

Supply Chain sustainability requirements and guidelines



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1 Introduction

In the light of Pirelli Supplier Code of Conduct, our Suppliers are expected to manage and improve their environmental performances, reducing the impacts related to their products and services, from a life cycle perspective, according to the precautionary principles, especially when natural resources needed to sustain food production, access to drinking water, access to sanitary facility or a person's health are impaired.

The present document constitutes an in-depth examination of the main demands that Pirelli has on its suppliers to **reduce the environmental impacts** associated to the raw material production (Pirelli's Scope 3 Upstream Emissions), with a particular focus on CO₂ emissions.

Suppliers are indeed expected to develop raw materials optimizing the use of resources through the progressive substitution of virgin materials with recycled ones.

Moreover, the substitution of fossil-based and mineral raw materials with bio-based ones is strongly encouraged when feasible from a technical point of view and supported by scientific evidence of an improved environmental footprint.

Suppliers are also expected to improve their energy efficiency and to increase their use of energy from renewable sources, setting scientifically sound GHG reduction targets aimed at a progressive decarbonization of their operations and supply chain.

Overall, suppliers shall continuously monitor, record, document and upon request provide Pirelli with environmental quantitative data and performances related to the raw material they supply to Pirelli.

The environmental impact associated to the raw materials supplied to Pirelli shall be calculated using the Life Cycle Assessment methodology (LCA).

Eventually, this document is aimed not only to sharing with suppliers Pirelli's requirements in relation to the above-mentioned topics, but also providing them with all the necessary information on how to calculate and deliver results according to international standards and Pirelli needs.

2 Requirements at product level

2.1 Life Cycle Assessment (LCA)

Pirelli is strongly committed to reduce the environmental impact of its products along the whole life cycle, thus including the impact of the tyre raw materials as well.

Main enabler for completing this task is the LCA methodology, which evaluates the potential environmental impacts of a product (e.g., Carbon Footprint, Water Use, Resource consumption etc.) from the production of the raw materials until the management of the End-of-Life Tyres. Therefore, suppliers are requested to provide the LCA results associated to the raw materials they provide to Pirelli according to international standards.

LCA results shall be compliant with international standards ISO 14040-44 and shall be verified by an internationally recognized certification body (third party).

Moreover, any change in the raw material life cycle that might have a potential effect on its environmental impacts, e.g., the feedstock used for the supplier's raw material manufacturing (e.g., recycled and bio-based materials) and/or the source of electricity and thermal energy used in the

manufacturing process, shall be always quantified, and supported by an update of the LCA results of the raw material. The information listed in this section is meant to foster transparency and to give guidance on how to calculate the life cycle impacts of the suppliers' product according to ISO 14040-44 requirements.

2.2 Goal & Scope

LCA results shall be provided for the raw material supplied to Pirelli following this hierarchy:

- LCA of the plant-specific raw material code supplied to Pirelli
- LCA of the plant-specific raw material cluster supplied to Pirelli (e.g., Carbon black)
- LCA of the raw material code supplied to Pirelli (plants average) provided that the Supplier shares a roadmap/plan to deliver the LCA according to option 1 or 2

The LCA study shall follow an attributional approach to quantify the environmental impacts associated to the product's life cycle in accordance with the goal of emissions reporting. The study shall thus be focused on describing the environmental burdens directly associated with the life cycle of a product by allocating emissions to specific processes and products rather than assessing broader system changes (see example in Annex II).

2.3 Declared Unit

A Declared Unit (DU) is a quantified description of a reference unit for all calculations regarding Life Cycle Assessment. For this LCA study, the declared unit shall be 1 kg of raw material. Therefore, LCA results shall be reported per kg of produced raw material, e.g., XX kg CO₂ eq./kg raw material.

2.4 System boundaries

LCA results shall be calculated considering cradle-to-gate system boundaries. Cradle-to-gate is the part of the life cycle from raw material extraction to the supplier's final product.

The production location(s) of the raw material and the source of electricity used for producing the raw material shall be specified.

In case renewable electricity is used, the following details are requested:

- Percentage of renewable electricity over total consumption
- Source of renewable electricity used (e.g., wind, hydro, solar, etc.)
- Type of contract/certificates: Green Energy Certificates (iRECs, REC and GOs); Green Supply Contracts (GSC); PPA (on-site/off-site) or any SBTi-compliant certificate

In order to avoid double counting, country-specific residual mixes should be used for the share of electricity not covered by renewable energy certificates. Where available, these residual mixes should be explicitly listed or referenced in the report for a specific reference year. For countries where residual mixes are not available, an approximation using the national average electricity emission factor for the same reference year may be applied.

