



Preferred by Nature Carbon Footprint Certification Standard

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Introduction

Customers, investors, and the global community expect businesses to take on a leadership role in the fight against climate change. These expectations have led to demands for transparent sustainability reporting, fact-based claims, and climate stewardship across industries. Recognising the importance of accurately communicating emissions in the private sector, this edition of the Preferred by Nature Carbon Footprint Certification Standard aims to help organisations to measure their product carbon footprint in a consistent way and allow communication and reporting of the actual product footprint information to customers both up and downstream. It is meant to be a useful tool to help comply with regulatory reporting requirements, increase transparency, and pass on information of the product carbon footprint in supply chains.

Keeping this specific purpose in mind, this standard does not contain requirements related to emissions reductions and does not cover compensation-related aspects.

The standard has been developed to align with leading product carbon footprint standards and methods. The standard builds upon elements of the GHG Protocol standards developed by the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) as well as PAS standards developed by the British Standard Institute (BSI) and ISO 14067:2018 requirements on quantifying, monitoring, and reporting of GHG emissions.

Standard effective date

This standard is effective from 01 of February 2025. The standard will be reviewed at least once every three years. New methodological or regulatory requirements may require updates at earlier frequencies.

Scope and Applicability

This standard is applicable to any organisation that would like to accurately account for their climate impact by following leading industry-accepted methodology. This version of the standard can be used for **Product Carbon Footprint**. The scope of the Product Carbon Footprint covers the materials and services produced or delivered. The scope includes the product life cycle as defined by the organisation.

All aspects of this standard are normative, including the scope, standard effective date, references, terms and definitions, tables and annexes, unless otherwise stated.

Disclaimer

This standard is meant to guide organisations to accurately measure and communicate the carbon footprint of their chosen products throughout their value chains. It has been developed to provide implementable and accurate criteria. The standard aims to be aligned with leading foundational methodologies. The standard is voluntary and does not guarantee compliance with all regulatory requirements.

Any organisations using this standard shall maintain full responsibility for all regulatory and legal compliance. PBN does not assume responsibility for consequences or damages resulting directly or indirectly from the use of this standard in the preparation of reports or program specifications or the use of reported data based on the standard.

Requirements for Carbon Footprint Certification

1. Quality requirements

1.1. Responsibilities and competence

- 1.1.1. The Organisation shall appoint an individual or position with overall responsibility for conformance with applicable requirements of this standard. The individual/position will also have the responsibility to update the carbon footprint calculations as per section 3.
- 1.1.2. The appointed individual/position shall have sufficient authority and access to resources to ensure compliance with this standard.
- 1.1.3. All relevant staff shall demonstrate competence in the Organisation's procedures relevant to fulfilling this standard.

1.2. Products in scope and documentation

- 1.2.1. The Organisation shall clearly define which products are included in the scope of this standard and regarding which it wishes to make claims.
- 1.2.2. The Organisation shall keep records of all products sold with carbon claims, including the product type, the size of the carbon footprint communicated and the volume of products in relation to which the claims were made.
- 1.2.3. The Organisation shall maintain records demonstrating conformance with this standard.
- 1.2.4. All relevant records shall be retained for a minimum of 5 years.

1.3. Performance monitoring

- 1.3.1. The Organisation shall follow up on nonconformities to ensure compliance with this standard within the timeframes agreed within the audit process.
- 1.3.2. The Organisation shall assess the quality of the data collected and hence the uncertainty of the carbon footprint calculation related to:
 - a) calculation methods, including any emission factors used;
 - b) estimates and assumptions;
 - c) primary and secondary data along with their sources;
 - d) quality criteria¹ or alternative data used for Scope 2 accounting;
 - e) processes and activities especially resulting in significant emissions;
 - f) allocation methods; and
 - g) product use and end-of-life profile when performing a cradle-to-grave life cycle.

¹ For additional information on market-based method quality criteria for evaluating contractual instruments refer to GHG Protocol - Scope 2 Guidance.

- 1.3.3. The Organisation shall assess data quality based on accuracy; completeness; time, technological and geographical representativeness; and reliability. The assessment should provide a quantitative evaluation when possible.

