GREENHOUSE GAS PROTOCOL

Corporate Value Chain (Scope 3) Accounting and Reporting Standard

Supplement to the GHG Protocol Corporate Accounting and Reporting Standard

WORLD RESOURCES INSTITUTE

wbcsd

GHG Protocol Team

Pankaj Bhatia, World Resources Institute
Cynthia Cummis, World Resources Institute
Andrea Brown, World Business Council for Sustainable Development
David Rich, World Resources Institute
Laura Draucker, World Resources Institute
Holly Lahd, World Resources Institute

Steering Committee

Gerald Rebitzer, Amcor Ltd.
Nigel Topping, Frances Way, Carbon Disclosure Project (CDP)
Graham Sinden, The Carbon Trust
H. Scott Matthews, Carnegie Mellon University
Luc Larmuseau, DNV Climate Change Services
David A. Russell, Rob Rouse, The Dow Chemical Company
Jiang Kejun, Energy Research Institute, China's National Development and Reform Commission
Andrew Hutson, Environmental Defense Fund
Simon Aumônier, Environmental Resources Management
Ugo Pretato, Kirana Chomkhamsri, European Commission Joint Research Centre
Steven Meyers, General Electric
Sergio Galeano, Georgia Pacific, ISO TC207 U.S. Technical Advisory Group
Gregory A. Norris, Harvard University, New Earth, University of Arkansas
Klaus Radunsky, ISO 14067 Working Group Convener
Atsushi Inaba, Kogakuin University
Alison Watson, New Zealand Ministry of Agriculture and Forestry
Susan Cosper, Nick Shufro, PricewaterhouseCoopers LLP
Rasmus Priess, THEMA1 GmbH, Product Carbon Footprint World Forum
Wanda Callahan, Shell
James A. Fava, UNEP SETAC Life Cycle Initiative, Five Winds International
Matthias Finkbeiner, UNEP SETAC Life Cycle Initiative, Technische Universität Berlin
Henry King, Unilever
Susan Wickwire, John Sottong, United States Environmental Protection Agency
Maureen Nowak, United Kingdom Department of Environment, Food, and Rural Affairs
James Stanway, Miranda Ballentine, Walmart Stores Inc.

Table of Contents

CHAPTERS

APPENDICES

01 Introduction

Emissions of the anthropogenic greenhouse gases (GHG) that drive climate change and its impacts around the world are growing. According to climate scientists, global carbon dioxide emissions must be cut by as much as 85 percent below 2000 levels by 2050 to limit global mean temperature increase to 2 degrees Celsius above pre-industrial levels.[1] Temperature rise above this level will produce increasingly unpredictable and dangerous impacts for people and ecosystems. As a result, the need to accelerate efforts to reduce anthropogenic GHG emissions is increasingly urgent. Existing government policies will not sufficiently solve the problem. Leadership and innovation from business is vital to making progress.

Corporate action in this arena also makes good business sense. By addressing GHG emissions, companies can identify opportunities to bolster their bottom line, reduce risk, and discover competitive advantages. As impacts from climate change become more frequent and prominent, governments are expected to set new policies and provide additional market-based incentives to drive significant reductions in emissions. These new policy and market drivers will direct economic growth on a low-carbon trajectory. Businesses need to start planning for this transition now as they make decisions that will lock in their investments for years to come.

An effective corporate climate change strategy requires a detailed understanding of a company's GHG impact. A corporate GHG inventory is the tool to provide such an understanding. It allows companies to take into account their emissions-related risks and opportunities and focus company efforts on their greatest GHG impacts. Until recently, companies have focused their attention on emissions from their own operations. But increasingly companies understand the need to also account for GHG emissions along their value chains and product portfolios to comprehensively manage GHG-related risks and opportunities.

Through the development of the *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard,* the GHG Protocol has responded to the demand for an internationally accepted method to enable GHG management of companies' value chains. Following the release of this standard, the GHG Protocol and its partners will proactively work with industry groups and governments to promote its widespread use – along with the entire suite of GHG Protocol standards and tools – to enable more effective GHG management worldwide.

