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Turning sustainability into business impact

How to use sustainability as a strategic lever and increase company value

Drafted by Guidehouse for EPCA

Introduction

The corporate sustainability environment is becoming increasingly complex, with numerous standards, terms, and expectations. This guide was developed by Guidehouse at the request of the European Petrochemical Association (EPCA) to offer a practical structure for navigating this landscape.

This guide highlights key concepts with practical examples. It is not exhaustive or definitive; the selection of initiatives reflects questions from EPCA's Net-Zero Transition Committee. The initiatives and methodologies covered in this guide include:

1. Greenhouse Gas Protocol
2. Science Based Targets initiative (SBTi)
3. Center for Decarbonization Demand Acceleration (CDDA – part of WBCSD)
4. ISO 14077 and ISO 22095
5. ISO/DIS 13662[A]
6. Catena-X
7. ISCC PLUS
8. REDcert2
9. RSB Global
10. Green Market Activation / AIM Platform
11. Together for Sustainability (TfS)

The purpose of this work is to clarify the landscape of these initiatives and methodologies related to greenhouse gas accounting, target setting, and certification schemes. It supports decision-making by explaining broader categories of guidance rather than delving into deep technical detail of individual initiatives and methodologies, and, to explain the narrative, positions sustainability as a strategic lever for business value - enabling differentiation, building brand credibility, and enhancing long-term valuation. The guide can also be used just to get a better understanding of these sustainability-related initiatives and methodologies.

The guide summarizes selected initiatives and methodologies at varying levels of detail, individual factsheets for a subset of these, and additional references for further exploration.

Voluntary initiatives are a key driver of sustainability progress, and their impact can be further strengthened when aligned with broader regulatory and market developments to tackle systemic challenges. Note that **this work does not cover regulations, directives, or policies, and does not strive for completeness given the breadth of the topic**. Comparative characteristics of key certification schemes may be included, but no evaluations or recommendations are provided. This guide offers an initial, high-level overview based on a preliminary and non-exhaustive selection of initiatives and methodologies. It is intended as a starting point for prioritization, action, and measurement, and can also serve as a reference for organizations seeking to become more sustainable. Inclusion of an initiative or methodology in this guide does not imply a recommendation. The information (including data) contained in this document is not intended to constitute or form the basis of any advice (financial or otherwise). Regardless of information in this document, companies are responsible for meeting or exceeding the European, national, subnational, and regional legislation.

[A] ISO/DIS 13662 is the draft standard that was ultimately published as ISO 22095-2:2026 in early 2026.

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- Certification schemes
- Sustainable value propositions through value chain collaboration

Chapter B - Elements of a corporate climate strategy

- How a Sustainability Strategy can increase an organization's value
- Measuring emissions
- Setting climate targets
- Disclosing progress

This guide focuses on both product and organization perspectives

Goal-oriented reading guide

Goal	Enhancing product positioning by demonstrating improved environmental performance.	Enhancing your organization's sustainability-maturity, and thus your overall company value and market position.
Chapter	Chapter A Providing more value with green products	Chapter B Elements of a corporate climate strategy
Content	Green products could enable differentiated offerings, based on individual organization strategies and market demand. If companies choose to offer a sustainable value proposition, they would need to build credible sustainability claims through product footprint calculation, supply chain traceability, certification, and industry collaboration.	This chapter will inform major elements of a climate strategy. This can enhance organizational value by meeting investor expectations, unlocking operational efficiencies, and strengthening market position.

Scope of this guide

Included in this guide

- High-level: How you could justify that your product is (more) sustainable (low-carbon).
- High-level: Elements of a corporate sustainability strategy (limited to greenhouse gas emission reduction).
- Voluntary tools, standards, and methodologies.

Not included in this guide

- Cost reduction strategies.
- Green financing (e.g., cheaper capital through sustainability).
- Project-level value creation.
- Broader ESG[A] risks and resilience (e.g., supply chain dependency, non-greenhouse gas topics).
- Regulations.
- Exhaustive overviews.
- Climate adaptation.

Disclaimers

- Generation of value from green products or a corporate strategy is not guaranteed. Companies need to investigate the potential themselves.
- Where we say “green products” or “sustainable” products, we refer to specific attributes (like alternative feedstock or low PCF). For readability, we have not constantly specified these attributes.

A Environmental, Social & Governance

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An introduction to the need for market pull and levers to improve the business case for green products

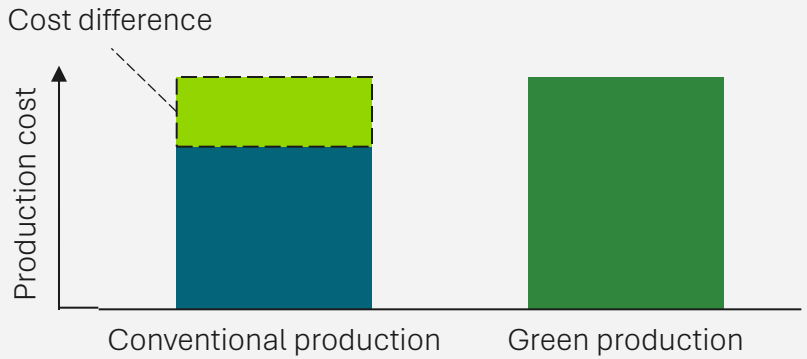
CHAPTER A

Overcoming potential cost differences between conventional and green production, and the role of market pull.

Cost differences need to be overcome to drive sustainable growth

The strategic potential of sustainable products

For petrochemical companies, the shift towards sustainability could bring pressure as well as strategic potential. Sustainable products in many cases still cost more to produce, but – when done correctly - they could potentially also strengthen a business' market position, enable a company to offer a sustainable value proposition and attract sustainability-driven customers.



A large sectoral variation in cost differences exists

The cost difference between conventional- and green-production **differs significantly across (sub)sectors and products** due to variations in technology maturity, production costs, availability of alternative feedstocks / energy carriers and regulatory environments. In some industries, sustainable alternatives remain substantially more expensive than conventional options, while in others, they may already offer cost savings. The below example concerns a case from the aviation industry.

Example: Sustainable Aviation Fuel (SAF)

SAF currently costs at least 2.5 times more [1] than conventional jet fuel - reflecting a high cost-difference. Despite this, airlines and corporate buyers show a strong willingness to recognize the additional value associated with lower-emissions alternatives:

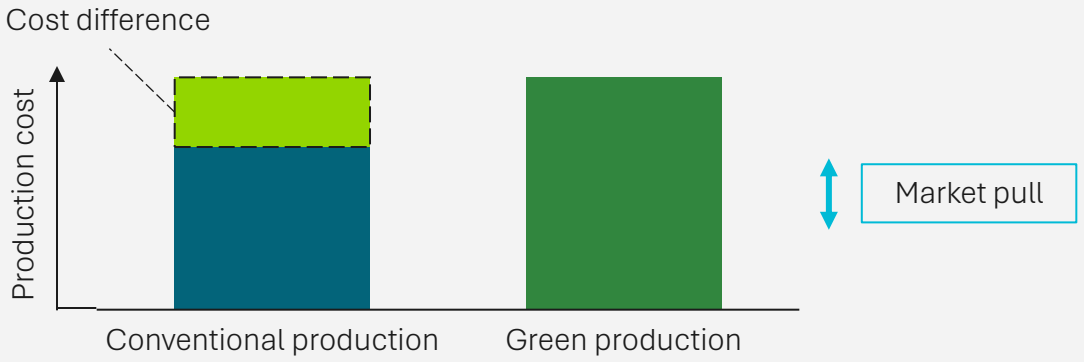
- Airlines: willingness to pay of up to $6 per gallon [2] for SAF.
- Corporate buyers (via SAF certificates): up to $300 per ton CO_2 abated [3], equivalent to $2.34–$3.93 per gallon.

A company could decide to prioritize solutions where the cost difference is low, or can shrink or disappear, as these drive competitive advantage and offer the best business case. On the next page, the definition and dynamics of **market pull** and **other levers** to overcome this cost difference will be explained.

Market pull can overcome the cost difference

Market pull

In the context of sustainability, we can define '**market pull**' as **demand creation measures that stimulate the uptake of low-carbon and circular products by creating incentives for their adoption** (definition based on Cefic, 2025 [4]). These measures are designed to address the market failure where most markets are currently unwilling to (fully) absorb the **cost difference between conventional- and green- production** (when such a cost difference exists). Market pull can help increase customer recognition of sustainability related value, which may increase the business case for green production.



Market pull example from the chemical industry: Bioplastics
Bioplastics - produced from renewable feedstocks - can benefit from market pull when major consumer brands commit to reducing plastic-related emissions. These commitments can translate into for example long-term sourcing agreements.

Three key market pull forces that could overcome the cost difference

The below 'market pull' forces could overcome the cost difference between green and conventional products:

A. Policy incentives
Governments can shape markets through green public procurement, subsidies, and regulation. When public institutions prioritize low-carbon materials or offer financial incentives, they help green products compete with conventional ones. This improves the business case for sustainable production and accelerates cost reductions.

B. Corporate commitments
Companies with ESG or net-zero targets could create predictable demand for sustainable inputs. These commitments signal long-term market potential, encouraging suppliers to scale up and innovate -key steps in reducing the cost of green production.

C. Consumer expectations
As consumers increasingly favor sustainable brands, companies respond by sourcing greener materials and increasingly offering green products. Certifications and transparency build trust and reinforce demand, helping green products move from niche to mainstream.

Three levers to strengthen a green product business case

Market pull could drive demand for green products and thus help to overcome the cost difference (where it exists). This left part of this slide provides a practical overview of **levers companies could pull to enhance the market position of their green products**.

Three levers for improving the market position of green products [A]

1. **Lower production costs** through - for example - innovating, improving efficiency, or increasing scale. Cleaner technologies, streamlined operations, and larger production volumes could help close the cost gap with conventional alternatives (Mckinsey [5]).

2. **Respond to market pull** by meeting the demand for sustainable products. The market for sustainability-related chemical products is projected to grow from $340 billion in 2023 to $570 billion by 2028 (an 11% CAGR[B], which is 4.5 times faster than conventional chemical products) highlighting a major growth opportunity for chemical companies that can innovate and adapt (Accenture [6]).

3. **Justify that your products are (more) sustainable**. Use carbon footprint data, traceable supply chains, third-party certifications, and partnerships to build trust [7] and show the added value of your sustainable offering.

The following chapter (chapter A) explores the third lever for advancing sustainable products: **'Justify that your products are (more) sustainable'.**

While the first two options - (1) 'lower production costs' and (2) 'respond to market pull' - are essential for shaping and meeting demand, this chapter focuses on how a companies could **enhance the value** of its green products, by justifying that its products are (more) sustainable.

