

# IMPACT ACCOUNTING FRAMEWORK

Accounting for lifecycle greenhouse gas impacts across sustainable fuels, chemicals, and materials



# Acknowledgements

This framework has been developed through Molecule Group's Impact Accounting Workstream and informed by contributions from participating organizations, technical experts, and other stakeholders

*Cover image: Agrivert, via Wikimedia Commons, licensed under CC BY-SA 4.0 ([creativecommons.org/licenses/by-sa/4.0](https://creativecommons.org/licenses/by-sa/4.0)); cropped for this publication.*

# Framework Overview

Sustainable fuels, chemicals, and materials (SFCM) are increasingly central to climate, energy-security, and industrial strategies, but life cycle methods and corporate inventories do not always speak the same language. This Framework provides a standardized way to disaggregate a product's life cycle carbon intensity (CI) score and map each component to the appropriate physical, market-based, land-sector, removal, or impact category.

The Framework is broken down into seven sections, each of which provides a distinct component of the guidance needed to understand and apply the accounting approach. The summaries below explain what each section provides and how it contributes to the Framework as a whole.

**Purpose of the Guidance.** Defines the Framework's scope, intended audience, applicability to GHG accounting guidance and standards.

**Background.** Explains how life cycle and scope-based accounting interact, why material climate effects can disappear when results are translated into corporate inventories, and where gaps remain in widely utilized programs.

**Importance of Accounting for Consequential Impacts.** Describes why the broader effects of SFCM matter for investment and procurement decisions, and how policy and market trends increase the need for alignment among life cycle methods, corporate inventories, and target-setting frameworks.

**Categorizing Impacts.** Provides the core method for splitting and reconciling a life cycle CI score and mapping each component to the appropriate physical, market-based, land-sector, removal, or impact reporting category.

**Verification and Documentation Requirements.** Establishes the minimum evidence and controls needed to support application and independent verification of the Framework, including appropriate reliance on existing audits, certifications, and verification processes.

**Case Studies and Examples.** Apply the mapping method across four practical pathways.

**Appendices.** Provide detailed interpretation of underlying GHG accounting guidance; summarize the wider accounting and target-setting ecosystem; and define the Framework's principal terms.

# Contents

|                                                                                                |           |
|------------------------------------------------------------------------------------------------|-----------|
| <b>Purpose of the Guidance</b>                                                                 | <b>5</b>  |
| <b>Background</b>                                                                              | <b>6</b>  |
| Inventory vs Life cycle Accounting                                                             | 6         |
| High-Level Translation of LCA to GHGP Framework                                                | 6         |
| Incentivizing Consequential Impacts                                                            | 7         |
| Market-Based Instruments and the Market-Based Inventory                                        | 8         |
| <b>Importance of Accounting for Consequential Impacts</b>                                      | <b>9</b>  |
| Increasing Focus on Sustainable Fuels, Chemicals, and Materials                                | 9         |
| Life Cycle Accounting is Widely Used Today and Expanding                                       | 11        |
| Harmonizing GHG Accounting for SFCM                                                            | 12        |
| <b>Categorizing Impacts</b>                                                                    | <b>13</b> |
| Calculating Impact: Separating Attributional and Consequential Impacts                         | 13        |
| Examples of Relevant Impact Categories                                                         | 14        |
| Example 1: Avoided Methane Emissions                                                           | 14        |
| Example 2: Bioenergy with Carbon Capture and Storage                                           | 17        |
| Example 3: Treatment of Recycled Carbon in Fuels and Materials Systems                         | 20        |
| Example 4: Indirect Land-Use Change Impacts                                                    | 23        |
| Example 5: Biogenic Carbon Storage in Materials                                                | 25        |
| Example 6: Regenerative Agriculture Practices                                                  | 29        |
| <b>Verification and Documentation Requirements</b>                                             | <b>34</b> |
| <b>Case Studies &amp; Examples</b>                                                             | <b>35</b> |
| Case Study 1: Diverted Food-Waste Biomethane                                                   | 35        |
| Case Study 2: BECCS With Bundled or Separately Sold Removal                                    | 36        |
| Case Study 3: Biogenic Carbon Storage in Materials                                             | 37        |
| Case Study 4: Regenerative Agricultural Practices                                              | 39        |
| <b>FAQ</b>                                                                                     | <b>40</b> |
| How to report fuels with two different carbon intensities?                                     | 40        |
| Preventing Double Counting in Methane-to-CO <sub>2</sub> Pathways                              | 40        |
| How the Impact Accounting Framework Addresses Additionality                                    | 40        |
| How does the Framework treat mitigation addressing residual or currently unabatable emissions? | 41        |
| Does the Framework require companies to implement every proposed disclosure immediately?       | 41        |
| How should companies compare pathways with different data quality and traceability?            | 41        |
| <b>Appendices</b>                                                                              | <b>42</b> |
| Appendix A: Interpretation of GHGP SBTi and TCAT Guidance                                      | 42        |
| Appendix B: Overview of the Accounting and Target Setting Ecosystem                            | 47        |
| Appendix C: Glossary and Definitions                                                           | 49        |
| Anticipated Future of the Framework                                                            | 50        |

# Impact Accounting Framework

## Purpose of the Guidance

The Impact Accounting Framework describes how life cycle greenhouse gas (GHG) impacts associated with sustainable fuels, chemicals, and materials (SFCM) can be reported within a scope-based GHG inventory. The Framework is intended for entities that consume, produce, and/or transact these products. It enables the disaggregation of a life cycle CI score and the reporting of each component in the physical inventory, market-based inventory, applicable LSR category, or impact statement.

Leading GHG accounting frameworks that utilize scope-based reporting include World Resources Institute's (WRI) Greenhouse Gas Protocol (GHGP), Science Based Targets Initiative's (SBTi) Corporate Net-Zero Standard (CNZS), and Task Force for Corporate Action Transparency's (TCAT) Mitigation Action Accounting Reporting Guidance (MAARG) and Target Accounting and Reporting Guidance (TARG). These frameworks remain anchored in corporate inventories and targets; they are not designed to aggregate the full life cycle GHG performance of SFCM into a single inventory result. Recent GHGP and SBTi developments create clearer places for actions, market instruments, land-sector metrics, and implementation claims, but they do not provide a way for entities to meaningfully report the life cycle GHG impacts associated with SFCM in their current form. In practice, this means that it is not possible for entities to distinguish between SFCM production pathways with materially different life cycle performance within their GHG inventories. The Impact Accounting Framework addresses that gap.

The Impact Accounting Framework is intended to align with GHGP, CNZS, TCAT guidance, and applicable ISO standards. It will also help to inform similar interactions where there is misalignment between life cycle and sector-based accounting (e.g., jurisdiction-level GHG inventories).

The Impact Accounting Framework applies to both physical purchases of SFCM and market-based purchases supported by contractual instruments. The emerging AMI architecture and CNZS V2 recognition of energy and commodity certificates open major opportunities for companies to support lower-carbon fuels, chemicals, materials, and agricultural commodities where direct delivery or complete physical traceability is impracticable. The Framework is needed to ensure that the climate associated with those purchases are appropriately mapped across physical, market-based, LSR, and impact categories. It does not prescribe mass balance, book-and-claim, or other chain-of-custody rules; rather provides the SFCM-specific accounting structure and evidence needed to support either form of purchase.

## Background

### Inventory vs Life cycle Accounting

Corporate GHG accounting frameworks—including GHGP and CNZS—have played a pivotal role in harmonizing emissions reporting and target-setting across corporate supply chains. These frameworks have established common principles and accounting structures, most notably the Scope 1, Scope 2, and Scope 3 classification known as scope-based accounting. This accounting method enables organizations to quantify direct and indirect emissions across their operations and value chains using consistent methods. Inventory accounting now forms the backbone of corporate climate reporting and provides the foundation for emissions tracking, risk assessment, and progress toward science-based and net-zero targets.

By contrast, life cycle accounting shifts the focus away from attributing emissions to organizational units or sectors and instead evaluates the total GHG emissions associated with a specific product, material, or service. This method accounts for emissions across the supply chain of products or services from raw material extraction through processing, manufacturing, use, and end-of-life disposal. Through this approach, users gain transparency into the emissions associated with each stage of a product's life cycle, including where emissions occur, how they are quantified, and which assumptions and methodological choices shape the overall result.

Inventory and life cycle accounting are compatible but answer different questions. Life cycle carbon-intensity results can often be disaggregated across corporate scopes and additional reporting categories, but GHGP and SBTi do not themselves provide a complete methodology for doing so. The Impact Accounting Framework supplies that mapping.

#### What Belongs in the Impact Category?

The impact category may include GHG-relevant outcomes associated with an SFCM pathway that are reported outside the physical and market-based inventories or reported as land-sector or carbon-stock metrics. These may include avoided or induced emissions, removals, or other system-level changes associated with the pathway.

### High-Level Translation of LCA to GHGP Framework

The life cycle of SFCM can be divided into upstream and downstream stages based on where emissions occur throughout the supply chain. The table below summarizes common life cycle stages and their correlation with scope categories from the perspective of a fuel-consuming entity based on current GHGP guidelines:

| Life Cycle Stage               | Description                                                                                                                     | Category |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------|
| Upstream Impacts               | Actions associated with feedstock production and harvesting (e.g., biomass, waste, CO <sub>2</sub> )                            | Various  |
| Land-Use Change                | Land-use change impacts, including direct land-use change (dLUC) and induced land-use change (iLUC)                             | Scope 3  |
| Feedstock Processing           | Processes that extract/enhance availability of valuable components from feedstock                                               | Scope 3  |
| Conversion to Finished Product | Transformation into fuel through fermentation, anaerobic digestion, hydrolysis, transesterification, pyrolysis, or gasification | Scope 3  |
| Distribution & Transport       | Movement of finished product from production facilities to end users                                                            | Scope 3  |
| End Use                        | Where energy or feedstock is used (e.g., energy/heat, chemicals, polymers)                                                      | Scope 1  |
| Downstream Impacts             | Actions that occur at end-use such as carbon sequestration                                                                      | Various  |

The GHGP currently covers some portion of value chain emissions within Scope 3 but does not explicitly categorize all upstream or downstream consequential impacts, creating a material gap in companies' ability to fully account for the range of climate impacts associated with SFCM technologies. For molecules, use-phase emissions alone can materially misstate performance because feedstock production, land effects, conversion, transport, and end-of-life outcomes are integral to the SFCM pathway. Companies should therefore evaluate the full life cycle, even where some associated effects must be disclosed outside the physical inventory.

These developments create an opportunity to build on emerging corporate accounting approaches while providing an SFCM-specific structure that supports consistency and interoperability across reporting systems. GHG Protocol is developing the Actions and Market Instruments (AMI) Standard to address accounting for consequential impacts, while its final LSR Standard and Guidance now establish detailed land-sector and CO<sub>2</sub>-removal categories. SBTi CNZS Version 2.0 separately defines how companies should implement targets using direct, activity-pool, sector-level, and market-supported actions. The Impact Accounting Framework will continue to evolve in parallel with the work of the GHGP's AMI Working Group to ensure ongoing consistency and interoperability.

## Incentivizing Consequential Impacts

Under the AMI framework, it is critical that impacts which fall into the life cycle of SFCM production and use are not conflated with offsets that are unrelated to the reporting entity's supply/value chain. While the recent AMI white paper appropriately distinguishes between these actions by creating different categories within statement 3, it does not go far enough in clarifying that they should not be treated as equivalent for accounting or target-setting purposes.

Without explicit differentiation, there is an assumption that these outcomes are interchangeable. This is not the case. For example, methane-reducing fuel projects generate consequential, real-world emissions impacts that are directly linked to the fuel production process. If avoided methane is

reported in the same manner as offsets, reporting entities will simply look for the cheapest option to lower their GHG emissions instead of supporting the production of the highest impact SFCM that they consume.

### **Recommendation to GHG Protocol and Target-Setting Organizations**

To address this, the AMI Standard should take two key steps. First, it should establish a clear hierarchy of subcategories within mitigation outcomes, distinguishing between in-value-chain actions and out-of-value-chain interventions. Second, it should actively encourage companies to transparently report Statement 3 impacts, particularly those associated with SFCM, even if such reporting is not mandatory. These effects are not merely out-of-value-chain mitigation: they arise from producing, sourcing, or using the SFCM itself. Standard- and target-setting organizations should recognize complete life cycle performance and create incentives for procurement of the lowest-emitting pathways. Consistent treatment and recognition by standard-setters and consumers will help appropriately value in-chain mitigation and drive more meaningful decarbonization outcomes.

## **Market-Based Instruments and the Market-Based Inventory**

This Framework supports the use of market-based instruments to reflect procurement SFCM in the market-based inventory, as currently proposed within GHGP's AMI process. Recognition of these instruments is a gating issue for clean fuels procurement. If companies cannot reflect procurement of lower-CI fuels in a market-based inventory when direct physical delivery or complete physical traceability is impracticable, corporate accounting will not distinguish that procurement from continued fossil fuel use, materially limiting the effectiveness of impact accounting. The market-based inventory and the impact statement are complementary: the former applies contractual attributes to attributional emissions, while the latter reports the consequential change caused or enabled by the underlying action.

The most common market-based chain-of-custody models for SFCM are mass balance and book-and-claim. Mass balance retains a controlled physical connection between inputs, outputs, and attributed characteristics within a defined system and reconciliation period. Book-and-claim separates the environmental attributes from the physical product and transfers them through a certificate or registry. This Framework is designed to be compatible with either model.

The eligibility and detailed quality criteria for these chain-of-custody models remain open questions in the AMI process. To achieve compatibility with existing markets, procurement and accounting structures, it is expected that both mass balance and book-and-claim will at minimum be reflected in the market-based inventory.

## Importance of Accounting for Consequential Impacts

The climate performance of SFCM technologies depends on complex and highly variable life cycle processes, including feedstock production, conversion, transport, and end use. Companies evaluating SFCM should therefore use full life cycle emissions as a core procurement and decarbonization metric, rather than treating associated upstream and downstream effects as optional mitigation unrelated to the product. The production and use of sustainable fuels and feedstocks present a unique opportunity to deliver benefits throughout the value chain, including in agriculture and waste management as well as the chemicals and fuels industries.

