

BIOGENIC
STORED
CARBON
QUOTIENT

Grown in Britain Biogenic Stored Carbon Quotient Certification Standard

Version control

Date	Version no.	Summary of changes	Approved by
13/5/2026	1.0		SH

Authors

The Biogenic Stored Carbon Quotient Standard has been written by Grown in Britain and co-authored by Charlie Law FCIOB, MISEP, CEnv (TDUK) and Morwenna Spear BSc, PhD, Research Fellow (Bangor University).

Contents

Grown in Britain Biogenic Stored Carbon Quotient Standard 1
Introduction 1
Scope 2
References 3
Definitions 4
General Requirements 5
1.0 Management, Procedures, Responsibility and Record Keeping 5
2.0 Building typologies 5
3.0 Provenance/Origin of materials/Traceability 5
4.0 Stored Carbon calculations 6
5.0 Additionality 8
Appendix 1 Calculating biogenic content for wood and other biogenic materials 9
Appendix 2 Baselines for building typologies under normal practice construction 11
Appendix 3 DNSH Criteria 12
Appendix 4 Key considerations 12
Scheme Rules 13

Grown in Britain Biogenic Stored Carbon Quotient Standard

Introduction

As the construction industry intensifies its efforts to mitigate climate change, the role of biogenic carbon storage in building materials—particularly wood and wood-based products—has become increasingly significant. The Biogenic Stored Carbon Quotient Standard (BSCQ) provides a robust, science-based framework for quantifying and reporting the carbon stored in construction projects.

Within this framework, the Standard provides a certified method for quantifying the biogenic carbon stored within a building by assessing the carbon sequestered in timber and other biobased materials at time of building project design, completion and handover. The Standard enables projects to demonstrate the carbon storage contribution of biobased construction materials in a credible and comparable way.

Alongside independent calculations, the RICS Whole Life Assessment for the Built Environment methodology (or equivalent procedure based on EN 15978) is an approved tool for calculating the biogenic stored carbon within a project to ensure consistent, transparent and verifiable measurement of carbon impacts.

The BSCQ Standard adopts these components to ensure consistency, transparency, and scientific rigor in carbon accounting for construction projects.

By implementing this Standard, construction projects can credibly demonstrate their contribution to climate change mitigation through long-term carbon storage.

Social Value Integration (PPN 002 Social Value Model)

In alignment with the UK Government's Procurement Policy Note (PPN) 002, this Standard incorporates social value as a core component of carbon-related decision-making. This ensures that carbon storage is not only environmentally beneficial but also socially impactful.

Scope

Grown in Britain's Biogenic Stored Carbon Quotient Certification covers stored carbon in all biogenic and/or biobased materials (where sufficient data is available to result in a meaningful calculation) in all construction projects with a suitable lifetime, relevant baseline and which comply with the BSCQ requirements.

In order to be eligible for certification, there must be a Grown in Britain timber element included in the calculation.

Social value will be included and determined by the UK Government's Social Value criteria.

MRV (monitoring, reporting and verification) will be robust enough to enable the outputs of the calculation to be monetised/carry a financial value in terms of credits.

This Standard can apply to:

- Developers
- Contractors
- Architects
- Designers
- Financiers

in connection with new build or retrofit/refurbishment activity that incorporates biogenic carbon into structures.

There are three levels available for the BSCQ Certification Scheme, as follows:

- Level 1 is a fixed life duration method for structural elements and insulation
- Level 2 is a fixed life duration method for all components within scope (see above)
- Level 3 is an activity specific duration method, requiring greater information but allowing consideration of long service lives of any building component, providing that sufficient evidence is available to demonstrate this claim.

References

ISO 13391-1:2025 Wood and wood-based products – Greenhouse gas dynamics Part 1: Framework for value chain calculations

Regulation (EU) 2024/3012 of the European Parliament and of the Council of 27 November 2024 establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products (CRCF)

BREEAM | Sustainable Building Certification

SKArating Offices Environmental Assessment Scheme

WELL - International WELL Building Institute | IWBI

EPD Database : Timber Development UK

2025 Embodied Carbon Data for Timber Products: Timber Development UK

Timber and Embodied Carbon: Timber Development UK

BS EN 16449:2014 - Wood and wood-based products — Calculation of the biogenic carbon content of wood and conversion to carbon dioxide

BS EN 15978:2011 - Sustainability of construction works — Assessment of environmental performance of buildings — Calculation method

RICS Whole_life_carbon_assessment_PS_Sept23.pdf

PAS2050:2011

SCSS School Measuring and Reporting Waste in the Built Environment: A Practical Guide.

