# CarbonLÄND

## Methodology for certification of bio-based carbon storage in buildings under the EU Carbon Removal and Carbon Farming (CRCF) regulation

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Baden-Württemberg
Ministerium für Ernährung,
Ländlichen Raum und Verbraucherschutz

HOLZBAU OFFENSIVE
BADEN-WÜRTTEMBERG

**Methodology Disclaimer**
**(Status as of January 2026)**

This methodology reflects the regulatory and technical framework as of January 2026.

Any official amendments, delegated acts, guidance documents, or further developments related to the Certification Framework for Permanent Carbon Removals, Carbon Farming and Carbon Storage in Products (CRCF) adopted after January 2026 have not been considered in this version of the methodology. Future updates of the CRCF framework may require corresponding revisions.

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# Definitions and Acronyms

**Additionality**

According to the CRCF, a project activity is considered to be additional if “it goes beyond Union and national statutory requirements at the level of an individual operator”. In case a standardised baseline is used, complying with this condition is sufficient (CRCF Article 5(2)).

**Baseline**

Quantitative profile of the carbon removal and storage capacity under a business-as-usual scenario. This methodology applies a standardised baseline approach.

**BIM**

Building Information Model is a detailed, digital prototype of a building or infrastructure object.

**BNB**

Assessment System for Sustainable Building is an instrument for planning and assessing sustainable building projects in Germany.

**BOM**

Bill of Materials is a detailed list of all raw materials, components and, if applicable, tools and technical equipment required for the manufacture of a product – in this case a building – including quantities.

**BOQ**

Bill of Quantities is a document that lists the materials, quantities and associated costs of a construction project in detail. It serves as the basis for cost estimates, tenders and construction invoices.

**Co-benefits**

According to the Regulation (Article 7, paragraph 3), owners of certifiable buildings can voluntarily report co-benefits for environmental objectives, such as the protection and restoration of biodiversity and ecosystems, soil quality, prevention of land degradation, adaptation to climate change, reduction of greenhouse gas emissions, water quality, a zero-pollution policy or the circular economy. Reporting these co-benefits, it is expected to increase the economic value of the certified units, potentially leading to higher revenues for the owners.

**CR*total***

The indicator is used to calculate the carbon removal/storage capacity of biogenic building materials in a construction project. The calculation is essential for the quantification of the Temporary Net Carbon Removal Benefit (TNCRB) and for the creation of Carbon Removal Units (CRUs), the value is always negative.

**CR*baseline***

Indicates the carbon removal/storage capacity under the baseline, the value is always negative.

**CRCF**

Carbon Removal Certification Framework, a.k.a. Carbon Removal and Carbon Farming regulation is a voluntary framework designed to support European carbon storage and removal projects. Projects eligible for certification shall comply with the framework's QU.A.L.ITY criteria.

**CRU**

A Carbon Removal Unit is a tradable unit representing one ton of $CO_2$ being stored in building materials used in project. However, the removal process itself occurs in forestry or agriculture.

**DQI**

The Data Quality Index is an instrument of the Level(s) framework for assessing data quality.

**EPD**

An Environmental Product Declaration is a document that standardizes the reporting of a product's environmentally relevant properties in accordance with ISO 14025 and EN 15804.

**EU**

European Union

**EU-ETS**

European Union Emission Trading System is a cap-and-trade system for trading emission rights, aimed at reaching the EU's total greenhouse gas emissions targets in a cost-effective manner.

**FSC**

The Forest Stewardship Council is an internationally recognized non-profit organization that provides a certification system for the sustainable management of forests.

**GK**

Municipality size class, an abbreviation used in German fire department statistics to categorize municipalities based on their size and population.

**GHG*associated***

A key figure that represents the increase in direct and indirect GHG emissions due to the project activity.

**GoO**

Group of operators as defined under the CRCF Regulation (EU) 2024/3012 in preamble 16.

**HOAI**

Fee Regulation for Architects and Engineers is a regulation in Germany that defines the minimum and maximum rates for the remuneration of OAFarchitectural and engineering services.

**KG**

Cost group is a systematic classification of construction costs in Germany, defined by DIN 276.

**KrWG**

Circular Economy Act regulates waste management in Germany and promotes the circular economy by prioritizing waste avoidance, recovery and recycling.

**Long-term storage**

Durability under QU.A.L.ITY criteria. Liabilities, risks and monitoring are also covered in the same section.

**LCA**

Life cycle analysis is a method for evaluating the environmental impact of a product or process throughout its entire life cycle.

**Level(s)**

A voluntary EU framework for measuring and improving the sustainability of buildings, based on criteria such as environmental impact, energy efficiency and resource use.

**LOD**

Level of Detail refers to the degree of detail in a model, which varies from coarse to highly detailed depending on the project phase (up to LOD 500 – As-built).

**LP**

A Service Phase refers to the different stages of a construction project in Germany, as defined by the HOAI, covering the process from planning to completion.

**NKWS**

National Circular Economy Strategy is a concept of the German federal government that promotes a resource-conserving economy by strengthening the recycling and reuse of materials in order to minimize waste.

**NRF/ UFA**

Usable Floor Area (German: "Netto Raumfäche") refers to the area of a building that includes all heatable and usable rooms, as well as technical facilities and non-usable areas such as stairwells, as defined by DIN 277.

**NRB**

Non-residential buildings are structures not primarily used for residential purposes. These include office buildings, administrative buildings, industrial buildings, retail and commercial premises, as well as facilities such as schools, hospitals, and hotels.

**PEFC**

The Program for the Endorsement of Forest Certification is an international certification system that promotes sustainable forestry.

**QU.A.L.ITY**

A set of criteria for projects to comply with under the CRCF: Quantification, Additionality, Long-term Storage, and Sustainability

**SCC**

The Social Cost of Carbon (SCC) represents the estimated monetary value of the long-term economic, environmental, and social damages caused by the emission of one additional ton of $CO_2$ into the atmosphere. Within climate mitigation methodologies, the SCC is commonly used to quantify the societal benefits of avoiding or delaying $CO_2$ emissions.

**TNCRB**

Temporary Net Carbon Removal Benefit: The key figure represents the difference between the project's carbon removal/storage volume and the baseline, considering emissions generated throughout the project's life cycle. The calculation of TNCRB aims to quantify the carbon removal/storage benefit and demonstrate the project's additionality.

**RB**

Residential buildings are primarily used for housing people. These include single-family homes, apartment buildings, semi-detached houses, and terraced houses.

# 1. Introduction

This methodology was developed under the "TYR" research project with the aim to provide a structured approach for implementing the Carbon Removal and Carbon Farming (CRCF) Certification Regulation in the building sector of the State of Baden-Württemberg. It is designed in accordance with the CRCF's mandatory QU.A.L.ITY criteria—Quantification, Additionality, Long-term Storage, and Sustainability—and translates these principles into a transparent system for calculation, monitoring, and certification.

The methodology enables construction projects to demonstrate additional, verifiable carbon-storage benefits beyond regulatory requirements and to obtain Certificates of Compliance confirming ecological conformity. This methodology follows the definitions provided in the CRCF Regulation and treats removal and storage activities under these definitions as synonymous. Based on the actual quantities of carbon fixed in bio-based building materials, Carbon Removal Units (CRUs) can be calculated and allocated.

To ensure environmental integrity and alignment with EU and international best practice, the methodology integrates region-specific standardised and activity-based baselines, a risk buffer based on best practice and reversal-risk statistics (e.g. fire), and data-quality requirements based on Levels Data Quality Index (DQI).

All CRU calculations are based on the $CO_2$ equivalent storage volume of the building materials used for load-bearing structural elements and insulation. Safeguards such as a minimum service life are embedded: service life is determined from the relevant EPDs or, where unavailable, according to the "BNB Service Life of Building Components".

To support architects and project developers already in the planning phase, the detailed assessment framework, based on cost groups as per DIN 276, is set out in the main body of this methodology.

Each Certificate of Compliance and Carbon Removal Unit is issued ex post – i.e. only after "as-built" information has been provided to the service partner or directly to the certification body to complete the certification process.

This methodology is structured into two modules. Module 1 covers new buildings and extensions. Module 2 will address renovation projects. At the current stage, only Module 1 is included; Module 2 will be incorporated in a subsequent version of this guideline.

By applying this methodology, project developers, certification bodies and verification entities/schemes gain a clear and harmonised pathway to certify biogenic carbon storage in buildings, increase transparency and support compliance towards national, EU and global climate goals.

# 2. Applicability Conditions

This methodology applies exclusively to construction projects that meet all of the following conditions. The scope covers buildings and structures in which biogenic materials are significantly incorporated.

## Level 1 – Project Scope

**Geographic scope:** The construction project is located within the State of Baden-Württemberg (BW), Germany.

**Project types:** Currently eligible projects include **new buildings** and **building extensions** with construction start **on or after 01 January 2025 (Module 1).**

**Project lifetime:** at least 50 years.

**Building classes:** All building classes (GK 1–5) are eligible, including special buildings (Sonderbauten) such as schools, military facilities and similar structures, as well as standardised or serially produced constructions (bauliche Anlagen) such as bus shelters or bridges.

**Minimum usable floor area / volume:** No lower limit is imposed.

All projects must comply with the **Do No Significant Harm (DNSH)** criteria and **safeguarding principles** as defined in Section 13 of this methodology.

**Exclusions:** Projects with demolition-only activities, or projects outside BW are not eligible under this methodology.

## Level 2 – Requirements for Biogenic Materials

**Wood from all origins:** Must be certified under FSC, PEFC or an equivalent recognized and third party verified sustainable forest management scheme.

**Other biogenic materials:** Materials such as hemp, sheep's wool, mycelium and other renewable raw materials shall comply with the requirements of the **CRCF Delegated Act** for biogenic storage in buildings and must provide verifiable and eligible information on their **carbon content values.**

**All** biogenic structural and insulation materials must be documented via Environmental Product Declarations **(EPDs)** or equivalent national databases compliant with EN 15804 + A2.