2. Defining the boundaries of the carbon footprint

2.1 Defining carbon footprint boundaries

- 2.1.1. The Organisation shall define the product and an appropriate unit of analysis.
- 2.1.2. The Organisation shall define all attributable processes within the product life cycle that generate emissions. At a minimum the footprint shall be cradle-to-gate.
- 2.1.3. The Organisation shall report all GHGs applicable in CO₂ equivalents to the scope of the carbon footprint. The Organisation shall, as a minimum, account for the 7 major GHGs: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃.
- 2.1.4. Emissions that are projected to amount to less than 1% of the total anticipated carbon footprint may be left out.
- 2.1.5. Emissions considered unfeasible to quantify or associated with unreasonably complicated or costly data collection may be left out in justified cases, provided total emissions excluded do not account for more than 5% of the total anticipated carbon footprint.
- 2.1.6. To account for any emission sources left out (2.1.4 and 2.1.5), the Organisation shall add an emission buffer to the total carbon footprint proportionate to the exclusions and any perceived margin of error.
- 2.1.7. Any excluded emissions, including carbon-intensive activities that have been outsourced, shall be justified and documented.

3. Calculation of carbon footprint

3.1. Identifying emission sources and removals

- 3.1.1. The Organisation shall include in the product carbon footprint calculations all emission sources required in Annex I unless otherwise justified per 2.1.
- 3.1.2. The Organisation shall include Scope 2 emissions based on both the emissions factors from contractual instruments (market-based method) and the average energy generation emission factors for a defined geographic location (location-based method). The market-based method should then be used in defining the footprint if it meets the quality criteria set out in GHG Protocol - Scope 2 Guidance, and if not, the location-based should be used².

² On the occasion that none of the Organisation's energy-consuming facilities exist in areas where *market-based instruments* provide data, the Organisation need only report per the *location-based method*.

- 3.1.3. Any biogenic emissions or removals and land-use change impacts occurring in the product boundary shall be reported separately in the inventory results, when applicable³.
- 3.1.4. The Organisation may include biogenic carbon stored in final products that is not released to the atmosphere based on the carbon stored in the product after the 100-year assessment period. Assumptions and calculations of the storage profile shall be documented (see Annex III).
- 3.1.5. Avoided emissions shall not be included in the inventory but may be reported separately.

3.2. Choosing calculation methods

- 3.2.1. The Organisation shall justify method(s) for calculating the carbon footprint⁴ (e.g. sector-specific calculation tools, spreadsheets etc.).
- 3.2.2. The Organisation shall use the most accurate calculation method available to them.
- 3.2.3. In case updated sector or product-specific rules exist, these should be applied⁵.
- 3.2.4. Carbon footprint calculations shall be made exclusive of any purchases of carbon offsets.

NOTE: When calculations are done with the Preferred by Nature supplied range of tools, the methodology can be considered accurate and justified.

3.3. Collecting emission data, choosing emission factors, and calculating results

- 3.3.1. The carbon footprint shall be based on primary data for all processes owned or operated by the Organisation attributable to the product. For other processes, including those involving indirect emissions, the Organisation shall use primary data if available and otherwise use secondary data from a relevant and authoritative source.
- 3.3.2. The Organisation shall identify and justify the method for collecting emission data across the product life cycle as well as the sources of data, emissions factors, and any techniques used to collect data via sampling or estimation.
- 3.3.3. GHG emissions shall be calculated using emission factors from reliable and updated sources (e.g. government agencies or industry associations) where quantifications are based on calculations (e.g. activity data is multiplied by an emission factor) instead of direct measurement of emissions.
- 3.3.4. The Organisation shall use emission factors that are relevant to the process or activity concerned and current at the time of quantification (e.g. kgCO₂e per kWh for the year under calculation), whenever possible.

³ In anticipation of the draft Land Sector Removals Guidance from the GHG Protocol being finalised, it is advised to prepare to report biogenic and non-biogenic emissions separately, as biogenic removals can only compensate against biogenic emissions. Until final version is released this is not considered mandatory.

⁴ The Organisation must also document any methods for calculating *land-use impacts* as well as *biogenic emissions* and *removals*, when applicable.

⁵ e.g. ISO 16759 Quantifying and communicating the *carbon footprint* of print media products; Product Environmental Footprint Category Rules and Organisation Environmental Footprint Sector Rules.

- 3.3.5. The Organisation shall convert emissions data⁶ into CO₂ equivalent through Global Warming Potential (GWP) factors⁷.
- 3.3.6. The Organisation shall ensure that the use of any energy attribute certificates demonstrates real emissions reductions (as based on green or renewable energy) and that such reductions have not been achieved through carbon offsets.
- 3.3.7. The product carbon footprint shall be expressed in relation to the specified unit of analysis in kgCO₂e or in tCO₂e (e.g. kgCO₂e per single production unit or per m³ of product) and in absolute terms as an amount of tCO₂e.
- 3.3.8. The Organisation shall update the carbon footprint of all products in the scope annually to account for material changes and calculation methodology updates⁸.

