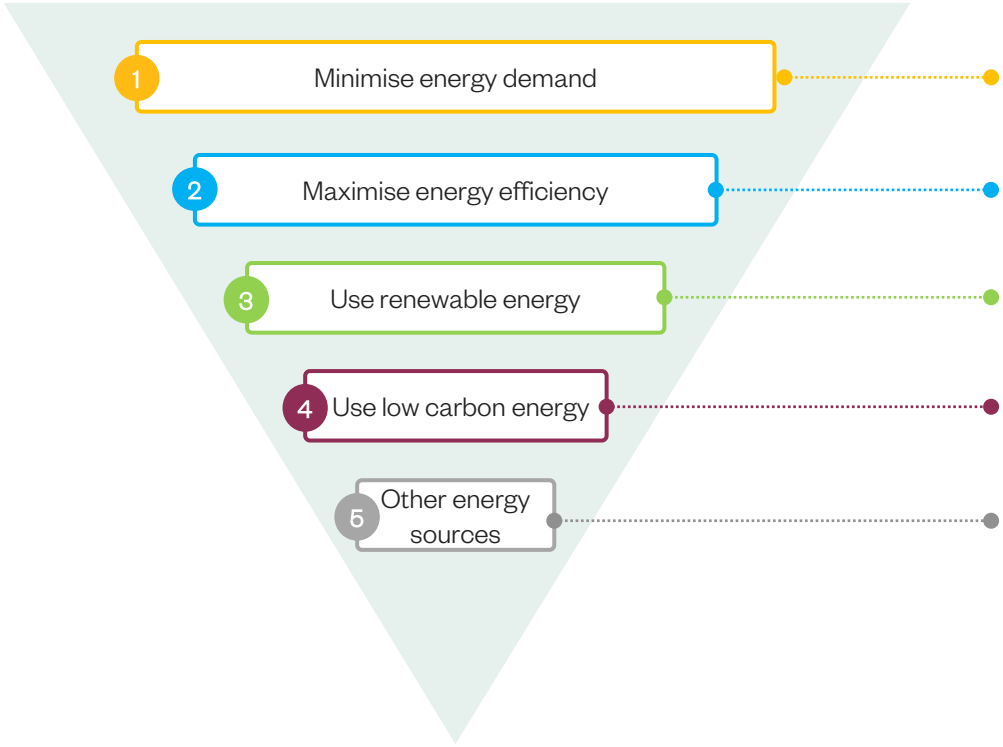
Links to the Energy and Carbon Framework

This energy hierarchy forms the basis for the Energy and Carbon Framework, which sets out the principles of a Net Zero Carbon building. The Energy and Carbon Framework is described on the following page.

Metrics and key performance indicators

Metrics and key performance indicators apply with each step of the hierarchy. Supplementary metrics have also been developed to cover all the principles of a Net Zero Carbon building. Compliance with these can be demonstrated through the submission of the Energy and Carbon Proforma.

Energy and Carbon Statements should also follow the order of the energy hierarchy.



Minimise energy demand - use less energy during operation, through design strategies such as energy efficient fabric and ventilation.

Maximise energy efficiency – consider the total operational energy use of buildings, and use energy efficiently through use of low carbon heating systems.

Use renewable energy - maximise opportunities for renewable energy, by generating, and using renewable energy on-site.

Use low carbon energy - maximise use of clean, low carbon energy, avoiding the use of fossil fuels.

Other energy sources - when all the above steps have been taken.

Energy and Carbon Framework

Principles of a Net Zero Carbon building:

1 Minimise energy demand

Space heating demand (kWh/m$^2_{GIA}$/yr)

The building must achieve the space heating demand limits through energy efficient fabric and ventilation.

2 Maximise energy efficiency

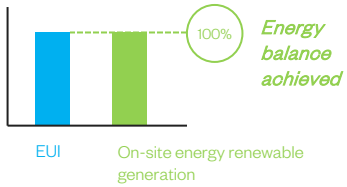
Energy Use Intensity (EUI) (kWh/m^{2}GIA/yr)

The building should meet the total energy use (regulated and unregulated), through low carbon and energy efficient heating systems. TANZ homes must meet an EUI limit.

3 Use renewable energy

PV footprint area (%)

The building should seek to maximise the generation of on-site renewable energy . There should be a balance between predicted annual energy use and annual renewable energy generation.



4 Use low carbon energy

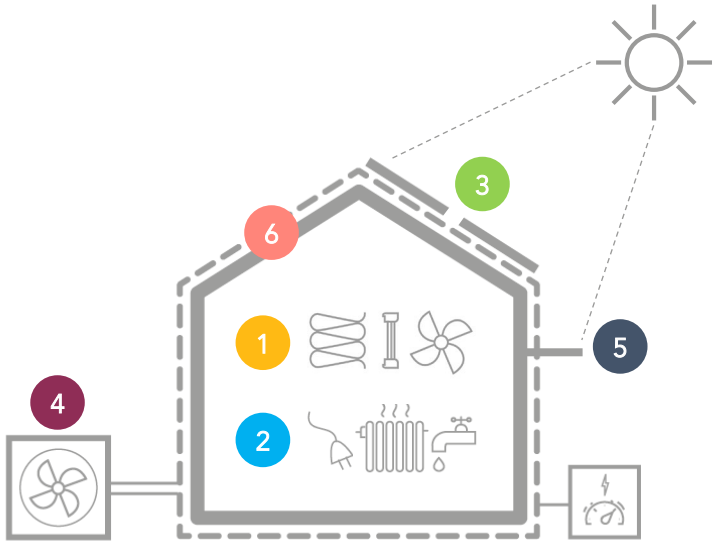
Fossil fuel free (yes/ no)

The building must not connect to the gas network or, more generally, use fossil fuels through a heat network. Low carbon heating systems must be installed.

5 Reduce overheating risk

Risk assessment/ full overheating assessment (pass/fail)

The building must assess the risk of overheating and minimise it through window design and shading strategies. Mechanical cooling in residential developments should only be installed when justified.



6 Minimise embodied carbon

Upfront embodied carbon (kgCO_2e/m^{2}GIA)

Embodied carbon should be minimised through efficient design and low carbon material selection. The building should meet the upfront embodied carbon benchmarks and the highest carbon materials used should be reported.

7 Offsets

Financial offset contribution

Following the implementation of steps 1 -6, financial contributions are the last step to offset the remaining emissions/energy. The decision to include offsetting will be determined by each local authority in Greater Manchester, with options for offsetting currently under development.

Residential - Metrics and key performance indicators

The table below lists the preferred and expected metrics and key performance indicators for residential development. When completing the Energy and Carbon Proforma these targets should be aimed for. Planning Officers will be assessing the development against these and will expect robust justification where they have not been met.

** extra large (XL) extensions (≥100m²)*

	Minor development		Major development	
	Small minor Single home and XL extensions*	**Minor** 2-9 homes	**Major** 10-149 homes	**Large major** +150 homes
Space heating demand (kWh/m²$_{GIA}$/yr) *Minimise energy demand*	Specs – Space heating demand *No requirement to meet the space heating demand - Specifications to be submitted as part of the proforma*	≤ 20 kWh/m².yr – Space heating demand - HOUSES ≤ 15 kWh/m².yr – Space heating demand - FLATS	≤ 20 kWh/m².yr – Space heating demand - HOUSES ≤ 15 kWh/m².yr – Space heating demand - FLATS	
Energy Use Intensity (EUI) (kWh/m2GIA/yr) *Maximise energy efficiency*	*Not applicable* *(35kWh/m²/yr for all TANZ homes)*	≤ 35 kWh/m².yr – Energy use intensity *Requirement for all TANZ homes*	≤ 35 kWh/m².yr – Energy use intensity *Requirement for all TANZ homes*	
PV footprint area (% of ground floor space) *Use renewable energy*	≥ 40 % fp – PVs installed	≥ 40 % fp – PVs installed	≥ 40 % fp – PVs installed	
Fossil fuel free (yes/ no) *Use low carbon energy*	Yes – Fossil fuel free	Yes – Fossil fuel free	Yes – Fossil fuel free	
Building regulations Part O met without mechanical cooling (yes/no) *Reduce overheating risk*	GHA – Overheating risk assessment tool	Yes – Cooling avoided	Yes – Cooling avoided	
Upfront embodied carbon (kgCO$_2$e/m²$_{GIA}$) *Minimise embodied carbon*	Summary of efforts – Upfront embodied carbon	Summary of efforts – Upfront embodied carbon	≤500 kgCO$_2$/m² – Upfront embodied carbon - HOUSES ≤600 kgCO$_2$/m² – Upfront embodied carbon - FLATS	
Operational carbon offset contribution (£) *Offsets*	*Not applicable*	*Not applicable*	£ – Offsets *Options for offsetting currently under development and to be adopted by each local authority.*	

Residential – Modelling expectations

The table below shows the expectation from applicants for the level of energy modelling to be carried out as part of a full or reserved matters application for each Energy and Carbon Framework theme. Predictive modelling (e.g. Passivhaus Planning Package (PHPP), dynamic modelling using CIBSE TM54 methodology) not only gives more accurate predictions of performance, but can also better influence early design to ensure the thermal envelope and systems are better designed.

** extra large (XL) extensions (≥100m²)*

	Minor development		Major development	
	Small minor Single home and XL extensions*	**Minor** 2-9 homes	**Major** 10-149 homes	**Large major** +150 homes
Minimise energy demand	No modelling expected	Predictive modelling recommended	Predictive modelling expected	
Maximise energy efficiency	No modelling expected	Predictive modelling recommended	Predictive modelling expected	
Use renewable energy	No modelling required	Predictive modelling recommended	Predictive modelling expected	
Use low carbon energy	Where a heat pump is specified – no low carbon heat appraisal is expected. Otherwise low carbon heat appraisal is expected		Full low carbon heat appraisal expected	Enhanced low carbon heat appraisal expected
Overheating	No modelling expected	Compliance modelling recommended	Overheating modelling expected	
Embodied carbon and materials	No modelling expected		Upfront embodied carbon modelling expected	Upfront and life cycle embodied carbon modelling expected
Offsets	No offset expected		Operational offsets calculated	

Non-residential - Metrics and key performance indicators

The table below lists the preferred and expected metrics and key performance indicators for non-residential development. When completing the Energy and Carbon Proforma these targets should be aimed for. Planning Officers will be assessing the development against these and will expect robust justification where they have not been met.

	Minor development		Major development	
	Small minor <100m^2	**Minor** 100-999m^2	**Major** 1,000-4,999m^2	**Large major** +5,000m^2
Space heating and cooling demand (kWh/m$^2_{GIA}$/yr) *Minimise energy demand*	Specs – Space heating demand: *No requirement to meet the space heating demand - Specifications to be submitted as part of the proforma*	≤ 15 kWh/m^2.yr – Space heating demand	≤ 15 kWh/m^2.yr – Space heating demand	
Energy Use Intensity (EUI) (kWh/m2GIA/yr) *Maximise energy efficiency*	*Not applicable*	kWh/m^2.yr – Energy use intensity; Excellent – BREEAM Ene 01; *Outstanding from 2028*	kWh/m^2.yr – Energy use intensity; Excellent – BREEAM Ene 01; *Outstanding from 2028*	
PV footprint area (% of ground floor footprint (fp)) *Use renewable energy*	% fp – PVs installed	% fp – PVs installed	% fp – PVs installed	
Fossil fuel free (yes/ no) *Use low carbon energy*	Yes – Fossil fuel free	Yes – Fossil fuel free	Yes – Fossil fuel free	
TM52 met and passed (yes/no) *Reduce overheating risk*	*Not applicable*	Yes – CIBSE TM52 pass	Yes – CIBSE TM52 pass	
Upfront embodied carbon (kgCO$_2$e/m$^2_{GIA}$) *Minimise embodied carbon*	Summary of efforts – Upfront embodied carbon	Summary of efforts – Upfront embodied carbon	kg/CO$_2$e – Upfront embodied carbon	
Operational carbon offset contribution (£) *Offsets*	*Not applicable*	*Not applicable*	£ – Offsets: *Options for offsetting currently under development and to be adopted by each local authority.*	

Non-residential - Modelling expectations

The table below shows the expectation from applicants for the level of energy modelling to be carried out as part of a full or reserved matters application for each Energy and Carbon Framework theme. Predictive modelling (e.g. Passivhaus Planning Package (PHPP), dynamic modelling using CIBSE TM54 methodology) not only gives more accurate predictions of performance, but can also better influence early design to ensure the thermal envelope and systems are better designed.