1.1 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). Launched in 1998, the mission of the GHG Protocol is to develop internationally accepted greenhouse gas (GHG) accounting and reporting standards and tools, and to promote their adoption in order to achieve a low emissions economy worldwide.

The GHG Protocol has produced the following separate but complementary standards, protocols, and guidelines:

- ***GHG Protocol Corporate Accounting and Reporting Standard* (2004):** A standardized methodology for companies to quantify and report their corporate GHG emissions. Also referred to as the *Corporate Standard*.
- ***GHG Protocol Product Life Cycle Accounting and Reporting Standard* (2011):** A standardized methodology to quantify and report GHG emissions associated with individual products throughout their life cycle. Also referred to as the *Product Standard*.
- ***GHG Protocol for Project Accounting* (2005):** A guide for quantifying reductions from GHG-mitigation projects. Also referred to as the *Project Protocol*.
- ***GHG Protocol for the U.S. Public Sector* (2010):** A step-by-step approach to measuring and reporting emissions from public sector organizations, complementary to the *Corporate Standard*.
- ***GHG Protocol Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects* (2007):** A guide for quantifying reductions in emissions that either generate or reduce the consumption of electricity transmitted over power grids, to be used in conjunction with the *Project Protocol*.
- ***GHG Protocol Land Use, Land-Use Change, and Forestry Guidance for GHG Project Accounting* (2006):** A guide to quantify and report reductions from land use, land-use change, and forestry, to be used in conjunction with the *Project Protocol*.
- ***Measuring to Manage: A Guide to Designing GHG Accounting and Reporting Programs* (2007):** A guide for program developers on designing and implementing effective GHG programs based on accepted standards and methodologies.

1.2 Purpose of this standard

The *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard* (also referred to as the ***Scope 3 Standard***) provides requirements and guidance for companies and other organizations to prepare and publicly report a GHG emissions inventory that includes indirect emissions resulting from value chain activities (i.e., scope 3 emissions). The primary goal of this standard is to provide a standardized step-by-step approach to help companies understand their full value chain emissions impact in order to focus company efforts on the greatest GHG reduction opportunities, leading to more sustainable decisions about companies' activities and the products they buy, sell, and produce.

The standard was developed with the following objectives in mind:

- To help companies prepare a true and fair scope 3 GHG inventory in a cost-effective manner, through the use of standardized approaches and principles
- To help companies develop effective strategies for managing and reducing their scope 3 emissions through an understanding of value chain emissions and associated risks and opportunities
- To support consistent and transparent public reporting of corporate value chain emissions according to a standardized set of reporting requirements

Ultimately, this is more than a technical accounting standard. It is intended to be tailored to business realities and to serve multiple business objectives. Companies may find most value in implementing the standard using a phased approach, with a focus on improving the quality of the GHG inventory over time.

1.3 Relationship to the GHG Protocol Corporate Standard

The *GHG Protocol Scope 3 Standard* is a supplement to the *GHG Protocol Corporate Accounting and Reporting Standard, Revised Edition* (2004) and should be used in conjunction with it. The *Corporate Standard* – first launched in 2001 and revised in 2004 – has been widely adopted by businesses, NGOs, and governments around the world as the international standard for developing and reporting a company-wide GHG inventory.