3.4. Allocations⁹

- 3.4.1. The Organisation shall avoid or minimise allocations where possible. This can be done by gathering additional product-specific data from value chain partners, developing models to estimate emissions related to products produced, subdividing a common process to distinguish product inputs and outputs, or expanding the system boundaries.
- 3.4.2. If allocations cannot be avoided, they shall be based on a physical relationship (e.g. mass, volume, number of outputs) or on an economic relationship as a second alternative.
- 3.4.3. The Organisation shall identify and justify allocation methods.
- 3.4.4. For allocations of recycled input or recyclable output the Organisation shall use the recycled content or closed loop approximation method¹⁰, or a method based on relationships expressed in 3.4.2 or sector/product specific rules.

⁶ Emissions data may stem from *direct emissions* data or by multiplying *activity data* by an emissions factor.

⁷ *GWP* values may be obtained from the Intergovernmental Panel on Climate Change (IPCC) or IPCC GWP values approved by the United Nations Framework Convention on Climate Change (UNFCCC).

⁸ As new ISO methodology and guidance from Greenhouse Gas Protocol is released, with grace period of 1 year to understand methodology application.

⁹ *Allocation* is the process of dividing emissions from a single facility, process or system among its various outputs e.g. several product outputs or *co-products*. (see Glossary).

¹⁰ For information on the *recycled content* and *closed loop approximation methods* refer to GHG Protocol - Product Life Cycle Accounting and reporting Standard or PAS 2050 - Specification for the assessment of the life cycle greenhouse gas emissions of goods and services.

4. Carbon footprint summary report¹¹

4.1. Requirements for carbon footprint summary report

- 4.1.1. The Organisation shall summarise the core elements of its GHG emissions methodology and scope.

NOTE: The Organisation may use the template provided in Annex II for this purpose.

- 4.1.2. The information shall be updated whenever the carbon footprint calculation of products is updated as per 3.3.8.

5. Claims

5.1. Requirements for carbon footprint claims

- 5.1.1. The Organisation may make claims about the assessed carbon footprint of the products in the scope and where all applicable requirements of this standard have been followed. The Organisation may use the standard claim below in 5.1.4 or formulate its own claim, following the requirements below.
- 5.1.2. Any claims shall be approved by Preferred by Nature, and information about the time of approval shall be kept.
- 5.1.3. Claims shall:
- a) clearly identify the subject and focus of the declaration;
 - b) identify the organisation responsible for making the declaration or ensure that this is unanimously clear;
 - c) include the size of the assessed carbon footprint
 - d) include the qualifying date;
 - e) not overstate or misrepresent any emissions covered or results.

- 5.1.4. The Organisation may use the following standard claim to communicate the carbon footprint of its products to its buyers and for general reporting on their carbon footprint:

"[Organisation name] has measured the carbon footprint of this product to be [xx] kgCO₂e per unit during [assessment period]. The carbon footprint has been verified and certified by Preferred by Nature, [month, 20XX]."

In cases where the product assessment scope includes removals/insetting, the following standard claim may be used: "[Organisation name] has measured the balance of the carbon footprint of this product to be [xx] kgCO₂e per unit during [assessment period]. This balance includes emissions of [xx] kgCO₂e per unit and removals of [xx] kgCO₂e per unit. The carbon footprint has been verified and certified by Preferred by Nature, [month, 20XX]."

¹¹ The purpose of such report is for a transparent record of product carbon footprint calculation methodology and scope. It is aligned to the 'carbon footprint study report' as per ISO 14067:2018 section 7.3 requirements.

References

For further elaboration of concepts or calculation methodology, the background standards below may be consulted:

1. WRI/WBCSD: Greenhouse Gas Protocol - Corporate Accounting and Reporting Standard Revised Edition (2015)
2. WRI: Greenhouse Gas Protocol - GHG Protocol Scope 2 Guidance: An amendment to the GHG Protocol Corporate Standard (2015)
3. WRI/WBCSD: Greenhouse Gas Protocol - Corporate Value Chain (Scope 3) Accounting and Reporting Standard: Supplement to the GHG Protocol Corporate Accounting and Reporting Standard (2011)
4. WRI/WBCSD: Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions: Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2013)
5. WRI/WBCSD: Greenhouse Gas Protocol - Product Life Cycle Accounting and Reporting Standard (2011)
6. BSI: Publicly Available Specification 2060 - Specification for the demonstration of carbon neutrality (2014)
7. BSI: Publicly Available Specification 2050 - Specification for the assessment of the life cycle greenhouse gas emissions of goods and services (2011)
8. ISO 14064-1:2018 Greenhouse gases — Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals
9. ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
10. SBTi - Corporate Net-Zero Standard Criteria Version 1.2

Annex I: GHG emission sources (normative)

Background

This annex specifies which emissions at minimum are to be included for Product footprints. The annex is used as reference by auditors and is thus part of the requirements of this standard.

