



Llywodraeth Cymru
Welsh Government

APPROVED DOCUMENT

Net Zero suite of Documents

Whole Life Carbon Assessment

PART Z

2025

PAGE LEFT BLANK

Table of Contents

SECTION 0 – INTRODUCTION.....	1
SECTION 1 – GENERAL PRINCIPLES.....	2
SECTION 2 – REGULATORY REQUIREMENTS	3
2.1 Applicability	3
2.2 WLCA Reporting Stages	3
2.3 Competency Requirements for NetZero Consultants and Officers	6
SECTION 3 – MINIMUM DATA REQUIREMENTS	8
SECTION 4 – PERFORMANCE STANDARDS.....	10
4.2 Upfront Embodied Carbon Limits (Modules A1-A5).....	10
4.3 Operational Energy Intensity Targets (Modules B6-B7)	11
4.4 Circular Economy Indicators	12
4.5 Data Quality Requirements	13
4.6 Review Cycles	14
SECTION 5 – ENFORCEMENT.....	15
5.2 Legal and Contractual Basis	15
5.3 Enforcement During Design Stages	15
5.4 Enforcement During Construction (RIBA Stage 5)	16
5.5 Enforcement at Handover (RIBA Stage 6)	17
5.6 Enforcement During Operation (RIBA Stage 7)	17
5.7 Persistent or Severe Non-Compliance	18
APPENDIX A – WLCA COMPLIANCE CHECKLIST.....	19
RIBA Stage 2 — Concept Design WLCA Checklist	19
RIBA Stage 3 — Developed Design WLCA Checklist	19
RIBA Stage 4 — Technical Design WLCA Checklist	20
RIBA Stage 5 — Construction WLCA Checklist	20
RIBA Stage 6 — Handover WLCA Checklist	21
RIBA Stage 7 — Operation and End-of-Life WLCA Checklist	21
Submission & Data Handling Checklist.....	22
APPENDIX B – DEFINITIONS AND KEY TERMS	23
APPENDIX C – RECOGNISED PROFESSIONAL BODIES AND STANDARDS	28
REFERENCE LIST.....	29
BIBLIOGRAPHY	32

LIST OF TABLES

Table 1: Values are indicative and based on LETI (2021a) performance benchmarks. These will be assessed and adapted (if necessary) at review cycles 11

Table 2: Values are indicative and based on advancements in renewable technologies and a 100% decarbonised grid by 2035 (HM Government 2021) and accompanies by the 'Clean Power Plan 2030' (UK Government, 2024). These will be assessed and adjusted (if necessary) at review cycles. 12

Table 3: Values are indicative and based on LETI (2020) targets for 2030. These will be assessed and adjusted (if necessary) at review cycles. % measured by volume of material. 13

SECTION 0 – INTRODUCTION

NetZero is achieved when the accumulative quantities of carbon emissions produced from the associated activities attributing to the buildings’ creation, operation, maintenance and deconstruction both on and off-site result at zero or negative (HM Government, 2021).

- 0.1 Approved Document Part Z is the first of several documents in the Welsh Government’s new [Net Zero Suite](#). Together, these aim to unify Wales’s pathway to achieving [Net Zero by 2050](#).
- 0.2 In addition to this new document, all existing Approved Documents will be reviewed and updated from 2025 onwards to ensure consistency with Net Zero objectives.
- 0.3 This Approved Document outlines the roles, responsibilities, and requirements for complying with [Whole Life Carbon Assessment \(WLCA\)](#).
- 0.4 Part Z must be read in conjunction with all existing Approved Documents, including those within the Net Zero suite.
- 0.5 Part Z applies to new-build commercial and domestic buildings. For existing buildings and refurbishments, refer to [Approved Document Part Zz](#).

SECTION 1 – GENERAL PRINCIPLES

1.1 The principles of Part Z follow the **RICS Whole Life Carbon Assessment (2nd Edition, 2023)**, which aligns with **EN 15978** and **ICMS3 (2021)**.