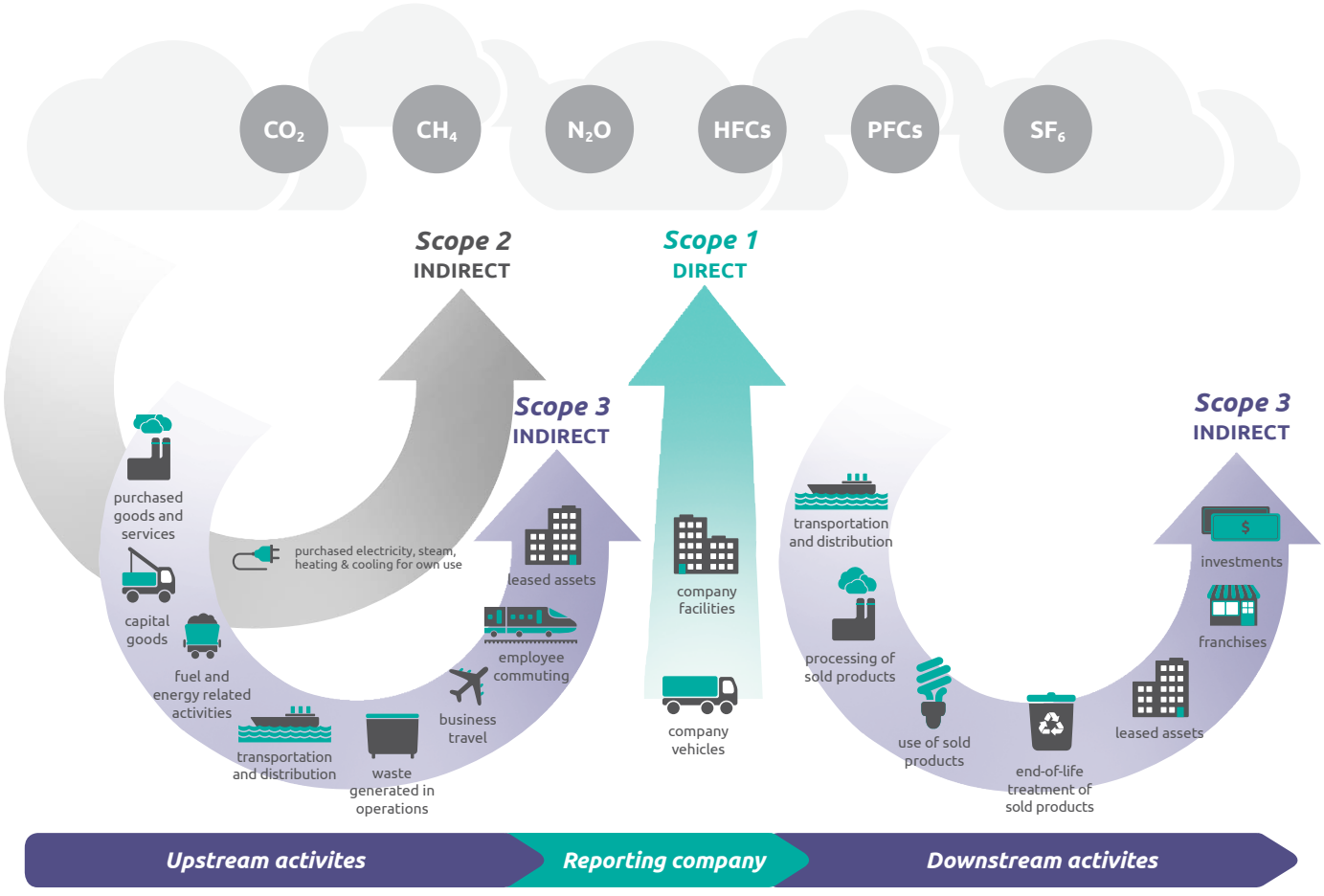
The *Scope 3 Standard* complements and builds upon the *Corporate Standard* to promote additional completeness and consistency in the way companies account for and report on indirect emissions from value chain activities.

The *Corporate Standard* classifies a company's direct and indirect GHG emissions into three "scopes," and requires that companies account for and report all scope 1 emissions (i.e., direct emissions from owned or controlled sources) and all scope 2 emissions (i.e., indirect emissions from the generation of purchased energy consumed by the reporting company). The *Corporate Standard* gives companies flexibility in whether and how to account for scope 3 emissions (i.e., all other indirect emissions that occur in a company's value chain). Figure 1.1 provides an overview of the three GHG Protocol scopes and categories of scope 3 emissions.