Emission scopes for Product Footprint Verification

The Table below outlines emission sources required or to be considered when pursuing Product Carbon Footprint verification, including services. Exclusions related to any required *life cycle* stage shall be justified and documented in the *carbon footprint* report. (*Emission sources including use and end-of-life are only applicable to cradle-to-grave.*)

Product Footprint		Life-cycle stage	Emission source
Product Footprint	Cradle-to-gate	Material acquisition and pre-processing (from nature to Production gate)	Emissions associated with raw materials, purchased goods and inputs, packaging, and equipment. Required Transportation between processes and facilities, including packaging. Required
		Production (upon entering facility and until exit)	On-site emissions (scopes 1 and 2) involving fuels, electricity, etc. Required Transport between organisational sites. Required Assembly and processes, and any fugitive emissions. Required Preparation for distribution. Required Treatment of waste from production. Required Water usage and wastewater treatment. Optional
	Cradle-to-grave (including prior stages) ⁱ	Distribution and storage (from production facility until customer acquisition)	Distribution of products and storage between sites (including retail emissions when applicable). Required
		Use ⁱⁱ (customer acquisition until discard)	Transport to user home. Required Emissions associated with use (e.g. cooling, warming, electricity, maintenance). Required
		End-of-life (discard until returned to nature or recycled)	Collection and transport of product and its packages. Required Waste management including breakdown of components and sorting. Required Incineration or land filling. Required
		Water consumption ^{iv}	Includes monitoring and management of water consumption by the organisation across the value chain. Optional

ⁱ Raw materials also refer to emissions from land use change when significant impacts are observed, or sources are material to production processes. Also refer to Annex III for additional information.

ⁱⁱ Not required for cradle-to-gate.

ⁱⁱⁱ Although a more difficult stage to evaluate, this is where significant emissions may occur due to energy consumption, for example.

^{iv} Monitoring water consumption is recommended if no water management plant exists for the product.

It is not a requirement for product verification to report on categories not directly linked to the product or service in focus because such non-*attributable processes* do not necessarily become, create, or carry the product or service through its *life cycle*. Such categories may include capital goods, overhead operations, research and development, transportation of the product user, or employee commuting. If such non-*attributable processes* are to be included, the Organisation shall disclose the information in the *GHG inventory* report.

In the case the Organisation focuses on *intermediate products* and the use of the *final product* is unknown, the Organisation may enlist a *cradle-to-gate boundary* approach, although the additional stage of distribution and storage is to be included if emissions are material, the life cycle stage is relevant to operations, or data collection and footprint calculations can feasibly be performed by the Organisation. It is encouraged those organisations working with *final products* take a *cradle-to-grave boundary* approach, incorporating all stages of the product *life cycle*. Any emission sources not material to the product may only be left out with appropriate justification.

Annex II: Carbon footprint summary report

Background

This annex is meant to demonstrate a template for a carbon footprint summary report, which shall include all relevant information as required by section 4.1.

Summary report template

The carbon footprint summary report may follow the following format and should, at a minimum include the information as shown below:

Product name:			
Activity:	Primary producer	Other, specify:	
Carbon Footprint verification year	Specify the year under analysis:		
Define Product 1:	Studied product name and description:		
Define scope:	<input type="checkbox"/> Cradle-to-grave <input type="checkbox"/> Cradle-to-gate	Justification	
Unit of analysis:	Define unit of analysis:		
Applicable GHGs:	<input checked="" type="checkbox"/> CO ₂ <input type="checkbox"/> PFC <input type="checkbox"/> CH ₄ <input type="checkbox"/> HFCs <input type="checkbox"/> N ₂ O <input type="checkbox"/> SF ₂	Additional GHGs: CO ₂ e	
Excluded emissions	Specify exclusion:	Justify exclusion (short)	Estimated % of footprint (buffer)
	1. Emissions less than 1%	1. Insignificant size (<1%)	1%
Allocation	Define any allocation methods applied: <input type="checkbox"/> N/A <input type="checkbox"/> Physical relationship <input type="checkbox"/> Economic relationship		
Use profiles included (N/A for cradle-to-gate)	Define use profiles: <input type="checkbox"/> N/A Profile 1: Estimated percentage: 100% Profile 2: Estimated percentage: 100% Profile 3: Estimated percentage: 5%		
Guidance:	Additional product rules or sector specific guidance used List: <input type="checkbox"/> N/A		
Carbon Footprint Calculation	Specify method used to calculate carbon footprint PBN Calculator Tool Other, specify:		

