

CHAPTER 1.

Introduction

This chapter provides background and an introduction for the Land Sector and Removals Standard and Guidance, including information on its intended audience and how to navigate the Standard and Guidance.

The global scientific consensus makes it clear that the world needs to reduce greenhouse gas (GHG) emissions and remove carbon dioxide (CO₂) from the atmosphere to avoid a 1.5°C (or even 2°C) rise in global average temperature compared to pre-industrial levels.

The Intergovernmental Panel on Climate Change (IPCC) identifies pathways to avoid dangerous levels of climate change that require significant and rapid emissions reductions across all sectors. Globally, the agriculture, forestry, and other land use sector, or land sector for short, is responsible for approximately 22 percent of annual net anthropogenic GHG emissions.¹ Due to a combination of natural and anthropogenic factors, the global land sink currently removes about 30 percent of annual anthropogenic net CO₂ emissions across all sectors.² 1.5°C pathways require additional CO₂ removal on the scale of 100 billion to 1 trillion tonnes over the course of the 21st century.³ Both land sector mitigation approaches and new CO₂ removal technologies will play an important role in reducing, halting, and ultimately reversing the accumulation of GHGs in the atmosphere.⁴

1.1 About the Greenhouse Gas Protocol

The Greenhouse Gas Protocol (GHG Protocol) is a multi-stakeholder partnership of businesses, non-governmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). Established in 1998, the mission of the GHG Protocol is to develop internationally accepted GHG accounting and reporting standards, guidance, and tools, and promote their adoption to achieve a net-zero emissions economy worldwide. The GHG Protocol is an accounting and reporting standard that facilitates participation in voluntary and mandatory GHG programs, used at companies' and programs' own risk.

1.2 About the Land Sector and Removals Standard, Guidance, and Executive Summary

Table 1.1 Comparison table of the use case of each document

Executive Summary	Land Sector and Removals Standard	Land Sector and Removals Guidance
Provides a high-level summary of the content and structure of the <i>Standard and Guidance</i> for non-technical users.	Establishes requirements and recommendations to account for, report, and track GHG emissions, CO ₂ removals, and other relevant metrics that reflect anthropogenic activities in the land sector, as well as other CO ₂ removal technologies.	Complements the <i>Standard</i> by providing comprehensive guidance on implementing the requirements and recommendations in the <i>Standard</i> , as well as examples, case studies, and calculation guidance.

This *Standard* builds upon and supplements the GHG Protocol's *A Corporate Accounting and Reporting Standard* (Revised Edition) (hereinafter the *Corporate Standard*) and *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* (hereinafter the *Scope 3 Standard*), which provide the foundation for producing a corporate GHG inventory for all sectors.

This *Standard* provides land sector-specific requirements and guidance and should be used in combination with the *Corporate Standard* and *Scope 3 Standard*. This *Standard* can also be used with the *Product Life Cycle Accounting and Reporting Standard* (hereinafter referred to as the *Product Standard*) and includes elements related to and aligned with *The GHG Protocol for Project Accounting* (hereinafter the *Project Protocol*). This *Standard* supersedes GHG Protocol's previous land sector-specific and removals-specific requirements and guidance, such as in the *Agricultural Guidance*.

The *Land Sector and Removals Standard* was developed through an international multi-stakeholder governance process between 2020 and 2025. Guided by the GHG Protocol's Independent Standards Board, an Advisory Committee, Technical Working Group, pilot testing companies and supporting partners, and public reviewers, this *Standard* is the result of the voluntary engagement and collaboration of hundreds of companies, NGOs, scientists, and other experts from around the world. These stakeholders were motivated by a common recognition: the need for a clear and standardized framework to account for land emissions, CO₂ removals, and other impacts on the climate caused by human activities on land previously underreported or excluded from companies' GHG inventories.