**Reused and recycled Biogenic materials:** are in scope and considered in all calculations.

## Level 3 – Structural Element Requirements

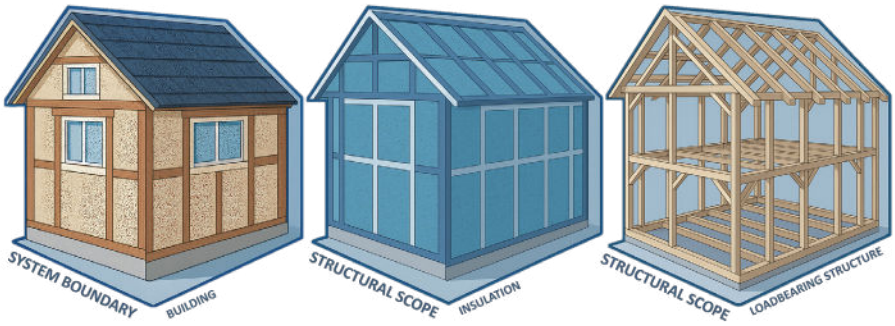
**Included components:** Floor slabs, roofs, load-bearing walls including beams and columns. Included cost groups (KGs) are defined in a reference table in Annex A.1.

**Documentation:** "As-built" data or data with LOD 500 must be provided for certification.

# 3. Scope and Boundaries

This methodology builds on the current state of EU negotiations on the Carbon Removal Certification Framework (CRCF) for long-lived biogenic materials and incorporates the CRCF's mandatory QU.A.L.ITY criteria (Quantification, Additionality, Long-Term Storage and Sustainability). The following system boundaries apply to all eligible projects.

**Figure 1:**
**System Boundary & Scope of Eligible Materials**




## System Boundary and Structural Scope

**Project boundary:** The system boundary is defined at the level of **a single building.**

**Carbon Pools Covered:** Only biogenic (bio-based) building materials used in **load-bearing structural elements and insulation** are included, provided they have a minimum service life of 50 years. Pools include:

- Load-bearing structural components and roof (walls, slabs, roof);
- Insulation materials with verified carbon content share.

* Eligible elements are specified according to DIN 276 cost groups (KGs) (see Annex A.1)

The service life of structural elements is determined in a hierarchical order:

- Specific Environmental Product Declarations (EPDs);
- BNB service life specifications (see Annex A.1);
- In the absence of information, the material shall not be considered.

## Biogenic Materials

**Permitted materials** are biogenic, derived from renewable raw materials such as wood, hemp, straw, reed, sheep's wool and mycelium fungi.

**Reused and Recycled Biogenic Materials** are in scope:

- The carbon content of these materials is included in the TNCRB calculation.
- The percentage of reused materials is recorded to demonstrate potential co-benefits for the circular economy.

## Life-Cycle Modules

Calculations of emissions cover only the product and construction stages of the life cycle (**LCA Modules A1–A5**, DIN EN 15978).

Modules **B, C and D** are excluded from TNCRB and CRU calculations, in line with the CRCF technical assessment.

**Reused and Recycled Biogenic Materials:** Included following **EN 15804**: attributional LCA for reused materials; cut-off method for recycled materials (A4–A5 considered; A1–A3 emissions set to zero).

# GHG Sources & Storages in Baseline and Project Scenario

**Table 1: GHG Sources & Storages:**

| Source | | Indicator | Gas | Incl. | Justification | Relevance for Methodology |
|---|---|---|---|---|---|---|
| Baseline | A1-A5: Product and construction stage | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✓ | All upstream emissions of biogenic materials included; covers fossil energy, land-use change and potential biogenic carbon flows (where applicable). | Input to baseline emissions, used in GHGassociated of TNCRB calculation. |
| | B1-B7: Use phase (energy, maintenance, repair, replacement) | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | Excluded in line with CRCF technical assessment. | No relevance. |
| | C1-C4: End-of-life (demolition, disposal, recycling) | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | Excluded in line with CRCF technical assessment; credits limited to 50-year period. | No relevance. |
| | D: Beyond system boundary (benefits and loads) | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | Excluded in line with CRCF technical assessment. | No relevance. |
| | Leakages: Not assigned to module | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | No cross-boundary leakage attributable to baseline scenario. | No relevance. |
| | Carbon Storage: | C *(biogenic)* | $CO_2$ | ✓ | Only included if baseline materials contain biogenic carbon; otherwise negligible. | Input to CS*baseline* in TNCRB calculation. |

| Source | | Indicator | Gas | Incl. | Justification | Relevance for Methodology |
|---|---|---|---|---|---|---|
| Project | A1-A5: Product and construction stage | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✓ | All upstream emissions of biogenic materials included; covers fossil energy, land-use change and potential biogenic carbon flows (where applicable). | Input to project emissions in the GHG*associated* component of the TNCRB calculation. |
| | B1-B7: Use phase (energy, maintenance, repair, replacement) | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | Excluded in line with CRCF technical assessment. | No relevance. |
| | C1-C4: End-of-life (demolition, disposal, recycling) | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | Excluded in line with CRCF technical assessment; credits limited to 50-year period. | No relevance. |
| | D: Beyond system boundary (benefits and loads) | GWP*biogenic*<br>GWP*fossil*<br>GWP*luluc* | $CO_2$<br>$CH_4$<br>$N_2O$<br>F-gases | ✗ | Excluded in line with CRCF technical assessment. | No relevance. |
| | Leakages: Not assigned to module | GWP*biogenic* | $CO_2$ | ✓ | Potential premature release of biogenic carbon (e.g. fire, structural damage) accounted for via conservative risk factor (R) and buffer as well as via reporting of replacements/reversals | Included in CRU calculations for upfront issuance and in procedure for reversals |
| | Carbon Storage: | C *(biogenic)* | $CO_2$ | ✓ | Biogenic carbon stored in structural and insulation materials is quantified. | CS*total* of TNCRB calculation. |

*Project emissions and biogenic carbon storage are both quantified **ex-post** and netted to calculate the **Temporary Net Carbon Removal Benefit (TNCRB)**. The resulting value is used to derive the number of **Carbon Removal Units (CRUs)** eligible for issuance.

These boundaries define the elements included in the calculation and certification process and establish the framework for issuing **Certificates of Compliance and Carbon Removal Units (CRUs).**

# 4. Baseline

## Overview

This methodology applies exclusively to a standardised baseline and is implemented where robust, transparent, and representative market data are available.

The objective of the baseline definition is to represent business-as-usual construction practices in a transparent, conservative, and market-representative manner, while ensuring consistency with the CRCF requirements.

## Standardised Baseline (Module 1)

### Key Characteristics of the Standardised Baseline

Separate standardised baselines are established for:

- biogenic building materials (load-bearing structures), and
- insulation materials.

The standardised baselines will be updated regularly, as new market data become available.

### Load-Bearing Structure

The standardised baseline for the building's load-bearing structure is defined as the business-as-usual construction practice commonly implemented in the respective country.

Baseline values for structural materials are derived from the national material cadaster IÖR (see Annex A.7) provided by the Leibniz Institute of Ecological Urban and Regional Development (IÖR). The dataset is based on 51.5 million records of the German building stock and comprises 44 material groups.

The IÖR cadastre values used for the baseline calculations are:

- Building-type specific;
- Based on the aggregated mass of biogenic materials used in the construction of the building structure;
- Considering the following structural components: roofs, ceilings, exterior walls, and interior walls;
- Based on material categories included in the dataset, in particular #31 sawn timber and #32 processed wood;
- Referenced to the usable floor area of the respective building type.

The approach for calculating baseline values for the structure accounts for different material mixes that may be implemented in building structures. The material mix assumptions are based on the most recent Wood Market Report (see Annex A.7) and relative production values of semi-finished wood products *(Produktion von Holzhalbwaren)* at the time of project submission.

Environmental data used to calculate carbon storage and associated emissions are based on generic representative datasets for Germany. The datasets are sourced from ÖKOBAUDAT and are compliant with EN 15804+A2.

Carbon storage is calculated based on the carbon content of the selected material. Emissions include all positive contributions to GWP-biogenic, GWP-LULUC, and GWP-fossil for life cycle modules A1–A5. Where emission data are missing, the same uncertainty rules as described in Section 9 are applied.

A detailed description of the material mix and the granular calculations for baseline emissions and carbon storage are provided in Annex A.3.

**Table 2: Baseline for Load-Bearing Structure in kg $CO_2$ per $m^2$ UFA**

| Building type (i) | CR_baseline(i) | GHG_baseline(i) |
|---|---|---|
| Agricultural halls | -69.85 | 11.41 |
| Agricultural operational buildings | -69.85 | 11.41 |
| Car dealerships | -3.07 | 0.50 |
| Combined heat and power plants (CHP) | -2.05 | 0.33 |
| Commercial buildings | -23.42 | 3.83 |
| Daycare centers / nurseries | -109.95 | 17.96 |
| Factory / workshop buildings | -22.32 | 3.64 |
| Fire stations / rescue stations | -39.34 | 6.43 |
| General education schools | -43.06 | 7.03 |
| Hotels / guesthouses | -33.01 | 5.39 |
| Hotels / restaurants | -37.93 | 6.19 |
| Institutional buildings | -33.73 | 5.51 |
| Multi-family houses (from 1991 onwards) | -23.63 | 3.86 |
| Nursing homes | -28.68 | 4.68 |
| Office and administrative buildings | -52.40 | 8.56 |
| Other non-agricultural operational buildings | 0.00 | 0.00 |
| Other non-residential buildings | -47.80 | 7.81 |
| Parking garages / parking decks | 0.00 | 0.00 |
| Production halls | -8.91 | 1.45 |
| Single-family houses (from 1991 onwards) | -39.69 | 6.48 |
| Sports and multi-purpose halls | -73.80 | 12.05 |
| Storage halls | -3.71 | 0.61 |
| Supermarkets | -26.33 | 4.30 |
| Underground parking garages | 0.00 | 0.00 |
| Warehouse buildings | -10.06 | 1.64 |

**Application of Baseline Values by Building Type**

The baseline values presented in Table 2 shall be applied as follows:

- If the project building type is explicitly listed in Table 2, the corresponding baseline value shall be used directly;
- If the project building type is a mixed-use building, the following rule shall apply:
  - Baseline value shall be calculated proportionally based on the shares of the respective uses;
  - Example: Mixed-use building with 1/3 restaurant and 2/3 sports hall = 1/3 * baseline restaurant + 2/3 * baseline sports hall;
- If the project building type is not explicitly listed, contact your group of operators to clarify which baseline values are appropriate for your project.

This hierarchy ensures a consistent, transparent, and representative application of baseline values.