	Specify sources of Carbon Global Warming Potential (GWP) factors https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf
	Specify sources of emission factors (Provide links, if applicable)
	Specify any major assumptions made in quantifying emissions and in the selection or development of emission factors
	Describe method used to calculate land-use change impacts, where applicable
Removals/Insetting	<input type="checkbox"/> N/A List of Measures: Calculated Using: PBN Calculator Tool Other, specify:
Data Quality	Assessment based on accuracy; completeness; time, technological and geographical representativeness; and reliability Qualitative Assessment Quantitative Assessment (1-5)
Additional Comments:	

Carbon footprint results (product)		
Assessment Period	Total footprint	Total footprint per ton
	Absolute kgCO ₂ e	kgCO ₂ e/ton product
Carbon removal results (product)		
Assessment Period	Total removals	Total removals per ton
	Absolute: kgCO ₂ e	kgCO ₂ e/ton product
Carbon balance (product)		
Assessment Period	Total balance	Total balance per ton
	Absolute: kgCO ₂ e	kgCO ₂ e/ton product

Annex III: Land-use change and carbon storage in products (guidance)

Background

Land-use change attribution is defined by the emissions resulting from any change in land use associated with an organisation's activities or the production of a product, such as the change from forest to agricultural land.

Emissions from land-use change

Land-use change shall be included in *product carbon footprints* when emissions are significant or the extraction of raw materials and associated agricultural or forest activities are material to production (see 3.1.3). Organisations that estimate high emissions resulting from change in land-use due to their activities are to include *land-use change impact* in their *carbon footprint* per 3.1.3. Land-use conversion may represent an area for carbon emissions reduction, e.g. by changing from uncertified to certified timber, where land-use change is not expected¹².

The basic principle for calculating the carbon emissions resulting from land-use change is to assess the change in *carbon stock* between the previous and new land use over a 20-year period or a harvest cycle - whichever is longer. When the location of origin of purchased raw material is known, the Organisation can calculate the change in *carbon stock* base on satellite imagery, historical data, sector, or country specific data, or otherwise generic *activity data* or *emission factors* (e.g. IPCC¹³, FAOSTAT¹⁴). If the location of origin or previous land-use is not known, the Organisation must estimate the most likely scenario with justification and provided references and choose a conservative approach. Please find more guidance in the Greenhouse Gas Protocol - Product Standard (Appendix B).

Carbon storage in products

Carbon stored in products is relevant for product carbon footprints and is defined by the accumulation of carbon in a form other than atmospheric gas (e.g. carbon stored in wood products). Carbon storage should be calculated based on the expected use profile of the product over a 100-year assessment period (i.e. amount of carbon expected to remain in the product after 100 years). Assumptions and calculations of the storage profile shall be documented. Organisations are advised to obtain recognised default values for carbon stored in products, e.g. Winjum et al. (1998)¹⁵ or IPCC¹⁶.

¹² Preferred by Nature deems FSC™ certification to offer assurance for responsible forest management. Other standards are considered by Preferred by Nature on a case-by-case basis.

¹³ IPCC, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, vol. 4: Agriculture, Forestry, and other Land Use.

¹⁴ FAO, FAOSTAT. Available from <http://faostat.fao.org>, 2022.

¹⁵ Winjum, J.K., Brown, S. and Schlamadinger, B. (1998): Forest harvests and wood products: sources and sinks of atmospheric carbon dioxide. Forest Science 44: 272-284 31

¹⁶ IPCC, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, vol. 4: Agriculture, Forestry, and other Land Use.

Glossary

100-year assessment period	Time period for which the GHG emissions and removals from the product life cycle shall be accounted for per global warming potential time horizon.
Accuracy	A data quality indicator refers to using the data that is most accurate and allows for measurements close to actual values. Ensure that bias and uncertainty have been reduced to the largest extent possible, and the quantification of GHG emissions is neither systematically over nor under actual emissions. Accurate representation should allow stakeholders to make decisions with a reasonable degree of certainty as to the integrity of the information.
Activity data	A quantitative measure of the level of activity resulting in GHG emissions (e.g. litres of fuel consumed, kilowatt-hours of electricity used). Activity data is multiplied by an emission factor to obtain GHG emissions of the process, activity, or operation.
Allocations	Method of dividing GHG emissions from a single facility or other system (e.g. vehicle, business unit) among its outputs or from a common process between a product and co-products. For example, a company shares an office building with other companies. To determine the company's share of electricity, it determines the proportion of space it occupies in the building (based on total area and occupancy rate) as a percentage and multiplies the result by total energy use (e.g. kWh) of the building. The company then multiplies this value by an emission factor. Methods for allocations are further explored in GHG Protocol's Corporate Value Chain (Scope 3) (Chapter 8) and Product Life Cycle Accounting and Reporting Standards (Chapter 9).
Anticipated carbon footprint	Refers to an estimate of the carbon footprint, not to be at the same level of accuracy as results following more thorough calculations.
Attributable processes	Any services, materials or energy flows that eventually become, make, and move the product through its life cycle.
Attributional approach	A foundational approach to product life cycle accounting, where GHG emissions and removals are attributed to the unit of analysis of the product or service in focus. This attribution of GHG emissions and removals to the unit of analysis is done by linking attributable processes along the life cycle.
Avoided emissions	Avoided emissions include emissions reductions that are indirectly caused by the product or a process that occurs in the product's life cycle. Regarding, renewable energy (e.g. biomass) avoided emissions can be calculated by assuming that the use of the biomass reduces the demand for coal-fired power.