This dynamic can be framed as delivering three primary benefits:

- **Prioritize the most impactful technologies and production practices by distinguishing pathways based on their full life cycle GHG performance**
- **Identify high-GHG technologies and pathways where upstream or downstream impacts may outweigh benefits**
- **Recognize the broader climate value of SFCM companies' producers whose products deliver emission reductions across the value chain**

## Increasing Focus on Sustainable Fuels, Chemicals, and Materials

SFCM are advancing as a credible and impactful strategy for reducing GHG emissions while strengthening energy security by displacing fossil-based alternatives throughout the economy. This approach is already taking shape in the growing procurement of liquid biofuels for on-road transport, renewable gases for thermal decarbonization, and sustainable aviation fuel (SAF), with the maritime sector emerging as a near-term priority.

The broader rationale for this transition—substituting lower-carbon molecules for fossil inputs across multiple end uses—is increasingly reflected in international policy and analytical frameworks. Recent developments from the United Nations Framework Convention on Climate Change (UNFCCC) and the International Energy Agency (IEA) underscore both the scale of the opportunity and the central role that sustainable fuels and carbon-based alternatives are expected to play in economy-wide decarbonization strategies.

### Belém 4X Pledge on Sustainable Fuels and Modeling from International Energy Agency

The Belém 4X Pledge on Sustainable Fuels,<sup>1</sup> advanced through the COP30 process, seeks to quadruple global production and use of sustainable fuels by 2035. It is co-sponsored by Brazil, Italy, Japan, and India, and garnered initial support from 23 additional countries. Grounded in the International Energy Agency's (IEA) report *Delivering Sustainable Fuels: Pathways to 2035*,<sup>2</sup> it aims to accelerate the adoption of clean energy sources, including hydrogen, biogases, biofuels, and e-fuels, to replace fossil fuels and advance energy system decarbonization. The report states that “by 2035 in the accelerated case, sustainable liquid and gaseous fuels cover 5% of global final energy demand (i.e. the combined energy demand of agriculture, buildings, industry and transport), a significant increase from the 1% share in 2024”.<sup>3</sup>

---

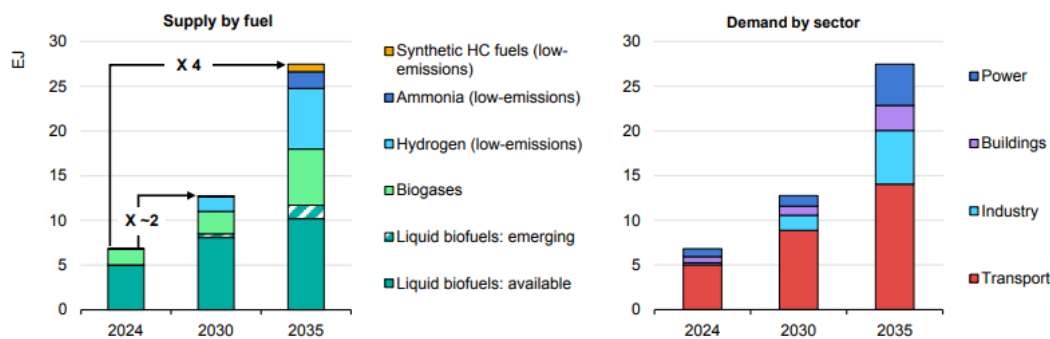
<sup>1</sup> Ministry of Foreign Affairs of Brazil. (2025). Launch of the Belém 4X pledge on sustainable fuels.

<https://www.gov.br/mre/en/contact-us/press-area/press-releases/launch-of-the-belem-4x-pledge-on-sustainable-fuels>

<sup>2</sup> International Energy Agency. (2025). Delivering Sustainable Fuels. <https://www.iea.org/reports/delivering-sustainable-fuels>

<sup>3</sup> Id., pg. 66

### Sustainable fuel supply by fuel and demand by sector in the accelerated case, 2024-2035



IEA. CC BY 4.0.

Note: For assumptions and definitions, see Figure 5.7.

Figure 2: IEA modeling shows the expected growth in sustainable fuels technologies through 2035, in line with net zero modeling.

### Declaration on Sustainable Chemicals and Materials & Chemical Sector Modeling

The Declaration on Sustainable Chemicals and Materials, launched at COP30 under the Clean Energy Ministerial (CEM) Biofuture Platform and initiated by the Netherlands, establishes a cooperative framework to accelerate the transition from fossil-based feedstocks to sustainable carbon sources in the chemical sector. It supports participating countries' climate commitments under the Paris Agreement and positions sustainable carbon, circularity, and innovation as central pillars of industrial decarbonization.

The Declaration promotes international collaboration to scale bio-based, recycled, and captured carbon feedstocks while aligning chemical sector transformation with climate neutrality, environmental protection, and sustainable development objectives. The initiative also recognizes and complements jurisdiction-level policy efforts—such as the European Union's Green Deal Industrial Plan, Circular Economy Action Plan, and chemicals and materials sustainability frameworks—which are advancing regulatory and market incentives for low-carbon and circular chemical production.

The 2025 BIC/RCI report led by nova-Institute, *Is There Enough Biomass to Defossilise the Chemicals and Derived Materials Sector by 2050?*, concludes that biomass can sustainably provide about 20% of the sector's global carbon demand by 2050. The report characterizes this level as realistic and achievable: a moderate Green High Tech pathway, requiring roughly 10% more agricultural yield than business as usual, is sufficient to reach the target, while stronger technology scenarios could support a larger share. The remaining transition would rely primarily on recycling and captured CO<sub>2</sub>.

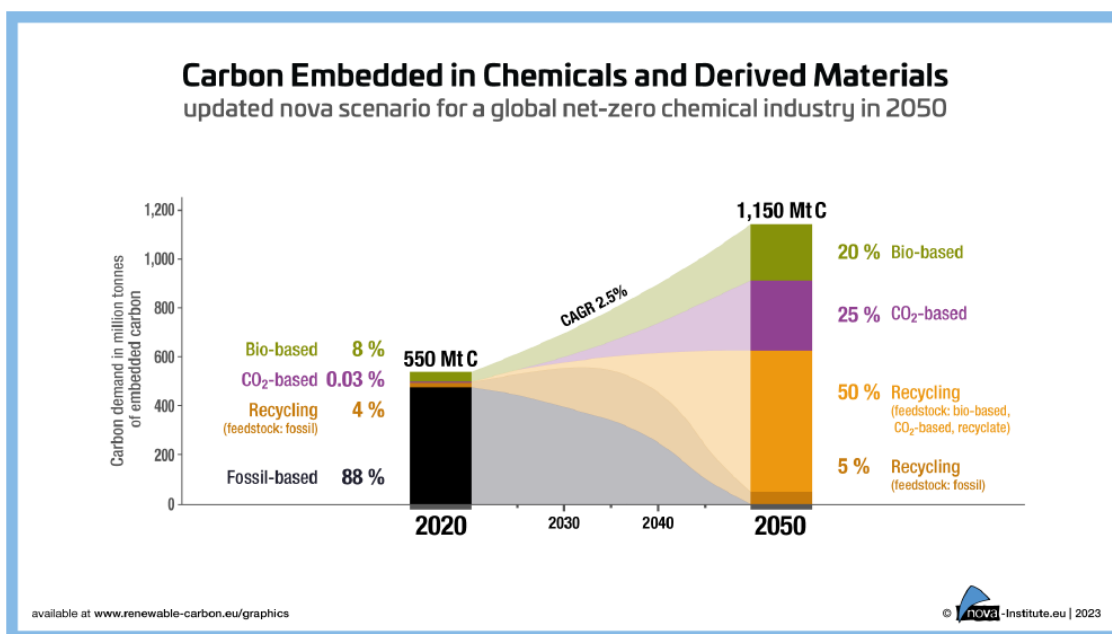


Figure 3: The nova-Institute scenario illustrates a global net-zero chemical industry in which renewable carbon fully replaces fossil carbon by 2050, including a 20% bio-based share.

## Life Cycle Accounting is Widely Used Today and Expanding

LCA is widely imbedded in policy frameworks, reflecting a deliberate decision to differentiate between technology pathways by accounting for upstream and downstream impacts associated with SFCM production and use. **By capturing both positive and negative effects across the value chain, these approaches enable more accurate comparisons of climate performance.** The following are examples of leading programs and their LCA models, including whether they incorporate consequential accounting. The widespread use of these methodologies substantiates the utility and necessity of full LCA.

| Methodology                                                                       | Model                            | Governing Body                                   | LCA Approach                                      | Policy Function                                                |
|-----------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------|
| <b>CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation)</b> | CORSIA GREET                     | International Civil Aviation Organization (ICAO) | Attributional + Consequential                     | Offset eligibility and airline compliance                      |
| <b>California LCFS</b>                                                            | CA GREET                         | California Air Resources Board (CARB)            | Attributional + Consequential                     | Compliance crediting and fuel switching incentives             |
| <b>EU RED II / III</b>                                                            | EU RED methodology               | European Union                                   | Attributional + Consequential                     | Sustainability certification and renewable energy targets      |
| <b>RenovaBio</b>                                                                  | RenovaCalc                       | Government of Brazil                             | Attributional                                     | Creating credits and lowering fuel emissions nationwide        |
| <b>Canada CFR</b>                                                                 | Fuel Life Cycle Assessment Model | Environment and Climate Change Canada            | Attributional + Consequential (emerging elements) | Compliance credit market and fuel life cycle reduction targets |

## Harmonizing GHG Accounting for SFCM

SFCM markets will struggle to scale efficiently when the same product receives materially different climate treatment across jurisdictions or corporate reporting programs. The immediate need is a common accounting core that connects life cycle carbon-intensity results to corporate inventories and claims.

The Belém 4X Pledge calls for international cooperation to increase sustainable-fuel use at least fourfold by 2035, while its implementation agenda emphasizes life cycle carbon accounting and market development. Molecule Group's Industry Principles<sup>4</sup> likewise call for harmonized carbon accounting across jurisdictions and voluntary and compliance markets, including interoperable LCA models, evidence-based inputs, consistent treatment of biogenic and recycled carbon, and common system boundaries.

A producer should be able to calculate a product's life cycle performance, transmit the supporting data and attributes through a credible chain of custody, and allow each purchaser to place the result in the correct Scope 1, Scope 2, Scope 3, gross-flux, removal, or impact category. This requires alignment on functional units, life cycle boundaries, data quality, allocation, attribute ownership, exclusive claiming, and reconciliation between the product carbon intensity (CI) and the corporate report.

Another critical gap in existing accounting systems is the limited recognition of downstream emissions benefits enabled by a producer's supply. Emissions attributed to the producer highlight the production and value-chain emissions of SFCM without showing the reductions their products enable for customers.

Complete uniformity is neither realistic nor necessary. The practical goal is interoperability: preserve transparent, program-specific differences while establishing conversion and disclosure rules that allow credible results to move between systems. The Impact Accounting Framework provides that bridge.

<sup>4</sup> <https://www.molecule-group.com/cop30industry/letter>

## Categorizing Impacts

### Calculating Impact: Separating Attributional and Consequential Impacts

Impact accounting begins with a life cycle CI score expressed on a common functional-unit basis, such as grams of CO<sub>2</sub> equivalent per megajoule (gCO<sub>2</sub>e/MJ). The total CI must then be separated into the components that belong in the reporting entity's physical inventory and those that represent consequential impacts. The components should reconcile to the reported total CI. The mapping of disaggregated CI is the core function of the Framework.

The preferred method is to obtain a pathway-specific CI record that separately identifies the emissions included in the CI, production and transport emissions, and consequential impacts. Gross biogenic CO<sub>2</sub> fluxes that are excluded from the governing CI result should be disclosed separately rather than added to the CI. The reporting entity can then map each component to the appropriate category without treating the net CI as a single inventory emission factor.

CARB's CA-GREET4.0 Tier 1 CI Calculators provide a regulatory example of this disaggregation. For example, the Tier 1 CI Calculator for Dairy and Swine Manure Biomethane provides a detailed breakdown of the pathway CI, including baseline and project methane emissions, avoided emissions, biomethane production, transport, and pathway CI results, rather than reporting only the composite CI (California Air Resources Board, Tier 1 CI Calculator for Dairy and Swine Manure Biomethane Instruction Manual, July 1, 2025, pp. 2–4, 22).

If a disaggregated CI record is not available, the reporting entity may estimate the impact component by subtracting the physical emissions included in the governing methodology—such as production, transport, and applicable use-phase emissions—from the total life cycle CI. Gross biogenic CO<sub>2</sub> reported separately under the LSR framework should not be subtracted from or added to the CI unless the governing methodology includes it. Any estimate should use factors that match the pathway's geography, feedstock, technology, transport route, time period, and functional unit, and should disclose the source, version, assumptions, and uncertainty. This residual method is a fallback and should not override more specific verified pathway data.

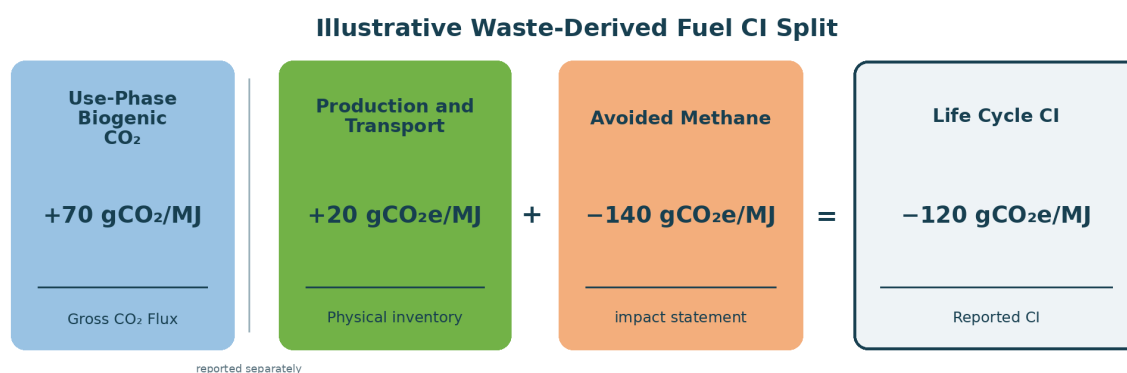


Figure 7: Illustrative CI split for a waste-derived fuel. The -120 gCO<sub>2</sub>e/MJ life cycle result reconciles to +20 production and transport and -140 avoided methane. The +70 gCO<sub>2</sub>/MJ use-phase biogenic CO<sub>2</sub> is reported separately as a gross CO<sub>2</sub> flux and is not added to the CI.

## Examples of Relevant Impact Categories

Impact categories can include both attributional and consequential elements depending on organizational boundary and how rules are finalized under GHGP. The Impact Accounting Framework is designed to be broadly compatible with third-party calculation methodologies, including LCA/CI models that aggregate these elements. Quantification will in many cases involve the disaggregation of LCA/CI scores. The impact categories outlined below are illustrative examples of applications of the Impact Accounting Framework.