The key for succeeding here lies in meeting **qualification criteria**: clear, widely accepted standards that define what makes a product "sufficiently sustainable". By aligning with these criteria, businesses can build trust and differentiate their offerings. This chapter will present three elements that can 'obtained';

i. Product Carbon Footprint (PCF)
ii. Chain of Custody (CoC)
iii. Certification schemes

and one participation opportunity:

iv. Valorizing sustainable product attributes through collaboration

[A] List non exhaustive I [B] Compound Annual Growth Rate

Justifying that your products are (more) sustainable by building credibility through footprinting, traceability, certification, and collaboration.

To justify a sustainable value proposition, an organization could build credibility through verified claims. This means measuring Product Carbon Footprints (PCF), ensuring supply chain traceability through Chain Of Custody (CoC), obtaining certifications, and joining industry collaborations. Together, these steps could turn sustainability into a value proposition. These concepts will be explained in more detail on the next pages.

Obtaining

i. Product Carbon Footprint (PCF)

A verified PCF could help buyers understand the climate impact of your product - making it easier to substantiate the green value proposition.

ii. Chain of Custody (CoC)

CoC could enable linking certified material flows to product attributes and the resulting sustainability claims that can and cannot be made.

iii. Certifications schemes

Certification schemes could provide trusted third-party verification that transforms traced and measured data into credible, marketable sustainability claims.

Participating

iv. Sustainable value propositions through collaboration

Collaboration could help shape market norms and buyer confidence, helping to valorize sustainable product attributes, based on individual company strategies and market demand.

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Product Carbon Footprints (PCFs)

CHAPTER A

How PCFs can be used to build trust and cut emissions in low-carbon markets.

Use PCFs to build trust and cut emissions in low-carbon markets

What are Product Carbon Footprints?

The **Product Carbon Footprint (PCF) is the most established method for determining the climate impact of a product**, considering the total greenhouse gas (GHG) emissions caused to produce a product, expressed as carbon dioxide equivalent (TfS[8]). Unlike a full **Life Cycle Assessment (LCA)**, which evaluates a broad range of environmental impacts (e.g., water use, toxicity, resource depletion), **PCF zeroes in exclusively on carbon emissions** (emissions related to fossil fuels, biogenic sources and land-use changes), making it a clear and actionable tool for carbon management and communication. To enhance the accuracy of your organization's carbon inventory, **requesting product-specific PCFs from suppliers** for key materials is considered best practice. Where available, these values will replace generic industry averages.

From a supplier's perspective, calculating a PCF for your product (e.g., per ton of resin or polymer) establishes a credible baseline of environmental performance. Key components include:

- Defining the scope of your PCF (typically **cradle-to-gate** [A]);
- Collecting emissions data from raw materials, energy use, production, and transport;
- When primary data is not available, using a trusted and recognized external database for emission factors can fill gaps in a consistent and transparent manner[B];
- Applying recognized standards like ISO 14067[9], the GHG Protocol Product Standard[10], Together for Sustainability[11] or PACT[12].

! In short, a verified PCF can be used to justify that your product is (more) sustainable. It translates sustainability into trusted numbers that buyers, auditors, and regulators can act on.

Advantages of Product Carbon Footprints

Build credibility with verified data
Product-specific PCFs provide hard evidence of a product's climate impact, helping companies back up sustainability claims and build trust with customers, regulators, and partners. An independent external review of the PCF methodology is recommended to enhance transparency and build stronger trust with customers and other stakeholders.

Identify emissions and inefficiencies
By mapping emissions across the product life cycle, PCFs reveal carbon hotspots and inefficiencies, guiding targeted improvements in energy and resource use.

Support regulatory compliance
PCFs help companies align with emerging climate regulation, making it easier to meet reporting requirements and avoid compliance risks.

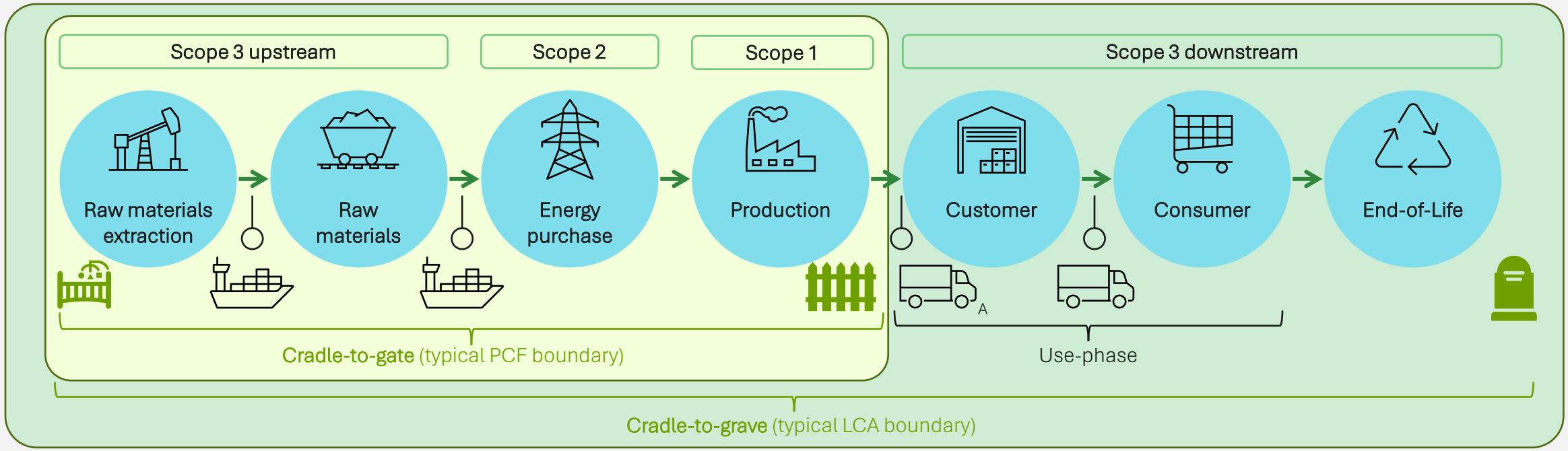
Enable value-based differentiation and broader market access:
Verified PCFs can justify a differentiated value proposition by proving lower carbon impact, helping companies stand out in competitive markets and attract climate-conscious buyers.

[A] Cradle-to-gate is an assessment that includes part of the product's life cycle, including material acquisition through the production of the studied product and excluding the use or end-of-life stages. – Together For Sustainability PCF Guidelines 2024 p.103[8].[B] Such as Sphera Managed LCA content (MLC), Ecoinvent, Carbon Minds, Agribalyse, ELCD (PEF), IDEA database, etc - Together For Sustainability PCF Guidelines 2024 p.56[8].

The PCF boundary depends on the organization's position in the supply chain

PCF boundaries depend on the actor's position in the value chain, whereas Life Cycle Assessments (LCAs) always cover the full life cycle of a product. A key distinction is that **a PCF is typically calculated retrospectively from the point in the value chain where the PCF is made** - looking backward to account in the value chain for upstream emissions only. As mentioned, PCFs are typically calculated on a **Cradle-to-Gate** basis. **Allocation rules** define how emissions from shared processes are distributed among multiple products, ensuring consistency and comparability in PCF results.

Because the cradle-to-gate PCF covers only one impact category and excludes key life-cycle stages, it may miss significant emissions (e.g., land-use change) and therefore may not reliably support CO_2-saving claims or comparative assertions without a full, robust LCA.



[A] Outbound transportation of the product is in general excluded (see Figure 5.2). If outbound transportation needs to be considered by customers' requests, it may be calculated and reported separately. Note: Schematic overview based on TfS PCF Guidelines[8].

ISO 14067, GHG Protocol, TfS and PACT are all wired together

ISO, GHG Protocol, PACT and TfS explained

ISO 14067 [9] and the GHG Protocol Product Standard [10] form the **foundation** for product carbon footprinting. They are global, cross-industry frameworks – essentially the "rules of the road" for calculating a product's carbon footprint. ISO provides the formal requirements, while the GHGp Product Standard provides a practical guide and accountability structure (with concepts like scopes and assurance).

The Together for sustainability PCF Guideline [11] is an application of the above principles to the chemical industry. It emerged because generic standards left too much ambiguity for complex chemical processes. The TfS guideline takes ISO/GHG Protocol's general rules and **makes them specific and** operational for chemicals – for example, providing a default approach to treat byproducts, or how to account for bio-based feedstock in a chemical context. It aims to remain 100% aligned to ISO 14067 and GHG Protocol.

PACT (Partnership for Carbon Transparency) PCF Methodology [12] represents the next layer, focusing on connecting industries through transparent data exchange. Whereas TfS is sector-specific, PACT is **cross-sector and collaboration-centric**. It was created to harmonize all these efforts (including TfS) so that data can flow along value chains. PACT also builds on ISO and GHG Protocol. Nor does PACT conflict with TfS – in fact, **TfS** actively coordinated [13] **with PACT to make sure a chemical PCF can plug right into PACT's network**.

! **When to use TfS vs. PACT**: It's not an either/or – they are complementary. A chemical company will typically calculate its product footprints using the TfS Guideline (since it provides the depth needed for accuracy in that sector) and then share those footprints with partners using the PACT framework. An additional overview of the PCF-related standards can be found in this slide.

Ultimately, leveraging these standards could help chemical companies **differentiate their green products** by **proving those products' climate benefits with data.** Automated and standardized PCF data exchange is becoming essential [14] for credibility and scalability in green markets. This credibility can translate into:

- Credible differentiation: For example, if you've developed a new polycarbonate with 30% lower GHG footprint, calculating that reduction per ISO 14067/TfS and perhaps verifying it gives customers confidence in the claim.
- Access to markets and premium segments: For example, the EU's upcoming regulations (like CBAM) will likely necessitate carbon footprint info. Aligning with these standards will help meeting such requirements.
- Internal performance improvement: These methodologies do not just facilitate reporting – they shed light on emissions hotspots, potentially enabling cost and carbon optimization.
- Transparency and trust in the value chain: For example, a footprint verified to ISO or reported via PACT's network is far more credible than an arbitrary claim.
- Preparing for regulatory and financial drivers: Credible data is increasingly demanded not just by customers but by regulators and investors.

How to explore potential applicable PCF standards

This chart concerns Guidehouse's visualization on selecting PCF standards as described in the TfS PCF Guideline[11]. Choosing an appropriate methodology supports credibility, comparability, and reporting goals, while enabling informed decisions, supplier engagement, and compliance – e.g., important in significant Scope 3.1 emissions sectors. **Footnotes belonging to this chart can be found in Appendix 1.** References that link to appendix questions start by "AP", followed by a number.