Since the *Corporate Standard* was revised in 2004, business capabilities and needs in the field of GHG accounting and reporting have grown significantly. Corporate leaders are becoming more adept at calculating scope 1 and scope 2 emissions, as required by the *Corporate Standard*. As GHG accounting expertise has grown, so has the realization that significant emissions – and associated risks and opportunities – result from value chain activities not captured by scope 1 and scope 2 inventories.

Scope 3 emissions can represent the largest source of emissions for companies and present the most significant opportunities to influence GHG reductions and achieve a variety of GHG-related business objectives (see chapter 2). Developing a full corporate GHG emissions inventory – incorporating scope 1, scope 2, and scope 3 emissions – enables companies to understand their full emissions

Figure [1.1] Overview of GHG Protocol scopes and emissions across the value chain



impact across the value chain and focus efforts where they can have the greatest impact.

Companies reporting their corporate GHG emissions have two reporting options (see table 1.1).

Under the *Corporate Standard,* companies are required to report all scope 1 and scope 2 emissions, while reporting scope 3 emissions is optional. The *Scope 3 Standard* is designed to create further consistency in scope 3 inventories through additional requirements and guidance for scope 3 accounting and reporting.

Companies should make and apply decisions consistently across both standards. For example, the selection of a consolidation approach (equity share, operational control or financial control) should be applied consistently across scope 1, scope 2, and scope 3. For more information, see section 5.2.

1.4 Who should use this standard?

This standard is intended for companies of all sizes and in all economic sectors. It can also be applied to other types of organizations and institutions, both public and private, such as government agencies, non-profit organizations, assurers and verifiers, and universities. Policymakers and designers of GHG reporting or reduction programs can use relevant parts of this standard to develop accounting and reporting requirements. Throughout this standard, the term "company" is used as shorthand to refer to the entity developing a scope 3 inventory.

1.5 Scope of the standard

This standard is designed to account for the emissions generated from corporate value chain activities during the reporting period (usually a period of one year), and covers the six main greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6). This standard does not address the quantification of avoided emissions or GHG reductions from actions taken to compensate for or offset emissions. These types of reductions are addressed by the *GHG Protocol for Project Accounting.*

Use of this standard is intended to enable comparisons of a company's GHG emissions over time. It is not designed to support comparisons between companies based on their scope 3 emissions. Differences in reported emissions may be a result of differences in inventory methodology or differences in company size or structure. Additional measures are necessary to enable valid comparisons across companies. Such measures include consistency in methodology and data used to calculate the inventory, and reporting of additional information such as intensity ratios or performance metrics. Additional consistency can be provided through GHG reporting programs or sector-specific guidance (see section 1.9).

Table [1.1] Corporate-level GHG Protocol reporting options

Reporting Option	*Scope 1*	*Scope 2*	*Scope 3*
Report in conformance with the *GHG Protocol Corporate Standard*	**Required**	**Required**	**Optional**: Companies may report any scope 3 emissions the company chooses
Report in conformance with the *GHG Protocol Corporate Standard* and the *GHG Protocol Scope 3 Standard*	**Required**	**Required**	**Required**: Companies shall report scope 3 emissions following the requirements of the *Scope 3 Standard*

1.6 How was this standard developed?

The GHG Protocol follows a broad and inclusive multi-stakeholder process to develop greenhouse gas accounting and reporting standards with participation from businesses, government agencies, NGOs, and academic institutions from around the world.

In 2008, WRI and WBCSD launched a three-year process to develop the *GHG Protocol Scope 3 Standard*. A 25-member Steering Committee of experts provided strategic direction throughout the process. The first draft of the *Scope 3 Standard* was developed in 2009 by Technical Working Groups consisting of 96 members (representing diverse industries, government agencies, academic institutions, and non-profit organizations worldwide). In 2010, 34 companies from a variety of industry sectors road-tested the first draft and provided feedback on its practicality and usability, which informed a second draft. Members of a Stakeholder Advisory Group (consisting of more than 1,600 participants) provided feedback on each draft of the standard.