- Avoided methane emissions
- Bioenergy with carbon capture and storage (BECCS)
- Treatment of recycled carbon in fuels and materials systems
- Biogenic carbon sequestration in materials
- Indirect Land Use Change (iLUC)
- Regenerative agriculture practices

The mapping tables use the following color key to distinguish physical emissions, the LSR Standard's additional reporting categories, and separately reported impacts:

|                    |                                     |         |
|--------------------|-------------------------------------|---------|
| Physical emissions | LSR Additional Reporting Categories | Impacts |
|--------------------|-------------------------------------|---------|

### Example 1: Avoided Methane Emissions

**Avoided methane emissions** refer to methane (CH<sub>4</sub>) emissions that would have occurred under a baseline manure, landfill, wastewater, or organic-waste management scenario (e.g., municipal food waste, crop residues, or distillery residues), but are prevented because uncontrolled methane production is captured and destroyed.

#### Consumer Perspective:

This perspective assumes the reporting company is the consumer of an SFCM whose **life cycle profile includes an avoided-methane claim**, but the reporting company **does not control** the upstream landfill, digester, lagoon, or waste-management system that generated that benefit.

| Life Cycle Element                          | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|---------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Combustion / Oxidation        | X       |         |         | X                          |        |                         |
| Upstream Production, Processing & Transport |         |         | X       |                            |        |                         |
| Avoided Methane                             |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The consumer reports biogenic product CO<sub>2</sub> emissions from combustion or oxidation under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18), and non-CO<sub>2</sub> emissions from combustion or oxidation in Scope 1 (Corporate Standard, Figure 3, p. 28). The consumer reports relevant upstream indirect emissions associated with processing and transporting the purchased SFCM in Scope 3 (Corporate Standard, Figure 3, p. 28).

**Note:** Depending on whether the company reports the required life cycle land emissions and related metrics, biogenic product CO<sub>2</sub> emissions are reported either under Gross CO<sub>2</sub> Fluxes separately from the physical inventory or under land emissions in the physical inventory. In either case, they are disaggregated by the associated scope. For biogenic waste, product CO<sub>2</sub> emissions are reported under Gross CO<sub>2</sub> Fluxes in the scope corresponding to the point of oxidation (LSR Standard, pp. 64-65).

**AMI Phase 1 Progress Update (March 2026):** An avoided-methane claim fits most naturally in the “GHG impacts of actions statement” as a “value chain associated impact” because it reflects a consequential, baseline-dependent impact that is not captured in the physical inventory (AMI Phase 1 Progress Update, p. 6).

### SFCM Producer Perspective:

This perspective assumes the reporting company **produces the SFCM itself**, and part of the product’s GHG reduction claim depends on the methane that was abated at an attached waste-management system, but the reporting company **does not control** the upstream landfill, lagoon, or waste-management system. The company may control enabling infrastructure (e.g., methane digester) in this situation.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Sold-Product Use / Oxidation             |         |         | X       | X                          |        |                         |
| Production Operations & Purchased Inputs | X       | X       | X       |                            |        |                         |
| Avoided Methane                          |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The producer reports non-CO<sub>2</sub> emissions from sold-product SFCM combustion or oxidation in Scope 3 and biogenic product CO<sub>2</sub> emissions from sold-product oxidation under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (LSR Standard, Figure 4.1, p. 18; Corporate Standard, Figure 3, p. 28). It reports production emissions in Scope 1 and purchased energy in Scope 2.

**AMI Phase 1 Progress Update (March 2026):** To the extent the producer is claiming that its product or system prevents methane emissions relative to a baseline scenario, that claim is not a reduction deducted from the physical inventory. Avoided methane in this case fits most naturally into “value chain associated impact” (AMI Phase 1 Progress Update, p. 6). Similarly, avoided emissions from the use of sold products (i.e., separate from avoided methane at the feedstock level) would fall under “GHG impacts of sold products” (AMI Phase 1 Progress Update, p. 6).

## Methane Source Perspective:

This perspective assumes the **reporting company is the agricultural operator or feedstock producer**, such as a dairy or livestock, wastewater, or food waste operation, that **owns or controls the methane-generating source** associated with the feedstock for SFCM.

| Life Cycle Element                  | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|-------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Controlled Methane-Source Emissions | X       |         |         | X                          |        |                         |
| Purchased Energy & Upstream Inputs  |         | X       | X       |                            |        |                         |
| Sold-Product Fossil Displacement    |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** Methane from sources such as enteric fermentation and manure management is reported as land-management production emissions in the physical GHG inventory (LSR Standard, pp. 57-59). Because the farmer owns or controls these sources, the direct methane emissions are Scope 1; purchased electricity is Scope 2, and upstream emissions from purchased feed, fertilizer, or other inputs are Scope 3 (Corporate Standard, Figure 3, p. 28). Biogenic CO<sub>2</sub> released through flaring, along with non-CO<sub>2</sub> Scope 1 combustion emissions, are reported by the entity that owns or controls the flare (assumed here to be the owner of the methane source). When the farmer reduces methane from the controlled source, its measured Scope 1 inventory decreases. The same logic applies to a landfill or other waste operator that owns or controls the emitting source.

**Note:** Avoided methane should be calculated in reference to existing regulatory baselines for emission reductions.

**AMI Phase 1 Progress Update (March 2026):** In this case captured methane is used as a feedstock for a SFCM product that avoids fossil CO<sub>2</sub> emissions in the economy. The AMI draft supports recording this impact under “GHG impacts of sold products” (AMI Phase 1 Progress Update, p. 6).

## Scope 3 Purchaser Perspective:

This perspective assumes the reporting company purchases goods or services from a Scope 3 supplier that uses or relies on an avoided-methane SFCM pathway; it **does not own the methane source or consume the SFCM directly**.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Oxidation in Value Chain   |         |         | X       | X                          |        |                         |
| Purchased Inputs, Processing & Transport |         |         | X       |                            |        |                         |
| Avoided Methane                          |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The company reports relevant indirect value-chain emissions in Scope 3, including emissions from purchased materials, purchased fuels, processing, and transportation (Corporate Standard, Figure 3, p. 28). Where its Scope 3 boundary includes oxidation of a biogenic SFCM, the related biogenic product CO<sub>2</sub> is reported under Gross CO<sub>2</sub> Fluxes, associated with the relevant Scope 3 category (LSR Standard, Figure 4.1, p. 18).

**AMI Phase 1 Progress Update (March 2026):** The AMI draft supports treating the avoided-methane claim in the “GHG impacts of actions” statement rather than the physical inventory. Where the impact arises within the company’s value chain but outside its organizational boundary, it aligns with “value chain associated impacts” (AMI Phase 1 Progress Update, p. 6).

## Example 2: Bioenergy with Carbon Capture and Storage

**Bioenergy with Carbon Capture and Storage (“BECCS”)** is a geologic storage pathway in which a company uses biogenic feedstocks to produce energy, captures the resulting biogenic CO<sub>2</sub>, and stores it geologically.

### Consumer Perspective:

This perspective assumes the reporting company purchases and uses a bioenergy product whose **life cycle profile includes a BECCS claim**, but the reporting company **does not own or control** the capture, transport, injection, or storage pathway.

| Life Cycle Element                          | Scope 1 | Scope 2 | Scope 3     | Gross CO <sub>2</sub> Flux | Impact    | LSR Additional Category |
|---------------------------------------------|---------|---------|-------------|----------------------------|-----------|-------------------------|
| Product Use / Combustion / Oxidation        | X       |         |             | X                          |           |                         |
| Upstream Production, Processing & Transport |         |         | X           |                            |           |                         |
| BECCS Removal / Consequential impact        |         |         | If eligible |                            | Otherwise |                         |

**Existing GHGP Guidance:** The consumer reports biogenic product CO<sub>2</sub> emissions from combustion or oxidation under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18), and non-CO<sub>2</sub> emissions from combustion or oxidation in Scope 1. It reports relevant upstream indirect emissions from agricultural feedstock production, processing, and transportation in Scope 3 (Corporate Standard, Figure 3, p. 28).

Because the capture and storage pathway sits outside the consumer's organizational boundary, the consumer does not report the BECCS removal in Scope 1. It may report a qualifying Scope 3 geologic-storage removal only where it has physical traceability to the capture, injection, and storage entities and meets the life cycle, data-quality, uncertainty, monitoring, permanence, and land safeguards; otherwise, the removal is not reported in the physical inventory (LSR Standard, pp. 81-85).

**Note:** Depending on whether the company reports the required life cycle land emissions and related metrics, biogenic product CO<sub>2</sub> emissions are reported either under Gross CO<sub>2</sub> Fluxes separately from the physical inventory or under land emissions in the physical inventory. In either case, they are disaggregated by the associated scope. For biogenic waste, product CO<sub>2</sub> emissions are reported under Gross CO<sub>2</sub> Fluxes in the scope corresponding to the point of oxidation (LSR Standard, pp. 64-65).

**AMI Phase 1 Progress Update (March 2026):** If the consumer cannot report a qualifying Scope 3 removal but has taken an action that causally enables additional geologic storage, the separately quantified effect may fit as a "value chain associated impact." The impact must use a credible baseline and remain separate from any removal reported in the physical inventory (AMI Phase 1 Progress Update, p. 6).

### SFCM Producer Perspective:

This perspective assumes the reporting company ***produces a fuel or feedstock whose biogenic CO<sub>2</sub> is subsequently captured and stored***, but it may not own or control every stage of the capture, transport, injection, and storage pathway.

| Life Cycle Element                       | Scope 1     | Scope 2 | Scope 3     | Gross CO <sub>2</sub> Flux | Impact    | LSR Additional Category |
|------------------------------------------|-------------|---------|-------------|----------------------------|-----------|-------------------------|
| Sold-Product Use / Oxidation             |             |         | X           | X                          |           |                         |
| Production Operations & Purchased Inputs | X           | X       | X           | X                          |           |                         |
| BECCS Removal / Consequential impact     | If eligible |         | If eligible |                            | Otherwise |                         |

**Existing GHGP Guidance:** The producer reports facility emissions in Scope 1, purchased energy in Scope 2, and relevant upstream and downstream emissions in Scope 3 (Corporate Standard, Figure 3, p. 28). Biogenic product CO<sub>2</sub> released at the facility is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 1, while biogenic product CO<sub>2</sub> from oxidation of sold SFCM is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (LSR Standard, Figure 4.1, p. 18; pp. 60-65).

Captured biogenic CO<sub>2</sub> with geologic storage may be reported as a Scope 1 or Scope 3 removal in the physical inventory, as applicable, when the LSR general and geologic-storage requirements are met (LSR Standard, pp. 66-72 and 81-85).

Where the producer owns or controls part of the removal-and-storage pathway, a contractual agreement may allocate the Scope 1 removal among eligible parties that own or control part of that pathway, with controls against double counting. A Scope 3 removal requires physical traceability to the capture, injection, and storage entities. If those conditions are not met, the producer does not report the removal in its physical inventory (LSR Standard, pp. 82-85).

**AMI Phase 1 Progress Update (March 2026):** A separately quantified consequential effect may be reported as an impact only if it has an independent, credible baseline and is not double counted (AMI Phase 1 Progress Update, p. 6).

### Agricultural Producer Perspective:

The reporting company **grows or harvests the biomass feedstock** used by the downstream BECCS facility but **does not operate the BECCS plant or the geologic storage pathway**.

| Life Cycle Element                  | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|-------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| On-Farm Production & Land Emissions | X       |         |         | X                          |        |                         |
| Purchased Energy & Upstream Inputs  |         | X       | X       |                            |        |                         |
| Downstream BECCS Effect             |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The agricultural producer reports direct land-management production emissions and net land carbon-stock losses in Scope 1, purchased energy in Scope 2, and upstream emissions from purchased inputs in Scope 3. Qualifying land-management removals may be reported in Scope 1, while gross biogenic land CO<sub>2</sub> emissions and gross biogenic land CO<sub>2</sub> removals may be disclosed under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18; pp. 21, 53-59, and 69-80). Supplying biomass into a downstream BECCS pathway does not by itself make the downstream captured-and-stored biogenic CO<sub>2</sub> the farm's removal.

**AMI Phase 1 Progress Update (March 2026):** If the farm separately quantifies a benefit associated with supplying biomass into a downstream BECCS pathway, it is reported under impact as “GHG impacts of sold products” rather than as the farm's physical-inventory removal (AMI Phase 1 Progress Update, p. 6).

### Scope 3 Purchaser Perspective:

This perspective assumes the reporting company purchases goods or services from a Scope 3 supplier that uses or relies on a BECCS pathway; it **does not own the BECCS system or consume the SFCM** directly.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3     | Gross CO <sub>2</sub> Flux | Impact    | LSR Additional Category |
|------------------------------------------|---------|---------|-------------|----------------------------|-----------|-------------------------|
| Product Use / Oxidation in Value Chain   |         |         | X           | X                          |           |                         |
| Purchased Inputs, Processing & Transport |         |         | X           |                            |           |                         |
| BECCS Removal / Consequential impact     |         |         | If eligible |                            | Otherwise |                         |

**Existing GHGP Guidance:** The Scope 3 purchaser reports relevant purchased materials, fuels, processing, and transportation emissions in Scope 3. Biogenic product CO<sub>2</sub> within its Scope 3 boundary is reported under Gross CO<sub>2</sub> Fluxes, associated with the relevant Scope 3 category. A qualifying BECCS removal may be reported in Scope 3 only if the physical-traceability, life cycle, land, data-quality, uncertainty, monitoring, and permanence requirements are met; otherwise it is not reported in the physical inventory (Corporate Standard, Figure 3, p. 28; LSR Standard, Figure 4.1, p. 18; pp. 81-85).

**AMI Phase 1 Progress Update (March 2026):** The AMI draft supports treating the BECCS claim in the “GHG impacts of actions statement” rather than the physical inventory. Where the impact arises within the company’s value chain but outside its organizational boundary, it aligns with “value chain associated impacts” (AMI Phase 1 Progress Update, p. 6).

### Example 3: Treatment of Recycled Carbon in Fuels and Materials Systems

**Recycled carbon fuels and materials** use carbon captured from an existing process or recovered from a product or waste stream. Accounting depends on carbon origin. Fossil-origin recycled carbon remains fossil carbon when combusted/oxidized and is reported in the physical inventory; recycling does not make it biogenic or a removal. Biogenic or TCDR-based carbon follows the LSR gross-flux and product-storage rules. Any claimed benefit from displacing virgin fossil feedstock, avoiding an alternative release, or extending carbon storage is quantified separately against a credible baseline.