Following the *Corporate Standard* and *Scope 3 Standard*, the primary focus of the *Land Sector and Removals Standard* is annual, entity-level GHG inventory accounting, thereby differentiating it from the *Product Standard*. This *Standard* is designed to ensure the accuracy, completeness, consistency, relevance, transparency, permanence, and conservativeness of companies' annual GHG inventories.

This *Standard* provides requirements and recommendations on how to account for land emissions, removals, and other metrics from products produced by the reporting company as part of their scope 1 inventory, or products purchased or sold by the reporting company as part of their scope 3 inventory. The requirements and recommendations in this *Standard* are also applicable to product life cycle inventories for land sector products and products with removals, that are prepared following the *Product Standard*.

This *Standard* does not provide requirements or guidance on project accounting, GHG credit certification, or GHG credit verification (see the *Project Protocol* for details), but does include some requirements on evaluating the impacts of actions to inform decision-making and avoiding double counting with GHG credits.

1.3 Structure of the Standard

Both the *Land Sector and Removals Standard* and *Guidance* are organized into four overarching parts for a company to follow when developing a GHG inventory that includes information on land sector activities and/or removals (Figure 1.1):

- **Part 1. Define business goals and inventory design** provides core requirements related to the principles of this *Standard*, explores why companies may choose to apply this *Standard*, establishes the company's inventory boundary, and determines the spatial boundary based on the company's level of traceability and the data and methods framework.
- **Part 2. Compile the GHG inventory** provides the accounting and reporting framework used to compile a complete GHG inventory for land sector and CO₂ removal activities.

- **Part 2.1 Requirements for land sector companies** provides the requirements to account for and report all GHG emissions and related metrics applicable to all land sector companies, including land use change-related metrics, land management emissions, and biogenic product emissions.
- **Part 2.2 Requirements for companies choosing to report CO₂ removals** provides the requirements for companies choosing to report net CO₂ removals from land management, technological removals, and CO₂ capture with geologic storage. This part is applicable only if relevant to business goals (see Chapter 2 for examples of business goals).
- **Part 2.3 Requirements for companies choosing to report product carbon storage** provides the requirements for companies choosing to report agricultural and technological carbon dioxide removal (TCDR)-based product carbon storage (this part is applicable only if relevant to business goals).
- **Part 3. Act based on the GHG inventory** provides guidelines for companies to evaluate actions, set targets, track progress, and avoid double counting with GHG credits when setting targets. These guidelines are applicable if relevant to the business goals of the company.
- **Part 4. Obtain assurance and report the GHG inventory** provides information on how to obtain third-party assurance and disclosure of the GHG inventory.

These four parts are organized into 20 chapters that each address a unique accounting category or topic (Figure 1.1). Each chapter provides the relevant requirements for that accounting category or topic, along with recommendations and options. This *Standard* contains a total of 32 requirements. Not all of them will be relevant to all companies, as this will depend on the company's business goals and inventory boundary. The difference between requirements, recommendations, and options is as follows:

Requirements – A statement that users must comply with to meet GHG Protocol standards and guidance. Requirements are written with “shall” statements. Section [X].2.1 in each chapter presents the accounting requirements. Each accounting requirement is numbered sequentially (except for “chapter-specific instances,” see below) and indicated in **pink**. Section [X].2.2 in each chapter presents the reporting requirements (which are not numbered). In some cases, additional information is found below the requirement, labeled as:

- **Specific cases** are instances of the main requirement that are required to conform with this *Standard* for specific industries, under certain circumstances. Specific cases are numbered with the number of the main requirement followed by a sequential decimal number (e.g., Requirement 10.1, Requirement 10.2).
- **Chapter-specific instances of a main requirement** are instances of a main requirement as it applies to a specific accounting category or topic. These instances are numbered with the number of the main requirement followed by a decimal and an alphabetical abbreviation of the relevant accounting subcategory or topic. For example:
 - The main removals traceability requirements in Chapter 12 (e.g., Requirement 20) have specific instances by accounting subcategory that appear in Chapters 13 and 14 (e.g., Requirement 20.LMR and Requirement 20.GS).