## Insulation

The same approach used for the structure baseline was applied to define the insulation baseline.

The only difference lies in the material category from the cadastre: #33 Renewable Insulation Materials, with the material mix based on Market Overview of Insulation Materials from Renewable Resources FNR (see Annex A.7).

Since the generic insulation material datasets do not include carbon content, GWP-biogenic was used to define baseline carbon storage value. In most cases, the GWP-biogenic of modules A1–A3 is not considerably higher than the material's carbon content, when accounting for negative emissions added in A3. Therefore, the uncertainties associated with this approach can be considered conservative.

A detailed description of the material mix and the granular calculations for baseline emissions and carbon storage are provided in Annex A.3.

**Application of Baseline Values by Building Type**

The baseline values presented in Table 3 shall be applied as follows:

- If the project building type is explicitly listed in Table 3, the corresponding baseline value shall be used directly;
- If the project building type is a mixed-use building, the following rule shall apply:
- Baseline value shall be calculated proportionally based on the shares of the respective uses;
- If the project building type is not explicitly listed, contact your group of operators to clarify which baseline values are appropriate for your project.

## Baseline review

The baselines for load-bearing structures and for insulation are data-driven and dynamic. They shall be recalculated based on the most recent data at the time of submission of each new project.

Once baselines are determined for a particular project, they will remain fixed over its respective lifetime.

**Table 3: Baseline for Insulation Materials in kg $CO_2$ per $m^2$ UFA**

| Building type (i) | CR_baseline(i) | GHG_baseline(i) |
|---|---|---|
| Agricultural halls | 0.00 | 0.00 |
| Agricultural operational buildings | 0.00 | 0.00 |
| Car dealerships | 0.00 | 0.00 |
| Combined heat and power plants (CHP) | 0.00 | 0.00 |
| Commercial buildings | -0.03 | 0.03 |
| Daycare centers / nurseries | -0.23 | 0.24 |
| Factory / workshop buildings | 0.00 | 0.00 |
| Fire stations / rescue stations | 0.00 | 0.00 |
| General education schools | 0.00 | 0.00 |
| Hotels / guesthouses | 0.00 | 0.00 |
| Hotels / restaurants | -0.03 | 0.03 |
| Institutional buildings | -0.01 | 0.01 |
| Multi-family houses (from 1991 onwards) | -1.53 | 1.62 |
| Nursing homes | 0.00 | 0.00 |
| Office and administrative buildings | 0.00 | 0.00 |
| Other non-agricultural operational buildings | 0.00 | 0.00 |
| Other non-residential buildings | 0.00 | 0.00 |
| Parking garages / parking decks | 0.00 | 0.00 |
| Production halls | 0.00 | 0.00 |
| Single-family houses (from 1991 onwards) | -7.55 | 8.01 |
| Sports and multi-purpose halls | 0.00 | 0.00 |
| Storage halls | 0.00 | 0.00 |
| Supermarkets | 0.00 | 0.00 |
| Underground parking garages | 0.00 | 0.00 |
| Warehouse buildings | 0.00 | 0.00 |

# 5. Additionality

This section sets out the two types of additionality required under the EU-CRCF and the process for their verification.

## Environmental Additionality

Environmental additionality is relevant for all projects. It is demonstrated by achieving a Temporary Net Carbon Removal Benefit (TNCRB) greater than zero. A TNCRB > 0 confirms that the project delivers additional $CO_2$ storage compared to the baseline scenario, thereby making a measurable contribution to greenhouse gas mitigation. Environmental additionality is assessed at the project level.

## Economic Additionality

Economic additionality is relevant only for projects applying an activity-based baseline, in accordance with **Regulation (EU) 2024/3012 (CRCF), Article 5,** and is therefore out of scope for this methodology.

# 6. Quantification

This chapter sets out how emissions and removals are quantified and how uncertainty is handled.

## Temporary Net Carbon Removal Benefit (TNCRB)

This section describes how the Temporary Net Carbon Removal Benefit (TNCRB) is calculated and its intended purpose.

**Definition and Purpose of the TNCRB metric**

The Temporary Net Carbon Removal Benefit (TNCRB) quantifies the net difference between the $CO_2$ storage capacity of the project and that of the baseline scenario, accounting for all greenhouse gas (GHG) emissions generated during the product and construction stages of the project (Life Cycle Assessment modules A1–A5).

The Temporary Net Carbon Removal Benefit (TNCRB) must be calculated separately for structural materials and for insulation materials, in accordance with the respective baseline approaches defined in this methodology.

**Requirement for Certification of the Construction Project and Formula**

The Temporary Net Carbon Removal Benefit (TNCRB) of the construction project shall be greater than zero to obtain certification:

$$\textbf{Temporary net carbon removal benefit} = CR_{baseline} - CR_{total} - GHG_{associated} > 0$$

**Where:**

**CR*baseline***
$CO_2$ storage capacity under the baseline scenario multiplied with UFA of a project, in kg $CO_2e$, the value is always negative;

**CR*total***
$CO_2$ storage capacity of the construction project, in kg $CO_2e$, the value is always negative;

**GHG*associated***
The increase in greenhouse gas (GHG) emissions attributable to the project's implementation, in kg $CO_2e$.

# CR*baseline*

**Definition**

CR*baseline* quantifies the $CO_2$ stored in the reference building of the corresponding building type in Germany through biogenic building materials within the defined scope (structure/ insulation) and serves as the basis for calculating TNCRB. CRbaseline shall be calculated separately for load-bearing structures and for insulation materials.

Baseline emissions in Table 2 and Table 3 are expressed in kg $CO_2e$ per m² of usable floor area (UFA) for the corresponding building type and shall be used for building type specific CRbaseline calculations.

**Formula:**

$$CR_{baseline} = CR_{baseline(i)} * UFA$$

**Where:**

**CR*baseline(i)***
Baseline carbon storage of a building type (i), kg $CO_2e$, the value is always negative;

**UFA**
Usable floor area of the project.

# CR*total*

**Definition**

CR*total* quantifies the volume of $CO_2$ stored in the construction project through biogenic building materials in scope and forms the basis for calculating TNCRB. CRtotal shall be calculated separately for load-bearing structures and insulation materials.

The calculation of CR*total* establishes a link between the storage of biogenic carbon in building materials, their volume, and specific material properties. It ensures that temporary $CO_2$ storage is accurately quantified and verified in accordance with applicable standards.

**Formula:**

$$CR_{total} = \sum_{i=1}^{n} CR_{(i)} * F_{CO_2} * V_{f(i)} * (-1)$$

**Where:**

**CR*(i)***
Carbon content of building material i, in t C/m³, based on specific EPDs in the format EN 15804 +A2;

**$FCO_2$**
Carbon-to-$CO_2$ conversion factor, 44/12 = 3.67
(Mol $CO_2$ = 12 g C+2×16g O = 44g)

**Vf(i)**
Volume of biogenic building material i at a specific moisture content f, in m³;

**n**
Total number of biogenic building materials included in the calculation.

**Calculation of CR*(i)*: Carbon content of a single building material**

If no carbon content data are included in the EPD:

$$CR_{(i)} = \frac{Ac * Ah * Rd_f}{1 + \frac{f}{100}}$$

**Where:**

**Ac**
Carbon fraction of dry wood mass, in t C/t;

**Ah**
Wood fraction of the building material, in %;

**Rd(f)**
Bulk density of the building material, in t/m³, depending on the moisture content f. The bulk density varies by wood species and is derived from specific standards;

**f**
Moisture content of the building material, in %
(default 12 % if uncertain).

**Data rules for bulk density and moisture content in CR*(i)* calculation:**

- Use material-specific bulk density and moisture content whenever available.

- If a range of values is given, use the lowest bulk density and the highest moisture content.

- If manufacturer data are missing, use default values for wooden structural components:
  - Average bulk density: 0.5 T/m³;
  - Average moisture content: 12 %;
  - Reference standard: DIN EN 16449;

- For bio-based materials other than structural wood, use only specific values for bulk density and moisture.

- For composites/additives: if the biobased material contains water, additives, and/or binders include only the biogenic fraction (Ah) in calculations; exclude non-biogenic portions.

# GHG*associated*

**Definition**

GHG*associated* represents the increase in greenhouse gas (GHG) emissions resulting from the implementation of the construction project compared to the baseline scenario. Only biogenic materials are considered in the calculations.

**Applicability**

If a **standardised baseline** is applied, the GHG*associated* emissions are calculated based on the corresponding building-type baseline.

GHG*project* represents the greenhouse gas emissions associated with the biogenic structural materials used in the project activity. It shall consider all relevant emissions over a lifespan of 50 years.

**Formula:**

$$GHG_{project} = \left(\sum_{i=1}^{n} \left(GWP_{fossil(i)} + GWP_{luluc(i)} + GWP_{biogenic(i)}\right) * U_{(i)}\right)$$

$$GHG_{associated} = GHG_{project} - GHG_{baseline} * UFA$$

**Where:**

**GWP*fossil(i)***
Emissions from fossil fuel combustion attributed to material i (A1-A5), kg $CO_2e$;

**GW*Pluluc(i)***
Emissions from land use/land-use change for material i (A1-A5), kg $CO_2e$;

**GWP*biogenic(i)***
Biogenic $CO_2$ emissions attributable to material i (A1-A5), (e.g. release of stored biogenic carbon), kg $CO_2e$;

**GHG*baseline***
Baseline emissions for corresponding building type, kg $CO_2e$ per m2 of UFA;

**n**
Total number of biogenic building materials in the project;

**U*(i)***
Uncertainty factor for material*(i)*;

**UFA**
Usable floor area of the project.

# 7. Long-term storage

The durability of carbon storage in biogenic construction materials is defined as a minimum storage period of 50 years, corresponding to the minimum service life of structural elements. Liability for ensuring permanence rests with the individual project operator for a period of at least 50 years following building completion.

For upfront issuance of Carbon Removal Units (CRUs), permanence shall be ensured through a buffer pool mechanism.

In the event of a change of ownership, the liability for durability shall be transferred to the new owner, in accordance with standard procedures governing land register entries.

While biogenic construction materials primarily enable a temporal shift of emissions—thereby reducing peak warming impacts and increasing carbon storage within the construction sector rather than achieving permanent carbon removal—the Social Cost of Carbon (SCC) approach provides a robust justification for long-term storage by emphasising the societal value of delaying emissions. True permanence may be achieved at the end-of-life stage if biogenic carbon is transferred into long-term storage, for example through technologies such as Bioenergy with Carbon Capture and Storage (BECCS).