	Minor development		Major development	
	Small minor <100m^2	**Minor** 100-999m^2	**Major** 1,000-4,999m^2	**Large major** +5,000m^2
Minimise energy demand	No modelling expected	Predictive modelling recommended	Predictive modelling expected	
Maximise energy efficiency	No modelling expected	Predictive modelling recommended	Predictive modelling expected	
Use renewable energy	No modelling required	Predictive modelling recommended	Predictive modelling expected	
Use low carbon energy	Where a heat pump is specified – no low carbon heat appraisal is expected, otherwise low carbon heat appraisal expected		Full low carbon heat appraisal expected	Enhanced low carbon heat appraisal expected
Overheating	No modelling expected	Overheating modelling recommended	Overheating modelling expected	
Embodied carbon and materials	No modelling expected		Upfront embodied carbon modelling expected	Upfront and life cycle embodied carbon modelling expected
Offsets	No offset expected		Operational offsets calculated	

3

Specific submission requirements for scale of development

Introduction to submission requirements

This section provides guidance for applicants on the submission expectations for full or reserved matters planning applications of different types and scales of development.

Submissions that are proportional to the scale of development

The submission requirements are designed to be proportionate to the scale of development, these are split over three categories.

1. **Small minor** - Extra large (XL) residential extensions* and 1 home and/or less than 100m^2 of non-residential development
2. **Minor** - 2-9 homes and/or developments of 100-999m^2 of non-residential development
3. **Major and large major** - More than 10 homes and/or developments of more than 1,000m^2 of non-residential development**

** An extension qualifies as 'extra large' for the purpose of this guidance document when it is adding more than 100m^2 of gross internal floor area.*

*** The submission requirements for major and large major applications are very similar with only a couple of additional assessments to undertake for large major applications. Therefore, for simplicity they are shown under the same category.*

Guidance on submission

The following sub-sections provide guidance on what should be submitted by the applicant:

3.1 – Small minor development

3.2 – Minor development

3.3 – Major and large major

For each sub-section, guidance is given on how to complete the Energy and Carbon Proforma and level of content required to satisfy the Energy and Carbon Statement requirements.

Additional information by energy and carbon theme

Section 4.0 provides additional technical information on a theme by theme basis. This is particularly aimed at major applications, but can be useful to all.

Breakdown of development types and scales for the purpose of energy and carbon submissions:

	Minor development		Major development	
	Small minor	Minor	Major	Large major
Residential	Single homes and extra large (XL) extensions	2-9 homes	10-149 homes	+150 homes
Non-residential	<100m^2	100-999m^2	1,000-4,999m^2	+5,000m^2

Corresponding Energy and Carbon Proforma applicable to the type and scale of development:

	Minor development		Major development	
	Small minor	Minor	Major	Large major
Residential	*Residential* Small minor Proforma	*Residential* Minor Proforma	*Residential* Major Proforma	
Non-residential	*Non-residential* Small minor Proforma	*Non-residential* Minor Proforma	*Non-residential* Major Proforma	

Requirements for Energy and Carbon Statements applicable to the type and scale of development:

	Minor development		Major development	
	Small minor	Minor	Major	Large major
Residential	Design and Access Statement	Energy and Carbon Statement		
Non-residential	Design and Access Statement	Energy and Carbon Statement		

3.1

Small minor developments

Residential

Extra large (XL) extensions or single homes

Non-residential

Less than 100 sqm

Small minor applications - Energy and Carbon Proforma *(1/2)*

For this type of development, a full Energy and Carbon Statement is not required. Instead, the relevant Energy and Carbon Proforma should be submitted and any relevant design information should be included in a design and access statement (if applicable). The Proforma is designed to be quick to complete it and does not require specialist skills.

- For applications made for large extensions to homes and single houses, a full energy and carbon statement is not required, however, the '**Resi – XL extensions + 1 home**' Energy and Carbon Proforma must be completed.
- For applications for non residential developments with a GIA of less than 100m^2, a full energy and carbon statement is not required, however, the '**Non-Resi < 100m^2**' Energy and Carbon Proforma must be completed.
- The applicant should submit the Proforma with the planning application.

For policy compliance applicants are expected to demonstrate performance by meeting a minimum specification for building fabric and systems as listed in the Proforma (target values). Although predictive energy modelling is not expected for small minor developments, it can still be a useful tool to inform sustainable design.

Tips on completion:

- For extra large (XL) extensions (>100m^2) the applicant should complete the proforma for the extension part of the dwelling only.
- Refer to 'Net Zero Design Guidance' document 1 for guidance on how to calculate the form factor and reduce embodied carbon and reduce overheating risk.
- The applicant should state if using a heat pump for both heating and hot water if the system efficiency will be better than 350%. If a different system is proposed, or a heat pump with a lower efficiency, a low carbon heat appraisal is required. Refer to 'Low Carbon Heat' document 2 for further guidance.

Energy and Carbon Proforma
Residential
Small minor development *(XL extensions & 1 home)*

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Project Name:
Application ref:
Date:

		Ref. name	Alpha house
		Area (m^2 GIA)	90
		Target values	**Extension/ home**
Minimise energy demand	Form factor per home or extension	*≤ 2*	1.9
	Average glazing ratio per façade: North	*~10-15%*	15%
	South	*~20-30%*	5%
	East	*~10-20%*	30%
	West	*~10-20%*	30%
	Average external walls U-value (W/m^{2}K)	*≤ 0.15*	0.14
	Wall thickness (mm)	*> 400*	475
	Average ground floor U-value (W/m^{2}K)	*≤ 0.10*	0.1
	Average external roofs U-value (W/m^{2}K)	*≤ 0.10*	0.1
	Average external doors U-value (W/m^{2}K)	*≤ 1.0*	1.0
	Average windows U-value (W/m^{2}K)(or double/ triple glazed)	*≤ 1 (triple)*	1.0
	Air permeability rate (m^3/h/m^2 @ 50 Pa)	*≤ 3*	3.0
	Ventilation strategy (background only)	-	MVHR
Use renewable energy	**PV footprint area (% of ground floor space)**	***≥ 40***	44
Use low carbon energy	**Fossil fuel free (yes/no)**	***Yes***	Yes
	Heat source - *Where the system for generating space heating and hot water is a heat pump and it achieves a SCOP of 3.5 or higher (then a Low Carbon Heat Appraisal not required)*	*Electric*	Gas
Reduce overheating risk	**Has the Good Homes Alliance overheating risk assessment tool been completed?**	***Yes***	Yes
	Resulting score from the GHA tool?	*<12*	15
Minimise embodied carbon	**Confirmation that a summary of the efforts made to design a lean, low carbon structure and building design has been submitted?**	***Yes***	Yes

An example of a completed 'small minor' Energy and Carbon Proforma (Resi – XL extensions + 1 home)

Small minor applications - Energy and Carbon Proforma *(2/2)*

The Energy and Carbon Proforma should be completed to include:

- **Building fabric:** targeted values relating to the building fabric, based on average U-values across new building elements.
- **Ventilation:** confirmation of the background ventilation system. Examples of background ventilation include intermittent extract fans in kitchens and bathrooms, continuous mechanical extract ventilation (MEV) and mechanical ventilation with heat recovery (MVHR).
- **Heating and hot water:** confirmation that the system does not use fossil fuels on site (e.g. gas) and that its seasonal coefficient of performance of the system will be at least 3.5.
- **Renewable energy generation:** the percentage of the building footprint covered by PV.
- **Overheating risk:** A statement to be included in the design and access statement on how the overheating risk has been minimised. The Good Homes Alliance overheating risk assessment tool should be completed for homes. For Non-residential buildings overheating risk should be reduced through environmental design (orientation, window areas, and shading).
- **Materials:** A short statement to be included in the design and access statement on how materials have been used efficiently and that low carbon materials have been selected where possible. This should include considerations such as reducing the quantities of high embodied carbon materials and using re-used and recycled materials.

It is possible for extensions and minor developments to be exemplar

There are many examples of completed extensions and minor developments that have achieved an exemplar level of performance. Some extension projects have even enabled the whole house to move away from fossil fuel heating by enabling the incorporation of a heat pump.

When determining a response to the application case officers will compare the values entered in to the Proforma with the 'target values' listed on the Proforma and the key performance indicators listed in section 2 of this document.

Energy and Carbon Proforma
Non-residential
Small minor development *(<100m²)*

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Project Name:
Application ref:
Date:

		Ref. name	Beta Warehouse
		Area (m² GIA)	80
		Target values	**Building 1**
Minimise energy demand	Form factor per building	*≤ 2*	2
	Average glazing ratio per façade: North	*See guidance for building type (% of façade)*	5%
	South		3%
	East		10%
	West		9%
	Average external walls U-value (W/m²K)	*≤ 0.15*	0.18
	Wall thickness (mm)	*> 400*	400
	Average ground floor U-value (W/m²K)	*≤ 0.10*	0.1
	Average external roofs U-value (W/m²K)	*≤ 0.10*	0.1
	Average external doors U-value (W/m²K)	*≤ 1.20*	1
	Average windows U-value (W/m²K) (or double/ triple glazed)	*≤ 1 (triple)*	1
	Air permeability rate (m³/h/m² @ 50 Pa)	*≤ 3*	2
	Ventilation strategy (background only)	-	N/A
Use renewable energy	**PV footprint area (% of ground floor space)**	-	60
Use low carbon energy	**Fossil fuel free (yes/no)**	***Yes***	Yes
	Heat source - *Where the system for generating space heating and hot water is a heat pump and it achieves a SCOP of 3.5 or higher (then a Low Carbon Heat Appraisal not required)*	*Electric*	Electric
Reduce overheating risk	**Has the Net Zero Design Guidance been followed for orientation, window areas and shading?**	***Yes***	Yes
Minimise embodied carbon	**Confirmation** that a summary of the efforts made to design a lean, low carbon structure and building design has been submitted?	***Yes***	Yes

An example of a completed 'small minor' Energy and Carbon Proforma (Non-Resi <100m²)

3.2

Minor developments

Residential
2-9 homes

Non-residential
100-999 sqm

Minor applications - Energy and Carbon Proforma

For this type of development, both the relevant Energy and Carbon Proforma and an Energy and Carbon Statement should be submitted. The appointment of a specialist to assist with the design and the submission of these documents is recommended.

- For applications for between 2 to 9 homes, the '**Resi – 2 – 9 homes**' Energy and Carbon Proforma must be completed and a short **Energy and Carbon Statement** is required,.
- For applications for non-residential developments with a GIA of 100m^2 to 999m^2, the '**Non-Resi – 100-999m^2**' Energy and Carbon Proforma must be completed and a short **Energy and Carbon Statement** is required,.
- The applicant should submit both the Energy and Carbon Proforma and Energy and Carbon Statement.

The use of predictive energy modelling is recommended when assessing the energy performance of the development to meet the key performance indicators.

Tips on completion:

- Building definition – 'Building 1' on the residential proforma refers to one complete block, or a pair of semi-detached homes, a complete terrace, etc.
- Every building with a distinct/complete thermal envelope/insulation line should have its own column. Add one column for every separate building.
- The applicant should state if using a heat pump for both heating and hot water if the system efficiency will be better than 350%. If a different system is proposed, or a heat pump with a lower efficiency, a low carbon heat appraisal is required. Refer to 'Low Carbon Heat' document 2 for further guidance.
- Confirm that *Residential developments* comply with the requirements of Building Regulations Part O assessment without the use of mechanical cooling and/or that *Non-residential developments* comply with a CIBSE TM52 assessment of overheating risk.