1.2 WLCA provides a consistent method to measure carbon from concept to end-of-life ‘**cradle to grave**’, covering:

- A1–A5: Product and construction stage
- B1–B7: Use stage
- C1–C4: End-of-life
- D: Beyond building life cycle

1.3 Part Z adopts a **carbon reduction hierarchy** aligned with the ‘*Passiv Haus*’ standard (**Passivhaus Trust, 2021**): Fabric first; passive design; low-carbon technologies.

1.4 Part Z also adopts a **circular economy hierarchy**: Reduce; re-use; recycle; recover; disposal.

1.5 The principle of ‘**measurement before reduction**’ must be applied at the design stage to ensure a betterment on the initial design. It is crucial to continuously challenge the design to achieve more where possible.

1.6 Transparent and consistent carbon reporting is required throughout design, construction, and operation (**UKGBC, 2014**). This ensures that all data is readily available to feed back to carbon databases for future benefit (**Arnold et al., 2024**). This clause also holds the design to public accountability and scrutiny.

1.7 Cost plans aligned to **ICMS 3 (2021)** must accompany the carbon reporting and attributed to the individual components in order to produce high level comparison between cost and carbon friendly systems.

SECTION 2 – REGULATORY REQUIREMENTS

2.1 Applicability

- 2.1.1 From **2026**, WLCA is required for **commercial buildings** >100 m². By **2030**, WLCA applies to all commercial buildings.
- 2.1.2 From **2026**, WLCA is required for **domestic developments** with >5 **habitable units** or >10 **individual structures**. By **2030**, WLCA applies to all new domestic buildings.
- 2.1.3 Improving on **LETI (2020)**, by **2030** new construction must demonstrate increased use of re-usable and re-used materials detailed in Section 5.

2.2 WLCA Reporting Stages

- 2.2.1 WLCA reporting aligns with the **RIBA Plan of Work (2020)**. The *appointed* designer under **CDM 2015** submits reports to the Local Planning Authority (LPA). Registration with the LPA must occur at RIBA Stage 2, after which a **Net Zero Officer** is assigned.
- 2.2.2 RIBA Stage 2 submission must include:
 - a. Scope of works
 - b. Spatial requirements
 - c. Intended use
 - d. Upfront, in-use, and end-of-life carbon targets (kgCO₂e/m² GIA)

- e. Preliminary Module D end-of-life strategy

2.2.3 RIBA Stage 3 submission must include:

- a. Developed design benchmark
- b. Cost plan based on current design
- c. Accepted Environmental Product Declarations (EPDs) (EN 15804+A2), or comparable product EPDs, or TM65 for services (**CIBSE 2021**) where unavailable must be used to develop the benchmarking exercise (**Arnold et al., 2024**).
- d. The **designer** must state the accepted EDP source. The designer is permitted to utilise multiple EPD databases if they conform to EN 15804+A2.

2.2.4 RIBA Stage 4 submission:

- a. At this stage it is deemed accepted that all materials must be specified, therefore an accurate WLCA benchmark can be produced.
- b. This will be the final WLCA benchmark.
- c. This WLCA will be used as the comparison benchmark for the project to assess and monitor the progress.
- d. Planning approval **cannot** be granted until the designer can accurately demonstrate to the LPA that the design aligns with Net Zero targets.

2.2.5 Construction Stage (RIBA Stage 5).

- a. At RIBA Stage 5, both the client and contractor must appoint qualified **Net Zero consultants**. These consultants are responsible for executing all obligated duties under Part Z.
- b. The contractor must deliver or better the RIBA Stage 4 WLCA benchmark and submit WLCA progress reports at appropriate intervals. These intervals can be after completion of each sub-

contract package or at agreed intervals at contract stage. If the latter is selected, then a report must be submitted no greater than at 10% progress intervals in line with the accepted programme of works. E.g., should a programme state a 52-week contract completion, a WLCA progress report should be produced < every 5.2 weeks. The WLCA must be accompanied by updated cost plans

2.2.6 Changes to design.

- a. Neutral or improved results can continue (with approval).
- b. Negative impact require formal justification to the LPA who have 10 days to respond.