Base year carbon footprint	Greenhouse gas emissions of the product life cycle (product footprint) measured in the determined base year. The base year carbon footprint is used for tracking emissions reductions and offsets.
Biofuels	Fuel derived from plant material (e.g. wood, ethanol from plant matter).
Biogenic CO₂ emissions	CO ₂ emissions stemming from combustion or biodegradation of biologically based materials not including fossil fuels (e.g. combustion of biological material from forests and agricultural feedstock).
Biomass	Materials or fuels produced by biological processes including non-fossil material (e.g. plants), biofuels, and biogenic waste and gas.
Calculation method	The technical method used by the Organisation to calculate the carbon footprint.
Carbon dioxide (CO₂)	A naturally occurring gas and one of the most abundant greenhouse gases in the atmosphere. Carbon dioxide is also a by-product of industrial processes, burning fossil fuels, and land-use changes.
Carbon dioxide equivalent (CO₂e)	The universal unit of measurement used to indicate the global warming potential of greenhouse gases expressed in the terms of the 100-year global warming potential of one metric tonne of carbon dioxide (tCO ₂ e). Product carbon footprints are usually expressed in kilograms or tons of CO ₂ e.
Carbon footprint	The total set of greenhouse gas (GHG) emissions caused by an organisation, event or product. For simplicity of reporting and comparison, it is often expressed in terms of the amount of carbon dioxide equivalent.
Carbon inventory	Quantified list of a subject's GHG emissions and sources.
Carbon stock	The total amount of carbon stored on a plot of land at any given time in one or more of the following carbon pools: biomass (above and below ground), dead organic matter (dead wood and litter), and soil organic matter. A change in carbon stock can refer to additional carbon storage within a pool, the removal of CO ₂ from the atmosphere, or the emission of CO ₂ to the atmosphere.
Carbon storage	Retention of carbon from biogenic or fossil sources or of atmospheric origin in a form other than atmospheric (e.g. wood products).
Closed loop approximation method	Also known as the 0/100 method, takes into consideration the impact that end-of-life recycling has for the acquisition of virgin material, which maintains the same intrinsic properties as the recycled material.

Completeness	As a data quality indicator, refers to the degree data is representative of applicable activities (e.g. percentage of activities or locations where data is available and incorporated out of the total number within the chosen boundaries; number of applicable emission sources included).
Consistency	Use consistent methodologies, data, and assumptions to allow for meaningful comparisons of the carbon footprint over time. Document any changes to the data, inventory boundary, methods, or any other relevant factors in a transparent manner.
Contractual instrument	Various types of contracts between parties for the purchase of energy and carrying attributes about the energy generation. Examples may include renewable energy certificates and guarantees of origin, direct agreements, supplier-specific emission rates, and emission factors representing the residual mix.
Control	Ability of a company to directly influence policies of operations either through demonstrating operational control or financial control. (see equity share, financial and operational control approach)
Co-products	Two or more products that come from the same unit process or product system.
Cradle-to-gate	Life cycle stages from the extraction or acquisition of raw materials to the point at which the product leaves the Organisation undergoing the assessment.
Cradle-to-grave	Life cycle stages from the extraction or acquisition of raw materials to recycling and disposal of waste.
Direct emissions	Emissions from sources owned or controlled by the reporting organisation. (Also referred to as Scope 1 emissions).
Double counting	When two or more individuals or organisations claim ownership of a specific emissions reduction or carbon offset.
Downstream emissions	Emissions occurring downstream in the value chain, after the handover of products or waste to a third party e.g. emissions caused by use, waste handling and recycling activities of the Organisation's products.
Emission buffer	An emission buffer refers to a percentage with which the total carbon footprint is multiplied in order to compensate for excluded emissions.
Emission factor	An amount of greenhouse gases emitted, expressed as carbon dioxide equivalent and relative to a unit of activity (e.g. kgCO ₂ e emitted in relation to a kWh of electricity purchased). Although originating from secondary sources, it is normal practice to use emission factors to convert activity data into emission values.