1. Is there a Product Category Rule (PCR) developed according to the TfS PCF Guideline or otherwise **accepted by TfS** for your product? [A]
   - Yes → Use this **TfS-accepted PCR** (ensuring it meets all required criteria).[AP-1]
   - No ↓
2. Is there an industry-specific or sector-specific PCF guideline based on ISO 14000-series standards (e.g. a Plastics Europe PCR for polymers)?
   - Yes → Use this sector-specific **ISO 14000-based guideline** (i.e. apply the relevant association's PCR).[AP-2]
   - No ↓
3. Does the Together for Sustainability (TfS) PCF Guideline apply to your product?
   - Yes → Apply the **TfS PCF Guideline** (the chemical industry's cradle-to-gate standard).[AP-3]
   - No[AP-4] ↓
4. Is the generic international standard ISO 14067 applicable for your product's carbon footprint?
   - Yes → Use **ISO 14067:2018** (the global standard for product carbon footprint quantification) as the basis.
   - No ↓
5. Are the WBCSD PACT Methodology or the GHG Protocol Product Standard applicable?
   - Yes → Use the **WBCSD PACT guidance** or the **GHG Protocol Product Standard** (global PCF frameworks) as appropriate. [AP-5]
   - No ↓
6. Is there a relevant EU Product Environmental Footprint Category Rule (**PEFCR**)[B]?
   - Yes → Apply the **PEFCR** (from the European Commission's PEF initiative) for your product category. [AP-6]

Documentation: For any PCR being applied, ensure it **fulfills ISO/TS 14027:2017 requirements** (on developing product category rules) and includes all necessary details (declared unit, system boundary, allocation rules, data quality assessment, documentation of any excluded life-cycle stages, etc.).[AP-9] All assumptions and choices should be transparently recorded in the PCF report for credibility.

[A] If multiple PCRs exist for the same product, the TfS technical working group will **review and designate one "TfS accepted PCR."** (more info in Appendix[AP-7]). Use that officially accepted PCR. If you intend to use any sector-specific rules or calculation guidelines that are not officially declared as a PCR or PEFCR, their use **must be justified and approved by TfS** before application (more info in Appendix[AP-8]). In other words, you need TfS verification to ensure such guidance is suitable. [B] The European Union's Ecodesign for Sustainable Products Regulation (ESPR) will regulate products groups also regarding Product Carbon Footprints. It is recommendable to monitor whether the EC makes specific methodologies mandatory for certain product groups for compliance with (future) policies.

Four leading PCF standards differ in scope, verification rigor, and reporting requirements.

Topic	ISO 14067	GHGp Product Standard	TfS PCF Guideline	PACT PCF Methodology
Scope & applicability	Cradle-to-**Gate** or Cradle-to-**Grave**	Cradle-to-**Grave** by default	Cradle-to-**gate** for chemical products	Cradle-to-**gate**, across all sectors/industries
Foundational Alignment	Based on ISO LCA rules	Aligned with ISO 14040/44; developed via GHG Protocol Initiative	Combines ISO 14067 and GHG Protocol principles with chemical-sector specifics.	Built on ISO 14067 and GHG Protocol frameworks
Data requirements	Primary data preferred, secondary data allowed when necessary (flexible)	Use primary data for processes you control (own operations); use secondary data for the rest if needed	Strong emphasis on primary data from suppliers	Must report the share of emissions using primary data
Allocation methods [A]	Avoid allocation where feasible. If unavoidable, allocate based on physical or economic share	Avoid allocation where feasible. If unavoidable, allocate based on physical or economic share	Follows an ISO/GHG-aligned allocation decision tree	Employs a standardized decision tree for allocation
Verification	Third-party verification optional (can use ISO 14064-3 standard for audits)	Verification not required but encouraged	Strongly encourages third-party verification of PCFs (not mandatory).	Has a verification roadmap – moving toward required audits in future; currently encourages verification.
Reporting requirements	Requires an LCA-style report	Requires detailed disclosure of methodology and results	Standardized PCF data model for reporting	Mandatory metadata must accompany each PCF
Industry focus	Cross-sector	Cross-sector	Chemical industry specific	Cross-sector
Tools and Support	No dedicated tool	Guidance documents provided; no official software	Industry toolkit: provides templates and a member network for implementation.	Digital network & API

Note: Table not exhaustive; [A] Data requirements and emission allocation rules.

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Chain of Custody (CoC)

CHAPTER A

How Chain of Custody models link certified material flows to product attributes and how to choose and apply the right model for credible sustainability claims.

Verify sustainable product claims by implementing the right Chain of Custody model

What is Chain of Custody (CoC)?

Implementing **Chain of Custody (CoC)** procedures - aligned with standards like ISO 22095 [15] - enables companies to offer verified sustainable grades of their product. It answers the customer's question: "*How do I know this 'green' polyol is really from biomass and not fossil?*" by providing traceability evidence.

CoC refers to **a system [16] for tracking the certified origin and flow of materials [15] throughout the value chain - from production to end use**. It ensures that attributes (for example bio-based C) in alternative feedstocks in the product (such as bio-based content or recycled content), are transparently passed along and not double-counted.

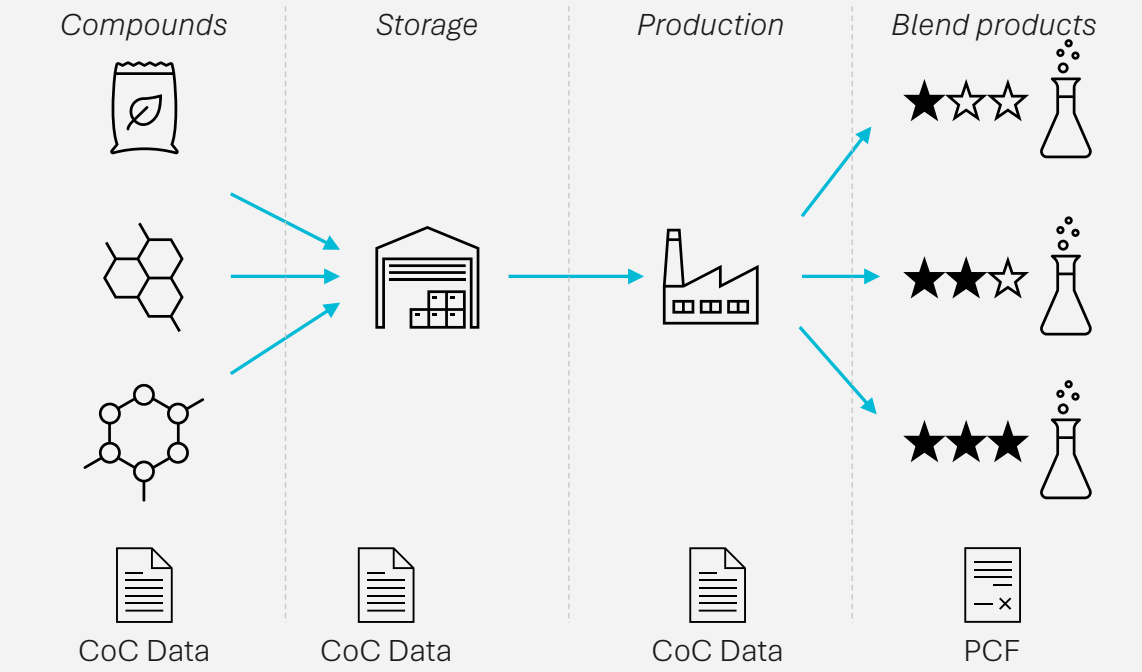
In sectors like petrochemicals, where feedstocks are mixed—such as bio-naphtha with fossil naphtha - **CoC models define how the "green" share is allocated**. For example, due to the large scale of crackers and the lack of competitive small-scale alternatives, the bio-based portion is currently always introduced into a mix. As a result, customers of cracker-based products typically receive a physical mix, not a pure bio-based product. Therefore, claims must reflect this reality: you can only state that, according to the CoC model, you have purchased the bio share—not that the product is physically 100% bio-based.

! The choice of CoC model - ranging from 'segregation' to 'book & claim' - depends on value chain complexity, buyer expectations, and the required level of credibility. An overview of different CoC models can be found on this page.

CoC, GHG protocol and ISO alignment

Understanding ISO standards like 22095, 14077, and 22095 is key to CoC discussions as they define and operationalize traceability and sustainability claims across supply chains. See this page for details. In addition, ISO and GHG Protocol have announced [17] a partnership and detailed action plan [18] to harmonize GHG accounting standards and create unified global frameworks to accelerate decarbonization.

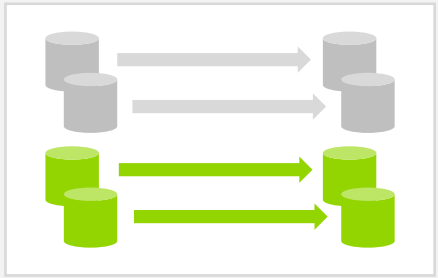
The CoC system tracks material flow and guarantees value chain transparency



Select the right certification method to ensure credible sustainability claims across your value chain

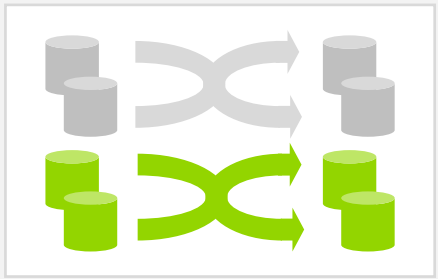
1. Identity preservation

Certified material originates from a single source and is kept physically separate from all other materials throughout the supply chain.



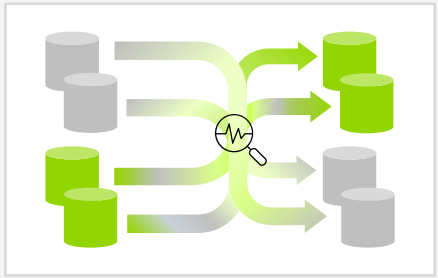
2. Physical Segregation

Certified material is separated from non-certified material but may mix with other batches of the same certified material.



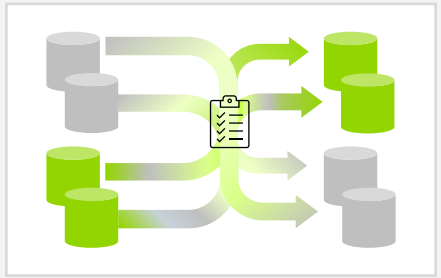
3. Controlled blending

Certified and non-certified materials are physically blended in a fixed ratio which is tracked and documented through to the final product, ensuring that at least some certified material is physically present.