2.2.7 Handover stage (RIBA Stage 6).

- a. Cost plans must accompany WLCA submissions at RIBA Stages 3 and 4 and be finalised at handover. It is appreciated that the accuracy of costs will only be truly realised during RIBA Stage 5, however the data collected will help drive more cost effective solutions for NetZero construction.
- b. At RIBA Stage 6, handover is approved only if the following comply or positively exceed with the project benchmark.
 - i. Modules A1–A5 comply.
 - ii. Module B1 performs as intended.
 - iii. Modules B2–B5 are jointly demonstrated by client and contractor.
- c. All O&M manuals and Net Zero documentation must be issued to the client/end-user, specialist equipment may require further support. Responsibility then transfers to the client post-handover albeit any clauses that stipulate otherwise in the projects main contract such as but not limited to limit of liability period.

- d. The LPA may issue incentives for exemplary performance where contractually defined. These can be presented as reduced tax rates.
- e. Failure to meet benchmarks will result in LPA-issued corrective actions or penalties such as but not limited to stand-alone or accumulative monetary fines.

2.2.8 Operation to end-of-life (RIBA Stage 7).

- a. From RIBA Stage 7, the client must submit quarterly operational carbon reports to the LPA for commercial buildings and annually for domestic buildings. These will feed public carbon databases to improve future management and operation (**Arnold et al., 2024**).
- b. At end-of-life, the owner must fulfil Modules C1–C4 and D1–D2 in line with the approved strategy detailed at RIBA stage 2 and developed throughout the project. The client and or contractor executing the end-of-life stage may apply to the LPA to alter the methodology.

2.2.9 Submission and Data Use.

- a. All submissions must be uploaded through a [Net Zero Portal](#) provided by the LPA as recommended by **Arnold et al., (2024)** which will feed into a Built Environment Carbon Database ‘BECD’ (**James Fiske, 2022**).

2.3 Competency Requirements for NetZero Consultants and Officers

2.3.1 **RICS (2023)** required consultants/assessors to be trained and qualified.

- 2.3.2 A relevant built environment qualification and/or 10+ years industry experience.
- 2.3.3 Chartered membership of a recognised professional body.
- 2.3.4 Demonstrate an understanding of RICS WLCA (2023).
- 2.3.5 From 2030, mandatory RICS WLCA Certificate + 10 hours annual [Continuous professional development \(CPD\)](#).

SECTION 3 – MINIMUM DATA REQUIREMENTS

3.1 Each WLCA should obtain the maximum amount of data at the disposal of the project. It is accepted that uncertainties will exist throughout the development of the project therefore **ICMS (2021)** and **RICS (2023)** suggests mandatory cost and carbon contingencies (applied to the total WLCA) are permitted. This document outlines maximum contingency weighting to accurate carbon data per RIBA stage:

3.3.1 <70% at Stage 2

3.3.2 <45% at Stage 3

3.3.3 <15% at Stage 4

3.3.4 <5% at Stage 5

3.3.5 0% by Stage 6

3.2 RIBA Stage 4 must include:

3.2.1 Gross internal area (m² and kgCO₂e/m²)

3.2.2 Project description and typology

3.2.3 Structural system and primary materials

3.2.4 Material quantities and associated carbon estimates

3.2.5 Material passports assigned to all design elements for monitoring compliance and status; i.e., in-use, recycled, re-used etc.

3.3 Carbon factors hierarchy:

3.3.1 EN 15804+A2 EPD

- 3.3.2 Industry-average EPD
- 3.3.3 Approved generic database

- 3.4 Module-by-module reporting (A–D) in kgCO₂e. [Sequestered carbon](#) and Module D must be reported separately as per LETI (2021b) and RICS (2023).

- 3.5 Module B requirements:
 - 3.5.1 Service life assumptions
 - 3.5.2 Maintenance and refurbishment cycles
 - 3.5.3 Operational energy by fuel type
 - 3.5.4 Carbon factors applied consistently; B-modules in kgCO₂e or kgCO₂e/m²; Operational energy calculated as kWh/m²/yr first before converting via its carbon factor; Water in m³ with carbon factors applied

SECTION 4 – PERFORMANCE STANDARDS

- 4.1 Performance standards provide numerical limits and benchmarks to support Wales's trajectory to Net Zero 2050. These limits will be reviewed on a five-year cycle (2030, 2035, 2040, 2045, 2050) with planned tightening to reflect national carbon budgets and BECD data.