1.7 Relationship to the GHG Protocol Product Standard

The *GHG Protocol Scope 3 Standard* and *GHG Protocol Product Standard* both take a value chain or life cycle approach to GHG accounting and were developed simultaneously. The *Scope 3 Standard* accounts for value chain emissions at the corporate level, while the *Product Standard* accounts for life cycle emissions at the individual product level. Together with the *Corporate Standard,* the three standards provide a comprehensive approach to value chain GHG measurement and management.

The reporting company's business goals should drive the use of a particular GHG Protocol accounting standard. The *Scope 3 Standard* enables a company to identify the greatest GHG reduction opportunities across the entire corporate value chain, while the *Product Standard* enables a company to target individual products with the greatest potential for reductions. The *Scope 3 Standard* helps a company identify GHG reduction opportunities, track performance, and engage suppliers at a corporate level,

while the *Product Standard* helps a company meet the same objectives at a product level.

Common data is used to develop scope 3 inventories and product inventories, including data collected from suppliers and other companies in the value chain. Since there can be overlap in data collection, companies may find added business value and efficiencies in developing scope 3 and product inventories in parallel.

While each standard can be implemented independently, both standards are mutually supportive. Integrated use might include:

- Applying the *Scope 3 Standard,* using the results to identify products with the most significant emissions, then using the *Product Standard* to identify mitigation opportunities in the selected products' life cycles
- Using product-level GHG data based on the *Product Standard* as a source of data to calculate scope 3 emissions associated with selected product types
- Applying either the *Scope 3 Standard* or the *Product Standard* and using the results to inform GHG-reduction strategies that reduce both product and corporate level (scope 3) emissions

The sum of the life cycle emissions of each of a company's products, combined with additional scope 3 categories (e.g., employee commuting, business travel, and investments), should approximate the company's total corporate GHG emissions (i.e., scope 1 + scope 2 + scope 3). In practice, companies are not expected or required to calculate life cycle inventories for individual products when calculating scope 3 emissions.

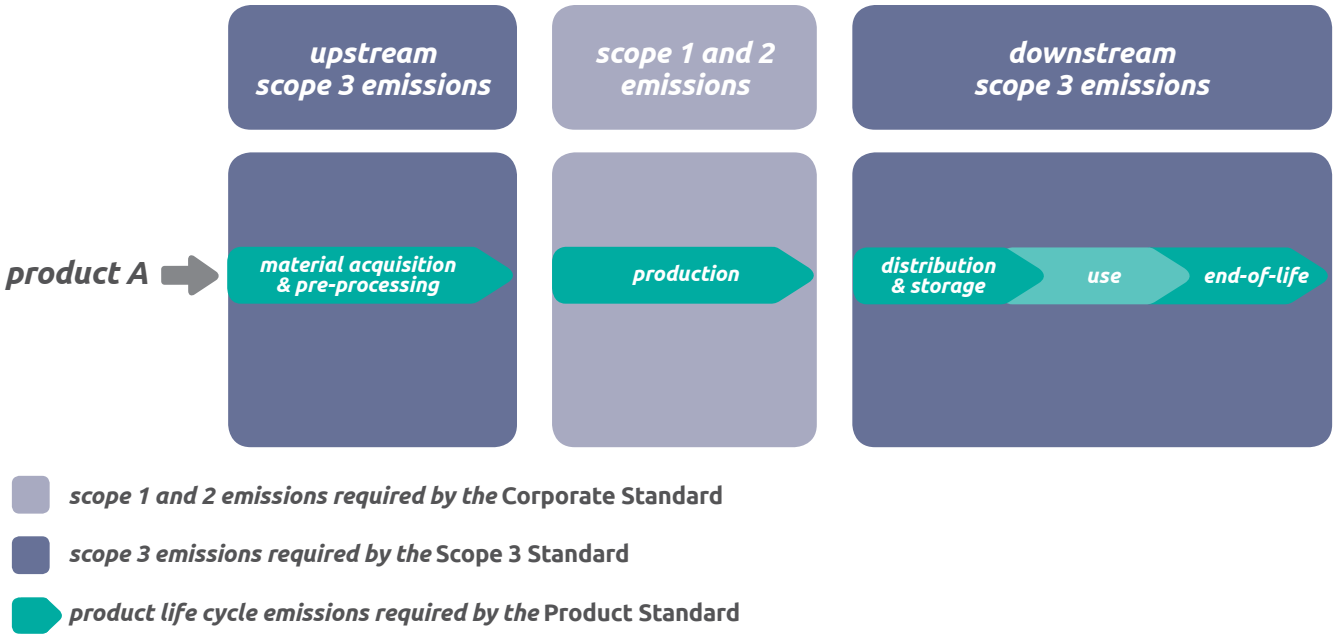
Figure 1.2 illustrates the relationship between the *Corporate Standard, Product Standard,* and *Scope 3 Standard.* In this simplified example, a company manufactures one product (Product A). The example shows how scopes of emissions at the corporate level correspond to life cycle stages[2] at the product level.