4. Mass balancing

Certified and non-certified materials are mixed, but the certified share is tracked administratively to ensure that the total certified input equals the certified output, adjusted for any process losses. Variations are possible with various design parameters, like (non limiting list):



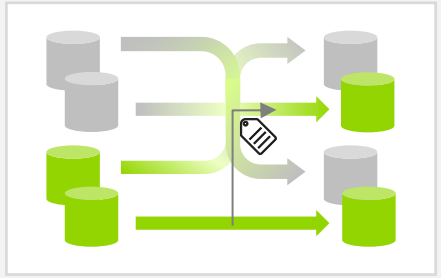
- Multi-site mass balance vs. one site mass balance vs. one process mass balance
- Mass vs. energy balance
- Allocation of attributes to outputs

Some frameworks (like the Renewable Energy Directive)[19], or voluntary schemes specify how these choices should be made.

Mass-balance allocation archetypes are increasingly distinguished (e.g., free allocation and ‘products-not-fuels’ approaches).

5. Book and claim

Certification is detached from the physical material flow and only based on documented traded certificates. Often used when physical traceability is not feasible. Not allowed under RED and ETS.



CoC models vary widely in traceability and credibility, from full physical tracking to certificate-based claims.

CoC model	Are the attributes [A] directly linked to product?	How does the attribution [A] work?	TfS PCF guideline [11] reference	Notes
Identity preserved	**Yes**, the attribute is specific to a single source.	**Physical tracking** of different batches.	p. 43, 88	Highest credibility; full traceability; physical segregation required.
Physical segregation	**Yes**, the attribute is specific to a characteristic (but can come from multiple sources).	**Physical segregation** implies no mixing of certified and non-certified materials.	p. 43, 88	Similar to identity preserved but less granular but may allow for batch-level rather than item-level separation. [B]
Controlled blending	The attribute is **allocated based on blending or ratios**, not fully unique to the product.	Inputs are blended under controlled, documented rules [C]; attributes can be **allocated based on blending ratios.**	p. 88–89	PCF allocation depends on blending logic and certification; transparency required.
Mass balance	**No**, attribute is administratively allocated based on certified input share.	**Bookkeeping** of sustainable and conventional inputs; Attributes are allocated to outputs based on input ratios.	p. 43, 88–91	No physical link to specific molecules; relies on robust certification and bookkeeping.
Book and Claim	**No**, attribute is claimed via certificates, not linked to physical product.	Certificates are traded separately from physical product.	p. 43, 44	No physical or administrative link. “Not accepted for product-level PCF claims under ISO 14067 or GHG Protocol; used in voluntary offset-like systems.

Note: Table not exhaustive; [A] With attributes we refer, for example, to biobased-content, or recycled-content. [B] meaning certified batches are processed separately from non-certified batches, but individual items within the batch are not uniquely tracked. [C] Requires robust certification and documented blending rules to ensure transparency.

ISO standards are the foundation of CoC and sustainability claims

Topic	ISO 22095 [15] – Chain of Custody – general terminology and models	ISO 14077[20] – application of CoC approaches in LCAs	ISO 22095-2:2026[21] – Chain of Custody – Part 2: Requirements and guidelines for mass balance
Latest version & status	Finalized[15] ISO 22095:2020 (*1st Edition, published Oct 2020*).	Under development[20] (ISO/WD 14077.2) (*Status December 2025*).	Finalized[21]. ISO 22095-2:2026 (International Standard), January 2026.
Purpose	**Defines a universal CoC framework**. Establishes a consistent, generic approach to designing and implementing Chain-of-Custody systems.	**Integrates CoC models into LCA**, aligning methodologies with CoC principles to enable more transparent and consistent environmental claims.	Provides detailed requirements and **guidelines for the design and governance of mass-balance chain-of-custody systems**.
Applicability	All materials and product supply chains. Cross-industry and global.	Sectors using LCA to track material sustainability, especially chemical sector, applying CoC models for recycled or bio-based content.	Supply chains using mixed-feedstock mass balance, common in chemicals, plastics, textiles, and forestry where physical segregation is not feasible.
CoC models defined	Covers five CoC models.	Covers the five ISO 22095 CoC models.	Focused exclusively on the Mass Balance model.
Benefits	A common language for CoC, allowing different certification schemes and industries to align their traceability practices.	Ensures credible LCA results when using CoC.	Enables credible mixed-material claims in chemicals (verifiable and globally recognized claims).
Limitations	This ISO alone does not allow claims on product content or sustainability. Specific standards or certifications (e.g., RSPO, FSC, ISCC) are still needed, as this ISO is not industry-specific.	Ongoing development; consensus still forming. The standard's effectiveness will depend on industry consensus.	This ISO addresses only one CoC model, so it does not cover needs where other models are required (*companies may have to look to additional standards for identity preservation or book-and-claim*).
Overlap	Underpins the whole system by defining the models and terminology.	Complements ISO 22095, bridging the gap between supply-chain traceability and LCA calculations.	Builds on ISO 22095's definitions, focusing on one model (mass balance) to ensure detailed consistency in its use.

Note: Table not exhaustive ; **Note**: ISO and GHG Protocol Announce [12] Strategic Partnership to harmonize their existing portfolios of GHG standards and to co-develop new standards for GHG emissions measurement and reporting

Guidehouse

Certification schemes

CHAPTER A

How voluntary certification schemes provide independent verification of your sustainability claims.

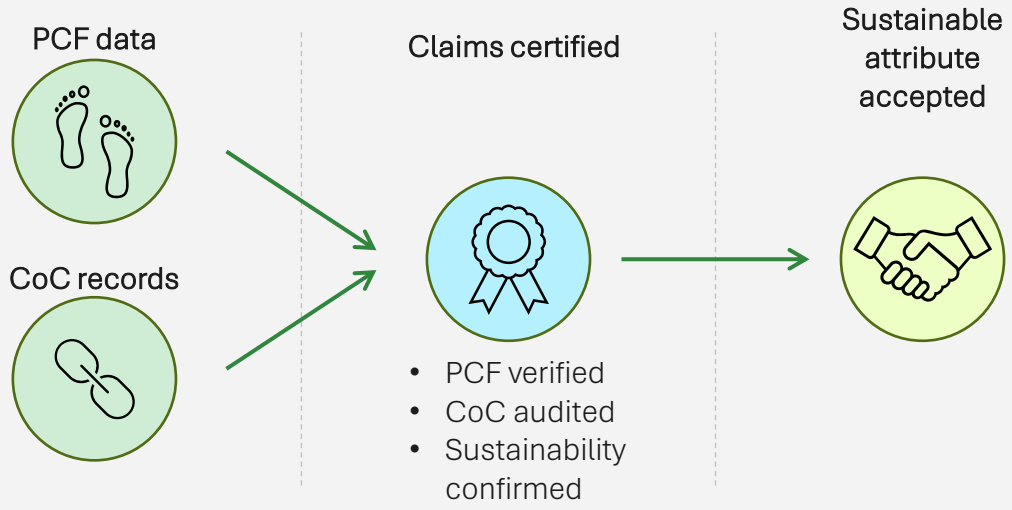
Building trust through certification and verification of green claims

Third party verification through certifications schemes

Even with a low PCF and CoC in place, buyers and regulators seek third-party verification to avoid greenwashing. **Independent verification** is the next layer that converts measured and traced data into marketable claims.

Voluntary certification schemes provide that verification by auditing the product's lifecycle and supply chain against recognized standards. In petrochemicals, key schemes include ISCC PLUS, REDcert[2], and RSB for bio-based or circular materials (a comparison of these schemes can be found on this page).

How sustainability data is verified, and can increase acceptance (example)



Certification can turn sustainability data into market trust

- Voluntary certification schemes such as ISCC PLUS[22], REDcert[2] [23], and RSB Global Advanced Products[24] provide **independent verification** of sustainability claims by auditing product lifecycles and supply chains against recognized standards. They verify attributes like bio-based content, recycled input, and mass balance application, offering a trusted seal of approval that reduces buyer risk and builds market confidence. More scheme examples can be found on the next slide.
- Beyond claim verification, these certifications often **integrate with broader sustainability systems**, verifying underlying PCF calculations, Chain of Custody documentation, and management practices. For example, ISCC PLUS ensures traceability and integrity across the entire supply chain, making it especially relevant for complex value chains in the chemical sector.
- Certified proof of sustainability is – among others - increasingly a **prerequisite for B2B buyers (e.g. through buyer platforms) and public procurement programs**, supporting supplier credibility, facilitating procurement processes, and enabling differentiated consideration in vendor selection.
- For SMEs and innovators, certification could potentially also act as a market signal, demonstrating reliability and helping differentiate products in competitive markets. Ultimately, these certification schemes convert technical sustainability efforts into recognized credentials that support long-term positioning in green markets.

ISSC PLUS, RedCert² and RSB global compared

ISCC PLUS, REDcert², and RSB are examples of three leading voluntary sustainability certification schemes that chemical companies use [A] to certify and trace sustainable feedstocks (bio-based or recycled materials) in their products. All three aim to **replace fossil raw materials with sustainable alternatives** and provide a credible chain-of-custody for claims, but they differ in scope, stringency, and industry adoption:

ISCC PLUS

The International Sustainability & Carbon Certification PLUS **(ISCC PLUS)** is a global scheme covering bio-based and circular feedstocks. It is known for its broad applicability and practical mass-balance approach, being the most widely used certification in the chemical and plastics sector (with over 2,700 certificates as of early 2023).

REDcert²

REDcert² is a certification scheme that originated in the EU biofuel sector and expanded to chemicals in 2018. It is industry-driven and aligned closely with European standards. It accepts sustainable feedstocks certified by other schemes like ISCC or RSB or by EU-recognized voluntary schemes, avoiding double certification and reducing administrative burden.

RSB

The Roundtable on Sustainable Biomaterials (**RSB**) is an NGO-led, multi-stakeholder scheme. It evolved from biofuels to certify non-energy products (chemicals, plastics, textiles, etc.) globally since 2013. RSB has the most comprehensive sustainability criteria.

! Chemical companies typically choose certification schemes based on operational scope, customer expectations, and sustainability goals. The three schemes enable credible claims for sustainable, circular, or bio-based products via mass balance accounting and third-party verification. All three schemes support traceability, regulatory compliance, and sustainability reporting. Dual certification (e.g. ISCC PLUS + REDcert²) is common to meet varied customer or regional requirements.