4.2 Upfront Embodied Carbon Limits (Modules A1-A5)

- 4.2.1 **Embodied carbon** represents the larger contributor to carbon emissions in construction as greener sources of energy and renewable technologies are becoming more abundant. Embodied carbon accounted for 85% of residential builds, with 'grey infrastructure' (pavements, concrete, etc) totalling 88% of the 85% (**UKGBC, 2022a**). Embodied design carbon targets based on **LETI (2021a)** best practise performance for projects which was considered a 'C' rating (573 kgCO₂e/m²) as of 2021 rising to 'A' by 2030 (<350 kgCO₂e/m²).

- 4.2.2 Values expressed in kgCO₂e/m² GIA.

Table 1: Values are indicative and based on LETI (2021a) performance benchmarks. These will be assessed and adapted (if necessary) at review cycles

Building Typology	2026 Limit	2030 Limit	2035 Limit	2040 Limit	2050 Target
Domestic (new build)	650	350	200	100	<100
Commercial offices	900	350	250	200	<100
Industrial	1000	350	300	275	<150
Education	800	350	250	200	<100

4.3 Operational Energy Intensity Targets (Modules B6–B7)

4.3.1 **Operational carbon** will be reported as intensity targets as recommended by LETI, RIBA, RICS and BECD as it is not a fixed quantity and reluctant to change as the electric grid decarbonises. This enabled the calculation to measure the energy usage separately before multiplying by the recent carbon factor. Following implementation of Part Z, energy performance certificates (EPCs) will be reformed to be evaluated on energy usage performance rather than running cost to improve the actual energy performance reporting of buildings (**UKGBC, 2021**).

4.3.2 In addition, energy production must follow an energy hierarchy;

- a Reduce energy demand
- b Improve energy efficiency
- c On-site generation of renewables
- d District energy (radius <50 miles from site)
- e Utilisation of the electric grid

4.3.3 Value expressed in kWh/m²/year.

Table 2: Values are indicative and based on advancements in renewable technologies and a 100% decarbonised grid by 2035 (HM Government 2021) and accompanies by the ‘Clean Power Plan 2030’ (UK Government, 2024). These will be assessed and adjusted (if necessary) at review cycles.

Typology	2026 Target	2030 Target	2040 Target	2050 Target
Domestic	<55	<25	<10	<1
Offices	<45	<20	<5	<1
Schools	<45	<20	<5	<1
Industrial	<80	<40	<20	<10

4.4 Circular Economy Indicators

- 4.4.1 The **Circular Economy** Hierarchy must be adopted to execute Modules C1, C3 and Module D as per **LETI (2020; 2021b)**. Module D assesses the current design against future carbon benefits, such as its deconstruction, re-use and recyclability and adaptability. **UKGBC (2021; 2022b; 2023)** encourages local authorities to promote circular economies by reducing VAT to builds that retain existing structures and increasing VAT on new builds, encourage re-use of available resources and reduce consumption needs.

Table 3: Values are indicative and based on LETI (2020) targets for 2030. These will be assessed and adjusted (if necessary) at review cycles. % measured by volume of material.

Indicator	Minimum Requirement by 2030	Long-Term (2050) Target
Reused materials	>30%	>55%
Reusable content	>80%	>95%
Construction waste to landfill	<10%	<1%
Design for deconstruction compliance	Mandatory	Mandatory

4.5 Data Quality Requirements

4.5.1 To assist in the transition of Part Z, the presented tier system will enable a manageable target and provide grace periods to elevate all relevant parties to standard.

4.5.2 Tier 1 – High Quality (Required by 2035)

- a. Product specific EPDs (EN 15802+A2)
- b. Primary manufacturer data

4.5.3 Tier 2 – Medium Quality (2026-2035)

- a. Industry Average EDPs
- b. Verified generic databases

4.5.4 Tier 3 – Low Quality (phase out by 2028)

- a. Generic estimates
- b. Unverified industry averages

4.6 Review Cycles

4.6.1 A formal review of performance standards will occur every five years, informed by:

- a BECD national dataset
- b CIBSE national dataset
- c EPDs
- d LETI
- e RICS WLCA updates
- f Welsh Government Carbon budgets
- g Market readiness

SECTION 5 – ENFORCEMENT

- 5.1 This section outlines how the Local Planning Authority (LPA) enforces WLCA compliance throughout the project lifecycle in alignment with Part Z principles and Net Zero governance.