# 8. Reversal Risk

## Procedure for Reversals

In case of premature release of stored $CO_2$, the following rules apply:

- Any premature release exceeding summarized 5 % of the primary material mass must be immediately reported to the certification scheme;
- The certification scheme shall assess the case and determine any necessary adjustments to CRUs, where applicable. In addition, the certification scheme shall open a compliance case, which may lead to a partial or complete project disqualification in instances of extensive or systemic losses;
- Compensation is carried out using buffer credits not associated with the project, in order to ensure environmental integrity. All affected project credits transferred to the buffer pool shall be permanently retired.

## Risk Factor and Buffer Pool Mechanism

The risk factor is a critical component for the establishment of the buffer pool, which is required to enable upfront credit issuance.

To reflect uncertainties related to storage permanence, a conservative risk factor (R) shall be applied Under this methodology, risks are assessed across the following main categories:

**Table 4: Risk Categories**

| Risk Category | Key Elements |
|---|---|
| Natural | Fire, moisture, pests, extreme weather events, etc. |
| Technical | Improper installation, maintenance failure |
| Demolition rate | RB and NRB in Germany |

The risk assessment is based on insurance statistics and the most recent DENA Building Report (see Annex A.7) and directly influences the applied risk factor. Detailed assumptions, data sources, and justifications are provided in Annex A.2.

**Risks Considered Out of Scope**

Further risks, including service life, end-of-life (EoL), and economic risks, are considered out of scope or not material under this methodology.

Service life: The service life scenario assumes that all certified materials have a minimum lifespan of 50 years. Any changes to the certified structure during the project lifetime shall be reported and must not exceed a 5 % threshold, calculated as a consolidated value based on 100 % of the certified materials.

End-of-life (EoL): End-of-life considerations are governed by the CRCF Regulation. In accordance with this framework, all materials are conservatively assumed to be incinerated after the certification period.

Economic risks: Economic risks are considered not material, as certificates are issued on an ex-post basis and rely exclusively on as-built data, assessed only after completion of the building. Consequently, market or financial uncertainties during planning or construction do not affect the validity of certification.

**Applied Risk Factor**

Under this methodology, a standard risk factor of **R = 15% (0,15)** is applied to all projects with **upfront crediting** (see Annex A.2 for justification).

Risk assumptions shall be transparent, regionally appropriate, and updated annually, provided that new and reliable data are available.

# 9. Uncertainties, Leakages, and Data Quality

## Data Levels of Uncertainty

Uncertainties are addressed at different data levels, depending on the origin and application of the data:

**Product level:** Where assumptions regarding bulk density or moisture content are required, the provisions set out in Section 6 shall apply. Environmental Product Declarations (EPDs) and commonly used databases providing product-level data are assumed to follow internal quality assurance (QA) processes, thereby reducing uncertainty.

**Building level:** Certification at the building level shall be based exclusively on as-built data, minimising uncertainty related to design assumptions or deviations during construction.

**Baseline level:** Baseline data shall be derived from the most recent available datasets, apply comparable building typologies, and reflect the same geographical context, defined at least at country level.

## Leakage Considerations

Leakage effects are indirectly addressed through the application of uncertainty management rules and quantification requirements. While leakage effects are recognised as relevant, they do not constitute a separate calculation component under this methodology.

Potential leakage pathways include:

- Market displacement effects related to timber resource availability. These effects should, in principle, be tracked at the level of changes in overall wood consumption; however, at present, such tracking is considered insufficient, based on available analyses and data from the Thünen Institute (see Timber Resource Availability in Annex A.7).

- Transport-related effects, which are reflected through conservative assumptions and uncertainty treatment.

# Uncertainty Management

To ensure conservative accounting, the following rules apply:

- All default values and assumptions shall be clearly documented and justified;
- The Data Quality Index (DQI) serves as the reference framework for uncertainty assessment (see Annex A.7);
- A consolidated DQI value is above the minimum threshold for datasets to be eligible for certification;
- Where the DQI value is below 3, it shall be assessed whether an uncertainty factor (U(i)) needs to be applied to the relevant datasets used in the TNCRB calculation, provided there is evidence of data quality gaps.

## Application of the Data Quality Index (DQI)

1. If DQI variable U = 3, no further adjustments are required and uncertainty factor of material U*(i)* = 1;
2. If DQI variable U is between 1 and 3, conservative adjustments shall be applied to the dataset, based on established LCA literature (see A4 & A5 Emissions in Annex A.7) and using deterministic worst-case assumptions, as follows:

   a. Module A4 missing:
      i. (A1–A3emissions+A5emissions) × (U*(i)* = 100/96); d.h. (A4 = 4 %),

   b. Module A5 missing:
      i. (A1–A3emissions+A4emissions) × (U*(i)* = 100/90); d.h. (A5 = 10 %),

   c. Modules A4 and A5 missing:
      i. A1–A3emissions × (U*(i)* = 100/86); d.h. (A4-A5 = 14%).

# Data Quality Index (DQI)

The Data Quality Index (DQI) is designed to ensure transparency, consistency, and traceability of the data used for project quantification, specifically for the calculation of carbon storage (CS) and associated emissions. It provides a standardised measure of data reliability, completeness, and uncertainty across all parameters included in this methodology.

Each certified project shall submit a DQI summary report as part of its documentation package. This enables reviewers, auditors, and stakeholders to assess the confidence level of the results and the robustness of the underlying data sources.

## Minimum Requirements DQI

- A minimum consolidated DQI threshold of 1 is mandatory for project eligibility.
- If the consolidated DQI falls below this threshold, the project developer shall revise input data sources or provide additional justification and evidence before certification can proceed.
- The consolidated DQI shall be determined across all building materials included in the certification scope.
- Unlike the “hot spot” approach used in the Level(s) framework, this methodology requires a comprehensive DQI assessment covering all certified materials.

## Assessment Basis DQI

The DQI shall be assessed using the Level(s) framework categories, adapted to the objectives and parameters of this methodology, as shown in Table 5.

**Table 5: DQI Assessment Template**

| Assessment | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Technological Representativeness of Data (TeR) | Other datasets | Generic datasets | Representative & average datasets | Specific EPDs (verified) |
| Geographical Representativeness of Data (GR) | Other regions | EU | Oceanic (EPBD region) | DE |
| Time-related Representativeness of Data (TiR) | No date | > 6 years | 2-4 years | < 2 years |
| Uncertainty of Data (U) | No evaluation made | Incl. Mod. A1-A3 | Incl. Mod. A1-A4 or A1-A3, A5 | Incl. Mod. A1-A5 |

Each parameter shall be rated according to Table 3. A DQI score shall be calculated for each material included in the TNCRB scope using the following formula aligned with Level(s) framework:

$$DQI_{material} = \frac{((TeR + GR + TiR)/3 + U)}{2}$$

An overall DQI score for a project shall be calculated as the sum of the DQI scores of individual materials, each multiplied by that material's share of the total certified biogenic materials, using the following formula:

$$DQI_{projet} = \sum_{i=1}^{n} DQI_{(i)} \times S_{(i)}$$

**Where:**

**DQI*(i)***
Data Quality Index of a single biogenic material i;

**S*(i)***
Proportion of material i within the total certified biogenic materials (based on mass).

# 10. Monitoring, Reporting and Verification (MRV)

Monitoring, reporting and verification procedures ensure the continued integrity of certified carbon storage and compliance with this methodology.

Monitoring activities are carried out by the Group of Operators (GoO) and follow the rules described below. Building owners are only required to report specific events that may affect the certified carbon stock of the building, as described in the section "Event-Based Reporting". Independent verification ensures that projects are implemented and monitored in accordance with this methodology.

## Monitoring

**1. Monitoring Objective is to verify:**

a. the continued existence of the certified building;
b. the integrity of certified structural elements containing stored carbon;
c. compliance with the requirements of this methodology.

**2. Monitoring Frequency:**

a. Monitoring shall be conducted at least once every five (5) years on a project-sample basis;
b. Additional monitoring may be triggered in response to reported events or where monitoring results indicate potential non-compliance.

**3. Monitoring Methods may include:**

a. Review of project documentation and the building file;
b. Remote sensing methods, including satellite imagery supported by AI-based analysis;
c. Targeted spot checks or on-site inspections where necessary.

**4. Sampling Approach:**

a. Monitoring shall be conducted on a representative sample of certified buildings;
b. The required sample size shall be determined and reported by the GoO in accordance with best-practice verification standards and shall ensure sufficient statistical confidence in the monitoring results.

**5. Structural Modifications:**

a. If cumulative replacement or modification of certified structural elements exceeds 5 % of the originally certified material volume of any given project, the certification body shall assess whether partial or full re-certification is required.

**6. Monitoring Parameters:**

a. Obligatory parameters to be monitored are specified in Annex 4.

**7. Data Retention:**

a. All relevant data and supporting documentation shall be retained for at least the duration of the certification period plus ten (10) years.

## Reporting Rules

- Transparency: A summary of the monitoring report shall be made publicly accessible.

- Reporting obligations: Monitoring results and any resulting re-certification decisions shall be formally documented and reported.

## Verification Rules

- Verification shall be carried out by an accredited independent verification body.

- The verifier shall confirm that the project complies with the methodological requirements and that certified carbon storage has been quantified and monitored in accordance with this methodology.

# 11. Crediting and issuance

## Eligibility and Timing

- **Certification requirement:** Carbon Removal Units (CRUs) are issued only after the project has been formally certified and a **Certificate of Compliance** has been granted under this methodology.
- **Timing:** Certification may take place within the first 24 months after commissioning. Before certification, only estimates of $CO_2$ storage capacity and verification of framework conditions are carried out (see Table 6).
- **Ownership and transferability:** The Certificate of Compliance and the CRUs generated by the construction project are owned by the **operator (building owner)**. CRUs may be transferred or sold on voluntary carbon markets. Certificate of Compliance can be transferred only if building ownership changes.