- If **broad market acceptance and supply-chain convenience** are key, **ISCC PLUS or REDcert² (or both)** could be favored. These schemes are well recognized by chemical industry customers and suppliers, and they are often interoperable [B].
- An **organization deeply integrated in European value chains** might lean toward **REDcert²** for its seamless alignment with EU rules and multi-site certificate option (reducing audit-overhead for many facilities).
- **ISCC PLUS** has a global reach and is accepted in diverse markets worldwide, making it **suitable for companies with international operations or customer bases.**
- **RSB** might be selected for differentiated products or corporate sustainability commitments where **highest sustainability performance is a selling point.**

ISCC PLUS, **REDcert²**, and **RSB** create value by enabling credible chain-of-custody models - such as mass balance, book & claim, and physical segregation - while ensuring transparency for sustainable feedstocks. Each scheme has its niche: ISCC PLUS and REDcert² emphasize broad implementation and industry practicality, whereas RSB offers the highest level of sustainability assurance. Chemical companies typically select the scheme that aligns with their feedstock sources, geographic priorities, and the sustainability ambition they aim to signal to the market.

[A] Other schemes than these three may be used by the chemical industry as well; [B] Material certified under ISCC PLUS or RSB can be accepted into REDcert²'s system without re-certification

Certification schemes all have different characteristics

Topic	ISCC PLUS [22, A]	REDcert² [25]	RSB Global [26]
Scope & applicability	Global, all sectors; covers all types of sustainable feedstocks.	EU-centric; chemicals & processing industry focus; accepts other schemes.	Global; bio-based, recycled, mixed feedstocks; all industries.
Sustainability criteria	Applies six sustainability principles; GHG emission calculation optional; RED-aligned.	RED II-based[B]; GHG emission calculation optional; aligned with regulatory standards (EU RED).	GHG, biodiversity, labor/land rights; SDG-aligned; alignment often means exceeding legal minimums.
CoC models	Mass balance, physical segregation, controlled blending; **no** book-and-claim.	Segregation, Controlled blending, Mass Balance; **no** book-and-claim; accepts other schemes (ISCC compatible).	All models **incl. book-and-claim**; highly flexible.
Certification process	Annual audits; ISO Certification Bodies; moderate administrative burden.	Annual audits; multisite certification option; low administrative burden.	Risk-based audits; ASI CBs; higher effort.
Regulatory alignment[D]	RED II-aligned; widely accepted by industry; compatible with EU policies and global norms.	Beyond legal requirements and not governed by RED, but highly RED II-compatible; EU industry trusted[C].	RED II-compliant; ICAO, ISEAL recognized, fully compatible with EU and international standards.
Material claims	Bio/circular labels [A]; mass balance attribution.	Delineates claims by product type (e.g. Biomass-balanced or recycled); clear claim rules.	Bio/recycled claims; including % content; strong labeling rules.
Governance & transparency	Multi-stakeholder with 175+ global members; open docs; public audits.	Industry-led; transparent docs; limited NGO input.	NGO/industry/government governance; full transparency.
Innovation & flexibility	Supports novel ideas, provides add-ons for novel tech; Power-to-X supported.	Recognizes other schemes; modular / adaptable to innovation, efficient.	Pioneering feedstocks; book-and-claim; SDG pilots.

Note: Table not exhaustive; [A] ISCC PLUS can allow companies to claim their product is made with “sustainable” or “certified” content – typically specifying “ISCC certified bio-based content” or “ISCC certified circular (recycled) content” as appropriate. [B] In practice, this means any bio-feedstock used must meet RED criteria; [C] As a voluntary scheme, REDcert² is not “approved” by the European Commission for a specific mandate (since no mandate exists for chemicals yet). [D] High level indication only – check yourself.

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Sustainable value propositions through value chain collaboration

CHAPTER A

How collaboration platforms could lead to greater standardization and transparency, making it easier to offer sustainable value propositions.

Partnerships/collaborations to accelerate the update of sustainable offerings

Driving sustainability through industry collaboration

A single organization's effort often is not enough. The market must reward sustainability. This is why **industry collaboration platforms** are critical for companies that want to differentiate themselves with green products. These platforms (see examples on the right, and on next slide) **can e.g., define common "green" criteria** and bring together suppliers and buyers of sustainable products.

By aligning with voluntary industry standards, sharing verified PCF and CoC data, and participating in trusted platforms, companies can confidently position their products as green. These mechanisms reduce buyer uncertainty, streamline procurement, and create real market pull for certified low-carbon materials.

Examples of collaboration platforms (non exhaustive list) can be found on this page.

Supplier

Verified PCF data and CoC records

Collaboration platforms for standardization and streamlining

See example platforms on the next slide

Items that can be exchanged in platforms

Harmonized green criteria

PCF alignment and templates

Buyers

Actively seeking sustainable products

Greater standardization and transparency provide clearer information, empowering buyers to make well-considered and confident purchasing decisions.

The below industry collaboration platforms could be utilized to harmonize green criteria, exchange PCFs and more

Platform	What is it	Example	Sector	Key Tool	Members
Center for Decarbonization Demand Acceleration (CDDA) [27]	This WBCSD initiative covers mechanisms to assist companies turning their stated demand for low-carbon materials, products, and technologies into actual procurement.	The Green Purchase Toolkit is a practical guide to help companies procuring low carbon products using tools like collaborative procurement and green market making models.	(Heavy) industry	Green Purchase Toolkit	25 (founding WBCSD members).
Catena-X [28]	An open data ecosystem for automakers and suppliers to securely share value-chain information while retaining full data control.	Ford uses[33] Catena-X's data exchange to gather carbon footprint data from Tier 1 and 2 suppliers, pinpointing hotspots and cutting CO_2 collaboratively.	Automotive industry	Eclipse Tractus-X	186 (as of June 2024).
Advanced and Indirect Mitigation (AIM) Platform [29]	A framework enabling companies to invest in supply-chain decarbonization and credibly claim Scope 3 emissions cuts.	AIM creates standards so companies funding cleaner steel or mining can count resulting emissions cuts toward climate targets.	Cross-sector	AIM Standard & Guidance	~10-15 participating companies (pilot phase 23-24).
Together for Sustainability (TfS) [30]	A procurement-driven alliance harmonizing supplier audits and sustainability assessments into one global standard to boost efficiency and social performance.	TfS's PCF Exchange solution enables members and suppliers to safely exchange upstream PCF data. TfS's Academy offers trainings in amongst others decarbonization.	Chemicals	PCF Guideline & Audit Tools	58 (as of October 2025).
Partnership for Carbon Transparency (PACT) [31]	A WBCSD-led partnership that created a unified methodology and digital infrastructure for exchanging product-level carbon footprint data across value chains.	Fujitsu applied[34] PACT standards to collect CO_2 data across laptop suppliers, targeting high-emission components for reductions.	Cross-sector	Pathfinder Framework	5,000+ companies involved globally.
First Movers Coalition (FMC) [32]	WEF[A]-Forum that leverages collective purchasing commitments to jump-start markets for breakthrough clean technologies in heavy-emitting sectors.	FMC member airlines and travel buyers pledge to purchase cleaner aviation fuel, creating demand that helps producers scale and lower costs.	(Heavy) industry	Advance purchase commitments	~100 corporate members (as of 2024).

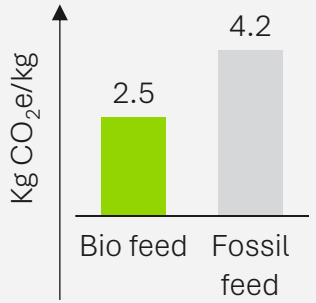
[A] World Economic Forum

This illustrative example shows that integrating PCF, CoC, and certification can support market uptake based on verified sustainability claims

Company

Organization's progress in improving positioning with customers that value sustainability criteria (illustrative)

Measured carbon footprint *(values are indicative)*



Organization performs an ISO 14067-compliant PCF study, finding the bio feed has an xx % lower PCF than its fossil-based conventional alternative.

Chain of Custody tracking (Identity Preserved)

Company (and its upstream value chain) implement identity preserved chain of custody approach, so that they can allocate the incoming certified feed to specific batches of output.

Third-Party Verified

Claims Certified

Organization receives ISCC PLUS certification (through 3rd-party audit). This confirms that product contains xx % renewable content, and the PCF is externally verified[A].

Buyer Matchmaking

Packaging alliance

Organization joins a collaborative buyer initiative (e.g. packaging coalition looking for sustainable materials). Organization connects with large packaging buyer.

Commercial Value Secured

Better commercial value

Buyer (assured by credibility) agrees to buy this green product. The deal is facilitated by the coalition's platform, which standardizes the data sharing (using the TfS data model).

This slide deck does not cover the specifics of which chain-of-custody (CoC) approach or certification body allows the use of the PCF for attributed feedstock (e.g., which CoC schemes permit using the PCF of bio-feedstock). Please verify this for the specific CoC approach or certification scheme you are applying.

[A] typically, third party verifiers verify by using the ISO framework, or a dedicated guidance like TfS guideline.

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Content

Introduction

Chapter A – How a sustainability strategy can increase an organization's value

- An introduction to the need for market pull and levers to improve the business case for green products
- Product Carbon Footprints (PCFs)
- Chain of Custody (CoC)
- Certification schemes
- Sustainable value propositions through value chain collaboration

Chapter B - Elements of a corporate climate strategy

- How a Sustainability Strategy can increase an organization's value
- Measuring emissions
- Setting climate targets
- Disclosing progress

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How a sustainability strategy can increase an organization's value

CHAPTER B

The typical process flow is a cycle, starting with measuring, followed by target setting, implementation of measures, and disclosure of results.

How a sustainability strategy can increase an organization's value

Regardless of changing global politics, leading companies increasingly **recognize that sustainability initiatives are key drivers of long-term shareholder value**. In fact, 88% of global companies in a 2025 study[1] reported that their sustainability strategy creates long-term value. Similarly, it was found in a 2025 Deloitte survey[2] that 83% percent of respondents reported increasing their sustainability investments in the last year.

This chapter will demonstrate **how typical major elements of a decarbonization strategy - from carbon accounting to target-setting and transparent reporting - could enhance organizational value** by meeting investor expectations, unlocking operational efficiencies, and strengthening market position. However, it is important to realize that ultimately, it is the implementation of strategies that matters most.

Measuring emissions

Calculate a corporate GHG inventory across Scope 1, 2, 3. This could reveal risks & opportunities and enables an informed strategy.

Setting climate targets

Commit publicly to emissions reductions. This typically signals ambition and could provide guidance for your organization to reach goals.

Reducing emissions

Plan + Implement decarbonization measures (e.g., alternative feedstocks, energy efficiency, renewables, product innovation to reduce your (customer's) GHG emissions. This could lower energy costs, spur innovation, or increase resilience.

Out of scope in this chapter [A]

Disclosing progress

Disclose progress on GHG emission reduction (relative to your targets) and enhance transparency and trust. Regular reporting meets stakeholder expectations(stakeholders often demand reporting) and can improve credibility ratings.