5.2 Legal and Contractual Basis

- 5.2.1 All parties (designer, client, contractor and any appointed consultants) are legally bound to comply with WLCA duties once registered with the LPA. WLCA submissions form a material planning consideration, and non-compliance constitutes a breach of planning conditions and Net Zero obligations.

5.3 Enforcement During Design Stages

- 5.3.1 Non submission or late submission; if WLCA reports are not provided at RIBA Stages 2, 3 or 4:
- a The LPA may pause planning
 - b The application may be deferred or refused
 - c A [notice of non-compliance](#) may be issued
- 5.3.2 Submission without meeting Net Zero alignment; if the WLCA fails to demonstrate alignment with Net Zero obligations:
- a. Planning approval cannot be granted

- b. Revised information must be resubmitted
- c. Continued failure may lead to application refusal

5.4 Enforcement During Construction (RIBA Stage 5)

5.4.1 Failure to submit WLCA progress reports; the responsible organisation may face:

- a Stand-alone monetary fines
- b Accumulative penalties for repeated non-reporting
- c Additional oversight imposed by the LPA

5.4.2 Failure to meet RIBA stage 4 benchmark; if WLCA progress reports show excessive carbon exceedance:

- a The LPA may issue [corrective action notices](#)
- b Further construction may be restricted until corrective action is demonstrated
- c Continued exceedance may result in financial penalties

5.4.3 Negative design changes not submitted for review; if changes negatively impact WLCA and are not reported:

- a Constituted a breach of Net Zero obligations
- b Restorative fines may be applied if the breach can be corrected
- c The LPA may require re-work or reinstatement at the contractor's expense

5.5 Enforcement at Handover (RIBA Stage 6)

5.5.1 Failure to meet benchmarks and modules A1-A5, B1, or B2-B5 fail to comply:

- a The LPA may withhold handover approval
- b Corrective works or offsetting measures may be mandated
- c Financial penalties may be issued

5.5.2 Incentives for exemplary performance where contractually defined:

- a The LPA may offer reduced tax rates
- b Recognition schemes may be applied

5.6 Enforcement During Operation (RIBA Stage 7)

5.6.1 Failure to submit operational carbon reports at the agreed intervals:

- a Financial fines
- b Increased inspection frequency
- c Formal warnings escalating to legal enforcement

5.6.2 End-of-life non-compliance; failure to deliver modules C1-C4 and D1-D2

- a May trigger legal penalties
- b May require remedial actions funded by the asset owner
- c May affect future planning permission for the owner/developer

5.7 Persistent or Severe Non-Compliance

5.7.1 Where breaches are repeated or severe in any of the WLCA stages:

- a The LPA may restrict future applications by the offending organisation or individual
- b Public disclosure for non-compliance may apply
- c Significant financial penalties may be issued
- d Mandatory training and awareness courses
- e In extreme cases, organisations or individuals may be blacklisted from the LPA jurisdiction and beyond.

APPENDIX A – WLCA COMPLIANCE CHECKLIST

RIBA Stage 2 — Concept Design WLCA Checklist

The designer must submit:

- ☐ Scope of works
- ☐ Spatial requirements
- ☐ Intended use and building typology
- ☐ Upfront, in-use and end-of-life carbon targets (kgCO₂e/m² GIA)
- ☐ Preliminary Module D end-of-life strategy
- ☐ Registration with LPA completed
- ☐ Net Zero Officer assigned

RIBA Stage 3 — Developed Design WLCA Checklist

The designer must submit:

- ☐ Developed design WLCA benchmark
- ☐ Updated cost plan aligned with current design
- ☐ Accepted EPDs (EN 15804+A2)
- ☐ Where product-specific EPDs unavailable: comparable EPDs used and justified

- ☐ Declared EPD sources (multiple databases permitted if EN 15804+A2 compliant)
- ☐ Confirmation that design aligns with RIBA Stage 2 carbon targets

RIBA Stage 4 — Technical Design WLCA Checklist

The designer must submit:

- ☐ Final WLCA benchmark for full materials specification
- ☐ Confirmation that the benchmark reflects the final design
- ☐ Cost plan updated and aligned with WLCA
- ☐ Evidence the design aligns with Net Zero requirements
- ☐ Submission to LPA for planning approval

Planning approval cannot be granted until WLCA alignment with Net Zero is demonstrated.