**Table 6: Service phases and certificates of compliance**

| HOAI | LOD | Estimation | Exact calculation | Generation | Monitoring |
|---|---|---|---|---|---|
| LP1-LP2 | 100 | ○ | ○ | ○ | ○ |
| LP3 | 200 | ✓ | ○ | ○ | ○ |
| LP4 | 300 | ✓ | ○ | ○ | ○ |
| LP5 | 400 | ✓ | ○ | ○ | ○ |
| LP6-7 | 400 | ✓ | ○ | ○ | ○ |
| LP8 | 500 | ○ | ✓ | ✓ | ○ |
| LP9 | 500 | ○ | ✓ | ○ | ✓ |

## Issuance Rules

**Table 7: Issuance Conditions Overview**

| Condition | Requirement |
|---|---|
| Commissioning | The project must be fully commissioned and handed over to the operator. |
| Monitoring | The project must successfully pass the monitoring process for the relevant period. |
| Partial operating years | If a project is commissioned, but less than 12 months have elapsed before the distribution date, the full annual issuance amount is granted for that year. |

**Frequency:**

- Upfront: CRUs are issued once after commissioning in the amount calculated under Section 11 “Issuance Amount”;
- Termed: not considered under this methodology version.

**Validity:** Each CRU remains valid until the end of the project’s certification period, with a minimum validity of five (5) years from issuance.

**Retirement:** When a CRU is used (claimed or transferred to offset a footprint), the unit is marked as retired in the registry to prevent double use.

## Carbon Removal Units (CRUs)

**Definition:**

Carbon Removal Units (CRUs) are tradeable units representing stored $CO_2$ in a construction project. Each CRU corresponds to **1t $CO_2$e of storage** achieved. The CRU*total* value is always an integer, i.e. CRU*total* Z (rounded).

**Formula:**

$$CRU_{total} = \frac{TNCRB * (1 - R)}{1000}$$

**Where:**

**TNCRB**
Temporary Net Carbon Removal Benefit, kg $CO_2$e;

**R**
Risk adjustment factor (decimal), accounts permanence risk for upfront issuance;

**/**
Dividing by 1000 converts from kg $CO_2$e to t $CO_2$e, matching the unit size of CRUs.

## Issuance Amount

CRUs are issued linearly over the certification period according to the following formula:

$$CRU_{period} = \frac{CRU_{total}}{T}$$

**Where:**

**T**
Duration of the crediting period for annual issuance / T = 1 for upfront issuance, in years.

# 12. Prevention of Double Counting

The following rules shall be applied at the project level to prevent double counting, in particular double use and double issuance, as defined by the German Environmental Agency (see Double Counting in Annex A.7):

- CRUs are issued with unique serial numbers in an approved registry;
- All transfers and retirements are logged; double issuance prevented;
- Project developer must disclose any subsidies or support to avoid double claiming;
- Any overlaps are reconciled or the project is excluded from crediting.

# 13. Safeguards and Sustainable Development

This section establishes the sustainability and safeguard requirements that apply to all projects certified under this methodology. These provisions ensure that projects contribute positively to sustainable development and comply with the environmental and social safeguards outlined in the EU Carbon Removal and Carbon Farming (CRCF) Certification Regulation.

## Minimum sustainability criteria

Projects shall comply with the sustainability goals set out in Article 7 of the CRCF and must not cause any significant harm in relevant environmental or social areas, following the Do No Significant Harm (DNSH) principle. In addition, projects are encouraged to identify and document co-benefits that go beyond basic compliance and contribute to broader sustainable development objectives.

Certified projects shall also comply with the Renewable Energy Directive — Directive (EU) 2018/2001, specifically Article 29, which defines sustainability and greenhouse gas emission criteria for biomass.

### Sustainability Requirements According to Article 29

A central sustainability criterion is the use of wood from certified sustainable forest management systems, such as the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC). These certifications are mandatory for all wood used in the project.

### DNSH criteria

To ensure a consistent and transparent evaluation process, projects are assessed against the Technical Screening Criteria (TSC) set out in this methodology. These criteria provide a standardised framework for verifying that projects meet the minimum sustainability requirements contributing to the environmental objectives of the CRCF Regulation—particularly climate change mitigation, climate change adaptation, and the sustainable use of resources.

By applying the TSC, this methodology ensures that all certified projects comply with the Do No Significant Harm (DNSH) principle as required under the CRCF Regulation. The DNSH criteria and correspon-

ding implementation requirements are set out in Annex A.6.

## Co-Benefits

Co-benefits are not mandatory for certification. However, projects may voluntarily demonstrate additional sustainability performance beyond the DNSH (Do No Significant Harm) requirements.

Projects are encouraged to document and substantiate measurable environmental or sustainability-related co-benefits. Such contributions may strengthen the overall environmental integrity of the project and underline its alignment with broader climate, resource efficiency, and sustainability objectives, including the Sustainable Development Goals (SDGs).

Where provided, documentation of co-benefits shall be reviewed during project certification and explicitly referenced in the Certificate of Compliance.

### Extended Criteria under Article 7 (CRCF Sustainability Goals)

Projects may go beyond the minimum DNSH and sustainability requirements described in Section 13 by demonstrating compliance with the extended criteria presented in Annex A.6.4. These criteria illustrate additional environmental benefits aligned with Article 7 of the CRCF and the EU Taxonomy.

Optional certifications such as GRP, QNG, DGNB, or comparable schemes may be used on a voluntary basis. While not mandatory, they may facilitate the process and support the identification and documentation of co-benefits.

# 14. Data Requirements

To ensure transparency, traceability, and verifiability of project results, all participating projects must provide comprehensive data and documentation in accordance with the requirements outlined below. These data are essential for the quantification of carbon storage (CS), emissions, and other sustainability indicators under this methodology.

The following table specifies the minimum required and voluntary datasets that must be available for project certification. All required data must be submitted at the time of certification.

**Table 8: Data Requirements**

| Data | Explanation | Required | Voluntary |
|---|---|---|---|
| **Core project data (from building permit)** | Fundamental identification and boundary data from official building permit documents (Baugenehmigung), including: project name, address, location (municipality, coordinates), operator or group of operators (liable entity), usable floor area (UFA), gross floor area (GFA), gross cubic volume, building type, number of storeys, and construction type (e.g., timber, hybrid, modular). | ✓ | ○ |
| **Building use purpose disclosure** | Declaration of the intended and actual building use to meet DNSH criteria: climate change mitigation | ✓ | ○ |

| Data | Explanation | Required | Voluntary |
|---|---|---|---|
| **BIM** | As-built model | ○ | ✓ |
| **IFC** | Industry Foundation Classes file, version 4.x. | ○ | ✓ |
| **BOM / BOQ** | Bill of Materials or Bill of Quantities including detailed data on material origin and quantities. | ✓ | ○ |
| **LCA*** | Life Cycle Assessment covering Modules A-C (whole life approach) in accordance with DIN SPEC 91606. | ✓ | ○ |
| **Energy requirement certificate** | Energy performance certificate according to **DIN 18599.** | ✓ | ○ |
| **Energy simulation** | Digital twin or equivalent dynamic energy simulation model. | ○ | ✓ |
| **Real energy consumption data** | Sensor-based or metered energy consumption data from the operational phase. | ○ | ✓ |
| **Re-use materials** | Information on reused materials as a separate file or as part of the BOM submission. | ○ | ✓ |
| **Adaptability and remodelling** | Assessment according to **Level(s) framework,** Indicator 2.3. | ○ | ✓ |
| **Deconstruction capability** | Assessment according to **Level(s) framework,** Indicator 2.4. | ○ | ✓ |
| **Data Quality Index (DQI)** | Required data shall be documented as defined in this methodology; consolidated DQI must meet minimum **threshold (≥1).** | ✓ | ○ |
| **EPDs** | Environmental Product Declarations in accordance with **EN 15804 + A2.** | ✓ | ○ |
| **Pollution prevention and material health** | Verification that all materials in direct contact with building users comply with **DIN EN 16516** and relevant national emission standards; documentation of absence of formal-dehyde, POP, mercury, and ozone-depleting substances via EPDs or manufacturer declarations. | ○ | ✓ |
| **Water consumption** | Data according to **Annex I, Appendix E** of the EU Taxonomy and **Annex II, Appendix B.** | ○ | ✓ |
| **Construction site waste** | Treatment percentages by waste category, in compliance with EU waste legislation. | ○ | ✓ |
| **Sustainability certificates of materials** | Verification of sustainable sourcing, e.g., **FSC, PEFC,** or equivalent. | ✓ | ○ |
| **DIN SPEC 91475** | Submission in accordance with German standards for digital construction documentation. | ○ | ✓ |

| Data | Explanation | Required | Voluntary |
|---|---|---|---|
| **Other existing certifications** | Recognition of quality or sustainability certifications such as **QNG, DGNB,** or equivalent. | ○ | ✓ |
| **Additional documents** | Supplementary evidence of project sustainability, including **pre-demolition audits** for refurbishment projects in accordance with **DIN SPEC 91484.** | ○ | ✓ |
| **Monitoring plan** | Description of the monitoring strategy, including parameters, frequency, responsible entity, QA/QC procedures, and satellite or on-site verification methods. | ✓ | ○ |
| **Financial support disclosure** | Documentation of any financial support from other certification schemes or public subsidies to prevent double counting or double financing. | ✓ | ○ |

* Voluntary requirements for small-scale projects with UFA below 1000 $m^2$.

# Annex

## A.1 Relevant Cost Groups

The following table presents the cost group mapping for structural components that fall within the scope of this methodology.

Only load-bearing biogenic materials used in these cost groups are eligible for inclusion in the TNCRB (Temporary Net Carbon Removal Benefit) calculation.

All biogenic insulation materials may also be considered in scope independently of their cost group assignment provided they meet the material and data quality criteria defined in this methodology.