#### Consumer Perspective:

This perspective assumes the reporting company purchases and uses an SFCM material (e.g., polymers, fertilizers, or construction materials) containing recycled carbon. The life cycle profile may include a recycled-carbon benefit, but the reporting company does not control the source process or the recovery and conversion pathway that generated that benefit.

| Life Cycle Element                          | Scope 1    | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|---------------------------------------------|------------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Combustion / Oxidation        | X (fossil) |         |         | X (biogenic/TCD R)         |        |                         |
| Upstream Production, Processing & Transport |            |         | X       |                            |        |                         |
| Recycled-Carbon Substitution Benefit        |            |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The consumer reports fossil-origin CO<sub>2</sub> released from combustion or oxidation in Scope 1, together with non-CO<sub>2</sub> combustion emissions; upstream processing and transportation emissions remain in Scope 3 (Corporate Standard, Figure 3, p. 28). Biogenic or TCDR-based product CO<sub>2</sub> may be reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 1, only when the applicable carbon-origin and life cycle criteria are met; otherwise the LSR Standard directs the company to report the emissions in the physical inventory (LSR Standard, pp. 60-65). A lower life

cycle CI or avoided virgin-fossil claim does not erase fossil-origin combustion emissions and may instead be reported separately as optional information (Corporate Standard, p. 63).

**AMI Phase 1 Progress Update (March 2026):** A recycled-carbon benefit that arises in the consumer's upstream value chain but is not reflected in the physical inventory fits most naturally under "value chain associated impacts." The benefit must be quantified against a credible counterfactual and remain separate from the physical inventory (AMI Phase 1 Progress Update, p. 6).

### SFCM Producer Perspective:

This perspective assumes the reporting company converts recovered carbon into a sold SFCM and **controls the production process**, but **does not control** the upstream carbon source or the downstream use and oxidation of the sold product.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3       | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------------|----------------------------|--------|-------------------------|
| Sold-Product Use / Oxidation             |         |         | X<br>(fossil) | X<br>(biogenic/TCD R)      |        |                         |
| Production Operations & Purchased Inputs | X       | X       | X             |                            |        |                         |
| Recycled-Carbon Substitution Benefit     |         |         |               |                            | X      |                         |

**Existing GHGP Guidance:** The producer reports production emissions in Scope 1, purchased energy in Scope 2, and other relevant upstream and downstream emissions in Scope 3 (Corporate Standard, Figure 3, p. 28). Downstream oxidation of fossil-origin recycled carbon remains a fossil emission in Scope 3. Where the sold-product carbon is demonstrably biogenic or TCDR-based, product CO<sub>2</sub> emissions are reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 3, when the LSR criteria are met (LSR Standard, pp. 60-65). The physical inventory remains distinct from a claim that the sold product displaced virgin fossil feedstock.

**AMI Phase 1 Progress Update (March 2026):** The system-wide change caused by selling a recycled-carbon product rather than a counterfactual virgin-fossil product fits most naturally under "GHG impacts of sold products." That category is defined as the change in system-wide emissions resulting from use of a sold product relative to a credible baseline (AMI Phase 1 Progress Update, p. 6).

### Carbon Source Perspective:

This perspective assumes the reporting company **owns or controls the process that generates the carbon stream** and captures and transfers that carbon for use in an SFCM, but **does not control its downstream fate**.

| Life Cycle Element                     | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|----------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Uncaptured Controlled-Source Emissions | X       |         |         | X if biogenic/TCD R        |        |                         |
| Capture, Conditioning & Transfer       | X       | X       | X       |                            |        |                         |
| Avoided Release / Sold-Product Effect  |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The source operator reports fossil-origin emissions actually released from sources it owns or controls, together with direct emissions from capture, conditioning, and processing, in Scope 1; purchased energy used to process the carbon in Scope 2; and relevant upstream inputs and downstream transfer or transportation in Scope 3 (Corporate Standard, Figure 3, p. 28). Biogenic or TCD R-based product CO<sub>2</sub> released from a controlled source is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 1, when the LSR criteria are met (LSR Standard, pp. 60-65). If capture prevents an otherwise current-year release from the controlled source, reported physical emissions decrease; however, transfer for utilization is not itself a removal because the carbon may later be oxidized downstream. A broader avoided-release or substitution estimate is baseline-dependent and is reported separately from the physical inventory (Corporate Standard, p. 63).

**AMI Phase 1 Progress Update (March 2026):** A broader claim about the system-wide effect of selling captured carbon for use in an SFCM fits most naturally under “GHG impacts of sold products” (AMI Phase 1 Progress Update, p. 6).

### Scope 3 Purchaser Perspective:

This perspective assumes the reporting company **purchases goods or services from a Scope 3 supplier that uses or relies on a recycled-carbon pathway; it does not own the carbon source or use the recycled-carbon SFCM directly.**

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Oxidation in Value Chain   |         |         | X       | X if biogenic/TCD R        |        |                         |
| Purchased Inputs, Processing & Transport |         |         | X       |                            |        |                         |
| Recycled-Carbon Benefit                  |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The Scope 3 purchaser reports relevant processing, transportation, and other value-chain emissions in Scope 3 (Corporate Standard, Figure 3, p. 28). Carbon origin remains determinative: applicable biogenic or TCD R-based product CO<sub>2</sub> within the purchaser’s value chain is reported under Gross CO<sub>2</sub> Fluxes, associated with the relevant Scope 3 category (LSR Standard,

pp. 60-65). Where an attribute is established through impact traceability rather than physical traceability, the related project or intervention impact is reported separately from the physical inventory (LSR Standard, pp. 22-24).

**AMI Phase 1 Progress Update (March 2026):** A separately quantified recycled-carbon benefit associated with the operator's suppliers or customers fits most naturally under “value chain associated impacts,” provided it is not reported in another statement and is supported by a credible baseline (AMI Phase 1 Progress Update, p. 6).

## Example 4: Indirect Land-Use Change Impacts

**Indirect land-use change (iLUC)** refers to land conversion that may occur when increased demand for an agricultural fuel, chemical, or material displaces food, feed, or other production. Unlike physical land conversion within a company's operations or traceable value chain, iLUC is estimated using a counterfactual model.

### Consumer Perspective:

This perspective assumes the reporting company purchases and uses an agricultural SFCM whose **life cycle includes iLUC**, but the company **does not own or control** the land on which the feedstock was produced.

| Life Cycle Element                          | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|---------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Combustion / Oxidation        | X       |         |         | X                          |        |                         |
| Upstream Production, Processing & Transport |         |         | X       |                            |        |                         |
| Modeled iLUC                                |         |         |         |                            |        | Land carbon leakage     |

**Existing GHGP Guidance:** The consumer reports biogenic product CO<sub>2</sub> emissions from combustion or oxidation under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18), and non-CO<sub>2</sub> emissions from combustion or oxidation in Scope 1. It reports relevant upstream indirect emissions from agricultural feedstock production, processing, and transportation in Scope 3 (Corporate Standard, Figure 3, p. 28).

iLUC remains outside the physical inventory and is quantified under the separate “land carbon leakage” category, associated here with Scope 3 (LSR Standard, pp. 48-51).

**AMI Phase 1 Progress Update (March 2026):** Because iLUC-related effects are already addressed through this unique GHG Protocol category, they should not also be reported as an impact. Doing so would risk counting the same underlying consequence twice.

### SFCM Producer Perspective:

This perspective assumes the reporting company produces an SFCM from an agricultural feedstock and **controls the conversion facility**, but **does not own or control** the farms or other lands supplying the feedstock.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Sold-Product Use / Oxidation             |         |         | X       | X                          |        |                         |
| Production Operations & Purchased Inputs | X       | X       | X       |                            |        |                         |
| Modeled iLUC                             |         |         |         |                            |        | Land carbon leakage     |

**Existing GHGP Guidance:** The producer reports manufacturing emissions in Scope 1, purchased energy in Scope 2, and relevant upstream and sold-product emissions in Scope 3 (Corporate Standard, Figure 3, p. 28). Biogenic product CO<sub>2</sub> from sold SFCM is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (LSR Standard, Figure 4.1, p. 18). The producer also quantifies applicable iLUC under land carbon leakage and reports it separately, associated with Scope 3 (LSR Standard, pp. 48-51).

**AMI Phase 1 Progress Update (March 2026):** Because iLUC-related effects are already addressed through this unique GHG Protocol category, they should not also be reported as an impact. Doing so would risk counting the same underlying consequence twice.

### Agricultural Producer Perspective:

This perspective assumes the reporting company **owns or controls the land** used to grow the SFCM feedstock and therefore has land conversion and land-management activities **inside its organizational boundary**.

| Life Cycle Element                  | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|-------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| On-Farm Production & Land Emissions | X       |         |         | X                          |        |                         |
| Purchased Energy & Upstream Inputs  |         | X       | X       |                            |        |                         |
| Modeled iLUC                        |         |         |         |                            |        | Land carbon leakage     |

**Existing GHGP Guidance:** The agricultural producer reports direct cultivation emissions from land it owns or controls in Scope 1—for example, N<sub>2</sub>O from fertilizer or manure applied to managed soils and CH<sub>4</sub> from rice cultivation. Purchased electricity is Scope 2, while upstream emissions from producing purchased fertilizer, seed, fuel, or other inputs are Scope 3 (Corporate Standard, Figure 3, p. 28; LSR Standard, pp. 57-59). Net land carbon-stock losses are Scope 1 land emissions, and gross biogenic land CO<sub>2</sub> emissions or removals may be separately reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, pp. 21, 53-56, and 69-72). The modeled iLUC effect occurs beyond the farm boundary and is reported separately as land carbon leakage, associated with Scope 1 (LSR Standard, pp. 48-51).

**AMI Phase 1 Progress Update (March 2026):** Because iLUC-related effects are already addressed through this unique GHG Protocol category, they should not also be reported as an impact. Doing so would risk counting the same underlying consequence twice.

### Scope 3 Purchaser Perspective:

This perspective assumes the reporting company **purchases goods or services from a Scope 3 supplier that uses an agricultural SFCM pathway with potential iLUC effects; it does not own the producing land or consume the SFCM directly.**

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Oxidation in Value Chain   |         |         | X       | X                          |        |                         |
| Purchased Inputs, Processing & Transport |         |         | X       |                            |        |                         |
| Modeled iLUC                             |         |         |         |                            |        | Land carbon leakage     |

**Existing GHGP Guidance:** The company reports relevant indirect value-chain emissions in Scope 3 (Corporate Standard, Figure 3, p. 28). Applicable biogenic product CO<sub>2</sub> within its value chain is reported under Gross CO<sub>2</sub> Fluxes, associated with the relevant Scope 3 category (LSR Standard, Figure 4.1, p. 18). iLUC remains outside the physical inventory and is quantified under the separate “land carbon leakage” category, associated with Scope 3 (LSR Standard, pp. 48-51).

**AMI Phase 1 Progress Update (March 2026):** Because iLUC-related effects are already addressed through this unique GHG Protocol category, they should not also be reported as an impact. Doing so would risk counting the same underlying consequence twice.

### Example 5: Biogenic Carbon Storage in Materials

**Biogenic carbon storage in materials** occurs when carbon derived from a biogenic sink remains physically contained in a product during its use stage, including recycling and reuse.

GHG Protocol measures product carbon storage using the annual net change in the carbon stock of sold products rather than the gross flow of biogenic carbon into products. A short-lived biomaterial may enter and leave the product pool within the same year, or annual inflows may only replace annual outflows. **The resulting net stock change can therefore be zero even when the biomaterial repeatedly displaces a fossil-based material.** The physical inventory and product-carbon-storage category do not, by themselves, express that substitution benefit under current GHG Protocol rules.

### Recommendation on Short-Lived Biogenic Materials

Under the LSR Standard's stock-change approach (Requirement 24, Section 15.4.2), a company may report positive product carbon storage only when the total biogenic and/or TCDR-based carbon held in its product carbon pool increases net, year over year. For short-lived materials such as single-use plastic, carbon entering the pool from current sales is largely offset by carbon leaving as recently sold products reach end of life. Under stable production, the net annual stock change therefore approaches zero regardless of how much biogenic or TCDR-based carbon the products contain.

***GHG Protocol should revise its standards and guidance to allow product-level carbon inflows and corresponding releases to be recognized within the relevant scope-based accounting categories.***

Until then, the Impact Accounting Framework recommends reporting the -1/+1 carbon flows separately from both the scopes and the impact statement. A distinct impact may be reported for the consequential benefit of substituting the biogenic material for a fossil-based material, provided that it is calculated using a credible counterfactual and is not recognized elsewhere.

### Consumer Perspective:

This perspective assumes the reporting company purchases and uses a durable material containing biogenic carbon. The company ***physically holds the product during use***, but ***did not sell the product*** and does not control the upstream biogenic sink or production pathway.

| Life Cycle Element                           | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact                | LSR Additional Category |
|----------------------------------------------|---------|---------|---------|----------------------------|-----------------------|-------------------------|
| Product Use / End-of-Life Oxidation or Decay | X       |         |         | X                          |                       |                         |
| Upstream Production, Processing & Transport  |         |         | X       |                            |                       |                         |
| Extended Storage / Circularity impact        |         |         |         |                            | If separately enabled |                         |

**Existing GHGP Guidance:** The product user reports upstream emissions from the purchased material in Scope 3 and emissions from owned or controlled end-of-life treatment in Scope 1 (Corporate Standard, Figure 3, p. 28). Biogenic product CO<sub>2</sub> released through oxidation or decay at that controlled stage is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 1, when the LSR criteria are met (LSR Standard, pp. 60-65).

The formal product-carbon-storage category is based on carbon in sold products during the use stage, is not Scope 1 for any entity, and corresponds to Scope 3 Category 11 (LSR Standard, pp. 88-91). A user that merely holds a purchased product therefore does not deduct the stored carbon from its inventory.

**AMI Phase 1 Progress Update (March 2026):** If the user implements an action that extends product life, reuse, or recycling beyond the physical-inventory result, the resulting baseline-dependent effect may fit under “within organizational boundary impacts” or “value chain associated

impacts,” depending on where it occurs. AMI has identified product durability and circularity as an issue for further development (AMI Phase 1 Progress Update, pp. 6 and 44).