RIBA Stage 5 — Construction WLCA Checklist

Client and contractor must ensure:

- ☐ Qualified Net Zero consultants formally appointed
- ☐ WLCA progress reporting schedule agreed (sub-contract package completion or <10% programme intervals)

- ☐ WLCA progress reports submitted at agreed intervals
- ☐ Updated cost plans accompany each WLCA submission
- ☐ Each design change reassessed for WLCA impact
 - ☐ Neutral / improved: accepted
 - ☐ Negative: justification submitted to LPA for decision within 10 days

RIBA Stage 6 — Handover WLCA Checklist

The following must be demonstrated for approval:

- ☐ Modules A1–A5 comply with or exceed project benchmark
- ☐ Module B1 performance verified
- ☐ Modules B2–B5 jointly demonstrated by client and contractor
- ☐ Final cost plan submitted
- ☐ O&M manuals issued including all Net Zero documentation
- ☐ End-user support for specialist systems identified
- ☐ All WLCA information uploaded to the Net Zero Portal

RIBA Stage 7 — Operation and End-of-Life WLCA Checklist

Client must submit:

- ☐ Quarterly operational carbon reports to LPA
- ☐ Updates to public carbon databases (via BECD)
- ☐ Confirmation of operational performance against Module B benchmarks
- ☐ End-of-life WLCA strategy for Modules C1–C4 and D1–D2
- ☐ If methodology is altered: formal LPA approval requested

Submission & Data Handling Checklist

- ☐ All submissions uploaded to the Net Zero Portal
- ☐ All WLCA data synchronised with BECD
- ☐ All baseline, interim, and final WLCA records stored for audit
- ☐ All EPDs used are EN 15804+A2 compliant (or justified equivalents)

APPENDIX B – DEFINITIONS AND KEY TERMS

A

Approved Document Part Z – is a new improved document addressing the WLCA in terms of existing buildings and refurbishment projects.

C

- *Carbon reduction hierarchy* – is the series of chronological principles that prioritises the most impactful strategy first in terms of reducing carbon.
- *Circular economy* – is the principle of reducing wastage by re-using, recycling, and repurposing by maintaining resources in a continuous circuit of demand, supply, re-use.
- *Circular economy hierarchy* – is the series of chronological principles that prioritises the most impactful strategy in terms of the environment.
- *Commercial Buildings* – is a structure designed to accommodate a commercial activities, such as retail, catering, hospitality, industrial or service supply.
- *Continuous Professional Development* – is the processes of on-going training and education specific to your job role. It aims to refresh and develop your professional skills and intuition.

- *Corrective Action Notices* – is a legal notice that can be issued by your LPA instructing the responsible individual to correct a non-conforming element(s) of a building.

- *Cradle to grave* – is the term defined to capture the structure's existence in its entirety, both physically and conceptually (i.e., from initial design concept to demolition and beyond).

D

- *Designer* – is the designated agent responsible for the design/development of the structure. The designer will be named under the contract in line with the CDM regulations (2015). If not defined, it will default to the lead architect.

- *Domestic developments* – is a structure designed to accommodate residential usage. This could be in the form of a singular habitable unit or multiple habitable spaces that may be shared by multiple individuals or occupied under a singular person. The structure must include at least one sanitary welfare such as a WC and wash facilities, a kitchen, and a space for living/sleeping.

E

- *Embodied carbon* – is the total of greenhouse gas emissions associated with the material and construction process of a building and or product.

H

- *Habitable units* – is a unit designed to accommodate residential usage. This could be in the form of a singular habitable unit or multiple habitable spaces that may be shared by multiple individuals or occupied under a singular person. The structure must include at least one sanitary welfare such as a WC and wash facilities, a kitchen, and a space for living/sleeping.