2.5 Life Cycle Inventory (LCI)

The Life cycle inventory (LCI) is a phase of life cycle assessment involving the compilation and quantification of inputs and outputs, for a given product system throughout its life cycle.

Life Cycle Inventory shall be provided in the form of LCA data exchange file (.tsx).

2.6 Data quality requirements

Data quality is determined by its precision, completeness, consistency and representativeness. To fulfill these requirements and to ensure reliable results, first-hand industry data in combination with consistent background data shall be used. Secondary data based on literature or on theoretical considerations are always to be avoided when primary data is available.

- **Precision:** Primary data shall be based on measured and/or calculated data. Facility data shall be collected based on yearly averages, which accounts for any seasonal variations in, e.g., energy demand or production volume. The data precision in terms of accuracy is therefore deemed to be high for all measured and calculated data and considered a conservative worst-case estimate for permitted data since actual emissions are assumed to be lower than what is permitted. Assumptions met should be indicated e.g. for transport and delivery.
- **The accuracy** of the data/calculations in form of +/- X% should be specified by the supplier.
- **Completeness:** All relevant process steps within the system boundary shall be considered.
- **Consistency:** To ensure consistency, primary data of the same level of detail shall be used.
- **Representativeness:** Regarding time, data that are used shall be up-to-date. Time-related representativeness for own primary data collection: Electricity mixes assumed shall not be older than two years. The LCI-model shall represent the technology applied at the time of writing the LCA report. Regarding geographical coverage, regional circumstances shall be considered. Regionalization of upstream processes (electricity, thermal energy) is also required.

2.7 Cut-off criteria

The system boundaries shall explicitly be described including cut-off rules applied. If coupled production of various products (or by-products) occur, the used allocation rule shall be stated.

Indications for cut-off criteria for including or excluding materials, energy and emissions data are as follows:

- **Mass** – If a flow is less than 1% of the cumulative mass of the model it may be excluded, providing its environmental relevance is not of concern.
- **Energy** – If a flow is less than 1% of the cumulative energy of the model it may be excluded, providing its environmental relevance is not of concern.
- **Environmental relevance** – If a flow meets the above criteria for exclusion, yet it may have a significant environmental impact, it must be included.

An impact is considered significant, if an order-of-magnitude estimation (e.g. by proxy substances) leads to deviance of GWP by 5% of the total product's cradle-to-gate GWP profile. This sensitivity check shall be reported. Material flows which leave the system (emissions) and whose environmental

impact is greater than 1% of the whole impact of an impact category that has been considered in the assessment must be covered.

The sum of the excluded material flows must not exceed 5% of mass, energy or environmental relevance. Application of cut-off rules shall be stated in the LCA data report.

2.8 Allocation

In a production process where more than one type of product is generated, it is necessary to allocate the environmental impacts (inputs and outputs) from the process to the different products in order to obtain product-based inventory data. Allocation rules should reflect the goal of the production process and should be avoided whenever possible by subdividing the unit processes into subprocesses that separately produce the studied product and co-products.

When allocation cannot be avoided, the following steps shall be completed to determine the appropriate method of allocation. The first step to decide on the allocation methodology is to calculate the ratio of the economic value of the co-products. The underlying logic behind the recommendation to use the ratio of economic value of co-products is that, in the case of high discrepancy in the market value of product coming from a common process, the product(s) with significantly higher economic value can be considered the driver(s) of the process. In other words, the production would not take place in the absence of the product with the highest economic value. The economic value of products should be calculated based on stable market prices. In the case of high price fluctuation, companies should calculate based on market prices averaged over a 3 year period, at minimum. The second step in determining the appropriate allocation methodology is to compare the economic value of co-products. If the calculated economic value ratio is equal to or lower than five, apply physical allocation between the studied product and the co-product(s). For this, the physical property used as the allocation factor should most accurately reflect the underlying physical relationship (e.g., mass, carbon content, chemical composition, etc.) between the studied product and co-product. (For additional information, see ISO 14044 Section 4.3.4).