### Materials Producer Perspective:

This perspective assumes the reporting company manufactures and sells a durable material containing biogenic carbon and therefore is the entity **most directly positioned to quantify carbon retained in sold products** across their use, recycling, and reuse stages.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact                   | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------------------------|-------------------------|
| Sold-Product End-of-Life Emissions       |         |         | X       | X                          |                          |                         |
| Production Operations & Purchased Inputs | X       | X       | X       |                            |                          |                         |
| Carbon Retained in Sold Products         |         |         |         |                            |                          | Product carbon storage  |
| Fossil-Material Substitution impact      |         |         |         |                            | If separately quantified |                         |

**Existing GHGP Guidance:** The materials producer reports manufacturing emissions in Scope 1, purchased energy in Scope 2, and relevant upstream and sold-product emissions in Scope 3. Biogenic product CO<sub>2</sub> released from sold products is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (Corporate Standard, Figure 3, p. 28; LSR Standard, Figure 4.1, p. 18). If the product-carbon-storage requirements are met, the producer may also report the annual net increase in biogenic carbon retained in sold products in the separate product-carbon-storage category corresponding to Scope 3 Category 11 (LSR Standard, pp. 88-91).

The calculation must use annual net stock-change accounting, carbon-content and product-lifetime data, include recycling and reuse, account for losses from the product pool, include complete life cycle emissions, and satisfy the land-related safeguard. This does not reduce the producer’s Scope 3 emissions or create a Scope 3 removal. Product carbon storage is reported separately and is expressly not fungible with emissions or removals in Scope 3 (LSR Standard, pp. 88-91).

**AMI Phase 1 Progress Update (March 2026):** Emissions avoided because the sold biogenic material stores carbon for longer, or replaces a product with shorter-lived storage or higher life cycle emissions, may be reported under “GHG impacts of sold products.” The calculation must compare the sold product with a credible counterfactual and remain separate from both Scope 3 and the LSR product-carbon-storage disclosure (AMI Phase 1 Progress Update, p. 6).

### Biogenic Feedstock Producer Perspective:

This perspective assumes the reporting company grows or supplies the biogenic feedstock incorporated into a durable material. It **controls the upstream land or feedstock-production stage**, but typically **does not control the downstream product’s manufacture, use, or end-of-life fate**.

| Life Cycle Element                             | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| On-Farm Production & Land Emissions            | X       |         |         | X                          |        |                         |
| Purchased Energy & Upstream Inputs             |         | X       | X       |                            |        |                         |
| Downstream Fossil-Material Substitution impact |         |         |         |                            | X      |                         |
| Storage in Sold Agricultural Products          |         |         |         |                            |        | X                       |

**Existing GHGP Guidance:** The feedstock producer reports direct cultivation and land-management production emissions from land it owns or controls in Scope 1, purchased energy in Scope 2, and upstream emissions from purchased inputs in Scope 3. Net land carbon-stock losses are Scope 1 land emissions, while qualifying land-management removals may be reported as Scope 1 removals. The biogenic CO<sub>2</sub> component of these emissions and/or removals may be reported separately under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18; pp. 21, 53-59, and 69-80).

Supplying biomass to a durable material does not convert downstream product storage into a Scope 1 removal. A feedstock producer could report product carbon storage only if it accounts for the annual stock change in its sold agricultural products across the use stage and meets all product-storage requirements (LSR Standard, pp. 88-91).

**AMI Phase 1 Progress Update (March 2026):** The feedstock producer may separately report avoided emissions where supplying biogenic carbon causes longer downstream storage or substitutes for a counterfactual fossil feedstock. The claim fits most naturally under “GHG impacts of sold products” and must remain separate from any land removal or product-carbon-storage result (AMI Phase 1 Progress Update, p. 6).

### Scope 3 Purchaser Perspective:

This perspective assumes the reporting company ***purchases goods or services from a Scope 3 supplier that uses a material containing stored biogenic carbon; it does not own the original biogenic sink or use the material directly.***

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / End-of-Life in Value Chain |         |         | X       | X                          |        |                         |
| Purchased Inputs, Processing & Transport |         |         | X       | X                          |        |                         |
| Storage / Circularity impact             |         |         |         |                            | X      |                         |
| Storage in Sold Agricultural Products    |         |         |         |                            |        | If eligible seller      |

**Existing GHGP Guidance:** The company reports relevant indirect value-chain emissions in Scope 3 (Corporate Standard, Figure 3, p. 28). Applicable biogenic product CO<sub>2</sub> is reported under Gross CO<sub>2</sub> Fluxes, associated with the relevant Scope 3 category. The company preserves information on carbon origin and product flows needed by an eligible seller to meet the product-storage data requirements. If the operator itself sells an eligible agricultural product and meets all requirements, it may report product carbon storage (LSR Standard, Figure 4.1, p. 18; pp. 88-91).

**AMI Phase 1 Progress Update (March 2026):** If the operator finances or enables use of a biogenic material that avoids emissions through longer carbon storage relative to a credible counterfactual, the result fits most naturally under “value chain associated impacts.” It remains separate from the physical inventory, the formal product-carbon-storage category, and any impact reported elsewhere (AMI Phase 1 Progress Update, p. 6).

## Example 6: Regenerative Agriculture Practices

**Regenerative agriculture practices** can reduce on-farm GHG emissions and increase soil or biomass carbon stocks through measures such as cover cropping, reduced tillage, nutrient management, and improved rotations. The majority of these measures are covered under various categories under the LSR Standard:

- Direct land-use-change emissions, land-management net biogenic CO<sub>2</sub> emissions, land-management production emissions (such as soil N<sub>2</sub>O and livestock CH<sub>4</sub>), and applicable fossil-fuel and industrial emissions are reported in the physical inventory
- Eligible net gains in land carbon stocks may be reported as optional land-management CO<sub>2</sub> removals
- Gross biogenic land CO<sub>2</sub> emissions and removals may be separately disclosed under Gross CO<sub>2</sub> Fluxes
- Associated land occupation and any required land carbon leakage are reported in the applicable LSR additional categories

A distinct, baseline-dependent practice effect belongs in the impact statement only when it is not already reflected in the physical emissions or removal result.

## Consumer Perspective:

This perspective assumes the reporting company purchases and uses an SFCM whose **life cycle profile includes regenerative agriculture practices**, but the company **does not own or control** the land where those practices occur.

| Life Cycle Element                           | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|----------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Combustion / Oxidation         | X       |         |         | X                          |        |                         |
| Upstream Cultivation, Processing & Transport |         |         | X       |                            |        |                         |
| Qualifying Net Land-Carbon Gain              |         |         | X       | X                          |        |                         |
| Distinct Regenerative-Practice impact        |         |         | X       |                            | X      |                         |

**Existing GHGP Guidance:** The consumer reports biogenic product CO<sub>2</sub> emissions from combustion or oxidation under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18), and non-CO<sub>2</sub> emissions from combustion or oxidation in Scope 1. It reports processing, transport, and relevant upstream agricultural emissions in Scope 3 (Corporate Standard, Figure 3, p. 28).

The consumer reports relevant supplier land emissions in Scope 3. Reductions achieved through regenerative practices therefore appear as lower Scope 3 emissions (LSR Standard, Figure 4.1, p. 18).

Qualifying net land carbon-stock gains may be reported as Scope 3 land-management removals when the LSR spatial-boundary, traceability, data-quality, monitoring, and permanence requirements are met. Physical traceability to a sourcing region can support reporting a sourcing-region-level Scope 3 removal in the physical inventory when the LSR sourcing-region safeguards are met. The biogenic CO<sub>2</sub> component of these emissions and/or removals may be reported separately under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (LSR Standard, Figure 4.1, p. 18; pp. 76-77).

**AMI Phase 1 Progress Update (March 2026):** A net land carbon-stock gain reported as a land-management removal should not also be reported as an impact. A distinct, baseline-dependent practice effect may be reported in impact only to the extent it is not already reflected in the physical emissions or removal result (AMI Phase 1 Progress Update, p. 6).

## SFCM Producer Perspective:

This perspective assumes the reporting company converts agricultural feedstocks into an SFCM and may finance or require regenerative practices in its supply chain. It **controls the facility** but **does not control the supplier's land**.

| Life Cycle Element                       | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Sold-Product Use / Oxidation             |         |         | X       | X                          |        |                         |
| Production Operations & Purchased Inputs | X       | X       | X       |                            |        |                         |
| Qualifying Supplier Net Land-Carbon Gain |         |         | X       | X                          |        |                         |
| Distinct Regenerative-Practice impact    |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The producer reports manufacturing emissions in Scope 1, purchased energy in Scope 2, and relevant upstream agricultural and sold-product emissions in Scope 3. Biogenic product CO<sub>2</sub> from sold SFCM is reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (Corporate Standard, Figure 3, p. 28; LSR Standard, Figure 4.1, p. 18).

The producer reports supplier cultivation and land-management production emissions in Scope 3, so practice-driven reductions appear as lower Scope 3 emissions (LSR Standard, Figure 4.1, p. 18).

Qualifying net land carbon-stock gains may be reported as Scope 3 land-management removals when the LSR safeguards are met. Physical traceability to a sourcing region can support reporting a sourcing-region-level Scope 3 removal in the physical inventory when the LSR sourcing-region safeguards are met. The biogenic CO<sub>2</sub> component of these emissions and/or removals may be reported separately under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (LSR Standard, Figure 4.1, p. 18; pp. 76-77).

Companies at different tiers of the same value chain may report the same removal, but companies at the same or similar tier may not double count it, and total allocation from the source may not exceed 100%. A documented “right to report” is one optional control, not an exclusive claim granted to a single company (LSR Standard, pp. 70, 76-80).

**AMI Phase 1 Progress Update (March 2026):** A net land carbon-stock gain reported as a land-management removal should not also be reported as an impact. A distinct, baseline-dependent practice effect may be reported in impact only to the extent it is not already reflected in the physical emissions or removal result (AMI Phase 1 Progress Update, p. 6).

### Agricultural Producer Perspective:

This perspective assumes the reporting company **owns or controls the agricultural land** and directly implements the regenerative practices. The resulting production emissions and carbon-stock changes therefore occur **inside its organizational boundary**.

| Life Cycle Element                         | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|--------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| On-Farm Cultivation & Production Emissions | X       |         |         | X                          |        |                         |
| Purchased Energy & Upstream Inputs         |         | X       | X       |                            |        |                         |
| Qualifying Net Land-Carbon Gain            | X       |         |         | X                          |        |                         |
| Distinct Sold-Product / Practice impact    |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The agricultural producer reports direct cultivation emissions from land it owns or controls in Scope 1—for example, N<sub>2</sub>O from managed soils following fertilizer or manure application and CH<sub>4</sub> from rice cultivation. Purchased electricity is Scope 2, while upstream emissions from producing purchased fertilizer, seed, fuel, or other inputs are Scope 3 (Corporate Standard, Figure 3, p. 28; LSR Standard, pp. 57-59).

Reductions from nutrient management, reduced fuel use, and similar practices appear as lower Scope 1 land-management production emissions. Qualifying net land carbon-stock gains may be reported as optional Scope 1 land-management removals. The biogenic CO<sub>2</sub> component of these emissions and/or removals may be reported separately under Gross CO<sub>2</sub> Fluxes, associated with Scope 1 (LSR Standard, Figure 4.1, p. 18).

**AMI Phase 1 Progress Update (March 2026):** A net land carbon-stock gain reported as a land-management removal should not also be reported as an impact. A distinct, baseline-dependent practice effect may be reported in impact only to the extent it is not already reflected in the physical emissions or removal result.

### Scope 3 Purchaser Perspective:

This perspective assumes the reporting company purchases goods or services from a Scope 3 supplier that sources an agricultural product produced using regenerative practices; it **does not own or control the land**.

| Life Cycle Element                           | Scope 1 | Scope 2 | Scope 3 | Gross CO <sub>2</sub> Flux | Impact | LSR Additional Category |
|----------------------------------------------|---------|---------|---------|----------------------------|--------|-------------------------|
| Product Use / Oxidation in Value Chain       |         |         | X       | X                          |        |                         |
| Supplier Cultivation, Processing & Transport |         |         | X       | X                          |        |                         |
| Qualifying Supplier Net Land-Carbon Gain     |         |         | X       | X                          |        |                         |
| Distinct Regenerative-Practice impact        |         |         |         |                            | X      |                         |

**Existing GHGP Guidance:** The company reports relevant indirect value-chain emissions in Scope 3. Applicable biogenic CO<sub>2</sub> emissions reported under Gross CO<sub>2</sub> Fluxes, associated with Scope 3. (Corporate Standard, Figure 3, p. 28).

The Scope 3 purchaser reports supplier cultivation, land-management production, processing and transport emissions in Scope 3, so practice-driven reductions appear as lower Scope 3 emissions. Qualifying net land carbon-stock gains may be reported as optional Scope 3 land-management removals (LSR Standard, pp. 69-80). The biogenic CO<sub>2</sub> component of these emissions and/or removals may be reported separately under Gross CO<sub>2</sub> Fluxes, associated with Scope 3 (LSR Standard, Figure 4.1, p.18).

**AMI Phase 1 Progress Update (March 2026):** A practice outcome the operator finances or enables outside its organizational boundary fits most naturally under “value chain associated impacts” if it is not reported in another statement. The consequential impact must remain distinct from the physical Scope 3 result and use a credible baseline (AMI Phase 1 Progress Update, p. 6).