I

- *Individual structures* – is a single structure, independent of another, typically built off foundations. In terms of 2.1.2 it refers to singular dwelling excluding multi-storey apartments which is defined as a structure with multiple habitable units.

M

- *Measure before reduction* – is the principle of quantifying a total quantity as a benchmark in order to better that figure.

N

- *Net Zero by 2050* – is the target set to become carbon neutral or negative by 2050.
- *Net Zero Consultant* – is a qualified person who is competent in managing and

advising the process of executing the WLCA and conforming to Net Zero requirements.

- *Net Zero Portal* – is an online portal managed and assigned by the LPA to collect, organise, and analyse WLCA processes. In addition, it creates a database

- *Net zero suite* – is the suite of documents issued by Llywodraeth Cymru / Welsh Government to achieve Net Zero by 2050.

- *NetZero Officer* – is a qualified and competent person, employed by the LPA to assess and monitor the project. They are the point of contact and representative for the LPA.

- *Notice of non-compliance* – is a notice handed by the LPA to the project informing the design and or construction is not complying with the project's requirements in regards to WLCA. This notice will usually be followed by a corrective action notice should the project not rectify the issues outlined in the notice of non-compliance within the given time frame.

O

- *Operational Carbon* - is the total of greenhouse gas emissions associated with the energy required to operate the building.

S

- *Sequestered Carbon* – is the carbon that is absorbed and stored within biological materials.

W

- *Whole Life Carbon Assessment* - is a holistic and comprehensive assessment to measure the greenhouse gas emissions associated with the building from cradle to grave and beyond.

APPENDIX C – RECOGNISED PROFESSIONAL BODIES AND STANDARDS

- BECDs
- CIBSE
- EPDs
- ICMS
- LETI
- PassivHaus
- RIBA
- RICS
- UKGBC

REFERENCE LIST

Arnold, W., Den Dekker, T., Giesekam, J., Godefroy, J. and Sturgis, S. (2024). An Industry-Proposed Amendment to the Building Regulations 2010: Proposed Document Z. [online] Available at: <https://part-z.uk/proposal> [Accessed 25 Nov. 2025]. Revision 2.

CIBSE (2021). TM65-Embodied Carbon in Building Services-A Calculation Methodology. https://www.cibse.org/knowledge-research/knowledge-portal/embodied-carbon-in-building-services-a-calculation-methodology-tm65?utm_source=chatgpt.com. Chartered Institution of Building Services Engineers.

GOV.UK (2015). The Construction (Design and Management) Regulations 2015. [online] Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/uksi/2015/51/contents> [Accessed 17 Nov. 2025].

HM Government (2021). Net Zero Strategy: Build Back Greener. [online] gov.uk. UK Government. Available at: <https://assets.publishing.service.gov.uk/media/6194dfa4d3bf7f0555071b1b/net-zero-strategy-beis.pdf> [Accessed 16 Nov. 2025].

ICMS (2021). ICMS: Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions Responses to consultation and basis for conclusions. [online] ICMS. Available at: https://www.rics.org/content/dam/ricsglobal/documents/standards/dec_2021_icms3_basis_for_conclusions.pdf [Accessed 25 Nov. 2025].

James Fiske (2022). White Paper - Our Philosophy V.3.0. [online] BECD. Available at: https://becd-cms.uksouth.cloudapp.azure.com/uploads/BECD_FINALNOV_22_b080019de6.pdf [Accessed 19 Nov. 2025].

LETI (2020). *LETI Embodied Carbon Primer*. [online] London: LETI. Available at:
https://www.leti.uk/_files/ugd/252d09_8ceffcbcafdb43cf8a19ab9af5073b92.pdf
[Accessed 17 Nov. 2025].

LETI (2021a). *Embodied Carbon Target Alignment: Letter bandings for embodied carbon in buildings*. [online] LETI Carbon Alignment. London: London Energy Transformation Initiative (LETI). Available at:
https://www.leti.uk/_files/ugd/252d09_25fc266f7fe44a24b55cce95a92a3878.pdf
[Accessed 25 Nov. 2025].