Allocation of secondary raw materials and waste destined for recovery has to follow the principle of first responsibility, i.e., the use of secondary raw material and recycled materials comes without environmental burdens from previous product systems. On turn, no environmental credits are given for wastes going to recycling or recovery. This corresponds to the recycled content approach according to GHGP – Product Life Cycle Accounting and Reporting Standard. Allocation methods and values used by the supplier shall be stated in the LCA data report.

2.9 Life cycle Impact Assessment (LCIA)

LCIA results must be calculated and reported for all impact categories considered by **each of** the following **LCIA** methods (the full list of impact categories for each LCIA method is reported in Annex I):

- EF 3.1
- IPCC GWP-GHG 100a

2.10 Product Carbon Footprint

Product Carbon Footprint (PCF) can be seen as a subset of an LCA study. Therefore, all the requirements mentioned in the previous sections (1.1-1.2.3.) also apply to the PCF study.

On top of that, Global Warming Potential (GWP) results shall be calculated in accordance with ISO 14067, thus reporting GWP100 indicators based on the most recent IPCC AR emission factors for each life cycle stage included within the cradle-to-gate system boundaries (Annex I).

Other GWP indicators might be reported separately, as additional information, specifying the selected LCIA method.

Carbon footprint results shall be verified by a third party and shall be updated in case of any changes in the process having an effect on the carbon intensity of the raw material.

N.B. Any CO₂ eq. emissions compensation through the purchase of dedicated GHG credits shall not be accounted in the LCA results. Nevertheless, the amount of CO₂ eq. emissions compensated and the related certificates shall be reported as additional information.

3 Requirements at Organizational level

3.1 Decarbonization strategy

Pirelli is pursuing the most ambitious Decarbonization plan in the tire sector, in line with the European Green Deal and the Paris Agreement, focusing on the reduction of Scope 1 & 2 and Scope 3 emissions across the entire tire value chain (raw materials, manufacturing, logistics and supply chain).

Thanks to its constant efforts, Pirelli achieved its SBTi near-term targets for both Scope 1 and 2, and Scope 3, two years ahead of schedule. As a result, Pirelli has set even more challenging ones.

As communicated in the Industrial Plan released in March 2024 Pirelli commits to reduce absolute Scope 1 and 2 emissions (our direct own GHG emissions) by 80% by 2030 (compared to the 2018 base year). Additionally, Pirelli commits to reduce absolute Scope 3 emissions from purchased goods and services, fuel and energy-related activities, upstream transportation, and distribution by 30% within the same timeframe.

We have also set intermediate targets to guide us along the path of reducing emissions toward achieving our near- and long-term goals.

Moreover, Pirelli has a Net Zero target for the entire value chain, aiming to reduce at least 90% of absolute Scope 1, 2, and 3 emissions by 2040 (compared to the 2018 base year). All these targets were validated by SBTi in September 2024, meaning they are science-based and aligned with the 1.5°C pathway of the Paris Agreement. To achieve these targets, Pirelli has identified key actions and initiatives. Pirelli is implementing several actions to reduce Scope 1, 2, and 3 emissions. For Scope 1 and 2 emissions, the main actions focus on energy efficiency projects and factory electrification, with 100% renewable electricity purchased from the grid at the Group level, a goal already achieved this year 2025 in all our plants. For Scope 3 emissions, which represent 89% (based on 2024) of Pirelli's total carbon footprint, the company is working intensively to engage suppliers and increase the collection of primary and accurate data, improving transparency and reliability.



By 2024, Pirelli has already begun requesting all raw material suppliers to use electricity from renewable sources for the production of materials supplied. Additionally, the goal is to extend the requirement for all raw material suppliers to define decarbonization targets validated by SBTi by 2025.

Measuring the Scope 3 Footprint requires collaboration, accurate data, and transparency. For this reason, suppliers are requested to disclose the carbon footprint associated to the raw material codes they supply to Pirelli and its decarbonization roadmap.