[A] Please refer to our Factsheets (https://epca.eu/net-zero-factsheets) for more information on reducing emissions. The collection of factsheets is not intended to be complete but has the objective to inform the reader's thinking.

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Measuring emissions

CHAPTER B

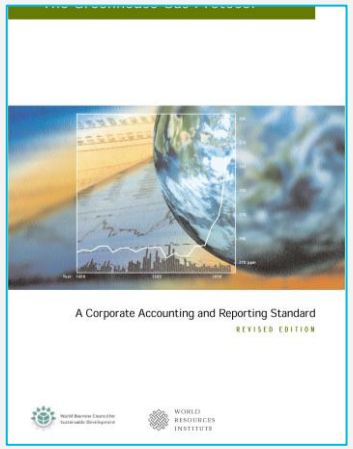
There is detailed guidance on how to measure emissions over the various scopes.

Measuring emissions – an introduction to the GHG protocol

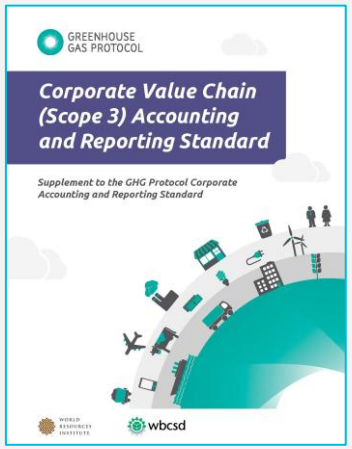
Why GHG inventories matter

A GHG Inventory (or corporate carbon footprint) is a quantified list of an organization's GHG emissions and sources (GHG Protocol Corporate Standard[3]). A credible GHG inventory is the foundation of any climate strategy. It ensures targets, disclosures, and initiatives are built on accurate data. Companies that measure emissions comprehensively can identify efficiency opportunities (lower costs) and manage risks proactively (WBCSD[4]). In GHG accounting, it is key to improve data quality over time.

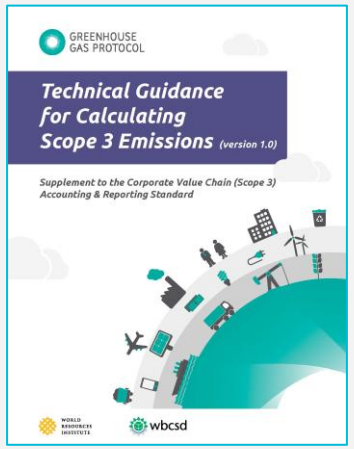
The **Greenhouse Gas (GHG) Protocol** is the most widely used international accounting tool, forming the basis of almost every climate program worldwide (In 2023, 97% of disclosing S&P 500 companies reported to CDP using GHG Protocol) (GHG protocol[5]). The GHG Protocol was co-developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) in 1998. Many GHG protocol standards exist (*below overview is non-exhaustive*), depending on the different reporting needs, and levels of governance that exist. To better understand how emissions are categorized in a GHG inventory, the next slide provides an overview of Scope 1, 2, and 3 emissions. Check for (developments in) the status of accepted Chain of Custody methods.



Corporate Standard: Baseline method for company-wide GHG accounting.



Scope 3 Standard: Guideline critical for value chain emissions (often the majority of an organization's footprint).



Scope 3 Calculation Guidance: Practical methods for categories like purchased goods, transport, waste, etc., co-developed with industry.

Land Sector & Removals Guidance: Newer guidance to account for forests, agriculture, carbon removal projects. [A]

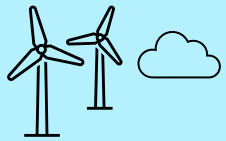
[A] The Land Sector and Removals Standard was launched on January 30, 2026.

GHG protocol's framework enables correct GHG allocation

Greenhouse Gases

CO_2 | PFCs | CH_4 | N_2O | HFCs | SF_6 | NF_3

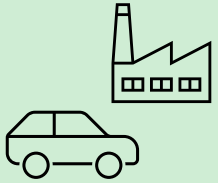
Scope 2
Indirect emissions



- Purchased electricity
- Purchased steam
- Purchased heating & cooling

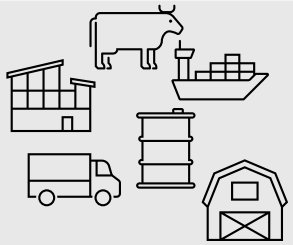
Scope 1
Direct emissions

- Company facilities
- Company vehicles



Corporate GHG footprint results are typically addressed in metric tonnes (tCO_2e).

Scope 3
Indirect emissions



- Purchased goods & services
- Capital goods & leased assets
- Fuel & energy related activities
- Transportation & distribution
- Waste from operations
- Business travel & employee commuting

Scope 3
Indirect emissions

- Transportation & distribution
- Processing of sold products
- Use of sold products
- End-of-life
- Leased assets
- Investments & franchises

Upstream activities | Reporting organization | Downstream activities

Address key scope 3 categories while anticipating new GHG frameworks

The most material Scope 3 categories in chemical industry

For large petrochemical companies, Scope 3 emissions are primarily concentrated in four categories:
- Purchased Goods & Services (Category 1),
- End-of-Life Treatment of Sold Products (Category 12),
- Use of Sold Products (Category 11), and
- Processing of Sold Products (Category 10).

Category 1 alone accounts for over 50% of Scope 3 emissions (CDP, 2023[6]; BASF, 2023[7]), while Categories 11 and 12 together contribute another 30%+ (Deloitte, 2024[8]).

Specialty chemical companies show a more upstream-heavy profile. Category 1 remains dominant (Merck KGaA, 2022[9]), followed by Capital Goods (Category 2), Fuel/Energy-Related Activities (Category 3), and Upstream Transportation (Category 4). Use-phase emissions (Category 11) are only material when products emit GHGs during use, such as specialty gases or medical propellants (Merck KGaA, 2022[10]; CDP, 2023[11]).

Potential updates included in the new corporate and scope 3 standards?

Major updates to the Corporate and Scope 3 Standards are underway (public drafts in 2025, final by ~2027). Anticipated improvements include *(not exhaustive – find more here)*:

- **Clearer Scope 3 requirements**: Mandatory reporting of significant categories, better supplier engagement, and improved data quality.
- **Treatment of biogenic CO_2 and removals**: Addressed through the upcoming Land Sector and Removals Guidance, expected in Q4 2025, which will integrate with Corporate and Scope 3 Standards.
- **Alignment with net-zero frameworks**: Updates aim to harmonize with SBTi, IFRS S2[A], CSRD, and other disclosure regimes, ensuring consistency for science-based and net-zero targets.

! ISO and GHG Protocol recently announced[12] a strategic partnership to create a unified global framework for greenhouse gas (GHG) emissions accounting. The partnership will produce joint standards for corporate, Scope 2 & 3, and product-level carbon footprints, including more detailed supply chain data. This will simplify reporting, improve consistency and credibility, and make it easier to apply harmonized guidance across different levels of emissions accounting.
See Appendix 2 for more information on GHG Protocol updates.

[A] International Financial Reporting Standards (IFRS) Climate-related Disclosures

Biogenic carbon accounting approach differs across initiatives

Biogenic CO_2 (from plant-based materials) is part of a **short natural cycle**: absorbed during growth, released at end-of-life. **Fossil CO_2**, by contrast, adds **new carbon to the atmosphere**. Understanding how this is treated in carbon footprinting is essential. The GHG Protocol[13] and ISO 14067[14] standards take different approaches to this cycle, affecting how biobased products are assessed and communicated. Please note that this topic is evolving.

GHG Protocol ("-1/+1" method)

- Tracks **CO_2 uptake** during biomass growth as a **removal (-1)** and **CO_2 release** at end-of-life as an **emission (+1)**.
- Highlights **timing** of emissions, making temporary carbon storage visible.
- Useful for showing early climate benefits of **long-lived biobased products**.
- Biogenic CO_2 is reported **separately** from fossil CO_2 to avoid double counting.
- Assumes sustainable regrowth [A]; transparency is key.

ISO 14067 ("0/0" method)

- Treats biogenic CO_2 as part of a **neutral cycle**: no credit for uptake, no penalty for release.
- Focuses on **net impact** over the full life cycle (cradle-to-grave).
- Only **non-neutral outcomes** (e.g. permanent storage, methane emissions) are counted.
- Avoids overestimation of "negative emissions" in partial assessments.
- Preferred in **strict LCA frameworks** for its conservative and clean accounting.

GHG Protocol

CO_2 absorbed during growth is credited (–), released later as emission (+).

CO_2 uptake: -1

CO_2 release: +1

ISO

CO_2 uptake/release treated as neutral (0) in impact – focuses on net result.

CO_2 uptake: 0

CO_2 release: 0

Note: Overview drafted using GHG Protocol, ISO 14067 and Textile Exchange (2024) Biogenic Carbon Guideline[15]. Other existing standards / methodologies were not considered for the benefit of this slide.

[A] refers to the assumption that the biomass (such as trees, crops, or other plants) used for producing biobased products will be replanted and grown again after harvesting.

GHG accounting is the foundation for many different elements of the ESG space

GHG accounting

Element	How element benefits from GHG Accounting	
Disclosing progress	• GHG accounting provides emissions data for transparent sustainability reporting. • Core to CDP [A], TCFD [B], ISSB [C], CSRD [D], and other frameworks.	Guide section
Internal carbon pricing	• Accurate GHG data underpins cost allocation for emissions-intensive operations. • Example: Plant-level CO_2 data informs a shadow CO_2 price for investment decisions.	
M&A and Due Diligence	• GHG inventories reveal climate risks and liabilities in acquisition targets. • Example: Assessing Scope 3 exposure before buying a specialty chemicals firm.	
Offsetting, Neutralizing	• GHG accounting quantifies residual emissions to determine offset volumes. • Example: Calculating remaining tons of CO_2e after process optimization.	
Product Carbon Footprints	• Especially relevant in chemical, manufacturing, and consumer goods sectors. • Refer to TfS [E] guideline[16] for system boundaries, allocation, and benchmarking.	Guide section
Supplier Engagement	• GHG data identifies high-emission suppliers for targeted collaboration. • Example: Requesting Scope 3 data from high-emission suppliers to reduce impact.	
Target setting	• Baseline GHG inventories define starting points for Science-Based Targets. • Example: Setting 2030 reduction goals aligned with SBTi[6] using Scope 1–3 data.	Guide section
Targeted decarbonization	• GHG accounting pinpoints hotspots for cost-effective emission reduction. • Example: Prioritizing energy efficiency in high-emission chemical processes.	