**All insulation materials, irrespective of their allocation to a specific cost group, are eligible for certification. All insulation materials must provide a specific EPD.**

**Table 9: Cost Groups (KGs) for Structural Components**

| KG | Main Category | KG | Subcategory | Service life BNB | Scope |
|---|---|---|---|---|---|
| 310 | Excavation, Earthworks | 311 | Construction | ND | ◯ |
| | | 312 | Enclosure | ND | ◯ |
| | | 313 | Dewatering | ND | ◯ |
| | | 314 | Tunneling | ND | ◯ |
| | | 319 | Other for KG 310 | ND | ◯ |
| 320 | Foundation, Substructure | 321 | Ground Improvement | ND | ◯ |
| | | 322 | Shallow Foundations & Slabs | > 50 | ◯ |
| | | 323 | Deep Foundations | > 50 | ◯ |
| | | 324 | Foundation Coverings | > 50 | ◯ |
| | | 325 | Sealing & Cladding | ND | ◯ |
| | | 326 | Drainage | 35 | ◯ |
| | | 329 | Other for 320 | ND | ◯ |

| KG | Main Category | KG | Subcategory | Service life BNB | Scope |
|---|---|---|---|---|---|
| 330 | Exterior Walls / Vertical | 331 | Load-bearing Exterior Walls | > 50 | ✓ |
| | | 332 | Non-load-bearing Exterior Walls | ND | ✓ |
| | Building Structures, Exterior | 333 | Exterior Columns | > 50 | ✓ |
| | | 334 | Exterior Wall Openings | 12-50 | ○ |
| | | 335 | Exterior Wall Claddings(Outside) | 1-50 | ○ |
| | | 336 | Exterior Wall Claddings (Inside) | > 50 | ○ |
| | | 337 | Prefabricated Exterior Wall Structures | ND | ✓ |
| | | 338 | Light Protection for KG 330 | 15-50 | ○ |
| | | 339 | Other for KG 330 | 30-50 | ○ |
| 340 | Interior Walls / Vertical | 341 | Load-bearing Interior Walls | > 50 | ✓ |
| | | 342 | Non-load-bearing Interior Walls | > 50 | ○ |
| | Building Structures, Interior | 343 | Interior Columns | > 50 | ✓ |
| | | 344 | Interior Wall Openings | 15-50 | ○ |
| | | 345 | Interior Wall Claddings | 10-50 | ○ |
| | | 345 | Prefabricated Interior Wall Structures | 25-30 | ○ |
| | | 347 | Light Protection for KG 340 | ND | ○ |
| | | 349 | Other for KG 340 | 30-50 | ○ |
| 350 | Ceilings / Horizontal | 351 | Ceiling Structures | > 50 | ✓ |
| | | 352 | Ceiling Openings | 4-50 | ○ |
| | | 353 | Ceiling Coverings | 5-50 | ○ |
| | | 354 | Ceiling Claddings | ND | ○ |
| | | 355 | Prefabricated Ceiling Structures | ND | ✓ |
| | | 359 | Light Protection for KG 350 | 40-50 | ○ |

| KG | Main Category | KG | Subcategory | Service life BNB | Scope |
|---|---|---|---|---|---|
| | | 361 | Roof Structures | > 50 | ✓ |
| | | 362 | Roof Openings | 20-50 | ○ |
| | | 363 | Roof Coverings | 12-50 | ○ |
| 360 | Roofs | 364 | Roof Claddings | 30-50 | ○ |
| | | 365 | Prefabricated Roof Structures | ND | ○ |
| | | 366 | Light Protection for KG 360 | ND | ○ |
| | | 369 | Other for KG 360 | 8-50 | ○ |

# A.2 Risk Assessment

## Assumptions Applied for the Risk Assessment

**Table 10: Assumptions for Risk Assessment**

| Assumption | Value | Source/ Explanation |
|---|---|---|
| **Overall probability of occurrence** | 7.3 % / a | Derived from: IRB Bauschadenbericht 2023 |
| **Impact per damage event (€)** | 1,329.00 € | Upper value of payments and provisions according to: IRB Bauschadenbericht 2023 |
| **Cost per m³ of structural timber** | 348.00 € | Average market value based on: Eichenspaltpfahl.de – Schnittholz Fichte |
| **Distribution of damage types** | 40.43 % / 29.90 % / 16.76 % etc. | Relative frequency by damage type according to: IRB Bauschadenbericht 2023 |
| **Density of structural timber** | 470 kg/m³ | Assumption for medium-density softwood species |
| **Carbon content of wood** | 50 % | According to LWF Bayern – Kohlenstoffbindung |
| **Conversion factor C → $CO_2$** | 3.67 | Standard conversion factor for $CO_2$-Binding: 1 t C = 3.67 (44/12) t $CO_2$e |

## Risk Assessment Matrix

The risk assessment is based on statistical data on damage incidents in the building sector, in particular from insurance reports (IRB Construction Damage Report 2023).

Instead of relying on purely financial damage valuations, the impacts were assessed in terms of potential $CO_2$ release ($CO_2e$). For this purpose, reported damage costs by damage category were converted into equivalent volumes of structural timber ($m^3$), and the corresponding carbon storage values were subsequently calculated.

A conservative assumption is applied whereby the entire damage cost is assumed to be used for the replacement of structural timber, serving as a proxy for the quantity of wood lost or requiring replacement within the building structure.

The probability of occurrence was derived from the statistical frequency of each damage type relative to the total number of reported damage cases. This results in a differentiated risk matrix, in which each damage category is evaluated based on both its probability of occurrence and its estimated $CO_2$ impact.

**Table 11: Risk Assessment Matrix**

| Category | Probability of Occurrence E [%/year] | Impact A [t $CO_2$ loss per event] | Expected Annual Loss [t $CO_2$/year] |
|---|---|---|---|
| Damage to building structure | 2.18 %/a | 1.33 | 0.1127079 |
| Water and moisture damage | 2.18 %/a | 0.98 | 0.0833531 |
| Other damage | 1.22 %/a | 0.55 | 0.0467224 |
| Damage to energy and communication systems | 0.42 %/a | 0.19 | 0.0161131 |
| Damage to technical installations | 0.30 %/a | 0.14 | 0.0115691 |
| Pipe leakage damage | 0.15 %/a | 0.07 | 0.0056870 |
| Fire damage | 0.05 %/a | 0.02 | 0.0020072 |
| Environmental damage | 0.02 %/a | 0.01 | 0.0006412 |

**Justification for Setting the Risk Factor at 15%**

The calculation of the expected annual loss, based on the conservative assumption that all damage events result in a complete (100 %) impact on structural timber, yields an average value of 0.28 t $CO_2e$ per building per year. When extrapolated over an assumed service life of 50 years, this corresponds to total potential emissions of approximately 14 t $CO_2e$ per building.

To account for demolition risk as a separate risk category, the DENA Building Report 2025 was considered, including its statistical evaluation of demolition data. An analysis of the most recent available data (2023) shows that demolition rates for buildings younger than 50 years are very low relative to the total building stock.

When comparing building completions and demolitions for the two main building categories – residential

buildings (RB) and non-residential buildings (NRB) – clear differences emerge:

For residential buildings, demolition rates for buildings under 50 years of age remain below 1% and are therefore not considered material for this assessment.

For non-residential buildings, a comparison of consolidated data for buildings constructed within the last 50 years shows a demolition-to-completion ratio of approximately 15 % in 2023 (building completions: 21,500; demolition of buildings under 50 years: 3,318).

Changes in use are the primary driver of demolition in NRBs and are therefore not related to insurance damage cases. Consequently, these risks can be assessed separately and in parallel, as they are independent of one another. As a result, the respective risk values are not additive and shall not be summed.

All assumptions are intentionally conservative, as the analysis:

- Considers new buildings, extensions, and renovations, and
- Assumes that all associated reconstruction costs would be fully implemented using timber construction, thereby allowing a direct and conservative translation into $CO_2$ emissions.

In addition, fire statistics were analysed, given that wood-based construction materials are classified as B2 according to DIN 4102-1 (see Table 6). The statistics show that the proportion of buildings in Germany actually affected by fire events is below 1% of the total building stock. Even in the highest risk category—across all timber building types and municipality sizes—the average value reaches only 7.26 % (see Tables 7 and 8).

Based on the represented values, a risk factor of 15 %, corresponding to at least 15 t $CO_2e$, is derived. This level is considered sufficient, particularly because additional mechanisms to safeguard permanence are integrated into the methodology and because demolition-related risks are not relevant for term-based credit issuance.

This value provides a robust safety buffer relative to empirically observed damage frequencies and represents a realistic yet precautionary estimate of potential $CO_2$ impacts.

**Table 12: Fire Protection Classes According to DIN4102-1**

| Supervised burning | | Building material class according to DIN 4102-1 |
|---|---|---|
| non-flammable | | A |
| | | A1 |
| | | A2 |
| flammable | | B |
| | flame retardant | B1 |
| | normally flammable | B2 |
| | highly flamable | B3 |

**Table 13: Fire Statistics Evaluation Germany 2021 / Dena and the German Firefighters Association**

| Building stock DE 2021 | Fires DE 2021 | % |
|---|---|---|
| 21.356.912 | 197,834 | 0.93 % |

**Table 14: Wood Alarms and Fires According to Technical Report from the vfdb Fire Damage Statistics**

| Category | Value |
|---|---|
| **Fires** | 77.78 % |

| Distribution for alarms in timber construction by municipality size classes | % Alarms | % Fires |
|---|---|---|
| **GK 2** | 18 % | 14.00 % |
| **GK 3** | 5 % | 3.89 % |
| **GK 5** | 5 % | 3.89 % |
| **AVG** | 9.33 % | 7.26 % |