## Verification and Documentation Requirements

This section establishes the minimum documentation and controls needed to support transparent application and independent verification of the Framework. It is not intended to constitute a standalone assurance or audit standard. Existing audits, certifications, and verification processes applicable to the underlying information—such as verification of a lifecycle carbon-intensity calculation—may be used to satisfy the relevant requirements and avoid duplicative review. Additional verification should focus on information or Framework-specific determinations not covered by those processes. Where independent assurance is sought, verification should be conducted under an applicable certification program or recognized assurance standard.

| Area                                 | Requirement                                                                                                                                                                                    | Minimum Documentation                                                                                                                                      |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Scope and intended use</b>        | The reporting entity, pathway, quantity, period, functional unit, boundary, intended claim, and governing standards are clearly defined.                                                       | Boundary documentation, contracts, product specifications, transaction records, and target or program requirements.                                        |
| <b>Method and eligibility</b>        | The selected LCA, CI, certification, registry, and impact methods are applicable and current; material methodological choices and departures are disclosed.                                    | Certified CI or LCA, model version and outputs, applicable methodology or program rules, and disclosed assumptions.                                        |
| <b>Data and traceability</b>         | Activity data, emission factors, product and feedstock origin, spatial and temporal resolution, and chain of custody are supported; estimates and limitations are identified.                  | Meter and production records, invoices, transport records, supplier declarations, certificates, mass-balance or registry records, and relevant field data. |
| <b>CI disaggregation</b>             | CI components use consistent units and boundaries and reconcile to the reported CI. Gross biogenic CO <sub>2</sub> is disclosed separately when it is not included in the governing CI result. | Calculation workbooks, pathway calculators or model outputs, emission-factor schedules, and prior verification results.                                    |
| <b>Category mapping</b>              | Each component is reported once in the appropriate physical or market-based inventory, LSR category, removal category, or impact statement.                                                    | A mapping worksheet and the applicable GHG Protocol, SBTi, TCAT, program, and Framework provisions.                                                        |
| <b>Allocation and claim controls</b> | Allocation, ownership, transfer, retirement, and double-claiming controls support the quantity and claim. Alternative controls are documented when no registry exists.                         | Allocation records, contracts, invoices, attestations, serial identifiers, chain-of-custody records, and registry records where available.                 |
| <b>Exceptions and conclusion</b>     | Errors, estimates, corrections, unresolved limitations, reliance on prior assurance, and the scope and conclusion of any verification are documented.                                          | Correction logs, verifier workpapers, management representations, prior assurance statements, and the final verification statement.                        |

## Case Studies & Examples

Each case study is presented from the buyer's perspective and uses illustrative values solely to demonstrate how a pathway CI or quantified outcome is disaggregated and mapped. The values are not default emission factors and must be replaced with pathway-specific data under the methodology governing the transaction or claim.

### Case Study 1: Diverted Food-Waste Biomethane

A data center operator purchases 100,000 MMBtu of pipeline-injected biomethane produced by an anaerobic digester using diverted, source-separated food waste as a feedstock. The supplier reports an illustrative pathway CI of  $-95 \text{ gCO}_2\text{e/MJ}$ , consisting of  $+25 \text{ gCO}_2\text{e/MJ}$  of digestion, upgrading, leakage, and transport emissions and  $-120 \text{ gCO}_2\text{e/MJ}$  of avoided baseline methane. Approximately  $+65 \text{ gCO}_2\text{e/MJ}$  of use-phase biogenic  $\text{CO}_2$  is reported separately as a gross  $\text{CO}_2$  flux and is not added to the pathway CI.

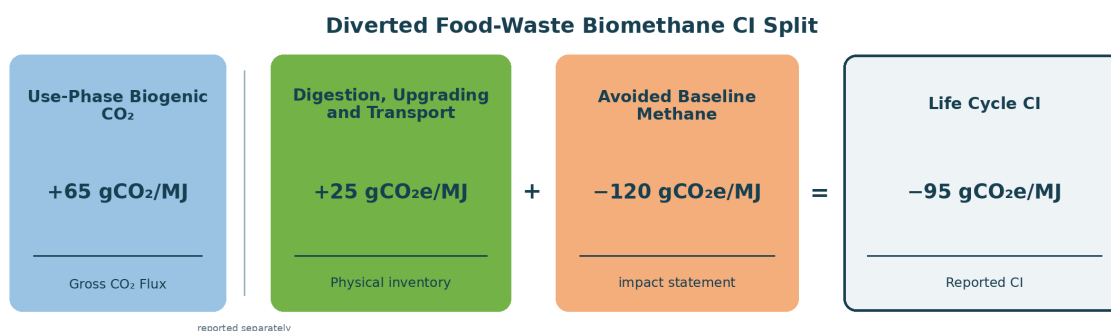


Figure 8: Illustrative buyer-perspective CI split for diverted food-waste biomethane. The reported CI is  $-95 \text{ gCO}_2\text{e/MJ}$ ; the  $+65 \text{ gCO}_2\text{e/MJ}$  use-phase biogenic  $\text{CO}_2$  is disclosed separately as a gross  $\text{CO}_2$  flux. Values are not default emission factors.

| Observed Outcome                                                                                      | Framework Treatment                                                                                             | Minimum Evidence                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><math>+65 \text{ gCO}_2\text{e/MJ}</math> use-phase biogenic <math>\text{CO}_2</math></b>          | Gross $\text{CO}_2$ Flux associated with the buyer's applicable scope                                           | Purchased quantity, carbon content, combustion or oxidation data, and applicable LSR life cycle information                                             |
| <b><math>+25 \text{ gCO}_2\text{e/MJ}</math> digestion, upgrading, leakage, energy, and transport</b> | Buyer's relevant Scope 3 emissions; corresponding supplier emissions remain in the supplier's applicable scopes | Metered energy, methane leakage, operating records, transport distance, and emission factors                                                            |
| <b><math>-120 \text{ gCO}_2\text{e/MJ}</math> avoided baseline methane</b>                            | Impact statement; not netted against the physical inventory                                                     | Documented diversion baseline, waste composition, methane-generation potential, collection and destruction assumptions, and causal link to the purchase |
| <b><math>-95 \text{ gCO}_2\text{e/MJ}</math> pathway CI</b>                                           | Reported pathway CI; gross biogenic $\text{CO}_2$ is disclosed separately and is not added to this result       | LCA model and version, project inputs, calculation file, and independent review where available                                                         |
| <b>Contractual biomethane attributes</b>                                                              | Separate market-based inventory when permitted by the governing standard                                        | Contract, chain-of-custody records, quantity match, registry issuance and retirement, and controls against duplicate use                                |

## Case Study 2: BECCS With Bundled or Separately Sold Removal

An industrial heat user purchases biofuel from a facility that captures and geologically stores biogenic CO<sub>2</sub>. The fuel has +30 gCO<sub>2</sub>e/MJ of production and transport emissions, and the facility stores –80 gCO<sub>2</sub>e/MJ of biogenic CO<sub>2</sub>. Approximately +60 gCO<sub>2</sub>/MJ of use-phase biogenic CO<sub>2</sub> is reported separately as a gross CO<sub>2</sub> flux and is not added to the pathway CI.

If the removal stays bundled with the fuel, the buyer receives a –50 gCO<sub>2</sub>e/MJ result. If the removal is issued and sold separately, the fuel result is +30 gCO<sub>2</sub>e/MJ and the –80 gCO<sub>2</sub>e/MJ removal belongs exclusively to the removal purchaser.

**Treatment A — Bundled removal. The product documentation conveys the BECCS removal bundled with the fuel.**

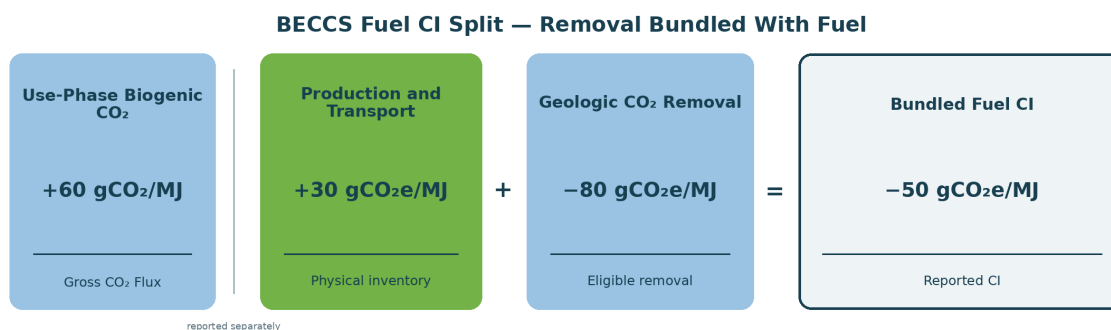


Figure 9: Illustrative BECCS fuel CI when the geologic removal remains bundled with the fuel. The +60 gCO<sub>2</sub>/MJ use-phase biogenic CO<sub>2</sub> is disclosed separately as a gross CO<sub>2</sub> flux.

| Observed Outcome                                                  | Framework Treatment                                                                                                              | Minimum Evidence                                                                                                                                           |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| +60 gCO <sub>2</sub> /MJ use-phase biogenic CO <sub>2</sub>       | Gross CO <sub>2</sub> Flux associated with the buyer's applicable scope                                                          | Fuel quantity, carbon content, use data, and applicable LSR life cycle information                                                                         |
| +30 gCO <sub>2</sub> e/MJ production and transport                | Buyer's relevant Scope 3 emissions                                                                                               | Facility energy, process, and transport data                                                                                                               |
| –80 gCO <sub>2</sub> e/MJ geologic removal conveyed with the fuel | Eligible Scope 3 removal only where all LSR traceability, life cycle, monitoring, permanence, and reporting requirements are met | Capture meter data, carbon balance, transport and storage records, monitoring plan, chain of custody, and confirmation that no separate removal was issued |
| –50 gCO <sub>2</sub> e/MJ bundled fuel CI                         | Reported pathway CI; the gross biogenic CO <sub>2</sub> flux remains separately disclosed                                        | LCA methodology, certification records, and buyer transaction documents                                                                                    |

**Treatment B — Removal sold separately.** The facility issues the  $-80 \text{ gCO}_2\text{e/MJ}$  equivalent as a separate removal instrument. The fuel buyer reports  $+30 \text{ gCO}_2\text{e/MJ}$  and may not claim the BECCS removal.

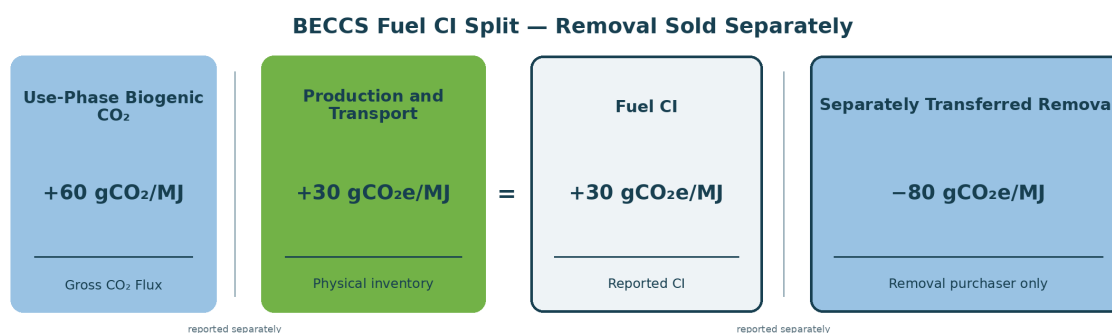


Figure 10: Illustrative BECCS treatment when the geologic removal is issued and sold separately. The fuel CI excludes the transferred  $-80 \text{ gCO}_2\text{e/MJ}$  removal, and the  $+60 \text{ gCO}_2\text{e/MJ}$  use-phase biogenic CO<sub>2</sub> is disclosed separately as a gross CO<sub>2</sub> flux.

| Observed Outcome                                                  | Framework Treatment                                                                                                  | Minimum Evidence                                                                                                                           |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>+60 gCO<sub>2</sub>/MJ use-phase biogenic CO<sub>2</sub></b>   | Gross CO <sub>2</sub> Flux associated with the fuel buyer's applicable scope                                         | Fuel quantity, carbon content, use data, and applicable LSR life cycle information                                                         |
| <b>+30 gCO<sub>2</sub>e/MJ production and transport</b>           | Fuel buyer's relevant Scope 3 emissions                                                                              | Facility energy, process, and transport data                                                                                               |
| <b>-80 gCO<sub>2</sub>e/MJ geologic removal issued separately</b> | Excluded from the fuel CI claims; reported only by the removal purchaser under the governing rules                   | Registry issuance, serial identifier, transfer and retirement, capture and storage records, permanence evidence, and contractual ownership |
| <b>+30 gCO<sub>2</sub>e/MJ fuel CI</b>                            | Reported pathway CI received by the fuel buyer; the gross biogenic CO <sub>2</sub> flux remains separately disclosed | Product documentation showing removal of the transferred attribute and consistent methodology and functional unit                          |
| <b>No overlap between product and removal claims</b>              | Allocation and claim control requirement                                                                             | Reconciled facility carbon balance, fuel records, removal registry records, and independent verification                                   |

### Case Study 3: Biogenic Carbon Storage in Materials

A packaging company purchases one tonne of short-lived bio-based polymer. Its product carbon footprint reports  $+1,200 \text{ kgCO}_2\text{e/t}$  for feedstock production, conversion, and transport. The polymer contains  $2,500 \text{ kgCO}_2\text{e/t}$  of biogenic carbon, shown transparently as a  $-2,500$  inflow and corresponding  $+2,500$  end-of-life release. With stable annual sales, the LSR annual net product-carbon-stock change is zero.<sup>5</sup>

<sup>5</sup> See previous note regarding suggested changes in GHG reporting that would enable companies to value the benefit of bio-based materials over fossil-based materials.

A separate consequential analysis estimates  $-1,800 \text{ kgCO}_2\text{e/t}$  from displacement of a functionally equivalent fossil-based polymer. The gross carbon flows cancel, and the illustrative impact-adjusted outcome is  $-600 \text{ kgCO}_2\text{e/t}$ .