The Supplier confirms that it shall:

- Comply with SBTi guidelines and set near and long-term targets within 2026/27 to achieve Net-Zero at the latest by 2050;
- Set and share with Pirelli a roadmap for the reduction of CO₂ emissions including but not limited to:
 - 100% electricity from renewable sources;
 - Set a roadmap aimed to reduce the utilization of fossil-based sources for the production/purchasing of thermal energy;
 - Propose to Pirelli bio-circular/recycled materials provided that the related emission factors deliver a reduction of CO₂ emissions;
 - Logistic optimizations (e.g. means of transport, proximity options, etc)
 - Report environmental data through Carbon Disclosure Project (CDP) questionnaire;

Science Based Targets Initiative

The Science Based Targets initiative (SBTi) requires companies to set Science Based targets and increase competitive advantage in the transition to a carbon neutral economy.

This initiative is a collaboration between the Carbon Disclosure Project (CDP), the United Nations Global Compact (UNGC), the World Resources Institute (WRI) and the Worldwide Fund for Nature (WWF).

The Science Based Targets are objectives for the reduction of CO₂ emissions and other climate-altering gases, consistent with the indications dictated by the IPCC (Intergovernmental Panel on Climate Change) which defined the objectives to contain global warming agreed at the COP 21 of Paris (2015).

A company's emission reduction targets (Scope 1 and 2) must be aligned with this goal of containing the global average temperature within +1.5°C, while for Scope 3 with a scenario of temperature increase "well below" 2°C. The IPCC calculates that, to achieve this important goal – fundamental in order to preserve the ecological, social and economic stability of the planet – it is necessary to reduce global CO₂ emissions by 45% by 2030 compared to 2010 levels and achieve Net Zero emissions around to 2050. Rapid and profound transformations in energy, land use, cities and infrastructure, and industrial systems are needed. The SBTi recognizes the need for companies to define short-medium term targets. Indeed, a 2050 target may not be very concrete, if not substantiated by a decarbonization action plan to be put in place immediately.

The Emission Reduction Targets must concern the company's own activities, direct emissions Scope 1 and indirect emissions Scope 2, but also emissions associated with the Scope 3 Upstream and Downstream. By "reduction", the SBTi means the progressive reduction of climate-changing emissions over time.



It is possible to re-absorb from the atmosphere only a limited part of the emissions produced, therefore the first and main choice of climate mitigation lies precisely in the emission reduction actions.

Note: *The use of techniques to remove greenhouse gases from the atmosphere (e.g., through plantations, ecosystem restoration, etc.) within the value chain, or "beyond value chain mitigation" projects (i.e., reductions or removals from atmosphere implemented outside its own value chain) are not considered by SBTi for the purpose of achieving the reduction target, being instead defined by SBTi precisely as "offsets".*

In order to achieve Net Zero in global emissions, reduction strategies must be implemented along the supply chain, regardless the "offsetting" strategies that may be implemented to achieve carbon neutrality.

3.2 Use of electricity from renewable sources

The deployment of renewables for electricity generation, for heat production for buildings and industry and in transport sectors is one of the main enablers of keeping average global temperature rise below 1.5°C. This document has the purpose to provide guidance to Pirelli's Suppliers in meeting Renewable Electricity quality requirements set by Pirelli with the aim to achieve Emission Reduction Targets. Here described the minimum requirements regarding technology and the contractual framework for the use of renewable electricity in the supplier's processes to ensure the credibility of measures. Those requirements are based on the logic used by RE100 and CDP.

The following types of renewable energy are eligible as renewable electricity sources:

- Hydropower
- Wind
- Solar power
- Bioenergy from solids, liquid and gaseous forms of biomass
- Geothermal
- Ocean-based energy resources captured through tidal and wave technologies

Renewable energy sources having a lower emission factor shall be preferred. The following types of renewable electricity are NOT eligible as renewable electricity:

- Electricity from nuclear power is not regarded as renewable electricity
- Electricity from waste combustion is not regarded as renewable electricity

3.3 Procurement mechanisms

Electricity will be regarded as renewable electricity if provided using one of the mechanisms stated below (in order of priority and preference):

- On-site generation of renewable electricity, directly or through a supplier (Power Purchase Agreement ("PPA"));

- Off-site generation of electricity through Power Purchase Agreement or virtual or slaved PPA;
- Green Supply Contracts (GSC) refer to power supplied by an electricity provider either directly from renewable sources or having embedded and deleted Energy Attribute Certificates. Not always available (e.g., China);
- Unbundled REC's/I-REC's;
- Unbundled EACs/GOs: origin certificates unbundled from electricity supply and regulated under the rules locally available. Specific conditions for the use of unbundled EACs/GOs:

Evidence shall be provided to demonstrate that the share of electricity covered by GOs or EACs is exclusively allocated to Pirelli—either covering 100% of the plant's consumption or all production lines dedicated to Pirelli volumes. All energy purchases must be fully traceable, properly documented, and verified by an independent third party.