[A] Carbon Disclosure Project; [B] Task Force on Climate-related Financial Disclosures; [C] International Sustainability Standards Board; [D] Corporate Sustainability Reporting Directive; [E] Together for Sustainability

Dedicated section available in this guide

Guidehouse

Setting climate targets

CHAPTER B

Science Based Target setting’s guidance is rapidly evolving

Target setting as a potential Value Driver

An introduction to Science Based Targets

- After completing a GHG inventory, companies often define **climate-related targets** to guide emissions management.
- While other target setting schemes exist, the Science-Based Targets initiative (SBTi)[17] is a collaboration between four NGOs – CDP, the UN Global Compact, World Resources Institute (WRI), and WWF – launched in 2015 to provide a framework for corporate climate target setting. Science-based target setting is widely adopted among corporations and is used to align business practices with emissions reduction goals.
- As of early 2025, over 10,000 companies have committed to science-based targets, including more than 7,000 with approved targets.

Why SBTs are important

Science-based targets (SBTs) are used by chemical and petrochemical companies as part of their long-term planning frameworks. More than 100 chemical firms globally have committed to SBTs, signaling broad market confidence in their business relevance (SBTi [18]). Companies with validated targets report improved investor relations (80%), enhanced stakeholder trust (95%), and stronger financial resilience (92%) - with no evidence of negative impacts on profitability (SBTi [18]).

Why SBTs are important - continued

Additionally, large buyers increasingly require suppliers to set SBTs - AstraZeneca, for instance, expects 95%[26] of its suppliers (by supplier spend) to have science-based targets by 2025 (SBTi Target Dashboard[19]).
Check for (developments in) the status of accepted Chain of Custody methods.

In sum, SBTs offer chemical companies an externally validated framework to navigate investor expectations and supply chain pressures. They help future-proof operations, be ready for future stricter climate policies, maintain market access, and build trust - making them a credible and increasingly essential component of long-term business strategy.

Target setting over time

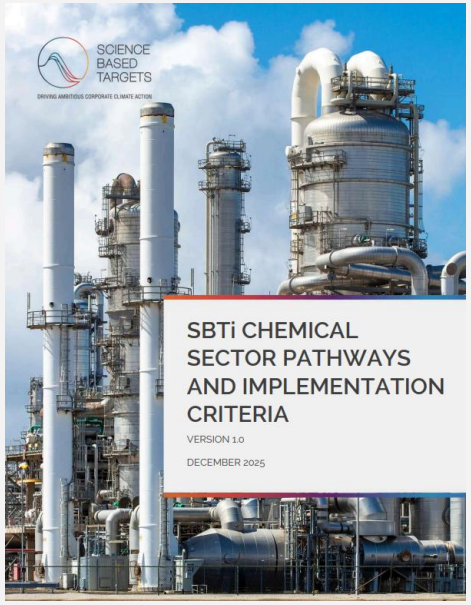
Target setting is a process repeated over time to set companies on a path to significantly reduce emissions. Companies set a series of short- to medium-term targets (5 to 10 years out), eventually leading to zero emissions in the long-term (e.g., by 2050).

Sector specific guidance

Next to general target setting criteria, SBTi provides tailored criteria for different industries (e.g., power, transport, buildings, chemicals). Targets must align with sector-specific decarbonization pathways and methodologies. Recently, SBTi has finalized its pathways criteria document for the chemical sector. More information on this guidance can be found on the next slide.

The chemical sector guidance introduces mandatory and optional targets across scopes and feedstocks.

Chemical Sector Pathways and Implementation Criteria



The Chemical Sector Pathways and Implementation Criteria[20] is a supplement to the Corporate Net-Zero Standard (NZS) and Corporate Near-Term Criteria (NTC). When chemical companies decide to set Science Based targets (which is voluntary), they must comply with the Corporate NZS / NTC except where explicitly superseded by provisions in the Chemical Guidance.

The final version of these criteria was published in December 2025.

Note the Corporate Net Zero Standard is also under review.

Key chemical-sector specific targets

Scope 1 targets:
- Mandatory targets for N_2O emissions during production of nitric acid (CHEM – C1).
- New optional target for CO_2[A] emissions during production of non-primary chemicals (CHEM – C3).

Scope 1-3:
- New optional targets for GHG emissions from the production of methanol, ammonia, and/or HVC) (CHEM-C2).

Scope 3 targets:
- Optional target for scope 3.11 N_2O emissions from the use-phase of sold nitrogen fertilizers (CHEM-C4).

Other target:
- Optional alternative feedstock (bio-based, recycled [B], and CCU[C]) target (CHEM-C5).

Notes:
- Typically, applicability thresholds apply.
- Other target options (not specific for the chemical sector) also apply.

[A] Including CH_4 and N_2O from combustion. [B] Feedstocks produced from chemical recycling technologies and (optional) material outputs from mechanical recycling technologies based on post-consumer wastes. [C] Under specific conditions.

Disclosing progress

CHAPTER B

Transparently share your emissions and progress relative to your targets

Reporting: beyond compliance - a strategic imperative

The disclosure landscape

Disclosure (reporting) in the context of sustainability and corporate responsibility refers to **the act of publicly sharing information about an organization's environmental, social, and governance (ESG) performance, risks, and impacts**. Companies typically disclose their sustainability efforts through Sustainability reports and annual reports. Typically, several benefits are linked to disclosure:

- **Beyond Compliance**: Sustainability reporting is evolving from a regulatory obligation to a strategic imperative. It reflects an organization's commitment to transparency and long-term value creation, helping organizations move beyond compliance and embed sustainability into core business strategy. (WEF[21]).
- **Internal value**: Reporting fosters internal alignment by integrating financial and non-financial data. It builds awareness across teams, supports risk management, and guides resource allocation toward sustainability goals. (WEF[21]).
- **External impact**: Public disclosure of environmental, social, and governance (ESG) performance enhances stakeholder trust. It demonstrates accountability and progress toward sustainable development, influencing investor confidence and brand reputation. (Global Reporting Initiative[22]).
- **Standard practice**: Sustainability reporting is now a mainstream practice in both private and public sectors. It is increasingly expected in CSR and annual reports, with frameworks like GRI and ISSB guiding disclosures globally. (OECD[23]).
- **Strategic tool**: ESG disclosures are used by investors, customers, and regulators to assess corporate performance. High-quality reporting can improve ESG ratings, support access to capital, and meet procurement or compliance requirements. (WEF[21]).

[A] GRESB chooses to use this as an abbreviation for something

Types of frameworks

Global standards enable companies to disclose ESG performance in a consistent, comparable, and credible way. Frameworks could help to:

- Benchmark against peers and industry best practices.
- Align with investor and stakeholder expectations.
- Integrate ESG into core business strategy, moving beyond compliance toward long-term value creation.

TCFD — **Task Force on Climate-related Financial Disclosures**: Focuses on climate-related financial risk. Typically used by Companies preparing for disclosure aligned with investor expectations or regulatory requirements.

GRI — **Global Reporting Initiative**: Typically used by companies that want to report on full environmental, social, and economic impacts.

ISSB — **International Sustainability Standards Board**: Typically used by multinationals preparing for convergence in global ESG reporting, especially where jurisdictions are adopting ISSB standards.

SASB — **Sustainability Accounting Standards Board**: Report financially material ESG issues specific to your industry. Typically used by companies seeking to communicate ESG performance to investors.

CDP — **Carbon Disclosure Project**: Used when responding to investor or customer requests for environmental data (climate, water, forests).

GRE-SB — **GRESB**[A]: Typically used by asset managers, REITs, and infrastructure funds seeking ESG benchmarking and investor-grade performance data.

CDP scoring system ranks companies from disclosure to leadership in environmental performance

What is CDP?

- CDP (formerly Carbon Disclosure Project) is the **leading global platform** for environmental disclosure. **It enables companies to report** their Scope 1, 2, and 3 greenhouse gas emissions, climate risks, and mitigation strategies in a standardized format.
- CDP integrates best-practice reporting standards such as the **GHG Protocol**, ensuring global consistency and comparability in emissions reporting across sectors and regions (CDP[24]).
- In 2024, over **22,700 companies were scored by CDP**. Ratings range from D- to A, reflecting levels of transparency, governance, and leadership in environmental performance (CDP[24]).
- CDP is supported by **827 institutional investors** managing over **$100 trillion in assets**. These investors use CDP data to assess climate-related risks and opportunities in their portfolios (WEF[25]).
- In 2025, **270+ major buyers** with a combined purchasing power **of $6.4 trillion** requested their suppliers to disclose through CDP. This underscores CDP's role in influencing procurement decisions and building customer trust (CDP[24]).

CDP scoring system

Responding companies will be allocated to one of the below **consecutive levels** which represent the steps an organization moves through as it progresses towards environmental stewardship.

Scoring level	Description
A / A- Leadership	Demonstrate advanced environmental stewardship
B / B- Management	Demonstrate environmental management
C / C- Awareness	Measure how environmental issues intersect with the company's business
D / D- Disclosure	Ability to provide data