# A.3 Baseline

## A.3.1 Material Mix Structure

| Description | | Absolute m³ | Relative % | Dataset UUID | Unit of Measure | Conversion Factor to kg |
|---|---|---|---|---|---|---|
| Sawn Timber | Softwood (Spruce) | 22,400 | 67% | 2bd4c91f-16e5-4e01-b8b5-0c01a-ac363ce | m³ | 484.51 |
| | Hardwood (Beech) | 801 | 2% | e131431f-4d99-4d7a-ae0a-744a06de3524 | m³ | 761.60 |
| Plywood | Cross-Laminated Timber (CLT) | 373 | 1% | 8c4eb262-9ae6-4ace-8f3d-0b06f2007f3e | m³ | 489.41 |
| Particle Boards | OSB (Oriented Strand Board) | 7,283 | 22% | aab0ed28-e5b0-43d6-a932-4cdc4770c518 | m³ | 600.00 |
| Fibreboards | MDF (Medium Density Fibreboard) | 2,491 | 7% | b513a7f4-a689-4d5e-8efd-349fb-25d21cb | m³ | 737.50 |

| Description | | Carbon Content | Biogenic $CO_2$ Stored (kg $CO_2e/m^3$) | Data | Stage A Emissions (kg $CO_2e/m^3$) | Data |
|---|---|---|---|---|---|---|
| Sawn Timber | Softwood (Spruce) | 216.30 | -793.10 | C | 59.68 | A1-A3 + A5 / fossil, luluc, biogenic |
| | Hardwood (Beech) | 340.00 | -1246.67 | C | 122.68 | A1-A3 + A5 / fossil, luluc, biogenic |
| Plywood | Cross-Laminated Timber (CLT) | 215.12 | -788.77 | C | 120.87 | A1-A3 + A5 / fossil, luluc, biogenic |
| Particle Boards | OSB (Oriented Strand Board) | 265.43 | -973.24 | C | 361.07 | A1-A3 + A5 / fossil, luluc, biogenic |
| Fibreboards | MDF (Medium Density Fibreboard) | 295.15 | -1082.22 | C | 329.04 | A1-A3 + A5 / fossil, luluc, biogenic |

| Description | | Stage A Emissions incl. Uncertanty (kg $CO_2e/m^3$) | Biogenic $CO_2$ Stored (kg $CO_2e$/kg) | Stage A Emissions (kg $CO_2e$/kg) | Uncertainty factor A4 |
|---|---|---|---|---|---|
| Sawn Timber | Softwood (Spruce) | 62.16 | -1.64 | 0.13 | 1.04 |
| | Hardwood (Beech) | 127.80 | -1.64 | 0.17 | 1.04 |

| Description | | Stage A Emissions incl. Uncertanty (kg $CO_2e/m^3$) | Biogenic $CO_2$ Stored (kg $CO_2e/kg$) | Stage A Emissions (kg $CO_2e/kg$) | Uncertainty factor A4 |
|---|---|---|---|---|---|
| Plywood | Cross-Laminated Timber (CLT) | 125.90 | -1.61 | 0.26 | 1.04 |
| Particle Boards | OSB (Oriented Strand Board) | 376.12 | -1.62 | 0.63 | 1.04 |
| Fibreboards | MDF (Medium Density Fibreboard) | 342.75 | -1.47 | 0.46 | 1.04 |

| Material Mix Structure | $m^3$ | kg |
|---|---|---|
| Storage per Unit in kg $CO_2e$ | -864.88 | -1.62 |
| Emissions per Unit in kg $CO_2e$ | 153.98 | 0.26 |

## A.3.2 Material Mix Insulation

| Description | Absolute % | Relative % | Dataset UUID | Unit of Measure | Conversion Factor to kg |
|---|---|---|---|---|---|
| Wood fibre | 14.00 % | 51.85 % | 5488d3f3-1e39-4a71-b357-ef605b65ed9c | $m^3$ | 162.34 |
| Cellulose | 6.00 % | 22.22 % | 3f764d2e-320b-4996-8c28-0f38e8971044 | $m^3$ | 80.00 |
| Hemp | 4.00 % | 14.81 % | 9a9f76b6-54f0-421e-9f8a-6a5d-b3a22e1d | $m^3$ | 38.00 |
| Other | 3.00 % | 11.11 % | b7b7c6be-122f-48d9-b1c2-9b81a-6b7e95c | $m^3$ | 38.00 |

| Description | Biogenic $CO_2$ Stored (kg $CO_2e/m^3$) | Data | Stage A Emissions (kg $CO_2e/m^3$) | Data |
|---|---|---|---|---|
| Wood fibre | -257.10 | A1 | 110.17 | A1-A3 + A5 / fossil, luluc, biogenic |
| Cellulose | -145.70 | A1-A3 | 154.05 | A1-A3/ fossil, luluc |
| Hemp | -5.50 | A1-A3 | 63.76 | A1-A3/ fossil, luluc |
| Other | -0.33 | A1-A3 | 63.74 | A1-A3/ fossil, luluc |

| Description | Stage A Emissions incl. Uncertainty (kg $CO_2e/m^3$) | Biogenic $CO_2$ Stored (kg $CO_2e$/kg) | Stage A Emissions (kg $CO_2e$/kg) | Uncertainty factor A4 | Uncertainty factor A5 |
|---|---|---|---|---|---|
| Wood fibre | 114.77 | -1.58 | 0.71 | 1.04 | 1.11 |
| Cellulose | 171.16 | -1.82 | 2.14 | 1.04 | 1.11 |
| Hemp | 70.85 | -0.14 | 1.86 | 1.04 | 1.11 |
| Other | 70.82 | -0.01 | 1.86 | 1.04 | 1.11 |

| Material Mix Insulation | $m^3$ | kg |
|---|---|---|
| Storage per Unit in kg $CO_2e$ | -166.54 | -1.25 |
| Emissions per Unit in kg $CO_2e$ | 115.91 | 1.33 |

## A.3.3 Material Demand

| Building Type | UFA in $m^2$ | Total Wood in t | Renewable Insulation Materials in t | Wood in kg per $m^2$ UFA | Insulation in kg per $m^2$ UFA |
|---|---|---|---|---|---|
| General education schools | 3,331.99 | 88.52 | 0.00 | 26.57 | 0.00 |
| Institutional buildings | 3,453.48 | 71.87 | 0.02 | 20.81 | 0.00 |
| Car dealerships | 2,139.63 | 4.05 | 0.00 | 1.89 | 0.00 |
| Combined heat and power plants (CHP) | 342.50 | 0.43 | 0.00 | 1.26 | 0.00 |
| Office and administrative buildings | 3,813.17 | 123.29 | 0.00 | 32.33 | 0.00 |
| Single-family houses (from 1991 onwards) | 217.53 | 5.33 | 1.32 | 24.49 | 6.05 |
| Factory / workshop buildings | 2,256.99 | 31.08 | 0.00 | 13.77 | 0.00 |
| Fire stations / rescue stations | 1,012.52 | 24.58 | 0.00 | 24.28 | 0.00 |
| Commercial buildings | 2,261.37 | 32.68 | 0.05 | 14.45 | 0.02 |
| Hotels / guesthouses | 1,610.67 | 32.80 | 0.00 | 20.36 | 0.00 |
| Hotels / restaurants | 1,743.71 | 40.81 | 0.04 | 23.40 | 0.02 |
| Daycare centers / nurseries | 748.48 | 50.78 | 0.14 | 67.84 | 0.18 |

| Building Type | UFA in m² | Total Wood in t | Renewable Insulation Materials in t | Wood in kg per m² UFA | Insulation in kg per m² UFA |
|---|---|---|---|---|---|
| Storage halls | 2,050.46 | 4.69 | 0.00 | 2.29 | 0.00 |
| Agricultural operational buildings | 673.00 | 29.01 | 0.00 | 43.10 | 0.00 |
| Agricultural halls | 673.00 | 29.01 | 0.00 | 43.10 | 0.00 |
| Multi-family houses (from 1991 onwards) | 785.97 | 11.46 | 0.96 | 14.58 | 1.22 |
| Parking garages / parking decks | 5,140.68 | 0.00 | 0.00 | 0.00 | 0.00 |
| Nursing homes | 3,726.74 | 65.94 | 0.00 | 17.69 | 0.00 |
| Production halls | 3,233.38 | 17.77 | 0.00 | 5.49 | 0.00 |
| Other non-agricultural operational buildings | 3,038.74 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other non-residential buildings | 3,162.98 | 93.29 | 0.00 | 29.50 | 0.00 |
| Sports and multi-purpose halls | 2,116.36 | 96.37 | 0.00 | 45.54 | 0.00 |
| Underground parking garages | 1,449.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| Supermarkets | 3,199.91 | 51.99 | 0.00 | 16.25 | 0.00 |
| Warehouse buildings | 2,280.35 | 14.15 | 0.00 | 6.21 | 0.00 |

# A.4 Monitoring: Parameters and Data Management

| ID | P1 |
|---|---|
| **Parameter** | Volume of biogenic building material Vf*(i)* |
| **Unit** | $m^3$ |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | Manufacturer records, EPDs, BIM or BOM |
| **Applicability & Method** | Applicable to all projects and biogenic materials. |
| **Monitoring frequency** | At commissioning and every 5 years |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check against BIM/BOM records and invoices; conduct site inspections where warranted; and perform remote monitoring using annually captured satellite imagery, analysed primarily with an AI model trained on labelled reference data and validated by manual spot checks |

| ID | P2 |
|---|---|
| **Parameter** | Sustainability Requirements According to Article 29 |
| **Unit** | % |
| **Value** | Number |
| **Tier** | 3 |
| **Source** | Manufacturer records |
| **Applicability & Method** | Applicable to all projects: The origin of the wood shall be Germany or, where applicable, the wood shall be certified under recognized schemes such as the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC). Such certifications shall be mandatory for all imported wood used in the project; disclose method used. |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check with manufacturer records, value should be 100% of certified materials |

| ID | P3 |
|---|---|
| **Parameter** | Carbon content CS*(i)* |
| **Unit** | t C/m³ |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | EPDs per EN 15804+A2, manufacturer records, or defaults (DIN EN 16449/338/350) |
| **Applicability & Method** | Included components: Floor slabs, roofs, load-bearing walls including beams and columns. Included cost groups (KGs) are defined in a reference table in Annex A.1<br>Materials are compliant with DNSH criteria of this methodology;<br>disclose method used |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Verify against EPDs or published databases and manufacturer records;<br>apply conservative defaults; assess via DQI |

| ID | P4 |
|---|---|
| **Parameter** | Emissions GWP*fossil(i)* |
| **Unit** | kg CO2e |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | Specific EPDs per EN 15804+A2 |
| **Applicability & Method** | Applicable to all cases for LCA Modules A1-A5; disclose method used |
| **Monitoring frequency** | At commissioning and every 5 years |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Independent review; DQI check |

| ID | P5 |
|---|---|
| **Parameter** | Emissions GWP*luluc(i)* |
| **Unit** | kg $CO_2$e |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | Specific EPDs per EN 15804+A2 |
| **Applicability & Method** | Applicable to all cases for LCA Modules A1-A5; disclose method used |
| **Monitoring frequency** | At commissioning and every 5 years |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Independent review; DQI check |

| ID | P6 |
|---|---|
| **Parameter** | Emissions GWP*biogenic(i)* |
| **Unit** | kg $CO_2$e |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | Specific EPDs per EN 15804+A2 |
| **Applicability & Method** | Applicable to all cases for LCA Modules A1-A5; disclose method used |
| **Monitoring frequency** | At commissioning and every 5 years |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Independent review; DQI check and check of building file in case of leakage |