Emission intensity terms	An expression of the carbon footprint per unit of physical activity or unit of economic value, e.g. tCO ₂ e per staff member employed or per ton of product produced within the base year. (Also known as <i>intensity ratio</i> .)
Emission rate	Emission factor provided by an electricity supplier to its clients. The term is often associated with Scope 2 emissions.
Emission scopes	The release of greenhouse gases into the atmosphere is divided into direct (Scope 1) and indirect emissions (Scopes 2 and 3).
Energy attribute certificate	Type of contractual instrument in the energy sector that demonstrates insights and information about energy generation to sellers, distributors, consumers and electricity regulators. Instruments often include certifications, credits, and tags.
Equity share approach	A type of consolidation approach whereby the subject or company accounts for emissions from operations based on its share of equity in the operation.
Final product	Products or services consumed by the final user.
Financial control approach	A type of consolidation approach whereby a subject or company accounts for all emissions over which it maintains financial control, or is able to direct financial and operating policies of an entity as to realise economic benefits.
Function	The service provided by the evaluated product.
Functional unit	The quantified performance of the evaluated product or service. It helps measure the function of the product or service and acts as a reference point for relating inputs and outputs. Examples include a paper cup – delivery of 6 ounces of a cold beverage, printed material – square cm of the printed good, hot shower – number of 5-minute warm water cycles during a year). (see <i>Unit of analysis</i>).
Geographical representativeness	As a data quality indicator, refers to the extent data relates to the actual location of the activity, process, or operation.
GHG accounting	The activity of accounting for an organisation's greenhouse gas emissions.
GHG inventory	Accounting of the GHG emission releases into the atmosphere.
GHG removal	Sequestration, absorption, or capture of GHG emissions from the atmosphere; biogenic removals, this typically refers to CO ₂ absorption by biogenic materials.
Global Warming Potential (GWP)	

Greenhouse Gases (GHGs)	A measure of how much a given amount of greenhouse gas contributes to global warming, relative to the same amount of carbon dioxide. (see <i>CO₂e</i>)
Guarantee of Origin	The atmospheric gases responsible for causing global warming and climate change. Major GHGs are carbon dioxide (CO ₂), methane (CH ₄) and nitrous oxide (N ₂ O). Less prevalent – but powerful – greenhouse gases include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF ₆), and nitrogen trifluoride (NF ₃). Type of energy attribute certification common in Europe.
Indirect emissions	Emissions from sources owned or controlled by a third party but whose emissions are influenced by the reporting organisation. (see <i>Scope 2 and 3 emissions</i>)
Intensity target	A reduction target relative to the intensity unit. e.g. 15% reduction of emissions per staff member between 2020 and 2023.
Intermediate product	The output from a unit process becomes the input to another unit process, requiring additional transformation within the product system.
Inventory boundary	Point of demarcation that illustrates direct and indirect emissions included in the carbon footprint inventory.
Land-use change attributions	The change in carbon emissions resulting from a land-use change is attributed to a product footprint. The land-use change attribution is calculated by determining or estimating the carbon storage potential of the previous land use and subtracting the carbon storage potential of the new land use.
Land-use change impact	A change in the purpose for which land is used by humans (e.g. between crop land, grass land, forest land, wetland, industrial land). Examples include biogenic CO ₂ emissions and removals as a result of carbon stock changes from land conversion; biogenic and non-biogenic emissions such as CO ₂ , CH ₄ , and N ₂ O stemming from, e.g. biomass burning or liming in the preparation of converted land.
Life cycle	Continuous and linked phases of a product system (e.g. processes of product or service to help model the life cycle), including land use, raw material acquisition and pre-processing, production, distribution and storage, product use, and end-of-life.
Life cycle assessment	Collection and evaluation of inputs, outputs and prospective environmental impacts of the product system (or product/services and processes) across the life cycle.
Location-based method	A method to quantify Scope 2 emissions derived from the average energy generation emission factors for a specific region or (local, national) boundary.