BRE (2023) Revised Product Category Rules PN 514, v2

ISO 15686-1:2011 Buildings and constructed assets - Service life planning. Part 1: General principles and framework.

Responsible Wool Standard (RWS) - Textile Exchange

van den Oever et al. (2024) Bio-based building products in the Dutch Environmental Database (NMD))

CIWM-CDE-TAG-Waste-Wood-Guide-v2.0.pdf

Price & Myers - The Sixth Edition of the Price & Myers Embodied Carbon Database

Definitions

Harvested Wood Products (HWPs) - wood based materials that are extracted from forests/woodlands and processed into usable goods

Reference service life (RSL) – service life of a product, component, assembly or system which is known to be expected under a particular set of in-use conditions and which can form the basis for estimating the service life under other in-use conditions

Estimated service life (ESL) – service life that a building or parts of a building would be expected to have in a set of specific in-use conditions, determined from reference service life data after taking into account any differences from the reference in-use conditions

Structural elements – elements within the superstructure of the building that … but excluding cladding and façade elements, and joinery elements (e.g. windows and doors).

Insulation products – elements within the superstructure that contribute to thermal insulation of the building. Note that this excludes other insulation materials such as pipe lagging or … where it is not incorporated within the wall, roof, ceiling or equivalent fabric of the building).

Temporary carbon storage – Carbon storage in products means any practice or process that captures and stores atmospheric or biogenic carbon for at least 35 years in long-lasting products, allows on-site monitoring of the carbon stored and is certified throughout the monitoring period

Permanent carbon removal - Permanent carbon removal means any practice or process that, under normal circumstances and using appropriate management practices, captures and stores atmospheric or biogenic carbon for several centuries, including permanently bound carbon in products, and which is not combined with enhanced hydrocarbon recovery

Construction projects – A construction project is any project where building, civil engineering or engineering "construction work" is carried out, as defined by The Construction (Design and Management) Regulations 2015

Biogenic material – biogenic carbon is derived from biomass which has recently absorbed CO_2 from the atmosphere

Biobased material – biobased material is wholly or partly derived from materials of biological origin, excluding materials embedded in geological formations and/or fossilized. The type of organism is not limited to plants; animals and lower forms of life are also composed of biomass.

DNSH - (Do No Significant Harm) is a core requirement of the EU Taxonomy regulation. This is included in the BSC standard to ensure that any biobased materials are considered environmentally sustainable. Please refer to Appendix 2 for specific criteria.

General Requirements

1.0 Management, Procedures, Responsibility and Record Keeping

1.1 There must be at least one Grown in Britain timber element included in the design and construction of the project

- For projects applying after completion this is a recommendation
- For projects commissioned after 1st June 2026 this is a requirement

1.2 There must be a written control system in place that defines the responsibility, training, procedures and records to demonstrate compliance with this Standard.

1.3 For all biogenic materials, there must be a record of the chain of custody of the material, back to its country of origin. If chain of custody cannot be evidenced, then this material cannot be used in any calculations.

1.4 There must be a written Project Plan, which contains all the required information to demonstrate compliance with the Standard including:

- Project design drawing and description highlighting all materials to be considered for the overall calculation (Reference EN 15978, as interpreted by the RICS WLCA PS)
- Sourcing policies for the highlighted materials, including secondary suppliers in case of supply chain interruptions
- Statement of categories to be considered – HWP, other biogenic materials and Social
- Stored Carbon Calculations for each type of biogenic material
- Additionality baseline scenario

1.5 All records required to demonstrate compliance with this Standard must be retained for a minimum of 5 years from practical completion.

2.0 Building typologies

All buildings may be considered using this Standard, so long as they have a sufficient lifespan and contain biogenic carbon in materials such as timber, wood panels, natural fibre insulation materials.

2.1 A suitable baseline must be available for equivalent buildings with 'normal practice construction'. Please see appendix 2 for a detailed table of typology baselines

2.2 Building typologies will be named in accordance with the SCSS School Measuring and Reporting Waste in the Built Environment: A Practical Guide

2.3 The biogenic materials must meet the DNSH criteria of EU CRCF

2.4 Building elements will be named in accordance with the RICS WLCA PS and RICS Building Element Categories

3.0 Provenance/Origin of materials/Traceability

Legality

3.1 All timber and timber products must have been legally harvested in accordance with the Timber and Timber Products (Placing on the Market) Regulations.

Sustainability of wood and wood products

3.2 Sustainability of wood and wood-based products must be demonstrated by third party certification recognised by UK Timber Procurement Policy e.g. Grown in Britain, FSC, PEFC.