When determining a response to the application case officers will compare the values entered in to the Proforma with the 'target values' listed on the Proforma and the key performance indicators listed in section 2 of this document.

Energy and Carbon Proforma
Residential
Minor development *(2-9 homes)*

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Project Name:
Application ref:
Date:

		Ref. name	Grove House
		No. dwellings	4
		Area (m^2 GIA)	320
		Target values	**Building 1**
Minimise energy demand	**Space heating demand (kWh/m^2/yr)**	***≤ 15 (flats) - 20 (houses)***	**15**
	Calculation methodology used to calculate space heating demand and confirmation that this covers all homes/blocks	*Predictive energy model*	PHPP
	Form factor per building	*≤ 2*	2
	Average external wall U-value (W/m^{2}K)	*≤ 0.15*	0.14
	Average window U-value (W/m^{2}K)	*≤ 1.0*	0.9
	Air permeability rate (m^3/h/m^2 @ 50 Pa)	*≤ 1*	1
Maximise energy efficiency	**Energy use intensity (kWh/m^2/yr)**	***≤ 35***	**35**
	Calculation methodology used to calculate energy use intensity and confirmation that this covers all homes/blocks	*Predictive energy model*	PHPP
Use renewable energy	**PV footprint area (% of ground floor space)**	***≥ 40***	**45**
	Annual renewable energy generation (kWh/m^2 building footprint/yr)	-	60
	Renewable energy balance (%)	-	43
	Total energy used (kWh/yr)	-	11200
	Total energy generated on-site (kWh/yr)	-	4800
Use low carbon energy	**Fossil fuel free (yes/no)**	***Yes***	**Yes**
	Heat source - *Where the system for generating space heating and hot water is a heat pump and it achieves a SCOP of 3.5 or higher (then a Low Carbon Heat Appraisal not required)*	*Electric*	Electric
Reduce overheating risk	**Have Part O overheating requirements been met without the use of mechanical cooling?**	***Yes***	**Yes**
Minimise embodied carbon	**Confirmation** that a summary of the efforts made to design a lean, low carbon structure and building design has been submitted?	***Yes***	Yes

An example of a completed Energy and Carbon Proforma (Resi – 2-9 homes)

Minor applications - Energy and Carbon Statement

Required contents

All developments of 2-9 homes and/or 100-999m^2 GIA non-residential must submit an Energy and Carbon Statement as part of the planning application.

The statement must follow the contents listed opposite (both in order and detail) to enable the planning officer to assess the proposals. The order and structure follows that of the energy hierarchy set out in policy.

Expected level of detail

Beyond the structure and headings specified on this page, there are no specific submission requirements. However, the following guidelines should be followed:

- The report should be written in plain English.
- There is no requirement to repeat planning policy wording from Places for Everyone.
- General considerations about the topics covered should be avoided. Instead, specific design considerations and commitments for the development should be made clear.
- It is expected that most statements for this scale of development will be up to 10 pages long with additional details provided in Appendix if helpful.

Contents

3.3

Major and large major developments

Residential

10 homes and above

Non-residential

1,000 sqm and above

Major applications - Energy and Carbon Proforma

For larger developments, both the relevant Energy and Carbon Proforma and an Energy and Carbon Statement should be submitted. The appointment of a specialist to assist with the design and the submission of these documents is highly recommended for major applications.

- For applications for more than 10 homes, the '**Resi – + 10 homes**' Energy and Carbon Proforma must be completed and a full **Energy and Carbon Statement** submitted.
- For applications for non-residential developments with a GIA of more than 1000m^2, the '**Non-Resi - +1,000m^2**' Energy and Carbon Proforma must be completed and a full **Energy and Carbon Statement** submitted.
- The applicant should submit both the Energy and Carbon Proforma and Energy and Carbon Statement.

Predictive energy modelling is required in order to assess the energy performance of the development and ensure it meets the key performance indicators.

Tips on completion:

- Building definition – 'Building 1' on the residential proforma refers to one complete block, or a pair of semi-detached homes, a complete terrace, etc.
- Every building with a distinct/complete thermal envelope/insulation line should have its own column. Add one column for every separate building.
- Refer to 'Net Zero Design Guidance' document 1 for guidance on how to design an efficient building form to reduce the space heating demand, reduce embodied carbon and reduce overheating risk.
- Refer to the Net Zero Carbon Building Standard Pilot version for relevant non-residential targets for energy use intensity and upfront embodied carbon.

When determining a response to the application case officers will compare the values entered in to the Proforma with the 'target values' listed on the Proforma and the key performance indicators listed in section 2 of this document.

Building fabric and ventilation

- Details of the predictive calculation methodology that was used to calculate the Space Heating Demand (SHD) should be provided. The suggested supporting values (such as u-values) are area weighted averages per element type.

Maximise energy efficiency

Residential and non-residential

- Energy use intensity (EUI) must be calculated using predictive modelling.

Renewable energy generation.

- The renewable energy balance should compare the calculated total energy used (kWh/yr) to the total energy generated on-site(both in kWh/yr).

Low carbon heating

- A low carbon heat appraisal is required with all major applications. Refer to 'Low Carbon Heat' document 2 for guidance. This should be an enhanced version for large major developments.

Overheating

Residential:

- Confirm that the scheme complies with the requirements of Building Regulations Part O assessment without the use of mechanical cooling.
- If mechanical cooling is necessary state the number of dwellings that require it.

Non- residential:

- Confirm that the development complies with a CIBSE TM52 assessment of overheating risk.
- If mechanical cooling is necessary state what percentage of spaces are cooled.

Materials

Using the RICS Whole Life Carbon Assessment methodology 2023:

- Calculate and report upfront embodied carbon and list out the top three materials with the highest upfront embodied carbon emissions.
- Lifecyle embodied carbon must be calculated for all large major applications

Major applications - Energy and Carbon Statement

Required contents

All developments of more than 10 homes and/or 1,000m^2 GIA of non-residential space must submit an Energy and Carbon Statement as part of the planning application.

The Energy and Carbon Statementt must follow the contents listed on this page in order to enable the planning officer to assess the proposals. The order and structure follow that of the energy hierarchy set out in policy.

Expected level of detail

Beyond the structure and headings specified on this page, there are no additional submission requirements. However, the following guidelines should be followed:

- The report should be written in plain English.
- There is no requirement to repeat planning policy wording from Places for Everyone.
- General considerations about the topics covered should be avoided. Instead, specific design considerations and commitments should be clear.
- It is expected that most Energy and Carbon Statements for 10-149 homes and/or 1,000-4,999m^2 non-residential will be between up to 20 pages long with additional details provided in Appendix.
- It is expected that most Energy and Carbon Statements for applications of more than 150 homes and/or 5,000m^2 non-residential will be approximately 20 pages or more.

Contents

**Large planning applications only, i.e. more than 150 homes (residential) and/or more than 5,000 m^2 (non-residential).*

4

Further guidance on content of Energy and Carbon Statements

Guidance for the preparation of Energy and carbon statements

Introduction

The previous pages set the requirements for the contents and structure of Energy and Carbon Statements to be submitted in support of major planning applications.

These pages provides additional details and example of what is expected in each section. Where certain elements are only relevant for residential or non-residential developments this will be noted.

Section 0: Executive summary

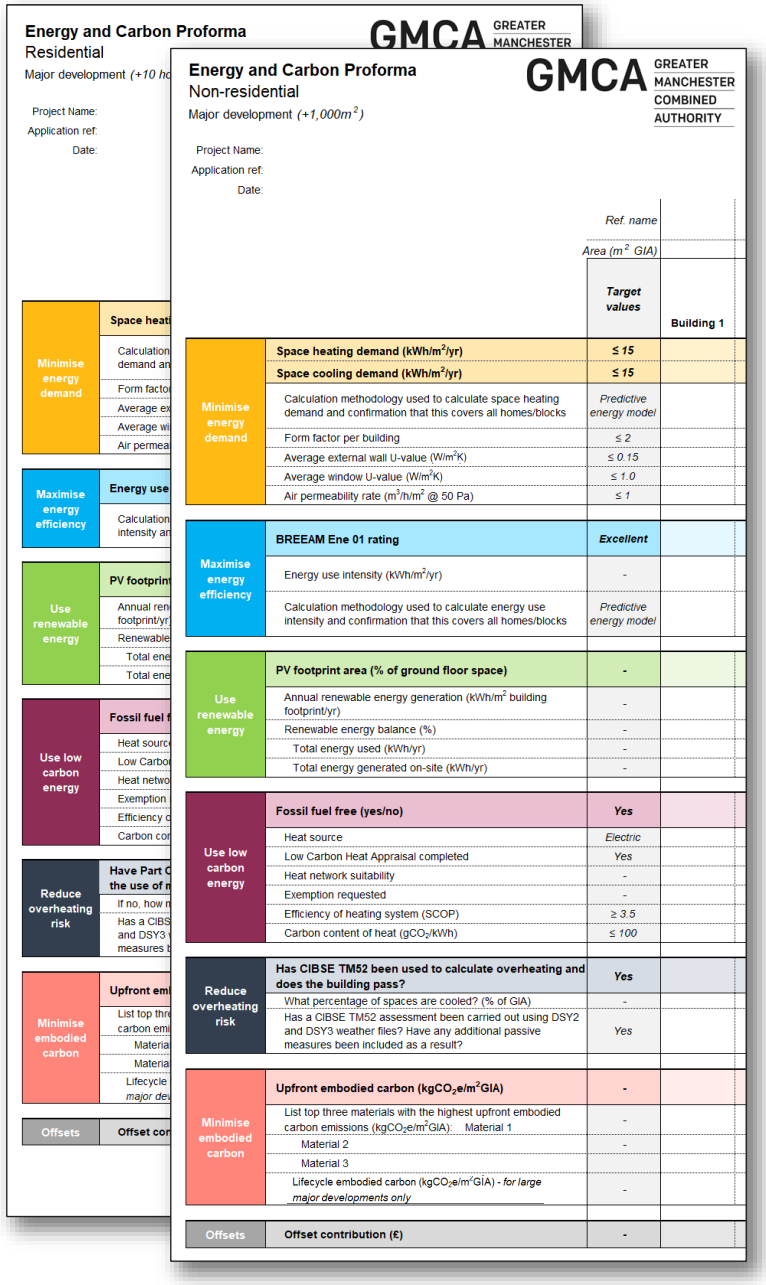
0.1 Energy and Carbon Proforma

The completed Energy and Carbon Proforma should be submitted as an Excel spreadsheet to the Local Authority. A screenshot of it/pdf should be also be included on the first page of the Energy and Carbon Statement.

0.2 Project overview

The applicant should include an introduction with a short description of the project. This should describe, in general terms, its location and the key associated constraints, the proposed uses and associated floor areas and/or number of dwellings and, if there is more than one building, a site plan with a key of the references used in the Proforma and the Energy and Carbon Statement for each separate block.

For large developments a description of which sample of buildings have been modelled and to which extent they are representative of the whole development would be useful.