1.8 GHG calculation tools and guidance

To help companies implement the *Scope 3 Standard,* the GHG Protocol website provides a variety of useful GHG calculation tools and guidance, including:

- *Guidance for Calculating Scope 3 Emissions,* a companion document to the *Scope 3 Standard* that provides

Figure [1.2] Relationship between a scope 3 GHG inventory and a product GHG inventory (for a company manufacturing Product A)



detailed guidance for calculating scope 3 emissions, including calculation methods, data sources, and examples of calculating scope 3 emissions
- A list of available data sources for calculating scope 3 emissions, including over 80 emission factor databases covering a variety of sectors and geographic regions
- Several cross-sector and sector-specific calculation tools, which provide step-by-step guidance, together with electronic worksheets to help companies calculate GHG emissions from specific sources or sectors

All GHG calculation tools and guidance are available at www.ghgprotocol.org.

1.9 Sector guidance

The development of sector-specific implementation guidance and tools can drive more consistent corporate GHG measurement, reporting, and performance tracking practices for a particular sector. Helpful sector-level information could include guidance on interpreting the standard for a specific sector, guidance and tools for calculating emissions from sector-specific activities, recommended performance metrics, specific guidance for identifying the largest sector emissions sources, and suggested data sources and emissions factors.

Sectors should develop guidance through an inclusive multi-stakeholder process to ensure broad acceptance and facilitate increased consistency and credibility.

Endnotes

1 IPCC, Summary for Policymakers (Table SPM.5: Characteristics of post-TAR stabilization scenarios), in Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, ed. B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2007).

2 A life cycle stage is one of the interconnected steps in a product's life cycle.

02 Business Goals

Developing a scope 3 inventory strengthens companies' understanding of their value chain GHG emissions as a step towards effectively managing emissions-related risks and opportunities and reducing value chain GHG emissions.

Business goals of a scope 3 inventory

Before accounting for scope 3 emissions, companies should consider which business goal or goals they intend to achieve. See table 2.1 for a list of goals frequently cited by businesses as reasons for developing a scope 3 inventory.

Identify and understand risks and opportunities associated with value chain emissions

GHG emissions from corporate activities are increasingly becoming a mainstream management issue for businesses. Potential liabilities from GHG exposure arise from unstable resource and energy costs, future resource scarcity, environmental regulations, changing consumer preferences, scrutiny from investors and shareholders, as well as reputational risk from other stakeholders. (See table 2.2 for examples of risks related to scope 3 GHG emissions.) By developing a scope 3 inventory, companies can understand the overall emissions profile of their upstream and downstream activities. This information provides companies with an understanding of where potential emissions and associated risks and opportunities lie in the value chain, as well as the relative risks and opportunities of scope 3 emissions compared to companies' direct emissions.

For some companies, developing a scope 3 inventory may improve planning for potential future carbon regulations. For example, energy or emissions taxes or regulations in a company's supply chain may significantly increase the cost of goods or components purchased by a company. Understanding scope 3 emissions helps companies plan for potential regulations and can guide corporate procurement decisions and product design.