3.3 To demonstrate UK provenance, timber and timber products used must be certified as Grown in Britain.

3.4 Biogenic materials from sources other than wood can also be considered where they form a component with sufficient lifespan (e.g. natural fibre insulation).

3.5 The non-wood biogenic materials must be produced in a legal and sustainable manner, and records must be available to demonstrate this requirement as defined by the DNSH criteria. If legality and sustainability cannot be evidenced, then this data cannot be used in any calculations.

These may include:

- Straw
- Hemp (and Hempcrete)
- Wool
- Reed/Thatch
- Flax
- Mycelium

Suitable standards to demonstrate legality and DNSH compliance will vary with material type, e.g. for sheep's wool the Responsible Wool Standard may be used.

4.0 Stored Carbon calculations

4.1 Project plans and whole life carbon assessment, or upfront carbon assessment must clearly indicate the total volume or mass of biogenic material

4.2 Biogenic carbon calculations must be carried out in accordance with BS EN 15978:2011 'Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method' further interpreted by RICS Professional Standard: 'Whole Life Carbon Assessment for the built environment' version 2. RICS approved tools may be used for this calculation.

4.3 The mass or volume of biobased material in a project must be calculated and recorded, broken down by material type and location within the building. This is then converted to the weight of biogenic carbon. Calculation methods for biogenic carbon content of wood and non-wood biobased materials are given in Appendix 1.0.

4.4 The gross internal floor area (GIFA) of the project must be reported

4.5 Only biobased materials remaining in the building at handover will be considered to have a carbon storage effect. For example, packaging, formwork and temporary site timbers must be excluded.

4.6 The biogenic carbon quantities will frequently be available using Environmental Product Declarations (EPDs) for the product. If no EPD is published then the biogenic carbon

quantity can be calculated according to the method outlined in Appendix 1, which is commonly used in life cycle assessment (LCA).

4.7 Within Level 1 (Default method) only the structural and insulation elements of the building are deemed to have a service life of 35 years or above and be at low risk of alteration or removal. All components within these elements will be handled as having a service life of 35 years.

4.8 Within Level 2 (Fixed life duration method) the service life of all components to be included must be 35 years or above and be at low risk of alteration or removal. It is possible to include a greater range of building elements than in Level 1. All will be handled as having a service life of 35 years only. It is required to supply evidence to demonstrate the service life of at least 35 years can be achieved for each eligible building component.

4.9 Within Level 3 (Activity specific duration) it is possible to declare carbon storage for longer periods than 35 years. This nominated duration will be clearly stated, and a single lifespan selected as the certification point for all eligible elements within the building or project. It is required to supply evidence to show the service life of each eligible building component can achieve or exceed the stated certification duration.

- Within Level 3 it is possible to declare carbon storage for a nominated period, for example 60 years. This would allow building elements with a service life of 60, 75 and 100 years, but omit products with a service life less than the chosen service life. However, gathering data on the lifespan of all elements within the building will allow the applicant to consider the desired nominated lifespan, for example, whether all building elements already exceed the 35 years eligibility for Level 1 or 2 application. It will also boost awareness of other choices, for example, to consider the benefit of material selection and good design practice to increase element longevity and carbon storage.

<u>Level 1 Calculation</u>

1. Calculate the biogenic carbon (P_{C02} values, as outlined in appendix 1, or within your RICS WLCA) for all structural elements and insulation with a service life of 35 years or above
2. Add together all P_{C02} values, this gives you the total stored biogenic carbon

For the additionality value

3. Take your gross floor area, multiply by the baseline value (as found in Appendix 2 Table 3).
4. Take your outcome value from step 2 and subtract the value from step 3, this gives your additionality value.

<u>Level 2 Calculation</u>

1. Calculate P_{C02} values (as outlined in appendix 1, or within your RICS WLCA) for all components with a service life of 35 years or above
2. Add together all P_{C02} values, this gives you the total stored biogenic carbon

For the additionality value

3. Take your gross floor area, multiply by the baseline value (as found in Appendix 2 Table 3).
4. Take your outcome value from step 2 and subtract the value from step 3, this gives your additionality value.

Level 3 Calculation

1. Determine the point in time (nominated certification time) that you wish the project to be certified to (X years).
2. Calculate P_{C02} values (as outlined in appendix 1, or within your RICS WLCA) for all elements with a service life of X years or above
3. Add together all P_{C02} values, this gives you the total stored biogenic carbon

For the additionality value

4. Take your gross floor area, multiply by the baseline value (as found in Appendix 2 Table 3).
5. Take your outcome value from step 3 for the structural and insulation elements and subtract the value from step 4, this gives your additionality value for these elements. All other elements are deemed to be additional. The additionality value must be stated alongside the nominated certificate lifespan (X years) to be certified.