Energy and Carbon Proforma
Residential
Major development *(+10 ho*

Project Name:
Application ref:
Date:

GMCA GREATER MANCHESTER

Energy and Carbon Proforma
Non-residential
Major development *(+1,000m²)*

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Project Name:
Application ref:
Date:

		Ref. name	
		Area (m² GIA)	
		Target values	**Building 1**
Minimise energy demand	**Space heating demand (kWh/m²/yr)**	**≤ 15**	
	Space cooling demand (kWh/m²/yr)	**≤ 15**	
	Calculation methodology used to calculate space heating demand and confirmation that this covers all homes/blocks	*Predictive energy model*	
	Form factor per building	≤ 2	
	Average external wall U-value (W/m²K)	≤ 0.15	
	Average window U-value (W/m²K)	≤ 1.0	
	Air permeability rate (m³/h/m² @ 50 Pa)	≤ 1	
Maximise energy efficiency	**BREEAM Ene 01 rating**	***Excellent***	
	Energy use intensity (kWh/m²/yr)	-	
	Calculation methodology used to calculate energy use intensity and confirmation that this covers all homes/blocks	*Predictive energy model*	
Use renewable energy	**PV footprint area (% of ground floor space)**	**-**	
	Annual renewable energy generation (kWh/m² building footprint/yr)	-	
	Renewable energy balance (%)	-	
	Total energy used (kWh/yr)	-	
	Total energy generated on-site (kWh/yr)	-	
Use low carbon energy	**Fossil fuel free (yes/no)**	**Yes**	
	Heat source	*Electric*	
	Low Carbon Heat Appraisal completed	*Yes*	
	Heat network suitability	-	
	Exemption requested	-	
	Efficiency of heating system (SCOP)	≥ 3.5	
	Carbon content of heat (gCO_2/kWh)	≤ 100	
Reduce overheating risk	**Has CIBSE TM52 been used to calculate overheating and does the building pass?**	**Yes**	
	What percentage of spaces are cooled? (% of GIA)	-	
	Has a CIBSE TM52 assessment been carried out using DSY2 and DSY3 weather files? Have any additional passive measures been included as a result?	*Yes*	
Minimise embodied carbon	**Upfront embodied carbon ($kgCO_2e/m^2GIA$)**	**-**	
	List top three materials with the highest upfront embodied carbon emissions ($kgCO_2e/m^2GIA$): Material 1	-	
	Material 2	-	
	Material 3	-	
	Lifecycle embodied carbon ($kgCO_2e/m^2GIA$) - *for large major developments only*	-	
Offsets	**Offset contribution (£)**	**-**	

Energy and Carbon Proformas – Major developments

Section 1: Building fabric and ventilation

1.1 Building form and heat loss envelope

Describe the form of the building(s), including the number of storeys, whether the façade and roofs are simple or complex and whether there are unheated spaces (bin stores, car parking, etc) within the building footprint. Provide the calculated form factors.

Form factor = exposed external surface area/gross internal floor area

1.2 Elevation design and window proportions

Explain the principles of the elevation design. Illustrate it with the window-to-wall ratio figures on each elevation for each orientation for each building.

1.3 Heated and unheated spaces

If there are unheated spaces within the building footprint, identify the unheated spaces on a floor plan. Provide a drawing(s) indicating the thermal envelope in plan and section (refer to Appendix list).

1.4 Building fabric specifications and airtightness

Provide list of the designed performance specifications for the envelope (follow the format of the adjacent table).

1.5 Ventilation system

Explain which type of ventilation system will be used for background ventilation (e.g. mechanical ventilation with heat recovery). Note, strategies for natural purge ventilation should be included in Section 5: Overheating.

1.6 Space heating demand

The metric used to assess the overall impact of the above measures is the space heating demand, expressed in kWh/m^2/yr. It should be reported in this section and and calculated using predictive energy modelling. Please refer section 5 for guidance on predictive modelling.

Specification	Unit/element	*Notes*
Airtightness	m^3/m^2.hr @ 50 Pa ach@ 50 Pa	*Report both where predictive modelling is used*
Average U-values	Ground floor: W/m^2.K External wall 1: W/m^2.K External wall 2: W/m^2.K Roof: W/m^2.K Terrace: W/m^2.K	*Ground floor U-value should include effect of ground* *External wall U-value should include the effect of thermal bridging from structure and masonry support system*
Window U-value	U_{window} : W/m^2.K	*Specify type of glazing* *U_{window} (pane and frame) excludes installation thermal bridging*
Door U-value	U_{door} : W/m^2.K	*U_{door} excludes installation thermal bridging*
Glazing g-value		
Shading	Explanation	*For example horizontal external shading above south facing windows*
Thermal bridging	List of key junctions	Ψ-Value
	E2: Lintels	W/mK
	E3: Sill	W/mK
	E4: Jamb	W/mK
	E5: Ground floor / external wall junction	W/mK
	E6: Intermediate floor within dwelling	W/mK
	E11 Eaves (insulation at rafter)	W/mK
	E13 Gable (insulation at rafter)	W/mK
	E16: Corner (normal)	W/mK
	E17: Corner (inverted)	W/mK
	E18: Party wall between dwellings	W/mK
	E21 Exposed floor (inverted)	W/mK
	P1: Ground floor	W/mK

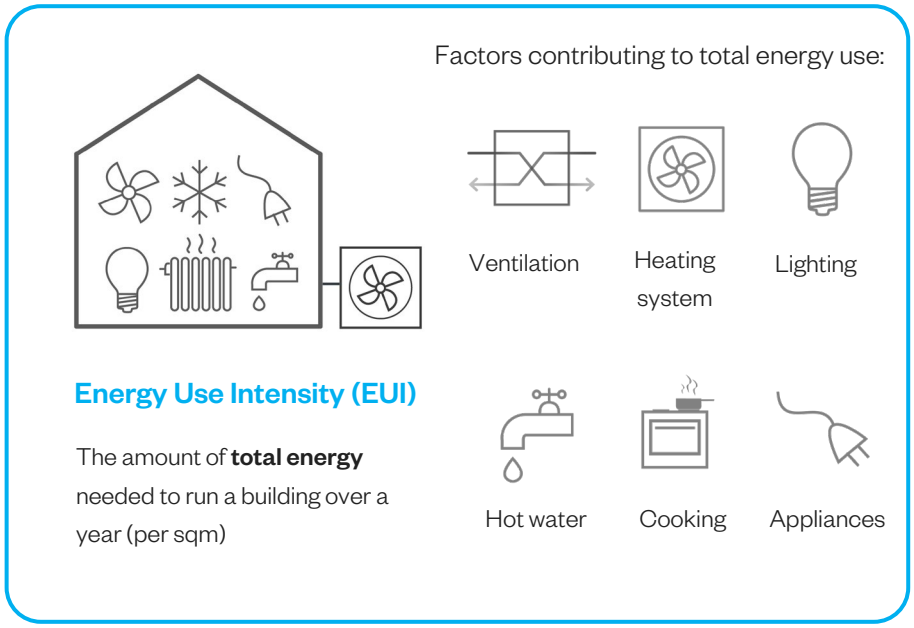
Example of tabulated format to summarise key building fabric specifications.

Section 2: Maximise energy efficiency

The energy use intensity (EUI) of a home or building is the total amount of energy (regulated and unregulated) it uses for all purposes in kWh/year, divided by the gross internal floor area (GIA) in m^2. It should be assessed using predictive energy modelling and should not take into account any reduction in energy use due to renewable energy generation on-site (this is reported and assessed separately). Electric vehicle charging is excluded completely from the EUI.

The value of using this as a metric to measure energy efficiency is that it is absolute, gives a picture of the total energy consumption of a building, is a metric that allows a comparison with other buildings of the same type/use and can be easily checked post-completion, where there is a desire to do so..

For the purpose of the planning application, the EUI is the energy consumed within the site boundary (split by uses and per building) divided by the floor area (split by uses and per building). However, where the development is served by an energy centre that is outside the boundary, the energy centre's generation and storage losses as well as the distribution system losses must be considered to understand the total energy required to deliver the heat to the end user.



2.1 Energy use intensity for residential developments

As part of the Energy and Carbon Proforma, applicants should state what predictive energy modelling software has been used to assess the building. Refer to modelling expectations for residential developments, applicable to the scale of development.

Please also refer to guidance on predictive modelling for residential developments.

2.2 Energy use intensity for non-residential developments

As part of the Energy and Carbon Proforma, applicants should state what predictive energy modelling software has been used to assess the building. Refer to modelling expectations for non-residential developments, applicable to the scale of development.

Please also refer to guidance on predictive modelling for non-residential developments.

2.3 Efforts to reduce energy use of equipment

Describe unregulated energy loads that are used in the building and explain how the energy consumption assumed in the energy calculations was determined. This should include appliances, cooking/catering equipment, plug loads, IT and lifts and any other specific equipment expected to be required.

EUI = Energy related to providing heating and hot water + Energy related to other electricity uses such as lighting, ventilation, appliance, catering and plug loads.

Section 3: Renewable energy generation

3.1 Proposed renewable energy generation system

Use the template table opposite to summarise the renewable energy system proposed. The template assumes solar PV as this will generally be the most appropriate option. For other renewable energy sources, use the same format with appropriate comparable values.

Provide a roof layout illustrating the proposed layout of solar PV, and demonstrate that the area for solar PV has been maximised. The roof layout should make reasonable allowance for other roof mounted equipment, including plant, lift overruns, stair AOVs, SVPs, etc. Access for maintenance and overshadowed areas e.g. close to parapets should also be considered.

Provide the following details for the onsite renewables.

- Type of system
- Capacity of system (kWp)
- Expected annual renewable electricity generation (kWh/yr)

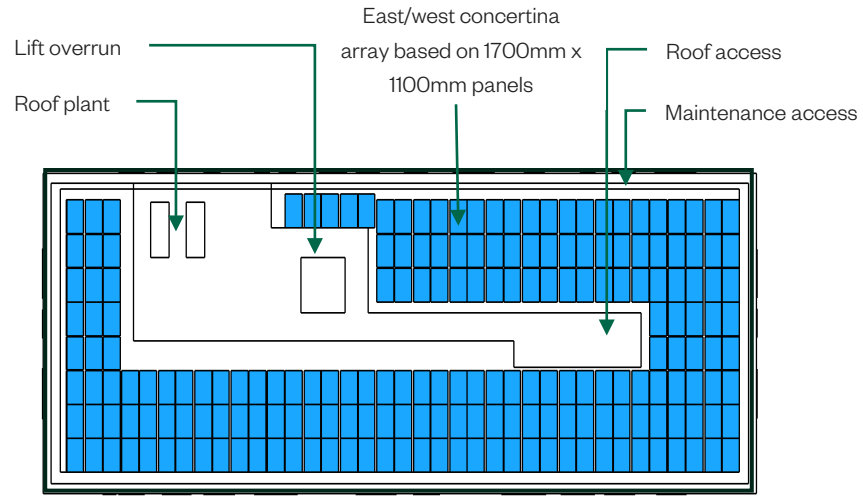
3.2 Renewable energy balance

The assessment of the renewable energy balance is reported in the Energy and Carbon Proforma. Applicants can use this section of the Energy and Carbon Statement to add the proportion of total annual energy used (kWh/yr) (energy use intensity without dividing by area) for the development that will be balanced by the total annual generation of renewable energy on site.

*Renewable energy balance = (annual generation/total energy used)*100)*

Description	Solar PV
Orientation	e.g. east / west concertina
Tilt	e.g. 10° (Horizontal)
Peak output (kWp)	kW
Panel (maximum output, type of inverters)	e.g. 450W
PV area as a percentage of ground floor area	%
Expected annual renewable energy generation	kWh/yr
Annual renewable energy generation per m^2 GIA	$kWh/yr/m^2_{GIA}$
Annual renewable energy generation per m^2 building footprint	$kWh/yr/m^2_{fp}$
Balance between total energy use and renewable energy generation	%
Shading constraints?	If applicable, describe
Data source	e.g. PVGIS generic data

Example of tabulated format to summarise renewable energy generation.



Example of roof layout to illustrate proposals for renewable energy generation

Section 4: Low carbon heating

4.1 Fossil fuel free

Confirm that the development is fossil fuel free, i.e. that it does not rely on burning fossil fuels (e.g. gas) on-site for heating, hot water, cooking or back up-generation. If an exemption from this policy is required and there will be any fossil fuels burnt on-site, explain the justification.

4.2 Proposed systems for heating and hot water

Identify which case (1 to 4) the development's location falls into with respect to low carbon heat networks (refer to 'Low Carbon Heat' document 2) and summarise discussions with officers regarding the approach to be taken.