### Short-Lived Bio-Based Polymer Carbon-Flow Split

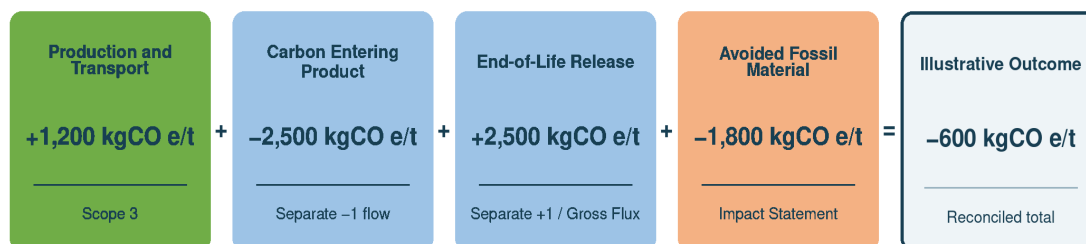


Figure 11: Illustrative carbon-flow split for a short-lived bio-based polymer. The  $-1/+1$  flows are disclosed separately and are not themselves an impact (not shown); the substitution impact is calculated against a fossil-material counterfactual.

| Observed Outcome                                                       | Framework Treatment                                                                                                                                                             | Minimum Evidence                                                                                                                        |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>+1,200 kgCO<sub>2</sub>e/t production and transport</b>             | Buyer's relevant Scope 3 emissions                                                                                                                                              | Product carbon footprint, supplier activity data, allocation, energy, and transport records                                             |
| <b>-2,500 kgCO<sub>2</sub>e/t biogenic carbon entering the product</b> | Supplemental $-1$ carbon-flow disclosure outside the physical inventory and impact statement; not described as LSR product carbon storage                                       | Biogenic carbon content, origin, mass balance, conversion yield, and product quantity                                                   |
| <b>+2,500 kgCO<sub>2</sub>e/t corresponding end-of-life release</b>    | Supplemental $+1$ flow and applicable Gross CO <sub>2</sub> Flux associated with the relevant scope; physical non-CO <sub>2</sub> end-of-life emissions remain in the inventory | Product lifetime, end-of-life pathway, oxidation or decomposition, recycling, and disposal data                                         |
| <b>Zero annual net product carbon storage under stable sales</b>       | No positive LSR product-carbon-storage result under Requirement 24                                                                                                              | Annual product-pool inflows and outflows, product half-life, recycling and reuse, and complete life cycle information                   |
| <b>-1,800 kgCO<sub>2</sub>e/t avoided fossil-material production</b>   | Impact statement; separate from the $-1/+1$ disclosure and physical inventory                                                                                                   | Functionally equivalent fossil counterfactual, market response, consistent boundary, uncertainty analysis, and controls against overlap |
| <b>-600 kgCO<sub>2</sub>e/t illustrative impact-adjusted outcome</b>   | Transparent reconciliation only; components remain in their separate Framework categories                                                                                       | Calculation workbook demonstrating that $-2,500$ and $+2,500$ cancel and that the substitution impact is independently quantified       |

## Case Study 4: Regenerative Agricultural Practices

A transportation company purchases biofuel produced using corn from farms implementing a documented USDA NRCS whole-farm regenerative plan. The pathway includes +20 gCO<sub>2</sub>e/MJ of processing and transport emissions, +28 gCO<sub>2</sub>e/MJ of agricultural emissions after the practices are implemented, and an eligible –8 gCO<sub>2</sub>e/MJ soil-carbon removal, producing an illustrative pathway CI of +40 gCO<sub>2</sub>e/MJ. Approximately +70 gCO<sub>2</sub>/MJ of use-phase biogenic CO<sub>2</sub> is reported separately as a gross CO<sub>2</sub> flux and is not added to the pathway CI. Agricultural emissions were +34 gCO<sub>2</sub>e/MJ before implementation; the 6 gCO<sub>2</sub>e/MJ reduction is already reflected in the lower physical Scope 3 result and is not reported again as an impact.

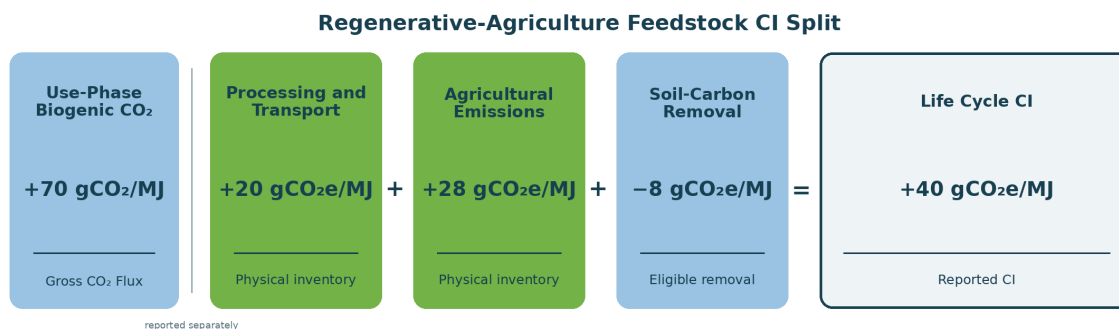


Figure 12: Illustrative buyer-perspective CI split for a pathway using regenerative agricultural practices. The reported CI is +40 gCO<sub>2</sub>e/MJ; the +70 gCO<sub>2</sub>/MJ use-phase biogenic CO<sub>2</sub> is disclosed separately as a gross CO<sub>2</sub> flux. The reduction from 34 to 28 gCO<sub>2</sub>e/MJ is already reflected in Scope 3 and is not reported again as an impact.

| Observed Outcome                                                   | Framework Treatment                                                                                                  | Minimum Evidence                                                                                                                                          |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Agricultural emissions decline from 34 to 28 gCO <sub>2</sub> e/MJ | Lower physical Scope 3 emissions for the buyer; no duplicate impact claim                                            | Farm and field identity, historical and current practices, input and yield records, emission factors or approved model, and consistent reporting boundary |
| –8 gCO <sub>2</sub> e/MJ net soil-carbon gain                      | Optional Scope 3 land-management removal only when all LSR requirements are met                                      | Field- or farm-level traceability where available, baseline, sampling or model data, monitoring, uncertainty, permanence, and allocation                  |
| +20 gCO <sub>2</sub> e/MJ processing and transport                 | Buyer's relevant Scope 3 emissions                                                                                   | Facility energy and process data, distance, mode, loss factor, and delivery region                                                                        |
| +70 gCO <sub>2</sub> /MJ use-phase biogenic CO <sub>2</sub>        | Gross CO <sub>2</sub> Flux associated with the applicable scope                                                      | Fuel quantity, carbon content, use data, and complete upstream life cycle information                                                                     |
| +40 gCO <sub>2</sub> e/MJ pathway CI                               | Reported pathway CI; the gross biogenic CO <sub>2</sub> flux is disclosed separately and is not added to this result | CI model and version, NRCS practice documentation, land-model output, and calculation reconciliation                                                      |

## FAQ

### How to report fuels with two different carbon intensities?

The reporting entity should use the CI score that most closely represents the fuel procured and the boundary of the report. Preference should be given to a current, pathway-specific, independently verified score that reflects the relevant feedstock, production technology, geography, transport route, and delivery point. Where one available score includes transport emissions and another does not, the score that includes the applicable transport penalty will generally align more closely with value-chain reporting under GHG Protocol and SBTi. The entity should not select between valid scores solely to obtain the lowest result; it should document the model, version, boundary, and reason for selection and apply that approach consistently.

### Preventing Double Counting in Methane-to-CO<sub>2</sub> Pathways

*If captured methane is converted to CO<sub>2</sub> and subsequently used or embedded in a downstream product, can a company claim both the avoided methane benefit and the CO<sub>2</sub> capture benefit?*

Where methane is converted to CO<sub>2</sub> and that CO<sub>2</sub> is subsequently used, embedded in a product, or captured, the avoided-methane claim should be limited to the net difference in climate forcing between the methane baseline and the resulting CO<sub>2</sub> pathway, so that the same GHG benefit is not counted again through downstream use, capture, or product claims. Any additional claim associated with the subsequent CO<sub>2</sub> use or capture should be accounted for separately.

### How the Impact Accounting Framework Addresses Additionality

The Framework does not establish a single additionality test or prescribe one counterfactual baseline for every LCA. Its purpose is to map results from credible LCA methodologies into a consistent reporting architecture, while allowing the underlying model and eligibility rules to reflect the user's reporting purpose. Users must therefore apply and disclose the additionality, baseline, and regulatory-surplus requirements of the governing program or standard, such as RED, LCFS, ISO, GHG Protocol, SBTi, TCAT. Where no external rule applies, the user should state the baseline, explain why it is credible, and report the impact separately from the physical inventory. A quantified impact under this Framework does not, by itself, establish eligibility for a target or claim.

## **How does the Framework treat mitigation addressing residual or currently unabatable emissions?**

Future GHG Protocol and SBTi guidance may provide greater clarity on how companies should document actions addressing residual or currently unabatable emissions. Until that guidance is available, the Framework can map and disclose the action but cannot determine its eligibility for a GHG Protocol- or SBTi-recognized target claim.

## **Does the Framework require companies to implement every proposed disclosure immediately?**

No company can implement every proposed disclosure immediately, particularly where existing inventories still rely heavily on spend-based estimates. A tiered or phased approach can preserve comparability while allowing first movers to use activity-based market instruments without making the most advanced reporting package the minimum entry requirement.

## **How should companies compare pathways with different data quality and traceability?**

Neither the LSR Standard nor the developing AMI architecture yet establishes a universal hierarchy for comparing different dimensions of integrity and performance. For example, one SFCM supplier may offer full supply-area traceability but a higher life cycle CI, while another uses a jurisdictional approach and reports a lower CI. Decision-makers need disclosure of both dimensions and a clear rule for when a data-quality or traceability advantage outweighs an absolute emissions difference.

## Appendices

### Appendix A: Interpretation of GHGP SBTi and TCAT Guidance

#### Takeaways from the Actions and Market Instruments Process

GHGP is currently considering whether and how to incorporate reporting of broader emissions impacts alongside traditional attributional accounting. However, this work is not expected to be finalized until 2028. In the interim, companies and markets are already making investment, procurement, and reporting decisions, creating a need for approaches that can accommodate broader impact information without conflating it with the corporate inventory. This discussion is particularly relevant for SFCM, where climate impacts extend beyond direct emissions to broader system effects. Incorporating relevant reporting categories will allow companies to better reflect the full emissions implications of fuel and feedstock choices across all scopes.

GHGP's AMI proposal would also make contractual procurement visible through a separate market-based inventory, while CNZS V2 permits eligible energy and commodity certificates to support target implementation. These developments create a major opportunity for market-based procurement of SFCM alongside physical procurement. They also make the Impact Accounting Framework necessary: companies need a consistent way to distinguish physical emissions, contractual attributes, and consequential effects while reflecting the full emissions implications of fuel and feedstock choices across all scopes.

GHG Protocol's March 2026 AMI Phase 1 Progress Update proposes a multi-statement reporting structure. Four statements are under consideration. Statements 1 and 2 would use attributional accounting, Statement 3 would use consequential accounting, and Statement 4 would report non-GHG key performance indicators. The proposal is intended to supplement, not replace, the physical GHG inventory, and key questions—including whether statements are required or optional and whether they overlap—remain unresolved.

**Figure ES-1. Reporting statements under consideration**

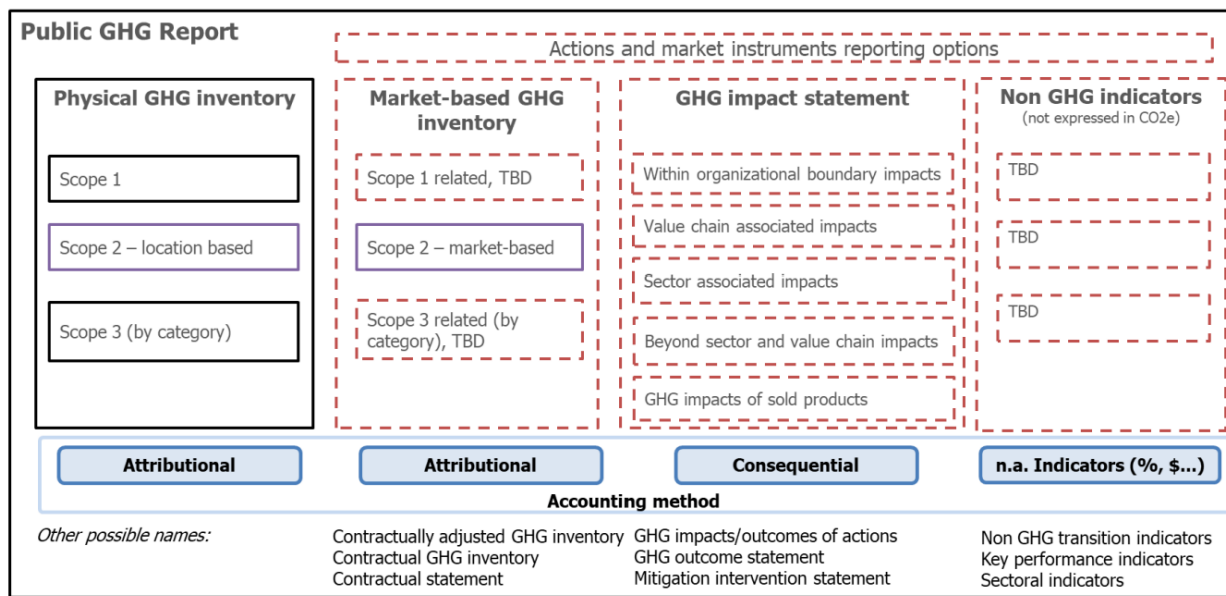


Figure 4: Reporting statements under consideration in the March 2026 AMI Phase 1 Progress Update

1. Statement 1: Physical GHG Inventory – Statement 1 provides a comprehensive account of the reporting entity's direct emissions & removals.
2. Statement 2: Contractual GHG Inventory – A proposed attributional statement that would apply eligible contractual instruments and other market-based methods while preserving a separate physical inventory.
3. Statement 3: GHG impact statement – A proposed consequential statement that would provide structured disclosure for reporting the consequential impacts of actions undertaken by the reporting company, both within and beyond its value chain. Unlike the physical and contractual inventories (Statements 1 and 2), which are grounded in attributional accounting, this statement introduces consequential accounting. These are expected to be reported separately across defined categories currently under exploration, including:
  - Within organizational boundary impacts
  - Value chain associated impacts
  - Sector associated impacts
  - Beyond sector and value chain impacts
  - GHG impacts of sold productsSeparating Statement 3 from the attributional inventories would allow avoided emissions, mitigation outcomes, and other intervention-driven effects to be disclosed without deducting them from Scope 1, Scope 2, or Scope 3.
4. Statement 4: Non-GHG Metric Transition Indicators – Statement 4 captures impacts beyond GHG emissions. These metrics provide additional context on decarbonization strategy, implementation, and financial alignment.

## Takeaways from the Land Sector and Removals Standard and Guidance

GHG Protocol's Land Sector and Removals Standard and Guidance (LSR), published in June 2026, apply to biomass feedstocks and CO<sub>2</sub>-removal technologies. The LSR distinguishes between emissions that are reported in the physical inventory vs. separately reported categories such as gross CO<sub>2</sub> fluxes, land carbon leakage, land use, and product carbon storage.