Source: CDP scoring introduction

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Appendix

Appendix 1: Footnotes belonging to methodology decision tree

- AP-1: **"TfS-accepted PCR" – Definition:** TfS (Together for Sustainability) evaluates and endorses certain third-party Product Category Rules for use in PCF calculations. A PCR *accepted by TfS* is one that **either** was developed in alignment with the TfS PCF Guideline **or** has been formally reviewed and approved by TfS's technical working group. TfS maintains a public list of such accepted PCRs (updated annually) to guide practitioners.
- AP-2: **Sector-Specific Guidelines (ISO 14000-based):** These refer to industry-specific carbon footprint calculation rules that adhere to ISO standards (typically under ISO 14025 for Type III environmental declarations). For example, **Plastics Europe** publishes a PCR for polyolefin plastics. If a relevant association PCR exists, it should be used in lieu of generic methods, as it ensures consistency within that product sector. (Notably, the TfS guideline prioritizes PCRs from global industry initiatives before regional ones, and both before generic standards.)
- AP-3: **TfS PCF Guideline Applicability:** The TfS Guideline is designed for cradle-to-gate footprints in the chemical industry and related sectors. It provides harmonized rules tailored to chemical processes (e.g. how to handle allocations, recycling credits, data quality, etc.). *In principle, if no more specific PCR is available, one should apply the TfS rules.* The guideline itself stresses that practitioners should first check that the TfS rules can reasonably be applied to their product, and if they believe not, they must document the reasons. This is to ensure that any deviation is justified (for instance, if a product falls outside the chemical sector's typical scope).
- AP-4: **Justifying Non-Use of the TfS Guideline:** If a company decides the TfS rules are not applicable (Step 3 = "No"), they are expected to provide a rationale. For example, perhaps the product in question has a functional unit or system boundary that the TfS guideline does not cover, or it belongs to a completely different industry. In such cases, the company should record why the TfS methodology was not used (e.g. in the PCF report's scope section). This practice aligns with ISO 14067's requirements on transparency and the TfS Guideline's own recommendation that any non-standard approach be explained to avoid misinterpretation.
- AP-5: **PACT vs. GHGp Product Standard:** The **WBCSD PACT (Partnership for Carbon Transparency) Methodology** and the **GHG Protocol Product Life Cycle Standard** are both overarching frameworks for calculating product carbon footprints. The GHG Protocol standard (2011) is widely used and provides general principles for life-cycle GHG accounting. The PACT Methodology is a more recent initiative (2023) focused on enabling data exchange and comparability across value chains. In the TfS hierarchy, these come into play only if no PCR or sector guide is available. When using them, ensure to choose the one that fits your goal: e.g. the GHG Protocol standard is often preferred for public corporate reporting, whereas PACT might be adopted for consistent data sharing in supply chains (the TfS guideline does not mandate one over the other when both are applicable). It's also acceptable to draw on elements of both, since they are compatible, but consistency is key for a given footprint study.
- AP-6: **EU PEF Category Rules:** A **Product Environmental Footprint Category Rule (PEFCR)** is a comprehensive set of requirements under the EU's PEF framework, covering multiple environmental impact categories (not just carbon) for a specific product type. If a PEFCR exists for the product, following its climate-related calculations can ensure alignment with EU-recommended methods. However, note that PEFCRs are geared toward comparative assertions across the EU market (and include additional impacts beyond GHGs). In this decision tree, PEFCRs are listed after other standards because the TfS Guideline focuses strictly on carbon footprint; one should use a PEFCR's instructions for CO_2 emissions *only if* no aforementioned method (PCR, TfS, ISO, etc.) is available. Additionally, if using a PEFCR, be mindful that it may require modelling other impacts and more cradle-to-grave elements—make sure to isolate the carbon footprint aspects if your goal is a cradle-to-gate PCF.
- AP-7: **Multiple PCRs – TfS Resolution:** If more than one PCR is published for the same product (by different program operators or associations), **do not mix and match methods.** Instead, TfS will determine which one should be adopted by practitioners. TfS's Expert Team will check each candidate PCR against the TfS Guideline and other relevant standards, then declare one of them as the "TfS accepted PCR" for that product. Only this chosen PCR should then be used, to maintain consistency. *Note:* TfS publishes the list of accepted PCRs on its website (with document version and date) to prevent confusion if multiple PCR documents exist.
- AP-8: **Unapproved Sector Rules:** Occasionally, companies might have access to internal or industry guidance that hasn't been externally validated as a PCR or PEFCR (for example, a calculative guideline from a trade association that is not registered under an ISO 14025 program). The TfS Guideline allows using such a method *only* with proper oversight. "Justified and verified by TfS" means the company should present the approach to TfS for review. TfS will examine if it meets quality criteria equivalent to an official PCR (correct scope, data requirements, etc.). Without TfS's green light, relying on an unofficial method could lead to inaccuracies or non-comparability, hence this safeguard. In practice, this likely involves contacting the TfS technical team and possibly undergoing a special assessment or certification step before proceeding.
- AP-9: **PCR Documentation Requirements (ISO/TS 14027):** ISO/TS 14027:2017 provides guidance on developing product category rules. Any PCR used should be compliant with this, meaning it must clearly define at least: the **declared unit** (what quantity of product the footprint is calculated for), the **system boundary** (which life-cycle stages are included, e.g. cradle-to-gate), the **allocation rules** (how impacts are divided among co-products or recycled content), the required **data quality** (e.g. age of data, technology representativeness) and any **exclusions** (if certain GHG sources or minor processes are left out). It should also describe the review process it underwent. When adopting a PCR, check that it contains these elements and was developed by a competent body. TfS explicitly requires that an accepted PCR adheres to ISO 14027 guidelines, to ensure robustness. If a PCR lacks any of these details, treat it with caution or seek additional guidance before use (as its results might otherwise be questionable or difficult to verify).

Appendix 2a: Greenhouse Gas Protocol timeline of key updates

An overview of GHG Protocol standard revisions and opportunities to provide input are outlined below.

<table>
<tr><th></th><th colspan="3">STANDARDS</th></tr>
<tr><th></th><th>CORPORATE STANDARD</th><th>SCOPE 2 V2</th><th>SCOPE 3</th><th>LAND SECTOR & REMOVALS</th></tr>
<tr><td rowspan="2">Recent updates</td><td colspan="3">Governance structuring including new Independent Standards Board and Technical Working Groups completed in 2024</td><td rowspan="2">Land Sector and Removals Standard v1.0 published on 30 January 2026 (effective 1 January 2027).</td></tr>
<tr><td colspan="3">ISO and GHG Protocol announce a strategic partnership to harmonize standards globally (September 2025 update)</td></tr>
<tr><td rowspan="3">Upcoming key dates</td><td colspan="2">First public drafts of Scope 2 Guidance (consultation ends January 31, 2026) and Corporate Standard (TBD 2026 anticipated))</td><td rowspan="2">TWG development through 2025; consultation timing to be announced.</td><td rowspan="2">The accompanying guidance will follow in Q2 2026.</td></tr>
<tr><td>Draft revisions are expected in 2026, with final publication targeted for 2027.</td><td>Public consultation for Scope 2 Guidance opened on 20 October 2025 and now closes 31 January 2026.

Revised Scope 2 text is expected to be circulated for a second consultation in 2026</td></tr>
<tr><td colspan="4">Final standards are anticipated for publication in 2027</td></tr>
</table>

Appendix 2b: GHG Protocol Technical Working Group updates

The **GHG Protocol Technical Working Groups (TWGs)** are expert groups formed to develop the technical content for the upcoming updates to the GHG Protocol standards. They operate under the oversight of the **Independent Standards Board (ISB)** and are a core part of the governance process for revising the Corporate Standards suite.

Details on TWG discussions and recommendations are not made public until consultation periods commence.

CORPORATE STANDARD	SCOPE 2	SCOPE 3	ACTIONS AND MARKET INSTRUMENTS	LAND SECTOR & REMOVALS (FORESTRY EXCLUDED)
Began discussions on base year recalculation and data quality. Continuing discussions on consolidation approaches. Preliminary findings have been presented to the ISB.	Proposed updates to location- and market-based methods by the ISB are open to a public consultation now, closing January 31, 2026.	Developing revisions on minimum boundaries, data quality, and treatment of complex categories (e.g. investments and facilitated emissions). Focus is on feasibility and consistency. Preliminary recommendations shared with the Independent Standards Board; consultation timing not yet announced.	Developing conceptual guidance on accounting and reporting impacts of actions and market instruments beyond the GHG inventory, including avoided emissions. Work continues through 2025–2026 under ISB oversight; publication and consultation details to be confirmed.	No consensus reached on forest carbon accounting. Forestry is excluded from Land Sector and Removals Standard v1.0; further work may be considered in future revisions.

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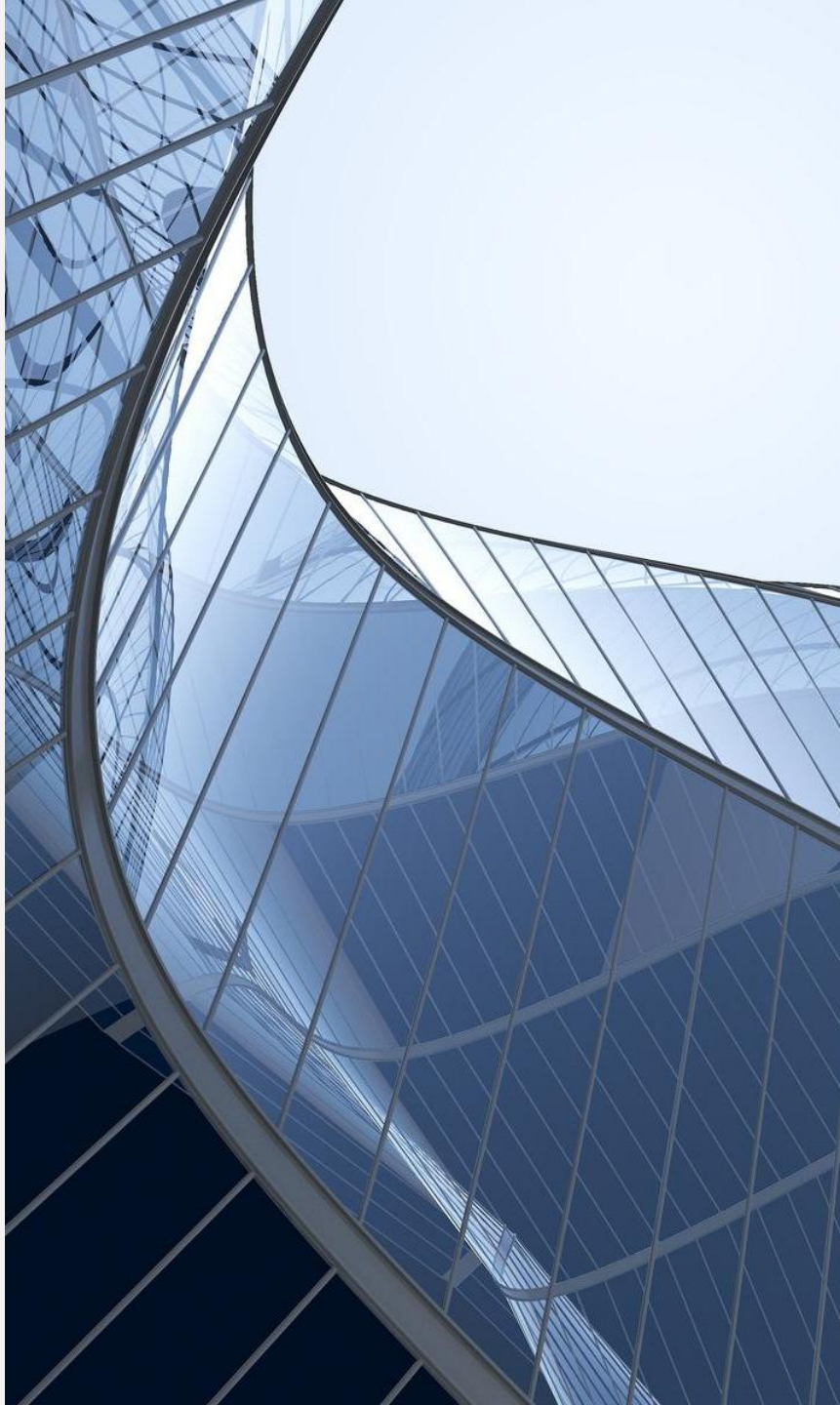

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