Describe the system that is proposed for heating and hot water in each building.

Provide a summary of the appraisal carried out to select the proposed system (see adjacent table), including a brief explanation of which systems were considered, how they were assessed and the advantages of the selected system(s).

The full appraisal should include the requirements set out in 'Low Carbon Heat' document 2 and be included as an appendix to the statement.

Identify the location of key system equipment.

4.3 Proposed system for cooling (if applicable)

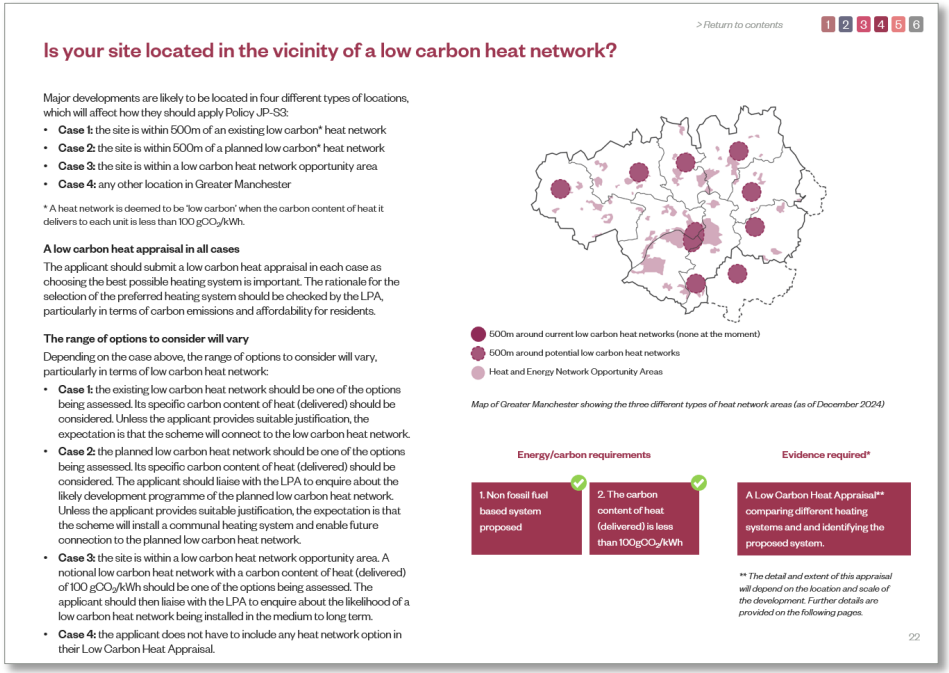
Describe the system that is proposed for cooling in each building and identify the location of key system equipment.

(Residential only) explain why mechanical cooling is necessary and what steps have been taken to minimise the associated energy consumption, for example, if window opening is restricted by external noise sources. Confirm that the building has been designed to not overheat (Pass CIBSE TM59) with windows open so that cooling is limited.

General		
Carbon factors	Carbon factor assumed for electricity ($kgCO_2e/kWh$)	Source
Heat costs	Energy costs assumed (p/kWh)	Source

Systems considered	**Carbon emissions ($kgCO_2/kWh_{heat\ delivered}$)**	**Cost of heat (£/dwelling/year)**	**Capital cost (£/unit)**
1			
2			
3			
4			

Example of tabulated format to summarise key outputs from heating system appraisal.



> Return to contents 1 2 3 4 5 6

Is your site located in the vicinity of a low carbon heat network?

Major developments are likely to be located in four different types of locations, which will affect how they should apply Policy JP-S3:

- **Case 1:** the site is within 500m of an existing low carbon* heat network
- **Case 2:** the site is within 500m of a planned low carbon* heat network
- **Case 3:** the site is within a low carbon heat network opportunity area
- **Case 4:** any other location in Greater Manchester

* A heat network is deemed to be 'low carbon' when the carbon content of heat it delivers to each unit is less than 100 gCO_2/kWh.

A low carbon heat appraisal in all cases

The applicant should submit a low carbon heat appraisal in each case as choosing the best possible heating system is important. The rationale for the selection of the preferred heating system should be checked by the LPA, particularly in terms of carbon emissions and affordability for residents.

The range of options to consider will vary

Depending on the case above, the range of options to consider will vary, particularly in terms of low carbon heat network:

- **Case 1:** the existing low carbon heat network should be one of the options being assessed. Its specific carbon content of heat (delivered) should be considered. Unless the applicant provides suitable justification, the expectation is that the scheme will connect to the low carbon heat network.
- **Case 2:** the planned low carbon heat network should be one of the options being assessed. Its specific carbon content of heat (delivered) should be considered. The applicant should liaise with the LPA to enquire about the likely development programme of the planned low carbon heat network. Unless the applicant provides suitable justification, the expectation is that the scheme will install a communal heating system and enable future connection to the planned low carbon heat network.
- **Case 3:** the site is within a low carbon heat network opportunity area. A notional low carbon heat network with a carbon content of heat (delivered) of 100 gCO_2/kWh should be one of the options being assessed. The applicant should then liaise with the LPA to enquire about the likelihood of a low carbon heat network being installed in the medium to long term.
- **Case 4:** the applicant does not have to include any heat network option in their Low Carbon Heat Appraisal.

Map of Greater Manchester showing the three different types of heat network areas (as of December 2024)

Energy/carbon requirements		Evidence required*
1. Non fossil fuel based system proposed	2. The carbon content of heat (delivered) is less than 100 gCO_2/kWh	A Low Carbon Heat Appraisal** comparing different heating systems and and identifying the proposed system.

** *The detail and extent of this appraisal will depend on the location and scale of the development. Further details are provided on the following pages.*

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Refer to 'Low Carbon Heat' document 2 for explanation of how to apply the low carbon heat network policy JP-S3.

Section 5: Overheating risk

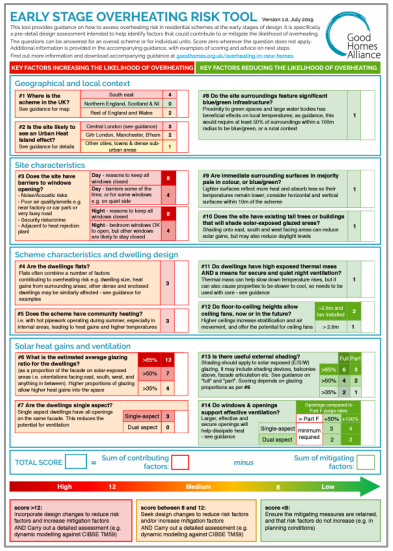
5.1 Natural ventilation (residential only)

Explain and illustrate which windows can be opened for ventilation purposes, the extent to which they would open and whether they can open during the day and/or at night.

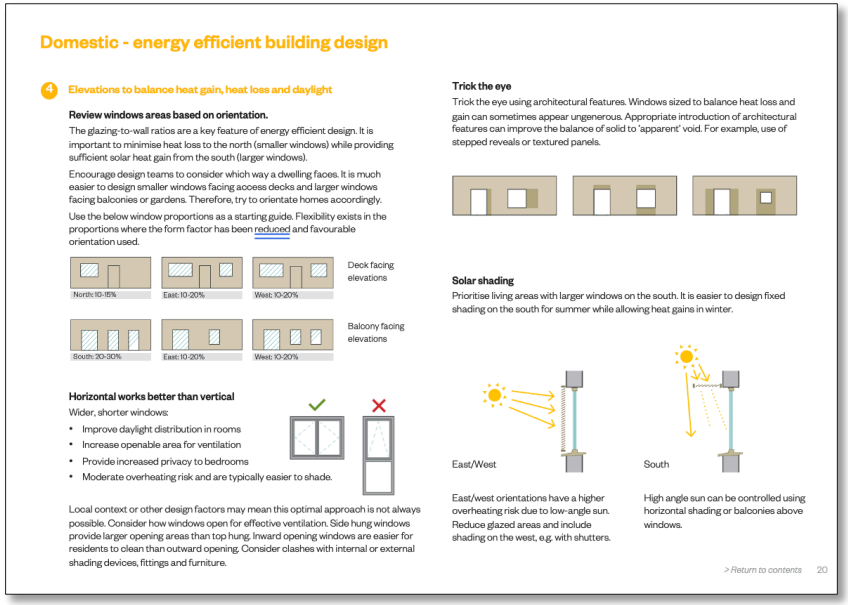
5.2 Overheating risk assessment

Provide a summary of the overheating assessment, this should include the following details:

- Confirmation of the risk category of the location.
- (Residential only) Applicants are encouraged to use the Good Homes Alliance overheating risk tool for early stages of the project. Small minor schemes are required to state the score in the Proforma.
- (Residential only) confirmation whether the simplified method or modelling has been used to assess compliance with the building regulations Part O.
- Description of passive measures adopted, e.g. external shading
- (Residential only) Results of Part O / TM59 analysis
- (Non-residential only) Results of TM52 analysis
- Describe if the overheating assessment been carried out using DSY 2/3 weather files and if any additional passive measures been included as a result.
- If mechanical cooling is deemed necessary state how many homes are cooled or the percentages of spaces cooled for non-residential.
- Include the overheating risk assessment as an appendix.



The Good Homes Alliance simple tool to assess overheating risk at early design stage.



Refer to 'Net Zero Design Guidance' document 1 for examples of design solutions to mitigate overheating risk

Section 6: Materials

6.1 Upfront embodied carbon

Provide a summary of the upfront embodied carbon assessment, and, most importantly the design choices already made to reduce upfront embodied carbon. Please split these design choices under the following headings:

- **Structural lean design**: Designing leaner structure can reduce the volume of overall material used in the building, including less foundations where the building becomes lighter. Explain whether you have implemented any design changes in the following areas in order to make the structure leaner: structural grid spacing (distance between columns), location of the service core (e.g. staircases, elevators and risers) , structural depth, amount of cantilevers (e.g. projecting balconies), type of slab, etc.
- **Architectural lean design**: Explain whether you have implemented any design changes in the following areas in order to reduce upfront embodied carbon associated with: the façade; reduction in amount of metal components; optimisation of window-to-wall ratio; and selection of multi-purpose façade components.
- **Building services lean design**: Building services are made from high carbon materials (metals, plastics, refrigerants) which are replaced multiple times during a building's lifetime. Explain whether you have implemented any design changes in the following areas: passive measures; ducts design; refrigerant specifications.

Upfront embodied carbon should be calculated and reported in compliance with the RICS Whole Life Carbon Assessment for the Built Environment (2023) which translates the BS EN15978 international guidance into the UK context.

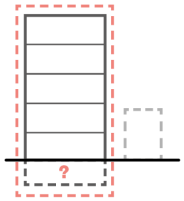
6.2 Life cycle embodied carbon

Life cycle embodied carbon should be calculated and reported (using RICS 2023) for applications of more than 150 homes and 5,000 m^2 of residential space.

Upfront embodied carbon, $kgCO_2e/m^2$ (modules A1-A5, excluding upfront biogenic carbon)				
Band	**Office**	**Residential (6+ storeys)**	**Education**	**Retail**
A++	<100	<100	<100	<100
A+	<225	<200	<200	<200
A (LETI 2030)	<350	<300	<300	<300
B	<475	<400	<400	<425
C (LETI 2020)	<600	<500	<500	<550
D	<775	<675	<625	<700
E	<950	<850	<750	<850
F	<1100	<1000	<875	<1000
G	<1300	<1200	<1100	<1200

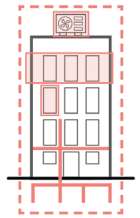
Upfront embodied carbon targets for various building typologies. The residential targets have been set based on data from 6+ storey developments, therefore the applicability to low-rise housing is unknown (Source: LETI)

RIBA Stage 1



- Ground condition survey and availability of local materials, which will influence design.
- Recognise the embodied carbon impact of non-typical features (cantilevers, dormers, podiums, basements), pre-determined material choices due to fire regulations and any other required features (shading devices, renewables, etc.).
- Calculate form factor to illustrate efficient building form.