Recommendations for companies - A statement that identifies best practice approaches or methods that users are encouraged to implement, but are not required to meet GHG Protocol standards and guidance. They are written with “should” statements. Recommendations for companies are indicated in **blue**.

Recommendations for GHG program administrators and regulators - A statement that identifies best practice approaches that GHG programs, regulators, or policymakers are encouraged to adopt but are not required when using GHG Protocol standards and guidance for entity-level inventory accounting and reporting of land emissions,

removals, and other relevant metrics. They are written with “should” statements. Recommendations for GHG program administrators and regulators are included within an **orange** text box.

Options - A statement describing approaches or methods that are allowable for users to meet GHG Protocol standards and guidance. They are written with “may” statements. Options are indicated in **purple**.

Figure 1.1 Structure of the Land Sector and Removals Standard and Guidance

Parts		Chapters	
		Chapter 1. Introduction	
Part 1. Define business goals and inventory design		Chapter 2. Business goals	
		Chapter 3. GHG accounting and reporting principles	
		Chapter 4. Setting the inventory boundary	
		Chapter 5. Spatial boundaries and traceability	
		Chapter 6. Data and methods	
Part 2. Compile the GHG inventory	Part 2.1. Requirements for land sector companies	Land use change–related metrics	Chapter 7. Land use change emissions
			Chapter 8. Land use and leakage
		Agricultural land management emissions	Chapter 9. Land management net biogenic CO ₂ emissions
			Chapter 10. Land management production emissions
		Biogenic and TCDR-based product emissions	Chapter 11. Biogenic product and TCDR-based product emissions
	Part 2.2. Requirements for companies choosing to report CO ₂ removals		Chapter 12. CO ₂ removal accounting
			Chapter 13. Land management CO ₂ removals
			Chapter 14. CO ₂ removals and CO ₂ capture with geologic storage
	Part 2.3. Requirements for companies choosing to report product carbon storage		Chapter 15. Product carbon storage
	Part 3. Act based on the GHG inventory		Chapter 16. Evaluating the impact of actions
		Chapter 17. Setting targets and tracking progress	
		Chapter 18. Accounting for credited emission reductions and removals	
Part 4. Obtain assurance and report the GHG inventory		Chapter 19. Assurance	
		Chapter 20. Reporting	

Applicability

- Required for all applicable companies
- Optional; contains requirements if companies choose to report the relevant category
- Required for land sector companies
- Optional; contains requirements if applicable to business goals



1.4 Applicability and intended audience

This *Standard* applies to entities (i.e., companies or other organizations) that meet the criteria provided in Requirement 1. Table 1.2 provides examples of entities that may meet these criteria.

REQUIREMENT 1

Applicability of the Land Sector and Removals Standard and Guidance

Companies⁵ reporting a corporate- or organization-level GHG inventory in conformance with the Greenhouse Gas Protocol **shall** follow the *Land Sector and Removals Standard and Guidance* if the company has significant⁶ land sector activities in its operations or value chain and/or if the company chooses to account for and report CO₂ removals or CO₂ capture with geologic storage in the current year or has done so in previous years.

Companies with land sector activities in their operations or value chain that do not follow and report in conformance with the *Land Sector and Removals Standard and Guidance* **shall** disclose and justify why those activities are not significant.

Table 1.2 Intended audience of the Land Sector and Removals Standard, version 1

Sector	Relevant chapters	Example companies
Agriculture and other land-based sectors	1–20	<ul style="list-style-type: none"> • Companies that own or control significant areas of land (e.g., agricultural producers or land developers) • Companies that purchase, consume, process, or sell significant amounts of food, fiber, feed, bioenergy, or other agricultural products (e.g., food and beverage companies, consumer goods companies, bioenergy producers and consumers, biomaterial producers and consumers, retailers, or food service companies) • Companies that supply significant amounts of products to agricultural producers • Companies that manage significant areas of land to increase carbon stored in biomass or soil
Technological CO₂ removal and CO₂ capture with geologic storage	1–6, 11, 12, 14–20	<ul style="list-style-type: none"> • Companies that own or control technological CO₂ removal operations • Companies that purchase, consume, process, or sell products that store CO₂ that was technologically removed • Companies that store captured fossil CO₂, captured biogenic CO₂, or CO₂ that was technologically removed in geologic reservoirs

Version 1 of this *Standard* does not apply to forestry or non-productive land uses (see Box 1.1 for details).