5.0 Additionality

Additionality can only be proved if the project is able to demonstrate that the stored carbon claims are real and measurable.

5.1 Additionality must be proved through project plan documentation (clause 1.3) demonstrating the difference between the project plan and a baseline scenario.

5.2 The GIFA of the project is multiplied by the appropriate baseline stored carbon factor for the building type (as set out in Appendix 2 Table #).

The baseline stored carbon quantity represents the typical average quantity of timber in a building in the UK, expressed as stored carbon.

5.3 The baseline carbon value calculated in 5.2 is then subtracted from the total stored carbon calculated for the building, as set out in Section 4.

Only the timber within the project that is additional to the baseline timber quantity is eligible to be reported as the stored carbon within the BSCQ.

This additionality calculation is required for all levels of the BSCQ calculations.

Appendix 1 Calculating biogenic content for wood and other biogenic materials

For the BSCQ Standard, biogenic carbon content data is required. This can be found in the RICS whole life carbon assessment, or from EPDs for the product, or via the calculations below

The following formulae cover different input data and product types.

Where the input data for the wood product is given in volume basis, the biogenic content can be calculated using the formula below (if data is in volume) (as published in BS EN 16449)

$$P_{CO2} = \frac{44}{12} \times c_f \times \frac{\rho_\omega \times V_\omega}{1 + \frac{\omega}{100}}$$

P_{CO2} is biogenic carbon stored (as kg of CO_2 equivalent)

c_f is the carbon fraction of oven dry wood (default value 0.5)

ω is the moisture content of the wood product (%)

ρ_ω is the density of woody biomass at that moisture content

V_ω is the volume of the product at that moisture content

Note that for not-solid wood products V_ω = VP x percentage of wood, where VP is the gross volume of the wood based product

(CIWM-CDE-TAG-Waste-Wood-Guide-v2.0.pdf

Where the input data for the wood product is given on a weight basis, the biogenic content can be calculated as below

$$P_{CO2} = \frac{44}{12} \times c_f \times \frac{M_\omega}{1 + \frac{\omega}{100}}$$

M_ω is the mass of the wood in the product at that moisture content

Note that for products where wood is only a percentage of the total mass M_ω = MP x percentage of wood, where MP is the gross mass of the wood based product

The table below presents some relevant c_f values for wood products, relating to the formulas above.

	Kg Carbon per kg material
Softwoods	0.498
Hardwoods	0.502
Cellulose	0.444
Recycled paper	0.433
Accoya	0.518
Thermally modified wood	0.529
Wood fibre insulation (dry process, loose fill)	0.498

Table 1 – This table demonstrates c_f values for wood-based materials for use in the biogenic carbon storage calculation for wood-based materials (van den Oever et al. (2024) Bio-based building products in the Dutch Environmental Database (NMD))

Where the input data for the non-wood bio-based product is given on a weight basis, the biogenic content of non-wood products can be calculated using the equation below:

$$P_{CO2} = \frac{44}{12} \times c_f \times \frac{M_\omega}{1 + \frac{\omega}{100}}$$

M_ω is the mass of the biobased material in the product at that moisture content

Note that for products where the biobased element is only a percentage of the total mass M_ω = MP x percentage of biobased material, where MP is the gross mass of the biobased product

The table below presents some relevant c_f values for biobased materials, which can be used within the formula above:

	Kg Carbon per kg material
Straw	0.467
Hemp bast fibre	0.443
Hemp shives	0.488
Sheep's Wool	0.505
Reed/Thatch	0.480
Flax	0.452
Mycelium	0.485
Cork	0.626
Expanded cork insulation	0.685
Hempcrete	See below

Table 2 – This table demonstrates c_f values for non-wood based materials for use in the biogenic carbon storage calculation for non-wood based materials (van den Oever et al. (2024) Bio-based building products in the Dutch Environmental Database (NMD))

For a product such as hempcrete where the biobased element is a proportion of the total product, the adjustment of total product quantity (MP) for the percentage of biobased material (M_ω) is used. The quantity of biobased carbon within the hemp shives is then calculated using the c_f value of 0.488 for hemp shives, taken from the table, in the formula above. For this reason, no c_f value has been given for the hempcrete itself – as percentage hemp within the product varies from blend to blend and between manufacturers.