RIBA Stage 2-3



- Structural lean design - including efficient grid, lean specification and material choice. Declare volumes of materials.
- Architectural lean design – including façade studies and material choice. Declare volumes of materials.
- Building services lean design – avoid over sizing, reduce pipework runs and refrigerant selection.
- Highlight areas where embodied carbon is reduced or increased by design.
- External works study.
- Upfront embodied carbon and WLC calculations.

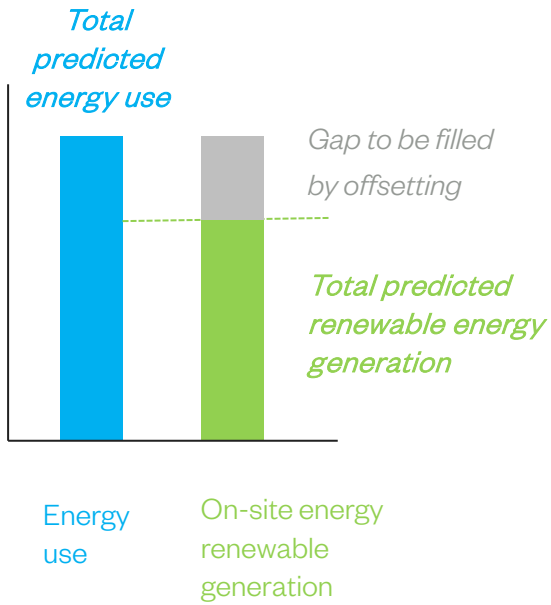
Refer to 'Net Zero Design Guidance' document 1 for examples of design solutions to reduce embodied carbon.

Section 7: Offsetting

7.1 Offsetting

Developments should seek to provide an operational energy balance on-site, i.e. 100% of the building's energy use should be matched by on-site renewable generation on an annual basis. For those major developments unable to meet this balance on-site, an offset mechanism will be used in future to enable the development to be deemed '*Net Zero Carbon compliant*'.

The final decision to include offsetting will be determined by each local authority in Greater Manchester, with options for offsetting currently under development.



Appendices

1. Thermal line strategy

Provide representative sections and floor plans showing the continuity of the insulation line (drawn in continuous colour). Refer to 'Net Zero Design Guidance' document 1 for further guidance grouping cold spaces together.

2. Low carbon heat appraisal

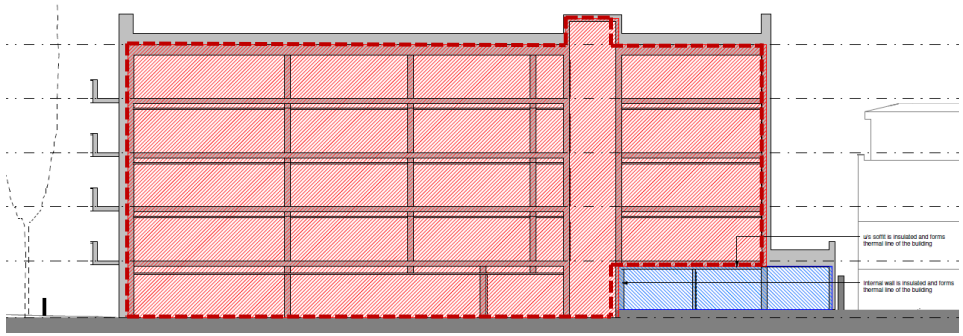
See 'Low Carbon Heat' document 2 on what is required for a Low carbon heat appraisal

3. Overheating report

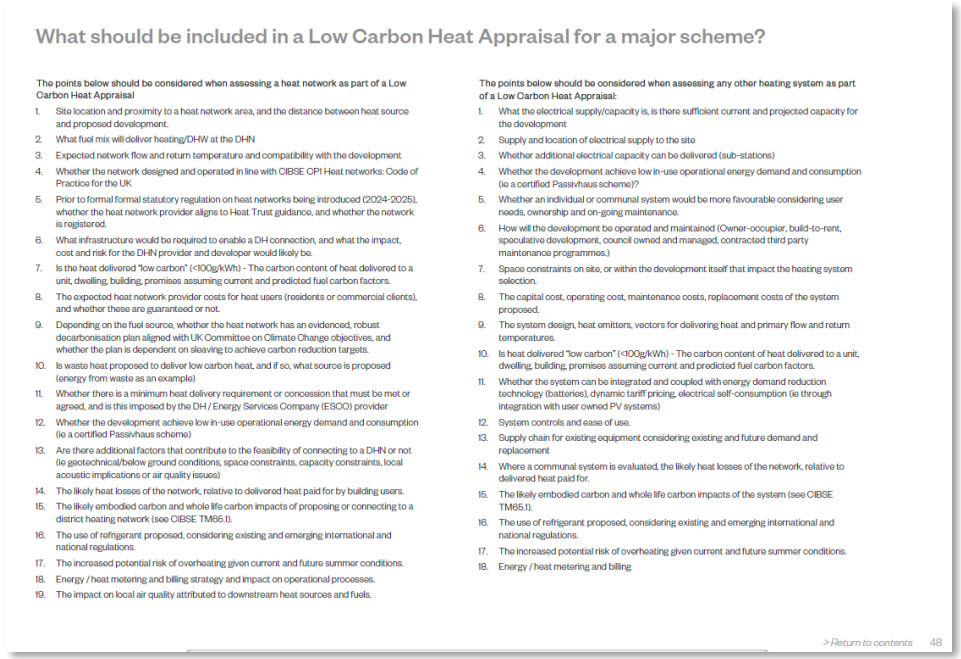
Full overheating report together with any additional reports (acoustics, daylight, etc.) that this may refer to should be included.

4. Embodied carbon statement

Provide the full upfront embodied carbon analysis (and lifecycle for large major developments) in accordance with the methodology set out in the RICS Whole Life Carbon Assessment standard 2023 to support the summary in the materials section of the statement.



Example of thermal line mark up of a section drawing. The areas in red are 'heated' whereas the area in blue are not heated. Therefore a continuous layer of insulation should follow the thermal line. Thermal line defined by a dashed red line.



What should be included in a Low Carbon Heat Appraisal for a major scheme?

The points below should be considered when assessing a heat network as part of a Low Carbon Heat Appraisal

1. Site location and proximity to a heat network area, and the distance between heat source and proposed development.
2. What fuel mix will deliver heating/DHW at the DHN
3. Expected network flow and return temperature and compatibility with the development
4. Whether the network designed and operated in line with CIBSE CP1 Heat networks: Code of Practice for the UK
5. Prior to formal formal statutory regulation on heat networks being introduced (2024-2025), whether the heat network provider aligns to Heat Trust guidance, and whether the network is registered.
6. What infrastructure would be required to enable a DH connection, and what the impact, cost and risk for the DHN provider and developer would likely be.
7. Is the heat delivered "low carbon" (<100g/kWh) - The carbon content of heat delivered to a unit, dwelling, building, premises assuming current and predicted fuel carbon factors.
8. The expected heat network provider costs for heat users (residents or commercial clients), and whether these are guaranteed or not.
9. Depending on the fuel source, whether the heat network has an evidenced, robust decarbonisation plan aligned with UK Committee on Climate Change objectives, and whether the plan is dependent on sleaving to achieve carbon reduction targets.
10. Is waste heat proposed to deliver low carbon heat, and if so, what source is proposed (energy from waste as an example)
11. Whether there is a minimum heat delivery requirement or concession that must be met or agreed, and is this imposed by the DH / Energy Services Company (ESCO) provider
12. Whether the development achieve low in-use operational energy demand and consumption (ie a certified Passivhaus scheme)
13. Are there additional factors that contribute to the feasibility of connecting to a DHN or not (ie geotechnical/below ground conditions, space constraints, capacity constraints, local acoustic implications or air quality issues)
14. The likely heat losses of the network, relative to delivered heat paid for by building users.
15. The likely embodied carbon and whole life carbon impacts of proposing or connecting to a district heating network (see CIBSE TM65.1).
16. The use of refrigerant proposed, considering existing and emerging international and national regulations.
17. The increased potential risk of overheating given current and future summer conditions.
18. Energy / heat metering and billing strategy and impact on operational processes.
19. The impact on local air quality attributed to downstream heat sources and fuels.

The points below should be considered when assessing any other heating system as part of a Low Carbon Heat Appraisal:

1. What the electrical supply/capacity is, is there sufficient current and projected capacity for the development
2. Supply and location of electrical supply to the site
3. Whether additional electrical capacity can be delivered (sub-stations)
4. Whether the development achieve low in-use operational energy demand and consumption (ie a certified Passivhaus scheme)?
5. Whether an individual or communal system would be more favourable considering user needs, ownership and on-going maintenance.
6. How will the development be operated and maintained (Owner-occupier, build-to-rent, speculative development, council owned and managed, contracted third party maintenance programmes.)
7. Space constraints on site, or within the development itself that impact the heating system selection.
8. The capital cost, operating cost, maintenance costs, replacement costs of the system proposed.
9. The system design, heat emitters, vectors for delivering heat and primary flow and return temperatures.
10. Is heat delivered "low carbon" (<100g/kWh) - The carbon content of heat delivered to a unit, dwelling, building, premises assuming current and predicted fuel carbon factors.
11. Whether the system can be integrated and coupled with energy demand reduction technology (batteries), dynamic tariff pricing, electrical self-consumption (ie through integration with user owned PV systems)
12. System controls and ease of use.
13. Supply chain for existing equipment considering existing and future demand and replacement
14. Where a communal system is evaluated, the likely heat losses of the network, relative to delivered heat paid for.
15. The likely embodied carbon and whole life carbon impacts of the system (see CIBSE TM65.1).
16. The use of refrigerant proposed, considering existing and emerging international and national regulations.
17. The increased potential risk of overheating given current and future summer conditions.
18. Energy / heat metering and billing

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Refer to guidance in 'Low Carbon Heat' document 2 for the content of a low carbon heat appraisal report

5

Guidance on predictive energy modelling

Residential - Energy modelling

Part L modelling – residential buildings

Standard Assessment Procedure (SAP 10.2) is the calculation methodology used on new residential buildings to demonstrate compliance with Part L of the Building Regulations. Until now, these Part L energy assessment methodologies were developed only to check compliance with Building Regulations. However, SAP was not developed to perform the key functions that are required to assess Net Zero Carbon buildings, and most importantly they were not meant to predict future energy use accurately. This is a widely accepted fact in the industry, hence why the Government is currently developing a new energy modelling methodology for residential buildings: the Home Energy Model (HEM) and its Future Homes Standard (FHS) wrapper. However, HEM:FHS is not yet validated or available for use*.

Predictive energy modelling for residential buildings

For residential buildings, the Passivhaus Planning Package (PHPP) methodology and excel based tool have been shown to predict energy use much more accurately than the current version of SAP.

Benefits of using PHPP on new residential building projects in Greater Manchester include:

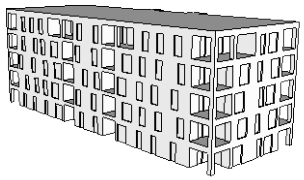
- Greater accuracy (e.g. Manchester weather file, more accurate shading assessment, ventilation duct heat losses taken into account)
- Inclusion of unregulated energy (e.g. cooking and appliances)
- Ability to assess the benefit of a better building form early during the design.
- Possibility to compare predictive performance against TANZ requirements.

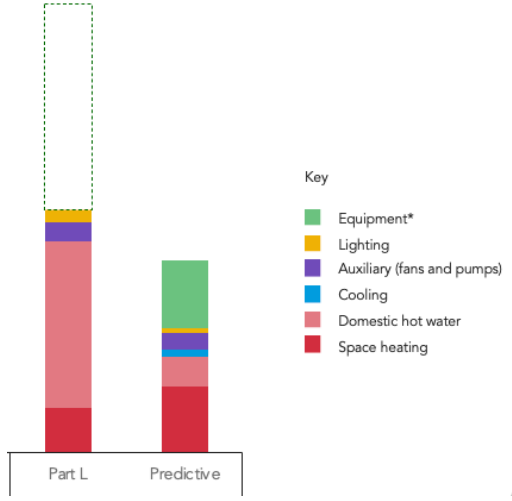
Applicants should summarise their key modelling assumptions to make it easier for the local planning authority to review them.