Additionally, companies may find that there is a reputational risk if they do not understand the impacts of their broader corporate value chain activities. By undertaking a scope 3 inventory and understanding where their emissions are, companies can credibly communicate to their stakeholders the potential impacts of these emissions and the actions planned or taken to reduce the associated risks.

Companies can also use the results of the scope 3 inventory to identify new market opportunities for producing and selling goods and services with lower GHG

Table [2.1] Business goals served by a scope 3 GHG inventory

Business goal	*Description*
Identify and understand risks and opportunities associated with value chain emissions	• Identify GHG-related risks in the value chain • Identify new market opportunities • Inform investment and procurement decisions
Identify GHG reduction opportunities, set reduction targets, and track performance	• Identify GHG "hot spots" and prioritize reduction efforts across the value chain • Set scope 3 GHG reduction targets • Quantify and report GHG performance over time
Engage value chain partners in GHG management	• Partner with suppliers, customers, and other companies in the value chain to achieve GHG reductions • Expand GHG accountability, transparency, and management in the supply chain • Enable greater transparency on companies' efforts to engage suppliers • Reduce energy use, costs, and risks in the supply chain and avoid future costs related to energy and emissions • Reduce costs through improved supply chain efficiency and reduction of material, resource, and energy use
Enhance stakeholder information and corporate reputation through public reporting	• Improve corporate reputation and accountability through public disclosure • Meet needs of stakeholders (e.g., investors, customers, civil society, governments), enhance stakeholder reputation, and improve stakeholder relationships through public disclosure of GHG emissions, progress toward GHG targets, and demonstration of environmental stewardship • Participate in government- and NGO-led GHG reporting and management programs to disclose GHG-related information

emissions. As more companies in the value chain measure and manage GHG emissions, demand will grow for new products that reduce emissions throughout the value chain. See table 2.2 for examples of opportunities related to scope 3 emissions.

Identify GHG reduction opportunities, set reduction targets, and track performance

The scope 3 inventory provides a quantitative tool for companies to identify and prioritize emissions-reduction opportunities along their value chain. Scope 3 inventories provide detailed information on the relative size and scale of emission-generating activities within and across the various scope 3 categories. This information may be used to identify the largest emission sources (i.e., "hot spots") in the value chain and focus efforts on the most effective emission-reduction opportunities, resulting in cost savings for companies.

For example, a company whose largest source of value chain emissions is contracted logistics may choose to optimize these operations through changes to product packaging to increase the volume per shipment, or by increasing the number of low-carbon logistics providers. Additionally, companies may utilize this information to change their procurement practices or improve product design or product efficiency, resulting in reduced energy use.

Table [2.2] **Examples of GHG-related risks and opportunities related to scope 3 emissions**

Type of risk	*Examples*
Regulatory	GHG emissions-reduction laws or regulations introduced or pending in regions where the company, its suppliers, or its customers operate
Supply chain costs and reliability	Suppliers passing higher energy- or emissions-related costs to customers; supply chain business interruption risk
Product and technology	Decreased demand for products with relatively high GHG emissions; increased demand for competitors' products with lower emissions
Litigation	GHG-related lawsuits directed at the company or an entity in the value chain
Reputation	Consumer backlash, stakeholder backlash, or negative media coverage about a company, its activities, or entities in the value chain based on GHG management practices, emissions in the value chain, etc.

Type of opportunity	*Examples*
Efficiency and cost savings	A reduction in GHG emissions often corresponds to decreased costs and an increase in companies' operational efficiency.
Drive innovation	A comprehensive approach to GHG management provides new incentives for innovation in supply chain management and product design.
Increase sales and customer loyalty	Low-emissions goods and services are increasingly more valuable to consumers, and demand will continue to grow for new products that demonstrably reduce emissions throughout the value chain.
Improve stakeholder relations	Improve stakeholder relationships through proactive disclosure and demonstration of environmental stewardship. Examples include demonstrating fiduciary responsibility to shareholders, informing regulators, building trust in the community, improving relationships with customers and suppliers, and increasing employee morale.
Company differentiation	External parties (e.g. customers, investors, regulators, shareholders, and others) are increasingly interested in documented emissions reductions. A scope 3 inventory is a best practice that can differentiate companies in an increasingly environmentally-conscious marketplace.