*In compliance with the guidance issued by ACCREDIA (Italian competent body of accreditation) on March 9, 2025, and the requirements of ISO 14067, the environmental benefit associated with unbundled EACs/GOs **must not be arbitrarily assigned to a single product**. Instead, the benefit must be **equitably distributed across the production output** of the plant, based on traceable and auditable allocation rules. This ensures that no product receives 100% of the benefit while others are excluded.*

*However, an **exception applies** in cases where:*

- *The **entire electricity consumption of the production facility** is covered by renewable electricity backed by GOs or EACs, allowing for a proportional allocation across all products; or*
- *A **dedicated production line** is isolated (fully or partially) for Pirelli volumes, with a separate meter and associated electricity bills, enabling exclusive allocation of renewable electricity and certificates to those specific products.*

*In both cases, documentation must ensure **full traceability** and be verified by an independent third party.*

Note: *As supporting evidence, in addition to the certificate proving the use of renewable energy, an intermediate certificate issued by a third party (acting between the energy supplier and Pirelli) is also required. This certificate, verified independently, must ensure that the share of energy provided is effectively allocated to Pirelli's products and has not been resold or assigned to other parties.*

3.3.1 Use of Guarantees of Origin (GO) under the GHG Protocol

For the calculation of Scope 2 emissions under the GHG Protocol, reference is made to the *Scope 2 Guidance*, particularly Table 7.1 and section 7.5. Among the listed requirements, **Criterion 4 – Vintage** states that the period during which the energy was generated (and to which the contractual instruments such as Guarantees of Origin refer) should closely align with the reporting period. This aims to ensure **temporal accuracy** between energy generation and its claimed usage, thereby enhancing the credibility of Scope 2 emissions reporting.

In the European context, GOs issued in year “n” remains valid until the end of the twelfth month following the month in which the energy was produced. During the six months after this period—and

in any case no later than March 31 of year “n+2”—GOs may only be cancelled if they are still available in the accounts of authorized GO operators. After this deadline, any remaining GOs are considered **expired** and can no longer be used for reporting purposes. It is also important to note that GOs cannot be issued more than 12 months after the period of energy production.

While the market allows the use of GOs within the above-mentioned timeframe, it is recommended—*in line with GHG Protocol guidance*—to ensure a **close temporal alignment** between the date of electricity generation and the reporting period. This approach promotes transparency and robustness in Scope 2 emissions accounting.

BOX 1: Pirelli’s Position on the Treatment of Renewable Energy and Direct Connections

In line with paragraph 5.4 of the GHG Protocol Scope 2 Guidance, Pirelli has adopted a position that reflects the nuances related to the ownership of renewable energy plants and their connection (or lack thereof) to the national electricity grid. The classification of emissions and the applicable emission factors depend on these conditions.

The following scenarios summarize Pirelli’s approach:

1. **Pirelli-owned renewable energy plant, not connected to the grid**
In this case, the GHG Protocol considers that emissions associated with the energy produced do **not fall under Scope 2**. This is because the electricity is generated and consumed on-site without entering the grid.
2. **Pirelli-owned renewable energy plant, connected to the grid**
When the plant is connected to the national grid, emissions must be accounted for using the **location-based method**, applying the appropriate **grid emission factor**, as specified in section 6.4.1 of the Scope 2 Guidance.
3. **Third party-owned plant, not connected to the grid (direct supply to Pirelli)**
If the energy is supplied to Pirelli via a **direct connection** and the plant is **not connected to the grid**, the GHG Protocol classifies these emissions under Scope 2. In this case, the applicable emission factor is the **specific emission factor of the connected plant**.
4. **Third party-owned plant connected both to the grid and to Pirelli**
If the plant is connected to both the national grid and to Pirelli, the situation is treated under the **location-based approach**, and the **grid emission factor** is used (as per section 6.4.1).

3.4 Energy efficiency projects

Energy efficiency projects are defined as innovative methodologies, solutions, and activities for the efficient use of energy, the reduction of energy consumption and the optimization of processes, without compromising performance.

Promote Energy Efficiency enhances visibility and control on energy-intensive processes, especially the still non-electrifiable thermal processes.