Appendix 2 Baselines for building typologies under normal practice construction

Buildings	Baseline Stored $kgCO_2e/m^2$ GIA New Build	Baseline Stored $kgCO_2e/m^2$ GIA Refurb	Definition Source
Public Sector Residential (Homes) – Low Rise (up to 3 stories)	51	20	SCSS (NZCBS)
Public Sector Residential (Homes) – Mid Rise (4-6 stories)	9	10	
Public Sector Residential (Homes) – High Rise (7 Stories and over)	1	0	
Private Sector Residential (Homes) – Low Rise (up to 3 stories)	51	20	SCSS (NZCBS)
Private Sector Residential (Homes) – Mid Rise (4-6 stories)	9	10	
Private Sector Residential (Homes) – High Rise (7 Stories and over)	1	1	
Commercial Offices (Offices)	17	5	SCSS (NZCBS)
Commercial Retail (Retail)	17	5	SCSS (NZCBS)
Industrial (Storage and Distribution)	0	0	SCSS (NZCBS)
Education (Schools/Higher Education)	51	8	SCSS (NZCBS)
Healthcare	5	6	SCSS (NZCBS)
Leisure (Sport and Leisure)	5	0	SCSS (NZCBS)
Cultural and Entertainment	10	10	NZCBS
Transport	5	0	SCSS
Public Buildings	17	10	SCSS
Mixed Use	3	2	SCSS
Datacentres	0	0	NZCBS
Hotels	5	0	NZCBS
Science and Technology	9	0	NZCBS
Commercial Other	17	5	SCSS
Buildings Other	5	0	SCSS

Table 3 – This table demonstrates baseline values for different building typologies which can be used alongside the gross floor area to calculate the biogenic carbon storage additionality within an application. Price & Myers - The Sixth Edition of the Price & Myers Embodied Carbon Database

Appendix 3 DNSH Criteria

In the absence of a sustainability certification (including but not limited to GIB, PEFC, FSC, Responsible Wool Standard) for each material used within the project and calculations, we will be referencing the following DNSH criteria:

1. Biobased materials must be resilient (e.g moisture-resistant, not prone to climate-amplified degradation such as mould or pests) or include mitigation measures
2. All animal-based materials must be sourced in a manner that ensures high standards of animal welfare are upheld throughout the supply chain (standards such as Responsible Wool Standard (RWS) - Textile Exchange can qualify for this)
3. Harvesting biobased materials must not contribute to
    - Water pollution
    - Depletion of groundwater
    - Degradation of aquatic ecosystems
4. Biobased material sourcing must avoid
    - Deforestation
    - Land-use change harming habitats
    - Removal of residues critical for soil health
    - Harvesting practices that reduce ecosystem integrity
5. Biobased materials must be:
    - Recyclable, degradable or reusable
    - Avoid generating non-recyclable composites
    - Document durability and end-of life pathways
    - Avoid designs that prevent material recovery
    - Must not contain hazardous chemicals
    - VOC emissions must remain low
    - Additives used to stabilise or preserve biomass must comply with chemical safety limits

All sites will be required to demonstrate the criteria laid out in point 4 for all materials, even if previously certified.

Appendix 4 Key considerations

EU TAP document makes some key recommendations, connected with CRCF methods.

These are listed below to allow checking during the BSCQ Standard drafting process:

- Prioritise structural wood and biobased insulation as key recommendations
- Eventually develop harmonised, standardised baselines linked to the EPBD whole life carbon data

- Ensure consistency among EPBD, CPR, (UK CPR) and EN standards to guarantee credible quantification
- Integrate credible uncertainty management at product level and sustainability safeguards at both product and building level
- Allow for liability-free termed certificate issuance and require robust liability mechanisms for upfront issuance of certificates

Scheme Rules

1. The applicant must complete a Grown in Britain application including calculations where a whole life assessment is unavailable
2. The applicant must consent to Grown in Britain terms and conditions
3. A Grown in Britain Biogenic Stored Carbon Quotient applicant must undergo both design and completion stage audit and assessment by a Grown in Britain approved auditor. The approved auditor list is available on the Grown in Britain website.
4. The applicant shall formally accept the audit report after which it will be sent to the certification body. The certification body will evaluate and submit a conformity report to the audited company and auditor.
5. The certification body will issue the appropriate Grown in Britain certificate indicating the project details, the total stored biogenic carbon (standalone and per square metre), gross floor area and total lifespan included under the certification.
6. If minor non-conformances are found during an inspection, corrective measures are due no more than 60 days following the audit. Where corrective measures are not put in place in accordance with this deadline the certificate may not be issued