### Physical Inventory Accounting Categories

The physical GHG inventory reports emissions and eligible removals within the reporting company's organizational and value-chain boundaries. The LSR Standard specifies the applicable accounting categories and data requirements; it does not convert all land-related metrics or life cycle effects into fungible inventory reductions.

| Physical GHG inventory |                                                   |                                        |                                                        |                                      |                                         |                                          |
|------------------------|---------------------------------------------------|----------------------------------------|--------------------------------------------------------|--------------------------------------|-----------------------------------------|------------------------------------------|
| Accounting category    | Emissions                                         |                                        |                                                        |                                      |                                         | Removals                                 |
|                        | Fossil fuel and industrial emissions <sup>a</sup> | Land emissions                         |                                                        |                                      |                                         | Removals                                 |
| Accounting subcategory |                                                   | Land use change emissions <sup>b</sup> | Land management net biogenic CO <sub>2</sub> emissions | Land management production emissions | Biogenic product emissions <sup>c</sup> | Land management CO <sub>2</sub> removals |
| Scope 1                |                                                   |                                        |                                                        |                                      |                                         |                                          |
| Scope 2                |                                                   |                                        |                                                        |                                      |                                         |                                          |
| Scope 3                |                                                   |                                        |                                                        |                                      |                                         |                                          |
| Reference              | Corporate & Scope 3 Standards                     | Chapter 7                              | Chapter 9                                              | Chapter 10                           | Chapter 11                              | Chapter 12 & 13                          |

Required categories
  Optional categories
  Not applicable

Figure 5: Physical inventory accounting categories and subcategories from Land Sector and Removals Standard and Guidance

1. **Fossil Fuel and Industrial Emissions** – Tracks traditional emissions sources (stationary combustion, mobile combustion, fugitive, and process emissions) that do not fall under “land emissions.” These sources are often included in the life cycle of land management production. This may include emissions from fossil fuels used in on-site farm machinery, inputs like fertilizer, HFCs and PFCs, on-site wastewater management, and purchased energy. If data allows, it is preferable that these emissions are reported as “Fossil Fuel and Industrial Emissions.”
2. **Land Emissions** – Tracks emissions from land management and use of biogenic products. This includes emissions from land use change, land management net biogenic CO<sub>2</sub> using stock change accounting, land management production, and biogenic products. This may also include traditional emissions sources where the data requirements are not met to record them in “Fossil Fuel and Industrial Emissions.” Biogenic CO<sub>2</sub> from combustion is reported here if the company cannot satisfy upstream data requirements.
3. **Removals (Optional)** – Tracks the net transfer of CO<sub>2</sub> from the atmosphere to non-atmospheric pools. Includes carbon capture and sequestration (CCS) of biogenic or atmospheric carbon. Reporting is optional but requires strict adherence to permanence and traceability rules.

### Additional Accounting Categories (Separate from Physical Inventory)

The LSR Standard also requires or permits several metrics to be reported separately from the physical inventory. These categories are decision-useful but are not interchangeable with Scope 1, Scope 2, or Scope 3 emissions and removals. They include biogenic product CO<sub>2</sub> emissions reported as gross CO<sub>2</sub> fluxes when the applicable life cycle-data conditions are met.

| Additional accounting categories |                 |                     |                 |                                                         |                                               |                                              |                                 |                                                       |
|----------------------------------|-----------------|---------------------|-----------------|---------------------------------------------------------|-----------------------------------------------|----------------------------------------------|---------------------------------|-------------------------------------------------------|
| Accounting category              | Land use        | Land carbon leakage | Total emissions | Gross CO <sub>2</sub> fluxes                            |                                               |                                              | Product carbon storage          | Reversals                                             |
| Accounting subcategory           | Land occupation |                     |                 | Biogenic product CO <sub>2</sub> emissions <sup>c</sup> | Gross biogenic land CO <sub>2</sub> emissions | Gross biogenic land CO <sub>2</sub> removals | Biogenic product carbon storage | Reversals of land management CO <sub>2</sub> removals |
| Scope 1                          |                 |                     |                 |                                                         |                                               |                                              |                                 |                                                       |
| Scope 2 <sup>d</sup>             |                 |                     |                 |                                                         |                                               |                                              |                                 |                                                       |
| Scope 3                          |                 |                     |                 |                                                         |                                               |                                              |                                 |                                                       |
| Reference                        | Chapter 8       | Chapter 8           | Chapter 20      | Chapter 11                                              | Chapter 9                                     | Chapter 13                                   | Chapter 15                      | Chapter 12                                            |

Required categories
  Optional categories
  Not applicable

Figure 6: Additional accounting categories and subcategories from Land Sector and Removals Standard and Guidance

1. Land Use – Reports agricultural land owned or controlled by the company, in hectares.
2. Land Carbon Leakage – Reports modeled land-use impacts from displaced food or feed production, including crop-based fuels and feedstocks.
3. Total Emissions – The sum of the physical GHG Inventory” categories plus “Land Carbon Leakage.”
4. Gross CO<sub>2</sub> Fluxes – A carbon flux is a flow of CO<sub>2</sub>, or its constituent carbon, from one carbon pool to another. A gross flux shows each one-directional transfer separately rather than netting opposing flows, which makes the movement of biogenic or technologically removed carbon visible even when it does not change the net physical inventory result (LSR Standard, Glossary, p. 119).

This category reports biogenic product CO<sub>2</sub> emissions when the LSR requirements are met; otherwise applicable emissions remain in the physical inventory. One-directional biogenic or technological carbon-dioxide-removal (TCDR) carbon flows are reported here.

5. Product Carbon Storage – Reports annual net increases in biogenic or TCDR-based carbon in sold products during the use stage. This includes where biogenic or atmospheric carbon is used to make materials, where products are recycled and reused, and certain forms of carbon storage (e.g., biogenic CO<sub>2</sub> stored in cement).
6. Reversals – Tracks losses of removals that were previously reported by the company. This occurs when the removal is no longer in the company’s value chain.

## Takeaways from SBTi Corporate Net-Zero Standard Version 2.0

SBTi published the final Corporate Net-Zero Standard Version 2.0 in June 2026. Validation against Version 2.0 is expected to open in early 2027, while Version 1 remains available for new target submissions through the end of 2027.

The revised Standard establishes an implementation hierarchy that prioritizes reductions as close to the emissions source as possible. It begins with direct actions in company operations and value chains and allows activity-pool and sector-level actions where direct decarbonization is not yet sufficiently feasible. Market instruments such as energy-attribute and commodity certificates using mass-balance or book-and-claim systems may support these actions, subject to integrity criteria. The final Standard also requires additionality for projects, program-level controls against double counting for market instruments, and recognized sustainability criteria for bio-based feedstocks. Detailed rules for some instruments and recognition processes remain forthcoming.

#### **Recommendation to SBTi and Other Target-Setting Organizations**

Target-setting organizations such as SBTi will need to recognize and appropriately value new accounting categories associated with SFCM. Companies rely on SFCM technologies to meet net-zero pathways, supported by a broader ecosystem of regulatory and non-regulatory frameworks that extend beyond and in many cases take priority over SBTi and voluntary target systems. Accounting and target-setting organizations should therefore reward decisions based on the complete life cycle performance of molecules, not only the emissions that happen to fall within one reporting scope. Alignment between GHGP reporting guidance, complementary frameworks such as the Impact Accounting Framework, and SBTi will be essential to create credible incentives for the highest-impact climate solutions. To achieve this alignment, target frameworks should also allow a company whose verified, eligible removals exceed its residual emissions to report a below-zero or net-negative outcome, while preserving separate gross disclosure of emissions and removals, rather than truncating performance at zero.

### **Takeaways from TCAT Guidance**

TCAT's Mitigation Action Accounting and Reporting Guidance (MAARG) and Target Accounting and Reporting Guidance (TARG) are designed to complement existing corporate inventories with transparent, third-party-assurable reporting of mitigation actions and target progress. For this Framework, TCAT is most relevant to the design of the impact calculation, documentation of the intervention and baseline, and the evidence needed for assurance. TCAT does not replace the GHGP inventory or determine where a physical emission belongs; it provides an additional reference for quantifying and substantiating the action and claim. Because Version 1.1 guidance became available in 2026 and may continue to evolve, users should identify the version applied and revisit the analysis when TCAT publishes updates. (TCAT, MAARG and TARG V1.1, 2026.)

## Appendix B: Overview of the Accounting and Target Setting Ecosystem

The Framework operates within a broader ecosystem of corporate inventories, target-setting standards, life cycle methodologies, assurance standards, and certification systems. The table below summarizes how the principal systems relate to one another and to the Framework. Status information reflects materials available as of September 2026.

| Framework or System                                                | Current Status                                                                                                                                                     | Primary Function                                                                                                                                               | Relationship to the Impact Accounting Framework                                                                                                                                           |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GHG Protocol Corporate and Scope 3 Standards</b>                | Published and currently applicable. A consolidated GHG Protocol–ISO corporate standard is scheduled for public consultation in Q2 2027 and publication in Q4 2028. | Attributional accounting for organizational Scope 1, Scope 2, and Scope 3 emissions.                                                                           | Provides the inventory structure into which attributional CI components are mapped. The Framework separately identifies market-based, land-sector, removal, and consequential categories. |
| <b>GHG Protocol Land Sector and Removals Standard and Guidance</b> | Version 1.1 published in June 2026; effective January 1, 2027.                                                                                                     | Accounting for agricultural land emissions, CO <sub>2</sub> removals, gross CO <sub>2</sub> fluxes, land use, land carbon leakage, and product carbon storage. | Supplies the land-sector categories, traceability rules, and safeguards used by the Framework.                                                                                            |
| <b>GHG Protocol Actions and Market Instruments</b>                 | Under development as part of the consolidated corporate standard; draft consultation planned for Q2 2027.                                                          | Proposes separate reporting of physical emissions, market-based emissions, and the GHG impacts of corporate actions.                                           | Provides the emerging corporate architecture most closely aligned with the Framework's separation of physical, contractual, and consequential results.                                    |
| <b>SBTi Corporate Net-Zero Standard Version 2.0</b>                | Published in June 2026; transition to Version 2.0 implementation and validation is underway.                                                                       | Corporate target setting, validation, implementation hierarchy, and conditions for recognized actions and instruments.                                         | Determines whether inventory results, actions, or instruments can support SBTi targets; it does not replace the underlying inventory or CI mapping.                                       |
| <b>TCAT MAARG and TARG</b>                                         | Version 1.1 guidance available in 2026; users should identify the version applied as the guidance evolves.                                                         | Third-party-assurable accounting and reporting of mitigation actions, baselines, attribution, and target progress.                                             | Provides a complementary reference for impact calculations, baseline selection, documentation, and assurance rather than physical-inventory classification.                               |
| <b>ISO 14040/14044/14067 and ISO 14064 series</b>                  | Published international standards. ISO and GHG Protocol are developing harmonized, co-branded corporate and product-level standards.                               | Life cycle assessment, product carbon footprints, organizational inventories, verification, and assurance competence.                                          | Provides methodological and assurance foundations used throughout the Framework.                                                                                                          |

| Framework or System                      | Current Status                                                                                                                       | Primary Function                                                                               | Relationship to the Impact Accounting Framework                                                                                                                     |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regulatory LCA and certification systems | Program-specific rules are in force and updated periodically (e.g., CARB LCFS/CA-GREET, GREET, RED, FuelEU Maritime, ISCC, and RSB). | Pathway CI calculation, eligibility, chain of custody, certification, and compliance evidence. | May provide pathway-specific CI values and evidence. Companies must assess use-case fit, disclose the methodology and version, and supplement gaps where necessary. |

## Appendix C: Glossary and Definitions

**Attributional accounting.** Quantifies total GHG emissions, removals, and other categories within a defined inventory boundary and period. Also called inventory accounting. (GHG Protocol, AMI Phase 1 Progress Update, p. 17)

**Carbon intensity (CI).** GHG emissions associated with a product or activity per functional unit, such as gCO<sub>2</sub>e/MJ for fuel. The stated boundary and included life cycle stages determine what the result represents. (Framework usage; IEA, Delivering Sustainable Fuels)

**GHG impact statement.** A proposed separate statement for consequential impacts of corporate actions, including emissions avoided, reduced, or removed inside or outside the value chain. (GHG Protocol, AMI Phase 1 Progress Update, pp. 5, 38-39)

**Land carbon leakage.** Modeled land-use-related GHG impacts from displaced food or feed production caused by specified high-leakage-risk activities; reported separately from the physical inventory. (GHG Protocol, LSR Standard, pp. 45-47)

**Market instrument.** A contractual arrangement that enables environmental attributes or mitigation outcomes to be conveyed between parties and applied under an accounting or target framework. (SBTi Corporate Net-Zero Standard V2.0, Glossary)

**Physical traceability.** Traceability through an eligible chain-of-custody model that links reported emissions, removals, or product characteristics to the relevant physical origin or pathway. (GHG Protocol, LSR Standard, pp. 19-28)

**Sustainable fuels, chemicals, and materials (SFCM).** Bio-based, synthetic, and hydrogen-based fuels, chemicals, and materials evaluated across the full life cycle and intended to reduce GHG emissions, displace fossil-based alternatives, and advance broader environmental and economic benefits. (Molecule Group; Framework usage)

**BECCS.** Captures and permanently stores CO<sub>2</sub> from processes in which biomass is converted into fuels or used to generate energy; because biomass absorbs CO<sub>2</sub> while growing, qualifying pathways can remove CO<sub>2</sub> from the atmosphere. (IEA Glossary)

**Consequential accounting.** Estimates system-wide changes in emissions or removals caused by a project, action, or intervention relative to a baseline in which it did not occur. (GHG Protocol, AMI Phase 1 Progress Update, p. 17)

**Gross CO<sub>2</sub> fluxes.** A separate LSR reporting category for specified one-directional biogenic or technological CO<sub>2</sub> flows, including biogenic product CO<sub>2</sub> emissions when complete life cycle land information is not reported. (GHG Protocol, LSR Standard, pp. 14, 57-61)

**Land emissions.** The LSR physical-inventory category covering land-use change emissions, land-management net biogenic CO<sub>2</sub> emissions, land-management production emissions, and qualifying biogenic product emissions. (GHG Protocol, LSR Standard, Figure 4.1, p. 14)

**Mitigation action.** A GHG-related activity that produces a measurable, verifiable, additional, and attributable reduction or removal relative to what would have occurred without the activity. (TCAT, Target Accounting and Reporting Guidance, p. 21)

**Product carbon storage.** The annual net increase of biogenic or TCDR-based carbon physically contained in sold products during use, recycling, and reuse; reported separately and not fungible with Scope 3 emissions or removals. (GHG Protocol, LSR Standard, pp. 84-87)

## Anticipated Future of the Framework

The Impact Accounting Framework is intended to remain a living document. Near-term developments are expected from GHG Protocol's Actions and Market Instruments process, implementation of the Land Sector and Removals Standard, and revisions to SBTi's Corporate Net-Zero Standard. Changes to regulatory LCA, certification, registry, and chain-of-custody systems will be ongoing. These developments may affect reporting categories, claims, baselines, traceability requirements, and the treatment of consequential impacts. Molecule Group's impact accounting workstream will review the Framework on a continuing basis, consult participating stakeholders, and issue versioned updates when changes are needed. Each update should identify the provisions changed, the reason for the change and its effective date.