The reduction of thermal and electrical energy losses is also included, by integrating an intelligent energy management system in manufacturing processes, buildings, offices (e.g., LED lighting, recover thermal waste to use it in the heating of the premises, flue gas recovery etc.).

3.5 Innovative solutions

Intervene on key production processes in order to reduce dependence on fossil fuels. This could be done through electrification of the following sectors: industry (e.g., heat pumps, electric heating, hydrogen) and transport (e.g., electric mobility, hydrogen, e-fuels); or by replacing fossil fuels with biofuels or bio-LNG.

4 Use of recycled and bio-based raw materials

4.1 Introduction

The use of bio-based and recycled materials as alternatives to fossil-based materials enables the company to reduce the depletion of virgin resources and, consequently, to lower the environmental impact (e.g., CO₂ emissions, water consumption) associated with upstream operations.

To ensure that relevant sustainability information is transferred in a robust and transparent manner along the supply chain, a **Chain of Custody (CoC)** model shall be implemented, especially for recycled materials. This model guarantees traceability and credibility of the sustainability claims made.

To support transparent communication of specific sustainability attributes and to ensure the correct application of the adopted CoC model, the information provided by upstream suppliers shall be verified or certified by **internationally recognized third-party certification bodies**, in accordance with the relevant international standards referenced in this document. The verification or certification process is the sole responsibility of the supplier and shall be completed **before the start of supply** or, in the case of renewal, prior to the expiration of the existing certificate or verification statement

4.2 Perimeter of the claim

Group level: the information on the quantity of bio-based and recycled materials consumed by Pirelli in a specific reporting year is included in the annual report, whose drafting is regulated by CSRD and considers all Pirelli plants excluding those not under direct operational control.

- Targets: >40% bio-based and recycled materials by 2030

Product specific: customers are increasingly asking for products made with specific % of bio-based and recycled content.

- Targets on best product placed on the market: >80% bio-based and recycled materials by 2030

4.3 Evidence hierarchy

To correctly calculate the percentage of bio-based and recycled materials within a specific product or production period, each raw material SAP code must be associated with a defined and documented percentage of bio-based and/or recycled content.

The nature of the evidence required differs by material type:

- **Bio-based content** is primarily determined by the chemical composition of the material. Evidence is therefore based on analytical testing of the material itself.
- **Recycled content** may vary depending on the supplier and the type of feedstock used. Evidence must therefore be renewed regularly and is tied to the supplier's certified chain of custody.

4.3.1 Bio-Based Materials

All Bio-Based Materials

Regardless of material type, the following evidence is required for all bio-based content claims:

Minimum – Radiocarbon analysis

- **Testing method:** Radiocarbon analysis in accordance with ASTM D6866-22, Method B (AMS), with Total Organic Carbon (TOC) reporting.
- **Certificate requirement:** The certificate must explicitly reference the Pirelli material code.
- **Frequency of update:** Before the start of supply, and whenever the supplier communicates a change in material specifications and or every 3 years.

Preferred – ISCC PLUS certification

- **Certification:** ISCC PLUS certification, backed by a Sustainability Declaration referring to each delivery or set of deliveries, in accordance with ISCC PLUS rules.
- **Audit frequency:** Annual, as required by the ISCC PLUS standard.

- **Chain of custody model (in order of priority):**

- Physical Segregation (preferred)
- Controlled Blending
- Mass Balance

Forest-Based Materials within FSC Scope (mandatory for EU supply, upon request for extra EU supply)

- **Certification:** FSC certification with a valid Chain of Custody (CoC) certificate.
 - **Document requirements:** The FSC CoC code and FSC claim must be clearly stated on both the **invoice** and the **delivery note (DDT)** for all deliveries.
 - **Audit frequency:** Annual, as required by the FSC standard.
 - **Chain of custody model:** Physical Segregation.
 - **FSC claim:**
 - *FSC 100%* — for natural rubber
 - *FSC Mix* — for all other forest-based materials
-

4.3.2 Recycled Materials

Materials within ISCC PLUS Material Scope

Where the material falls within the ISCC PLUS material scope, the following evidence is required:

- **Certification:** ISCC PLUS certification, backed by a Sustainability Declaration referring to each delivery or set of deliveries, in accordance with ISCC PLUS rules.
- **Audit frequency:** Annual, as required by the ISCC PLUS standard.
- **Chain of custody model (in order of priority):**
 1. Physical Segregation
 2. Controlled Blending
 3. Mass Balance

Materials outside ISCC PLUS Scope

Where the material does not fall within the ISCC PLUS material scope, the following evidence is required:

- **Certification:** Self-declaration in accordance with ISO 14021, backed by a verification certificate issued by a globally recognized certification body. The certificate must explicitly reference the material codes supplied to Pirelli.
- **Audit frequency:** Annual, as required by the ISO 14021 standard.
- **Chain of custody model** (in order of priority):
 1. Physical Segregation
 2. Controlled Blending

Note: Mass balance is not an accepted chain of custody model for materials outside ISCC PLUS scope.

Annex I – Life Cycle Impact Assessment

EF 3.1: The method (Environmental Footprint 3.1) is a European Commission-developed approach to assess the environmental impact of products and organizations throughout their lifecycle. It uses standardized indicators to measure impacts on climate change, water use, land use, and biodiversity.

EF 3.1 aims to provide a harmonized framework for transparent and comparable environmental assessments, aligning with international standards.

Acidification [Mole of H+ eq.]
Climate Change - total [kg CO ₂ eq.]
Climate Change, biogenic [kg CO ₂ eq.]
Climate Change, fossil [kg CO ₂ eq.]
Climate Change, land use and land use change [kg CO ₂ eq.]
Ecotoxicity, freshwater - total [CTUe]
Ecotoxicity, freshwater inorganics [CTUe]
Ecotoxicity, freshwater organics [CTUe]
Eutrophication, freshwater [kg P eq.]
Eutrophication, marine [kg N eq.]
Eutrophication, terrestrial [Mole of N eq.]
Human toxicity, cancer - total [CTUh]
Human toxicity, cancer inorganics [CTUh]
Human toxicity, cancer organics [CTUh]
Human toxicity, non-cancer - total [CTUh]
Human toxicity, non-cancer inorganics [CTUh]
Human toxicity, non-cancer organics [CTUh]
Ionising radiation, human health [kBq U235 eq.]
Land Use [Pt]
Ozone depletion [kg CFC-11 eq.]
Particulate matter [Disease incidences]
Photochemical ozone formation, human health [kg NMVOC eq.]
Resource use, fossils [MJ]
Resource use, mineral and metals [kg Sb eq.]

Water use [m³ world equiv.]

ISO 14067 GWP indicators (based on IPCC AR6) with an example of life cycle stage subdivision.

Emission category	Raw material production	Inbound logistics	Product manufacturing
Aircraft emissions [kg CO ₂ eq.]	-	-	-
Biogenic GHG emissions [kg CO ₂ eq.]	-	-	-
Biogenic GHG removal [kg CO ₂ eq.]	-	-	-
Emissions from land use change (dLUC) [kg CO ₂ eq.]	-	-	-
Fossil GHG emissions [kg CO ₂ eq.]	-	-	-

Annex II – Differences between attributional and consequential approach

Applying attributional (requested) vs consequential approach in LCA/PCF studies: carbon black production example.

Process Description

Carbon black is produced via furnace black process, where hydrocarbons are partially combusted. This process yields:

- Carbon black (main product, used in tires, inks, etc.)
- Fuel oil / tail gas (co-product, which can be used as an energy source)

Attributional Approach (Fixed Allocation of Emissions)

Focus: Assigns emissions directly to carbon black and fuel oil based on an allocation rule (e.g., mass, energy content, or economic value).

Example:

Total CO₂ emissions from production = 1,000 kg CO₂e

Output: 1 ton of carbon black + 0.3 tons of fuel oil

Using mass-based allocation:

Carbon black: $1000 \times 1 / 1.3 = 769$ kg CO₂e

Fuel oil: $1000 \times 0.3 / 1.3 = 231$ kg CO₂e

Result: Carbon black receives 769 kg CO₂e per ton, and fuel oil receives 231 kg CO₂e per ton, regardless of how fuel oil is used.

Consequential Approach (System-Wide Effects, Market Substitution)



Focus: Instead of allocating emissions, considers the system-wide impact of producing fuel oil.

Example:

Assume that fuel oil is used to replace diesel in another industry.