The use of PHPP is independent of meeting Passivhaus standards and certification.

** Note: it is possible that HEM: FHS can be used for predictive energy modelling purposes in the future but that can only be confirmed when the first 'official' version for use will be released.*

Part L modelling	Predictive modelling	HEM
SAP 10.2	PHPP	HEM:FHS
Used to check compliance with Part L 2021	Used to predict space heating demand and energy use or to check compliance with Passivhaus Standard	Will be used to check compliance with Future Home Standard
Active to be replaced by HEM in 2025 (tbc)	**Active**	**From 2025** (tbc)
Least accurate • UK standard weather file • Underestimates space heating and overestimates domestic hot water and appliances	**Most accurate** • Specific weather conditions and location used • As-built performance predicted more accurately	**To be determined** Strengths and weaknesses of HEM:FHS are not confirmed yet





There is a significant difference between Part L modelling currently used to demonstrate compliance with building regulations and predictive energy use modelling which should be used to demonstrate compliance with the proposed policies.
(Source: Delivering Net Zero Study, 2023)

Residential - Energy modelling

Part L modelling – residential buildings

The NCM (National Calculation Methodology) is the calculation methodology used on new non-residential buildings and is used through the Simplified Building Energy Model (SBEM) and Dynamic Simulation Modelling (DSM) tools in order to demonstrate compliance with Part L of the Building Regulations. However, this methodology was never meant to perform key functions that are required to assess Net Zero Carbon buildings, and most importantly they were not meant to predict future energy use accurately. This is a widely accepted fact in the industry. This is why the use of predictive energy modelling is required to demonstrate compliance with Net Zero requirements.

Predictive energy modelling for residential buildings

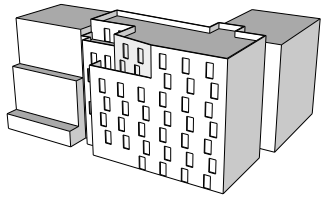
For non-residential buildings, the same Dynamic Simulation Modelling (DSM) tools can be used but the methodology set out in CIBSE Technical Memorandum 54 (TM54) should be followed. The PHPP methodology and excel based tool have also been shown to predict energy use reasonably accurately.

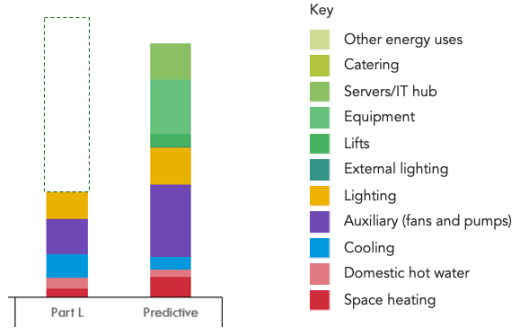
Benefits of using TM54 on new non-residential building projects in Greater Manchester include:

- Ability to model opening/working hours and occupancy specifically.
- Inclusion of unregulated energy (e.g. IT and equipment).
- Possibility to compare predictive performance against benchmarks for similar buildings.

Applicants should summarise their key assumptions to make it easier for the local planning authority to review them.

Part L modelling	Predictive modelling
SBEM and DSM for Part L (e.g. IES , TAS)	DSM for CIBSE TM 54 (e.g. IES , TAS), PHPP
Used to check compliance with Part L 2021	Used to predict space heating demand and energy use or to check compliance with Passivhaus Standard
Active to be updated in 2025 (tbc)	**Active**
Least accurate • High level of standardisation • Underestimates space heating and overestimates domestic hot water and equipment (incl. IT)	**Most accurate** • As-built performance predicted most accurately





There is a significant difference between Part L modelling currently used to demonstrate compliance with building regulations and predictive energy use modelling which should be used to demonstrate compliance with the proposed policies.
(Source: Delivering Net Zero Study, 2023)

6

Pre-apps and outline applications

Pre-application requirements

On some applications, there will be one or several pre-application meeting(s), depending on the scale and complexity of the proposed scheme.

The information listed on this page outlines the information that should be presented to the local authority at the pre-application stage.

Where various massing options are provided in the pre-application, indicative targets and design performance should be provided for all options.

Prior design experience of similar schemes can be used to set targets relating to space heating and cooling, energy use, overheating and upfront embodied carbon or, if this is not available in the design team, confirmation should be given that the development will meet relevant targets, unless otherwise agreed.

Case officers will compare the proposed strategies and targets with 'Net Zero Design Guidance' document 1 , to provide feedback to the applicant on design for Net Zero and when determining a response to the application.

It is expected that policy will be discussed during the pre-app to ensure understanding of requirements and to clarify the intended approach.

Level of information expected to be discussed for major developments:

Building fabric and ventilation

- Proposed targets relating to space heating and cooling demand
- Proposed calculation methodology to be used.

Maximise energy efficiency

Residential and non-residential

- Targeted EUI, calculation methodology for calculating the EUI.

Renewable energy generation.

- Proposed % of roof area targeted for renewable generation

Low carbon heating

- Confirmation that the system does not use fossil fuels on site (e.g. gas)
- Confirmation that a Low Carbon Heat appraisal will be carried out.
- Confirmation of site location with regards to low carbon heat networks (i.e. Case 1, 2, 3 or 4 – see Document 2).

Overheating

Residential:

- Completed GHA overheating checklist.
- Confirmation that a Part O/TM59 assessment will be undertaken pre-planning.
- Indication of likelihood of mechanical cooling being used.

Non- residential:

- Confirmation that a TM52 assessment will be undertaken pre-planning.
- Indication of likelihood of mechanical cooling being used.

Materials

- Proposed upfront embodied carbon target.

Outline planning application requirements

This page provides guidance to applicants on what they should submit to the Local Authority as part of an outline planning application.

It is expected that the Energy and Carbon Proforma is completed to confirm that the targets are committed to by applicant. The outline application should include a review of design with comment on likelihood of achieving policy and key performance indicators. This should ideally include some early energy calculations on sample buildings.

It is also expected that an Outline Energy and Carbon Statement will be submitted.

Prior design experience of similar schemes can be used to set targets relating to space heating and cooling, energy use, overheating and upfront embodied carbon or, if this is not available in the design team, modelling could be carried out for sample homes/units.

Case officers will compare the proposed strategies and targets with 'Net Zero Design Guidance' document 1, to provide feedback to the applicant on design for Net Zero and when determining a response to the application.

Level of information expected to be submitted for major developments:

Building fabric and ventilation

- Proposed targets to be achieved relating to space heating and cooling including the calculation methodology to be used at reserved matters for space heating and cooling demand.
- Proposed targets to be achieved relating to the building fabric form factor, glazing ratios, U-values and airtightness.
- Proposed ventilation strategy.

Maximise energy efficiency

Residential and non-residential:

- The EUI that is targeted as well as proposed calculation methodology.

Renewable energy generation.

- Proposed % of roof area targeted for renewable generation .
- Proposed resulting energy balance (based on basic calculations).

Low carbon heating

- Confirmation that the system does not use fossil fuels on site (e.g. gas).
- Proposed heating system approach.
- Confirmation that a Low Carbon Heat appraisal has been/will be carried out.
- Confirmation of site location with regards to low carbon heat networks (i.e. Case 1, 2, 3 or 4 – see Document 2).

Overheating

Residential:

- Confirmation whether the development is expected to meet Part O without the use of mechanical cooling.

Non- residential:

- Confirmation whether mechanical cooling will be required.

Materials

- Proposed upfront embodied carbon targets

7

Appendix

Glossary of terms

Air permeability – *'The measure of airtightness of the building fabric. It is defined as the air leakage rate per hour per m2 of envelope area at the test reference pressure differential of 50Pa or 4Pa.'* Source: *Building Regulations Part L*

Airtightness – *The resistance of the building envelope to infiltration when ventilators are closed. The greater the airtightness at a given pressure difference across the envelope, the lower the infiltration.'* Source: *Building Regulations Part L*

Biogenic/ sequestered carbon – '*Carbon removals associated with carbon sequestration into biomass, as well as any emissions associated with this sequestered carbon. Biogenic carbon must be reported separately if reporting only upfront carbon, but should be included in the total if reporting embodied carbon or whole life carbon.'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

Capacity – The capacity of the system is the maximum power output. It depends on the installation's size and technical capability. The capacity may be in terms of electrical or thermal output.

Carbon sequestration – '*The process by which CO2 is removed from the atmosphere and stored within a material, for example by being stored in biomass as biogenic carbon by plants.'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

Chartered Institute of Building Services Engineers (CIBSE) TM52 - '*This Technical Memorandum (TM) is about predicting overheating in buildings. It is intended to inform designers, developers and others responsible for defining the indoor environment in buildings. It includes the recommendations of the Overheating Task Force, which has sponsored and published this document.'* Source: *CIBSE*

Chartered Institute of Building Services Engineers (CIBSE) TM59 methodology - *'The application of this technical memorandum, by standardising the assessment methodology, should play a key role in limiting overheating risk in new and refurbished homes.'* Source: *CIBSE*

Chartered Institute of Building Services Engineers (CIBSE) TM65 methodology - '*A calculation methodology (TM65) outlines the need for assessment of embodied carbon of products linked to building services engineering systems, to increase knowledge and facilitate research related to whole life carbon.'* Source: *CIBSE*

Combined heat and power – A system which generates electricity whilst also capturing usable heat generated in the process. Typically, when referring to CHP it is inferred that this is gas-fired though this does not necessarily need to be the case.

Deep retrofit – '*Development involving the re-use of as much of the existing building as possible, but may involve substantial demolition and replacement of parts of (but not all of) the façade, core, floor and slab, and which results in significant energy, performance, and climate adaptation upgrades, comparable to those a new building, dramatically reducing carbon emissions from the building and prolonging its usable lifespan.*' Source: *Westminster City Plan Retrofit first Topic Paper, City Plan 2024.*

Demolish and recycle - '*Traditional demolition, with elements and materials processed into new elements, materials and objects for use on the site or on another site.'* Source: *CE Statement 2022.*

Disassemble and reuse - '*Disassemble sections of a building and enable their direct reuse ideally on the site or, where this is not possible, off site (with nearby sites preferred). This approach also includes careful selective deconstruction of the building and material types i.e. taking apart each layer and material type as much as possible, minimising damage to parts and maintaining their value, and then reusing those elements and materials. If reuse is not possible, materials may be carefully and selectively separated for processing and recycling into new elements, materials and objects.*' Source: *CE Statement 2022.*

Embodied carbon – '*The embodied carbon emissions of an asset are the total GHG emissions and removals associated with materials and construction processes, throughout the whole life cycle of an asset (modules A0–A5, B1–B5, C1–C4, with A0[2] assumed to be zero for buildings.'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

Energy Use Intensity (EUI) – *'An annual measure of the total energy consumed in a building … EUI can be expressed in GIA (Gross Internal Area) or NLA (Net Lettable Area). In this document the EUIs are expressed in GIA unless specified.'* Source: *LETI*

Environmental Product Declaration (EPD) – '*A document that clearly shows the environmental performance or impact of any product or material over its lifetime.'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

Form factor – *'Form factor measures how compact a building is and how well it retains heat. It is a ratio of external fabric area to internal area.*

Fossil fuel – *'A natural fuel such as petroleum, coal or gas, formed in the geological past from the remains of living organisms. The burning of fossil fuels by humans is the largest source of emissions of carbon dioxide, which is one of the greenhouse gases that allows radiative forcing and contributes to global warming.'* Source: *LETI*

Glossary of terms

Glazing ratio – *'The proportion of glazing to opaque surface in a wall. Also called window-to-wall ratio, it is a key variable in façade design affecting energy performance in buildings.'* Source: LETI

Global warming potential (GWP) – The Global Warming Potential of a refrigerant is often expressed in carbon dioxide equivalents (CO2e). The timescale the value refers to may be in the order of 50 or 100 years.