Box 1.1 *Scope of the Land Sector and Removals Standard and Guidance, version 1*

Version 1 of this *Standard* and *Guidance* applies to agriculture and CO₂ removal technologies. Version 1 of this *Standard* and *Guidance* does not apply to forestry, as it does not provide comprehensive requirements for companies that own or control forest land or are in forest product value chains. The GHG Protocol’s Independent Standards Board did not reach a decision on forest carbon accounting for corporate GHG inventories. Instead, it recognized a need for further methodological development to account for anthropogenic CO₂ emissions and removals attributable to corporate activities in the forest sector. The issue of isolating anthropogenic CO₂ emissions and removals also applies to management activities on proximate and adjacent non-productive lands, which can include forests or non-forest land uses; therefore, Requirement 7 in this *Standard* cannot currently be implemented.

While version 1 of this *Standard* does not apply to forestry, it does provide requirements to account for and report biomass carbon stock changes on productive agricultural lands (e.g., in agroforestry and silvopasture systems), land use change emissions from the conversion of natural forests to plantation forests, and land management production emissions due to activities on forest lands.

Future versions of this *Standard* and *Guidance* may include comprehensive requirements for forestry and non-productive lands. To inform the future approach on forest carbon accounting and related topics and to motivate methodological advances for corporate GHG accounting in the forest sector, the GHG Protocol will release a request for information on forest carbon accounting in 2026.

1.5 Relationship of this Standard to other GHG Protocol standards and guidance

This *Standard* builds upon and supplements the GHG Protocol's *A Corporate Accounting and Reporting Standard* (Revised Edition) (hereinafter the *Corporate Standard*) and *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* (hereinafter the *Scope 3 Standard*), which provide the foundation for producing a corporate GHG inventory for all sectors. Through the development of the *Scope 3 Standard* and the *Product Life Cycle Accounting and Reporting Standard* (hereinafter the *Product Standard*), the GHG Protocol has responded to the demand for an internationally accepted method to account for GHG emissions associated with companies' value chains, and goods and services.

The *Scope 3 Standard* provides requirements and guidance for companies and other organizations to prepare and publicly report an entity-level GHG emissions inventory that includes indirect emissions resulting from value chain activities (i.e., scope 3 emissions). This *Standard* provides land sector-specific requirements and guidance and should be used in combination with both the *Scope 3 Standard* and *Corporate Standard* to prepare annual, entity-level GHG inventories. Specifically, this *Standard* provides requirements and recommendations on how to account for land emissions, removals, and other metrics from products produced by the reporting company as part of their scope 1 inventory, or products purchased or sold by the reporting company as part of their scope 3 inventory. This *Standard* supersedes the GHG Protocol's previous *Agricultural Guidance*.

This *Standard* can also be used with the *Product Standard*. Product-level accounting is closely linked to scope 3 accounting, as companies that purchase goods and services often multiply activity data (e.g., purchasing data) by product-level data (e.g., emission factors) to estimate total GHG impacts. The *Product Standard* provides requirements and guidance for companies and other organizations to quantify and publicly report an inventory of GHG emissions and removals associated with a specific product. This *Standard* provides requirements and recommendations on how to account for land emissions, removals, and other metrics from products purchased or sold by the reporting company as part of their scope 3 inventory. For land sector products and products with removals, the requirements and recommendations in this *Standard* are also applicable to product life cycle inventories that are prepared following the *Product Standard* (see Requirement 3).