Market-based method	A method to quantity Scope 2 emissions of an organisation based on contractual instruments including those coupled with agreements between the Organisation and its supplier for the procurement of a determined electricity bundle.
Material threshold	Term employed in the process of emission verification. It is commonly incorporated to determine if an error or omission in the carbon footprint inventory represents a material discrepancy or error that is significant to the extent it may influence performance or decisions.
Method	Methods used to calculate the carbon emissions from activities taking place within the Organisation as well as upstream and downstream in the value chain.
Operational control approach	A type of consolidation approach whereby a subject accounts for all emissions over which it maintains operational control or maintains authority to introduce and implement operating policies at an operation.
Organic growth	Refers to the growth or decline of the Organisation's business operations, e.g. increasing or decreasing production volumes.
Organisational boundaries	The boundaries that determine the activities owned or controlled by the reporting organisation, depending on the consolidation approach taken (e.g. <i>equity share</i> , <i>financial</i> or <i>operational control approach</i>).
Primary data	Activity or emissions data from specific activities in the Organisation's value chain or processes in the product life cycle.
Process emissions	Emissions stemming from physical or chemical processes often linked to industry sectors such as aluminium, cement, chemical, iron and steel, oil and gas, and waste.
Product carbon footprint	The calculated emissions from all life cycle stages of a given unit of product or well-defined service product in its time of function.
Qualifying date	The date at which the proclaimed carbon emissions reduction and/or carbon neutrality are verified, and the Organisation may qualify for related claims.
Ratio indicator	Indicators that illustrate information on relative performance such as intensity or efficiency ratios.
Recycled content method	Also known as the 100-0 method, allocates the related process emissions and removals from recycling to the product life cycle that uses the material.

Reference flow	Amount of the evaluated product that is needed to fulfil the function (e.g. service) defined in the unit of analysis or that is relevant for completing the GHG inventory.
Relevance	Ensure the carbon footprint appropriately reflects the GHG emissions of the Organisation or product and serves the decision-making needs of users both internal and external to the Organisation. As a data quality indicator, refers to the degree sources, data collection methods, and procedures used to gather and calculate data are dependable.
Reliability	Energy from non-fossil sources including e.g. wind, solar, hydropower, biomass.
Renewable energy Renewable energy certificate	Type of energy attribute certification common in North America.
Residual mix	Mix of energy generation resources and attributes including GHG emissions left over after contractual instruments have been claimed or retired.
Science Based Targets	GHG emissions reduction targets aligned with scientific insights in order to meet the goals of the Paris Agreement.
Scope 1 emissions	See <i>Direct emissions</i> .
Scope 2 emissions	Indirect GHG emissions from the generation of purchased electricity that is consumed by the Organisation.
Scope 2 Quality Criteria	Requirements that contractual instruments (e.g. contracts between an organisation and a utility provider for sale and purchase of energy attributes concerning energy generation) must meet to be used in market-based (Scope 2) accounting method.
Scope 3 emissions	Indirect GHG emissions (excluding Scope 2) that occur in the value chain of the Organisation, including upstream and downstream emissions.
Secondary data	Data that is not derived from specific activities in the Organisation's value chain or processes in the product life cycle. Such data is taken from industry average data (e.g. published databases, government statistics, scientific studies, and sector guides), financial activities, and proxy data from similar activities.
Sector/product-specific rules	Rule set developed for a specific sector or product group, stating the most significant carbon emission sources in the product life cycle. Such rules shall enable consistent application of a carbon footprint methodology within a sector and ensure meaningful comparison between companies and products.

Significance threshold	Qualitative or quantitative criteria used to define a significant change to data, inventory boundaries, methods or any other relevant factors that triggers base year emissions recalculation.
Subject	Refers to the entity under investigation and subject of the measurement, reduction, or neutrality claim e.g. corporation, product, or event.
Supporting documentation	The documents by which the Organisation demonstrates conformance with this standard, e.g. the climate policy statement and carbon footprint management plan.
Technological representativeness	As a data quality indicator, refers to the extent data relates to technologies or solutions used or the product under assessment.
Time representativeness	As a data quality indicator, refers to the extent data coincides with the actual timeframe or age of the activity, process, or operation.
Transparency	Make available relevant assumptions used in the accounting and reporting of GHG emissions and include references related to calculation methods and data sources used in the inventory. All issues should be addressed in a factual and coherent manner based on clear assessment.
Unit of analysis	The basis on which inventory results are calculated. Parameters such as size, service life, and level of quality should be used to help define the unit of analysis. For final products, this typically refers to the functional unit, and for intermediate products, this refers to the reference flow. (see <i>Functional unit</i> and <i>Reference flow</i>)
Upstream emissions	Emissions occurring upstream in the value chain before the takeover of the material by the reporting organisation. Upstream emissions are generally caused by a third party and can therefore be difficult to obtain, determine or quantify.
Waste	Waste material arising from the production or use phase and sent to waste management - waste from the production that is reused for a different process is therefore not considered as waste.



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