Gross Internal Area – *'Broadly speaking the whole enclosed area of a building within the external walls taking each floor into account and excluding the thickness of the external walls.'* Source: gov.uk

G-value – *'Sometimes also called a Solar Factor or Total Solar Energy Transmittance, it is the coefficient commonly used in Europe to measure the solar energy transmittance of windows.'* Source: LETI

Heat Pump – A heat pump is a device that transfers thermal energy from a heat source to a heat sink (e.g. the ground to a house). There are many varieties of heat pump e.g. air, ground and water source heat pumps. The first word in the title refers to the heat source from which the pump draws heat. The pumps run on electricity, however less energy is required for their operation than they generate in heat, hence their status as a renewable technology.

Inventory of carbon & energy (ICE) database – *'The Inventory of Carbon and Energy (also know as the ICE database) is an embodied carbon database for building materials which is available for free on this page. It contains data for over 200 materials, broken down into over 30 main material categories.'* Source: ICE

Kilowatt – Unit of power equivalent to a thousand watts.

Kilowatt hour – Unit of energy. It is equal to the amount of energy a system will generate in an hour whilst running at a kilowatt power output.

Life Cycle embodied carbon – *See 'embodied carbon'*

Major development – *'Major development is: for housing, development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more [OR] The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more [OR] Development carried out on a site having an area of 1 hectare or more.'* Source: gov.uk

Major renovation – *'Defined in regulation 35 as the renovation of a building where more than 25% of the surface area of the building envelope undergoes renovation.'* Source: Approved Document Part L 2021.

Megawatt – Unit of power equivalent to a million watts

Megawatt hour – Unit of energy. It is equal to the amount of energy a system will generate in an hour whilst running at 1 megawatt power output.

Minor development – *'Minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres [OR] Alterations: development that does not increase the size of buildings, e.g. alterations to external appearance [OR] Householder development: for example, sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (e.g. subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.'* Source: gov.uk

Offsetting – *'Payment to receive credit for a certified unit of carbon emission reduction or removal carried out by another actor. Varying levels of accreditation exist for carbon offsets.'* Source: UK Net Zero Carbon Buildings Standard

Operational carbon – '*Operational carbon – energy (module B6) refers to GHG emissions arising from all energy consumed by an asset in use, over its life cycle.'* Source: RICS Whole life carbon assessment for the built environment, 2nd edition

Overheating – *'Refers to discomfort to occupants caused by the accumulation of warmth within a building.'* Source: The Construction Wiki

Partial retention and refurbishment – '*Significant quantities of carbon-heavy aspects of the building are retained in place, such as the floors and substructure, with replacement of some elements of the building, such as walls or roofing. More significant refurbishment can involve adding floors or extensions.*' Source: CE Statement 2022

Passivhaus planning package (PHPP) – Predictive energy modelling tool, typically used for Passivhaus projects, but can be used for any project to better predict performance and deliver outcomes.

Peak demand – *'Refers to the times of day when our electricity consumption is at its highest which, in the UK, occurs between 5-30pm to 6pm each weekday evening.'* Source: LETI

Performance gap – *'This term refers to the discrepancy between energy predictions at design stage, compared to in-use energy consumption of buildings.'* Source: LETI

Photovoltaics (PV) – solar panels converting sunlight into electricity.

Glossary of terms

Post-occupancy evaluation (POE) – *'Post-occupancy evaluation is the process of obtaining feedback on a building's performance in use after it has been built and occupied. By accurately measuring factors such as building use, energy consumption, maintenance costs and user satisfaction, POE allows for a process of continuous improvement in the construction industry.'* Source: *RIBA*

Regulated energy – *'Regulated energy is building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, ventilation, fans, pumps and lighting. Such energy uses are inherent in the design of a building.'* Source: *The Construction Wiki*

Renewable energy – *'Renewable energy technologies use natural energy sources to generate electricity and/or heating/cooling. Sources include solar, wind, wave, marine, hydro, etc.'* Source: *LETI, 2nd edition*

Responsible retrofit – '*Responsible retrofitting is an informed and integrated attitude to retrofit in a way that enables people to reduce the operational carbon of a building, improve energy efficiency, and/or improve a building's resilience to the impacts of climate change. Responsible retrofit will take into account the building's location, context, design, construction, materials and use, to ensure retrofit measures perform well and avoid adverse impacts to health, heritage and the natural environment.'* Source: *Westminster City Plan Retrofit first Topic Paper, City Plan 2024.*

Retain and retrofit - *'The vast majority of the building's fabric is retained, with the building refurbished for the same or new uses through restoring, refinishing and future-proofing. This also encompasses retrofitting, where new technology or features are added to existing buildings to make them more efficient and to reduce their environmental impacts.'* Source: *Circular Economy (CE) Statement 2022.*

Retrofit – '*Development involving the re-use of at least 50% of the existing building in-situ (by mass or volume), retaining as a minimum the foundations, core, and floor slabs, and which results in energy, performance, and climate adaptation upgrades, which will reduce carbon emissions from the building and prolong its usable lifespan.'* Source: *Westminster City Plan Retrofit first Topic Paper, City Plan 2024.*

RICS Professional Standard (RICS PS v2 2023)– '*Sets requirements or expectations for RICS members and regulated firms about how they provide services or the outcomes of their actions. RICS professional standards are principles-based and focused on outcomes and good practice. Any requirements included set a baseline expectation for competent delivery or ethical behaviour. They include practices and behaviours intended to protect clients and other stakeholders, as well as ensuring their reasonable expectations of ethics, integrity, technical competence and diligence are met. Members must comply with an RICS professional standard.'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

Substantial demolition – '*Development consisting of the demolition of 50% or more of existing above ground structures, by area or volume, but not constituting total demolition.'* Source: *Westminster City Plan Retrofit first Topic Paper, City Plan 2024.*

Thermal bridge – '*Heat makes its way from the heated space towards the outside. In doing so, it follows the path of least resistance. A thermal bridge is a localised area of the building envelope where the heat flow is different (usually increased) in comparison with adjacent areas (if there is a difference in temperature between the inside and the outside).'* Source: *LETI*

Total demolition – '*The removal, deconstruction or demolition of an existing building, which will entail the removal of all of its fit out, superstructure, cores, and basement slab(s), but which could involve the retention of parts or all of the façade.'* Source: *Westminster City Plan Retrofit first Topic Paper, City Plan 2024.*

Unregulated energy – '*Unregulated energy is building energy consumption resulting from a system or process that is not 'controlled', i.e. energy consumption from systems in the building on which the Building Regulations do not impose a requirement. For example, this may include energy consumption from systems integral to the building and its operation, e.g. IT equipment, lifts, escalators, refrigeration systems, external lighting, ducted-fume cupboards, servers, printers, photocopiers, laptops, cooking, audio-visual equipment and other appliances.'* Source: *The Construction Wiki*

Upfront embodied carbon – '*Upfront carbon emissions are GHG emissions associated with materials and construction processes up to practical completion (modules A0–A5). Upfront carbon excludes the biogenic carbon sequestered in the installed products at practical completion.'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

U-value – *'The rate of transfer of heat through a structure (which can be a single material or a composite), divided by the difference in temperature across that structure. The units of measurement are W/m²K.'* Source: *LETI*

Whole life carbon (WLC) - '*Whole life carbon emissions are the sum total of all asset-related GHG emissions and removals, both operational and embodied, over the life cycle of an asset, including its disposal (modules A0–A5, B1–B7, B8 optional, C1–C4, all including biogenic carbon, with A0[2] assumed to be zero for buildings). Overall whole life carbon asset performance includes separately reporting the potential benefits or loads from future energy or material recovery, reuse, and recycling and from exported utilities (modules D1, D2).'* Source: *RICS Whole life carbon assessment for the built environment, 2nd edition*

Abbreviations

AHU: Air Handling Unit

ASHP: Air Source Heat Pump

CHP: Combined Heat and Power

CIBSE: Chartered Institution of Building Services Engineers

CLT: Cross Laminated Timber

CO_2e: Carbon dioxide equivalent

DHW: Domestic Hot Water

EAHP: Exhaust Air Heat Pump

EC: Embodied Carbon

EPD: Environmental Product Declaration

EUI: Energy Use Intensity

GIA: Gross Internal Area

HP: Heat Pump

GGBS: Ground Granulated Blast-furnace Slag

GHG: Greenhouse gas

GWP: Global warming potential

IPCC: Intergovernmental Panel on Climate Change

IStructE: Institution of Structural Engineers

kW: Kilowatt

kWh: Kilowatt hour

KPI: Key performance indicator

LETI: Low Energy Transformation Initiative

MEP: Mechanical, electrical and plumbing

MVHR: Mechanical Ventilation with Heat Recovery

MW: Megawatt

MWh: Megawatt hour

NZCBS: UK Net Zero Carbon Buildings Standard

PH: Passivhaus

PHPP: Passivhaus Planning Package

POE: Post-Occupancy Evaluation

PV: Photovoltaic

RIBA: Royal Institute of British Architects

RICS: Royal Institute of Chartered Surveyors

RICS PS: RICS Professional Statement

UKGBC: The UK Green Building Council

UPVC: Unplasticized Polyvinyl Chloride

WLC: Whole life carbon OR whole life cycle

Useful links

- BAMB –Building as material passports
- BECD – Built Environment Carbon Database
- Building to net zero: costing carbon in construction: Government Response to the Committee's First Report – Environmental Audit Committee
- CIRCuIT
- Climate action tracker 2023
- Climate Change Committee - the sixth carbon budget
- CWCT– How to calculate embodied carbon of facades
- Easi Guide Passivhaus Design
- European Union's Roadmap for Whole Life Carbon
- Greencore Homes – low carbon offsite construction
- IStructE How to calculate embodied carbon 2nd edition
- IStructE Lean design: 10 things to do now
- LETI Circular economy 1 pager
- LETI Climate emergency design guide
- LETI Embodied Carbon Primer
- LETI opinion piece - Circular economy and carbon in construction
- LETI opinion piece – operational carbon in whole life carbon assessments
- LETI The Whole Life Carbon Alignment paper
- Net Zero Carbon Toolkit
- Net Zero Carbon Building Standard Pilot
- Net Zero: The UK's Contribution to Stopping Global warming
- Part B building Regulations Volume 1: Domestic
- Part Z proposed amendment to building regulations
- Policy paper by Part Z group of experts , January 2024
- Places for Everyone - Joint development plan document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan
- RIBA 2030 climate challenge
- RICS Whole Life Cycle assessment 2017, 1st edition
- RICS Whole Life Cycle Assessment 2023, 2nd edition
- Services Guide - Zero Carbon Hub
- Shading for housing - Design guide for a changing climate
- The concrete centre– Sustainable concrete
- The construction material pyramid
- Thermal Bridging Guide - Zero Carbon Hub
- TM52 - The limits of thermal comfort: avoiding overheating
- TM54 - Evaluating operation energy use at the design stage
- TM59 - Design methodology for the assessment of overheating risk in homes
- TM65 - Embodied carbon in building services
- UK Net Zero Carbon Building Standard - Pilot
- UKGBC - Circular economy guidance for construction clients
- UKGBC - Circular economy metrics for buildings
- UKGBC – Net zero whole life carbon technical study
- Understanding overheating - where to start - NHBC

Accessibility information

GMCA acknowledges that this guidance is not fully accessible as it would be a disproportionate burden to do so, particularly as it is extremely technical, contains a high number of illustrations and tables, and is used by a low number of people.

Please contact planningandhousing@greatermanchester-ca.gov.uk if you require an accessible version of this document. GMCA will consider your request and aim to get back to you within seven working days.

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