The *Scope 3 Standard* enables a company to comprehensively account for and report on indirect emissions associated with its activities and identify the greatest GHG mitigation opportunities across the entire corporate value chain. The *Product Standard*



enables a company to quantify the life cycle emissions of a given product and target those individual products with the greatest potential for reductions. Common data is used to develop scope 3 inventories and product-level inventories for the land sector, including data collected from suppliers and other companies in the value chain. Since there can be overlaps in data collection, companies may find added business value and efficiencies in developing scope 3 and product-level inventories in parallel (see Box 6.1 in Chapter 6). The reporting company’s business goals should drive the use of a particular GHG Protocol accounting standard.

This *Standard* does not provide requirements or guidance on project accounting, GHG credit certification, or GHG credit verification, but does include some requirements on evaluating the impacts of actions (see Chapter 16) and avoiding double counting with GHG credits when setting targets (see Chapter 18). To support decision-making and to evaluate the impacts of actions or policies, companies should consult *The GHG Protocol for Project Accounting* (hereinafter the *Project Protocol*) and *The GHG Protocol Policy and Action Standard* (hereinafter the *Policy and Action Standard*).

1.6 How to use the Land Sector and Removals Guidance

The *Land Sector and Removals Guidance* version 1.0 (hereinafter the *Guidance*) complements the *Standard* by providing users with comprehensive guidance on implementing the requirements in the *Standard*, including examples, case studies, and calculation guidance. The *Guidance* is intended to be used alongside the *Standard*.

To facilitate interoperability and ease of use, both the *Standard* and *Guidance* are organized into the same 20 chapters organized across four overarching parts for a company to follow when developing a GHG inventory, as outlined in Section 1.3 (see also Figure 1.1). Therefore, each chapter in the *Standard* (e.g., Chapter 4 on “Setting the inventory boundary”) corresponds to the same chapter in the *Guidance* (i.e., Chapter 4).

Each chapter in the *Standard* and *Guidance* is also structured in a common way, so that the *Guidance* builds on the corresponding requirements and recommendations set forth in the *Standard* (Table 1.3). Section [X].5 provides calculation guidance and therefore only appears in the chapters in Part 2 (i.e., Chapters 7–15).

Table 1.3 Chapter structure in the Standard and Guidance

<i>Standard</i> chapter section	<i>Guidance</i> chapter section	Purpose of section
X.1 Overview		Provides a brief overview of the subject and content of the chapter
X.2 Requirements		Sets forth the relevant requirements, including accounting and reporting requirements
X.3 Recommendations and options		Sets forth the relevant recommendations and options
	X.4 Guidance on the requirements and recommendations	Provides guidance on interpreting and implementing the requirements and recommendations in the <i>Standard</i>
	X.5 Calculation guidance	Provides calculation guidance (e.g., equations, tables, etc.) on quantifying the relevant accounting (sub)category in alignment with the requirements and recommendations in the <i>Standard</i>



For example, Chapter 7 (Land use change emissions) in the *Guidance* includes Section 7.4, which provides guidance on interpreting and implementing the land use change emissions accounting requirements, recommendations, and options that are set forth in Sections 7.2 and 7.3 in the *Standard*, respectively. Section 7.5 in the *Guidance* presents calculation guidance (e.g., equations, tables, etc.) for calculating land use change emissions in alignment with the relevant accounting requirements and recommendations in the *Standard*.

1.7 Calculation tools and resources

To help companies implement this *Guidance*, the GHG Protocol website provides links to relevant calculation tools, life cycle databases, and other resources created by non-profit organizations, academic institutions, service providers, and companies.⁷ The links to calculation tools are organized by sector, country, and other factors that companies can use to identify resources that are most relevant to the reporting company. The GHG Protocol website also provides answers to frequently asked questions (FAQs) organized by GHG Protocol standards and other topics.