| ID | P7 |
|---|---|
| **Parameter** | Risk factor R |
| **Unit** | % |
| **Value** | Number |
| **Tier** | 2 |
| **Source** | Method default, see Annex A.2 |
| **Applicability & Method** | Applicable to all cases of upfront issuance; disclose method used |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Document rationale and evidence |

| ID | P8 |
|---|---|
| **Parameter** | DQI |
| **Unit** | Number |
| **Value** | Number |
| **Tier** | 3 |
| **Source** | Method default (based on consolidated DQI) |
| **Applicability & Method** | Applicable to all projects and all certified materials; disclose method used |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check with aggregated DQI of certified materials and appropriate material EPDs |

| ID | P9 |
|---|---|
| **Parameter** | Carbon content of standardised baseline CR*baseline* |
| **Unit** | t C/m³ |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | Method default |
| **Applicability & Method** | Whenever a standardised baseline is used; disclose method used |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check with architects and building completion statistics |

| ID | P10 |
|---|---|
| **Parameter** | Emissions standardised baseline Bsemissions |
| **Unit** | kg $CO_2e$ |
| **Value** | Number |
| **Tier** | 2-3 |
| **Source** | Method default |
| **Applicability & Method** | Whenever a standardised baseline is used; disclose method used |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check with architects and building completion statistics |

| ID | P11 |
|---|---|
| **Parameter** | TNCRB |
| **Unit** | kg $CO_2e$ |
| **Value** | Number |
| **Tier** | 3 |
| **Source** | Method default |
| **Applicability & Method** | Applicable to all projects: TNCRB > 0; disclose method used |
| **Monitoring frequency** | At commissioning and every 5 years |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-checks shall be performed against cumulative emission and storage calculations, including any structural changes, where applicable. |

| ID | P12 |
|---|---|
| **Parameter** | CRU |
| **Unit** | Unit |
| **Value** | Number |
| **Tier** | 3 |
| **Source** | Method default |
| **Applicability & Method** | Applicable to all projects: TNCRB > 0; disclose method used |
| **Monitoring frequency** | At commissioning and every 5 years |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-checks shall be performed against cumulative emission and storage calculations, including any structural changes, where applicable. |

| ID | P13 |
|---|---|
| **Parameter** | DNSH |
| **Unit** | Binary |
| **Value** | Yes/No |
| **Tier** | 3 |
| **Source** | Different verifiable data sources may be used |
| **Applicability & Method** | Applicable to all projects and all DNSH parameters; disclose method used |
| **Monitoring frequency** | At commissioning and every five years thereafter, in the event of changes to the structure. |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check with DNSH criteria listed in this methodology, all requirements shall be fully met |

| ID | P14 |
|---|---|
| **Parameter** | Co-Benefits |
| **Unit** | Binary and applicable units for the disclosure of exact values. |
| **Value** | Yes/No; exact values if applicable |
| **Tier** | 3 |
| **Source** | Different verifiable data sources may be used |
| **Applicability & Method** | Applicable to all projects, all relevant co-benefits shall be documented; disclose method used |
| **Monitoring frequency** | At commissioning |
| **Responsibility for collection and archiving** | Responsible for storage, with a retention period of at least the duration of the certification period plus ten (10) years, including the name and location of the archive. |
| **QA/QC procedures** | Cross-check with Co-Benefits criteria listed in this methodology |

*Tier definitions follow IPCC: 1 = default, 2 = country/region-specific, 3 = project-specific.

# A.5 Standard template for the activity plan referred to in Article 3

The standard template for an activity plan, in accordance with Commission Implementing Regulation (EU) 2025/2358 of 20 November 2025 laying down rules on certification schemes, certification bodies, and audits under Regulation (EU) 2024/3012 of the European Parliament and of the Council, shall at a minimum include the following sections:

1. Description of the activity, including the description of the following elements:

   a. eligibility for certification under Regulation (EU) 2024/3012;

   b. legal ownership and contact information of the operator;

   c. georeferenced boundaries of the activity, including, if applicable, codes from the national integrated administration and control system (IACS) and land parcel identification system (LPIS) pursuant to Regulation (EU) 2021/2116 of the European Parliament and of the Council (1);

   d. technologies, practices and processes applied;

   e. start date of the activity;

   f. information listed in Article 8 (1).

2. Description of the application of the certification methodology or methodologies, including separate sub-sections on:

   a. quantification, including calculation of the activity baseline, if applicable;

   b. additionality, including funding sources;

   c. long-term storage;

   d. sustainability.

3. Expected total carbon removals, total soil emissions, and total greenhouse gas emissions associated to the activity.

4. Expected net carbon removal benefit or the expected net soil emission reduction benefit generated by the activity.

5. In case of a group of operators, description of how advisory services are provided to operators.

6. In case of a group of operators implementing a carbon farming activity, description of the internal control system established by the group of operators in accordance with Article 12 (1), point (d).

# A.6 DNSH & CO-Benefits Implementation Criteria

## A.6.1 DNSH based on TSC of EU Taxonomy

**Table 15: DNSH Requirements aligned with EU Taxonomy**

| Goal | Requirements |
|---|---|
| **Climate change mitigation** | **New buildings and extensions:** Buildings may not be used for the extraction, storage, transportation or production of fossil fuels. |
| | **New buildings:** The Primary Energy Demand (PED) shall comply with the requirements of the Energy Performance of Buildings Directive (EPBD; EU/2010/31). **Minimum requirement:** KfW Efficiency House 55 |
| **Climate change adaptation** | No dedicated requirement (ND). |
| **Sustainable use and protection of water and marine resources** | **New buildings and extensions:** Efficiency of water consumption during the use stage (B1-B5) with relevant criteria set out in Commission Delegated Regulation (EU) 2021/2139, Annex 1 Appendix E . |
| | **New buildings:** Generic DNSH criteria (Annex II, Annex B) apply to construction sites to ensure water quality, ecological potential and compliance with the Water Framework Directive and the Marine Strategy Framework Directive. |
| **Transition to a circular economy** | **New buildings and extensions:** Construction site waste shall comply with EU waste legislation. At least 70% of non-hazardous construction waste shall be reused or recycled. |
| | **New construction:** GWP shall be calculated for all life cycle phases. **Extensions:** GWP shall be calculated for all life cycle phases from the start of renovation. |
| | **New construction:** BIM models are required for projects (see EN ISO 22057:2022), just as environmental product declarations (EPD) for building materials are mandatory. |
| **Pollution prevention and control** | **New buildings and extensions:** Building materials shall comply with the TSCs in Annex II, Annex C. This includes in particular the avoidance of chemicals in accordance with REACH (1907/2006), the exclusion of persistent organic pollutants, mercury compounds and ozone-depleting substances. |
| **Protection and restoration of biodiversity and ecosystems** | No dedicated requirement (ND). |

## A.6.2 DNSH based on TSC of German Regulations: Building Level

**Table 16: DNSH Requirements - Building Level**

| Goal | Requirements |
|---|---|
| **Climate change mitigation** | · Application of existing laws in the field of energy efficiency: Building Energy Act (GEG);<br>· Avoidance of emissions through material use. |
| **Climate change adaptation** | · Already regulated under building law. |
| **Sustainable use and protection of water and marine resources** | · No dedicated requirement (ND);<br>· Structural components and insulation don't come into contact with water; installed dry. |
| **Transition to a circular economy** | · Proof through as-built documentation.<br>· **For larger projects could be: Circularity Index (CI) as provided for in the Building Resource Passport (If DIN Norm will be in place) |
| **Pollution prevention and control** | Fulfilled through German legislation:<br>· State Building Code for Baden-Württemberg (LBO);<br>· Construction Products Act (BauPG);<br>· Chemicals Act (ChemG);<br>· Hazardous Substances Ordinance (GefStoffV);<br>· Waste Wood Ordinance (AltholzV). |
| **Protection and restoration of biodiversity and ecosystems** | · Already regulated under building law. |

## A.6.3 Co-Benefits based on TSC of EU Taxonomy

**Table 17: Co-Benefits Requirements aligned with EU Taxonomy**

| Goal | Requirements |
|---|---|
| **Climate change mitigation** | **New buildings:** The Primary Energy Demand (PED) exceeds the minimum requirement, achieving performance better than KfW Efficiency House 55 or equivalent standard. |
| **Climate change adaptation** | **New buildings and extensions:** Construction plans and designs should take into account resilience to climate change impacts, such as reducing the Urban Heat Island Effect (Annex II, Annex A). An independent expert assessment is required to verify adaptation measures. |
| **Sustainable use and protection of water and marine resources** | **New buildings and extensions:** Demonstration of additional positive effects related to the sustainable use, conservation, or restoration of water and marine ecosystems (e.g., rainwater harvesting, greywater reuse, or water-efficient landscaping). |

| Goal | Requirements |
|---|---|
| **Transition to a circular economy** | **New buildings:** Construction site waste shall comply with EU waste legislation. At least 90 % of non-hazardous construction waste shall be reused or recycled.<br>**Extensions:** More than 70 % of non-hazardous waste shall be reused or recycled. |
| | **New construction:** A maximum of 80 % of the materials may come from primary raw materials.<br>**Extensions:** A maximum of 90 % of the materials may come from primary raw materials.<br>**New construction and extensions:** The design and construction techniques should support circularity through concepts of adaptability and deconstructability, according to level(s) indicators 2.3 and 2.4. |
| **Pollution prevention and control** | **New buildings and extensions:** Demonstration of further positive effects in pollution prevention (e.g., use of low-emission materials, air quality improvements, or additional substance restrictions beyond legal minimums). |
| **Protection and restoration of biodiversity and ecosystems** | **New buildings and extensions:** Implementation of measures that positively contribute to biodiversity (e.g. habitat creation, or the use of native species in landscaping). In addition, compliance with generic TSCs in Annex II, Annex D is required. |

# A.7 Data Sources

| Topic | Source Name | Date | Linl |
|---|---|---|---|
| A4 & A5 Emissions | Building and Environment | 2024 | https://doi.org/10.1016/j.buildenv.2024.112457 |
| Building Classes | Landesbauordnung für Baden-Württemberg (LBO) | 2017 | https://www.landesrecht-bw.de/bsbw/document/jlr-BauOBW2010V6P2 |
| Carbon Content of a Single Building Material | DIN EN 16449 | 2014 | DIN EN 16449 |
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