If 0.3 tons of fuel oil avoids 250 kg CO₂e (from diesel production/use), then:

Net emissions = 1,000 kg CO₂e – 250 kg CO₂e = 750 kg CO₂e

The carbon footprint of carbon black is now lower because the co-product avoids additional emissions elsewhere.

Result: The carbon footprint of carbon black is reduced because its co-product offsets fossil fuel use elsewhere.

Key Differences

<i>Approach</i>	<i>How It Handles Fuel Oil</i>	<i>Effect on Carbon Footprint</i>
Attributional	Allocates emissions based on mass, energy, or economics	Carbon black receives a fixed share of emissions
Consequential	Considers avoided emissions if fuel oil replaces another fuel	Carbon footprint of carbon black decreases due to fuel oil substitution

Annex III – Glossary & Definitions

IRECS	International Renewable Energy Certificates: An international system for tracking and certifying the renewable origin of electricity in countries without local regulated schemes.
REC	Renewable Energy Certificate: A market-based instrument in the U.S. and other countries representing 1 MWh of electricity generated from renewable sources.
GOs	Guarantees of Origin: European certificates verifying the renewable origin of electricity, as defined by the EU Directive 2009/28/EC.
GSC	Greenhouse Gas Standard Council: An international organization that develops and oversees standards for greenhouse gas accounting and environmental markets.
PPA	Power Purchase Agreement: A long-term contract between an electricity generator (often renewable) and a buyer, securing a fixed price for the energy supplied.
GWP	Global Warming Potential: A metric that expresses the relative climate impact of a greenhouse gas compared to CO ₂ over a specific time horizon (e.g., 100 years).
EF	Emission Factor: A coefficient that quantifies the emissions produced per unit of activity, such as kg CO ₂ e per kWh of electricity consumed.
BIO LNG	Bio-Liquefied Natural Gas: Liquefied methane derived from upgraded biogas, used as a low-carbon alternative fuel in transport and industry.
SBTi	Science Based Targets initiative: A global initiative helping companies set GHG emission reduction targets aligned with climate science and the goals of the Paris Agreement.
AMS	Approved Methodologies for Small-scale projects: Simplified methodologies under the Clean Development Mechanism (CDM) of the UNFCCC for small-scale emissions reduction projects

Definitions:

- **Biological Materials** (or alternatively “*Biobased materials*”): Materials wholly or partially of biogenic origin. (source: ISO 16620 – 2 2019)
- **Sustainably sourced biological material**: A biobased material (including biofuels used for non-energy purposes) that has been sourced sustainably in accordance with internationally recognized certification schemes, such as, but not limited to, FSC or ISCC+.
- **Recycled Materials**: Material that has been reprocessed from recovered material by means of a manufacturing process and made into a final product or into a component for incorporation into a product (source: ISO 14021:2021 - paragraph 7.8.1.1).

- **Recycled content:** proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content (source: ISO 14021:2021 - paragraph 7.8.1.1)
- **Pre-consumer material:** material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it (source: ISO 14021:2021 – paragraph 7.8.1.1).
- **Post-consumer material:** Material generated from households or commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purposes. This includes returns of material from distribution chain (source: ISO 14021:2021 – paragraph 7.8.1.1).
- **Plastic:** material which contains as an essential ingredient a high polymer and which, at some stage in its processing into finished products, can be shaped by flow (source: ISO 472:2019) (such as: Nylon, PET, Aramid)
- **Chain of custody:** process by which inputs and outputs and associated information are transferred, monitored and controlled as they move through each step in the relevant supply chain (source: ISO 22095:2021 – paragraph 3.1.1)
 - Physical segregation: chain of custody model in which specified characteristics of a material or product are maintained from the initial input to the final output (source: ISO 22095:2021 – paragraph 3.3.2)
 - Controlled blending: chain of custody model in which materials or products with a set of specified characteristics are mixed according to a certain criterion with materials or products without that set of characteristics resulting in a known proportion of the specified characteristics in the final output. (source: ISO 22095:2021 – paragraph 3.3.3)³
 - Mass balance: chain of custody model in which materials or products with a set of specified characteristics are mixed according to defined criteria with materials or products without that set of characteristics 22095:2021 – paragraph 3.3.4).
 - FSC “Transfer system: FSC control system which allows outputs to be sold with an FSC claim that is identical to, or lower than, the input material category and, if applicable, the lowest associated percentage claim or credit claim.