The *Standard* and *Guidance* do not mandate the use of specific tools or datasets. Instead, the *Guidance* is intended to help companies evaluate and select the most relevant calculation resources based on factors

such as sector, geographic location, data availability, and the relevant requirements and recommendations in this *Standard*. Chapter 6 provides general guidance on evaluating available data and calculation methods.

1.8 Standard and Guidance development process

In 2020, WRI and WBCSD launched a multi-year process to develop the GHG Protocol *Land Sector and Removals Standard and Guidance*. The first draft of the *Land Sector and Removals Guidance* was developed through the Land Sector and Removals Technical Working Group (LSR TWG) and Advisory Committee (LSR AC), together comprised of over 100 international experts from businesses, NGOs, governments, and academic institutions.

In 2022, the second draft of the *Land Sector and Removals Guidance* (hereinafter the draft *LSR Guidance*) was published and made available for pilot testing by the Pilot Testing Group and review by the Review Group. The Review Group was open to any interested stakeholder who wanted to participate in the public consultation by reviewing the draft. The Pilot Testing Group consisted of 71 companies and 25 supporting partners who implemented the draft *LSR Guidance* and provided pilot GHG inventory results, feedback on their ability to meet the requirements, responses to pilot testing questions, and descriptions of the data and methods they used to

compile their pilot GHG inventories. The Review Group was comprised of over 300 stakeholders who participated in the public review of the *LSR Guidance*. The pilot testing phase lasted six months, and the review phase lasted two months.

In 2023, following the pilot testing and review phase, the second draft of the *LSR Guidance* was subject to a revision process where the 42 key issues raised by stakeholders were identified and discussed among 11 subgroups, each comprised of members from the LSR TWG, the Pilot Testing Group, and the Review Group. The revision process lasted five months, during which 88 percent of the issues were resolved within subgroup discussions.

In 2024, the main outcomes and four unresolved issues were shared with the LSR AC to reach final resolutions. Two out of four remaining issues (on assurance and the “right to report”) were resolved by the LSR AC. The remaining two issues (agricultural leakage and forest carbon accounting) were not resolved, and the LSR AC approved a proposal to resolve these issues under the GHG Protocol’s new governance structure and the newly convened Independent Standards Board (ISB). In Dec 2024, the ISB approved the Forest Carbon Accounting Technical Working Group (FCA TWG) requirements development plan with the task of further investigating options to account for CO₂ emissions and removals from forest management and to deliver recommendations to the ISB.

In 2025, the ISB reached a final decision on agricultural leakage and the FCA TWG developed two proposals for ISB consideration. The ISB was unable to reach consensus on a forest carbon accounting methodology or methodologies. In recognition that additional input is needed to inform further deliberation and that the proposed methods should be subject to further stakeholder consultation, the ISB approved the release of a Request for Information on forest carbon accounting under a special comment period. To avoid delaying the release of the rest of the standard, the GHG Protocol Steering Committee decided that forest carbon accounting would not feature in Version 1 of the LSR Standard.

To review the GHG Protocol’s governance structure, current membership on governance bodies, and to receive current updates about GHG Protocol workstreams, please visit the [Standards Development and Governance Repository](#) at the GHG Protocol website.

Endnotes

- 1 IPCC 2023.
- 2 IPCC 2022.
- 3 IPCC 2018.
- 4 IPCC 2019b.
- 5 Throughout this *Standard* and *Guidance*, the term “company” is used as a shorthand to refer to the entity (i.e., company or other organization) developing a GHG inventory.
- 6 The GHG Protocol makes no specific recommendations as to what constitutes a “significant” exclusion threshold. However, some GHG programs do specify numerical significance exclusion thresholds (e.g., SBTi requires companies to set a Forest, Land, and Agriculture [FLAG] target if their FLAG-related emissions are 20 percent or more of overall emissions across scope 1, 2, and 3).
- 7 Available at <https://ghgprotocol.org/tools-resources>

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