LETI (2021b). *Whole Life Carbon: Embodied carbon & operational energy one-pagers*. [online] LETI. London: London Energy Transformation Initiative. Available at:
https://www.leti.uk/_files/ugd/252d09_c4aa3410d7614e8d8b524e87b1b8fd2a.pdf
[Accessed 25 Nov. 2025].

Passivhaus Trust (2021). *What is Passivhaus?* [online] www.passivhaustrust.org.uk. Available at: https://www.passivhaustrust.org.uk/what_is_passivhaus.php [Accessed 26 Nov. 2025].

RIBA (2020). *RIBA Plan of Work 2020 Overview RIBA Plan of Work*. [online] <https://www.riba.org/work/insights-and-resources/riba-plan-of-work/>. London: RIBA. Available at:
<https://www.riba.org/media/syneeto/2020ribaplanofworkoverviewpdf.pdf> [Accessed 17 Nov. 2025].

RICS (2023). *Whole life carbon assessment for the built environment RICS PROFESSIONAL STANDARD*. [online] London: RICS. Available at:
https://www.rics.org/content/dam/ricsglobal/documents/standards/Whole_life_carbon_assessment_PS_Sept23.pdf [Accessed 16 Nov. 2025].

UK Government (2024). *Clean Power 2030 Action Plan: A new era of clean electricity*. [online] UK Government . Available at:
<https://assets.publishing.service.gov.uk/media/677bc80399c93b7286a396d6/clean-power-2030-action-plan-main-report.pdf> [Accessed 26 Nov. 2025].

UKGBC (2014). *Building Zero Carbon - The Case For Action* . [online] UK Green Building Council . Available at: <https://ukgbc.org/wp-content/uploads/2017/09/Final20Zero20Carbon20Non20Dom20201920Task20Group20report.pdf> [Accessed 26 Nov. 2025].

UKGBC (2021). *Net Zero Whole Life Carbon Roadmap: Summary for Policy-Makers*. [online] UKGBC - Net Zero Whole Life Carbon Roadmap The industry's pathway to net zero by 2050. London : UK Green Building Council. Available at: <https://ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-Summary-for-Policy-Makers.pdf> [Accessed 25 Nov. 2025].

UKGBC (2022a). *Building the Case for Net Zero: A case study for low carbon residential developments*. [online] UK Green Building Council. Available at: <https://ukgbc.org/wp-content/uploads/2022/02/08737-Exec-Summary.pdf> [Accessed 26 Nov. 2025].

UKGBC (2022b). *Insights on How Circular Economy Principles Can Impact Carbon and Value*. [online] UK Green Building Council. Available at: <https://ukgbc.org/wp-content/uploads/2022/08/Whole-Life-Carbon-Circular-Economy-Report.pdf> [Accessed 29 Nov. 2025].

UKGBC (2023). *A Pathway to Net Zero for the UK Built Environment Net Zero Whole Life Carbon Roadmap Progress Report*. [online] UK Green building Council. Available at: <https://ukgbc.org/wp-content/uploads/2023/12/Progress-Report-Roadmap-December.pdf> [Accessed 26 Nov. 2025].

BIBLIOGRAPHY

BREEAM (2025). BREEAM certification from BRE - BREEAM - Liferay DXP. [online]

BREEAM. Available at: <https://breeam.com/> [Accessed 26 Nov. 2025].

Passipedia (2010). The world's first Passive House, Darmstadt-Kranichstein, Germany [online] Passipedia.org. Available at:

https://passipedia.org/examples/residential_buildings/multi-family_buildings/central_europe/the_world_s_first_passive_house_darmstadt-kranichstein_germany [Accessed 26 Nov. 2025].

Passive House Institute (2019). Passivhaus Institut. [online] Passivehouse.com.

Available at: <https://passivehouse.com/> [Accessed 26 Nov. 2025].

UK Green Building Council (2024). UKGBC - The UK Green Building Council. [online]

UKGBC. Available at: <https://ukgbc.org/> [Accessed 26 Nov. 2025].

UKGBC (2017). Developing a Client Brief. [online] UK Green Building Council. Available

at: <https://www.ukgbc.org/wp-content/uploads/2017/09/UK-GBC-EC-Developing-Client-Brief.pdf> [Accessed 29 Nov. 2025].