Conducting a GHG inventory according to a consistent framework is also a prerequisite for setting credible public GHG reduction targets. External stakeholders, including customers, investors, shareholders, and others, are increasingly interested in companies' documented emissions reductions. Therefore, identifying reduction opportunities, setting goals, and reporting on progress to stakeholders may help differentiate a company in an increasingly environmentally-conscious marketplace.

Engage value chain partners in GHG management

Developing a scope 3 inventory encourages the quantification and reporting of emissions from various partners across the value chain. For many companies, a primary goal of developing a scope 3 inventory is to encourage supplier GHG measurement and reduction, and to report on supplier performance. For example, a company may engage with their major suppliers to obtain emissions information on the products it purchases from them, as well as information on suppliers' GHG management plans. Successful engagement with suppliers often requires a company to work closely with its supply chain partners to build a common understanding of emissions-related information and the opportunities and benefits of achieving GHG reductions. Reporting on the progress of a company's engagement with its supply chain can be useful information for stakeholders external and internal to the reporting company.

Companies may also wish to engage with their customers by providing information on product use and disposal. For example, a company may want to work with stakeholders such as retailers, marketers or advertisers to convey information to customers on less energy intensive products, how to use a product more efficiently, or to encourage recycling. A scope 3 inventory enables companies to identify their downstream hot spots so that they can credibly engage with customers to reduce their value chain emissions.

By developing a scope 3 inventory, companies can identify where the largest energy, material and resource use is within the supply chain. This knowledge can inform cost savings through reducing material, energy and resource

National Grid: Business objectives for scope 3 accounting

National Grid is an international electricity and gas company and one of the largest investor-owned energy companies in the world. At the heart of National Grid's corporate vision is "safeguarding our environment for future generations." One of National Grid's strategic objectives is to ensure that National Grid is a sustainable low carbon business. National Grid recognized that in order to deliver a fully effective greenhouse gas reduction plan, all emissions need to be taken into account. Therefore, National Grid developed a strategy for quantifying and reducing its scope 3 emissions, with several specific objectives in mind:

To deliver a fully effective greenhouse gas reduction plan, all emissions need to be taken into account

- Understanding the risks and opportunities associated with emissions across the entire value chain
- Considering the environmental impact in investment and other business decisions through internalization of carbon costs and assessment of benefits
- Becoming agents for change by working with customers and supply chain partners to drive GHG reductions and providing transparency and accountability within the value chain
- Working with governments and regulators to encourage allowable investments through carbon-trading mechanisms and clear legislation

To help achieve these objectives, National Grid used the *GHG Protocol Scope 3 Standard* to inventory its scope 3 emissions. After developing the full scope 3 inventory, a clear picture appeared with emissions from the use of sold products emerging as by far the biggest source of scope 3 emissions. This valuable insight helped National Grid understand the full impact of its business operations and provided more focused direction for future strategies and targets.

use, improving overall efficiency of companies' supply chains, reducing regulatory risks, and strengthening supplier and customer relationships.

Enhance stakeholder information and corporate reputation through public reporting

As concerns over climate change grow, NGOs, investors, governments and other stakeholders are increasingly calling for greater disclosure of corporate activities and GHG information. They are interested in the actions companies are taking and in how companies are positioned relative to their competitors. For many companies, responding to this stakeholder interest by disclosing information on corporate emissions and reduction activities is a business objective of developing a scope 3 inventory.

Companies can improve stakeholder relationships through proactive disclosure and demonstration of environmental stewardship. Examples include demonstrating fiduciary responsibility to shareholders, informing regulators, building trust in the community, improving relationships with customers and suppliers, and increasing employee morale.

Companies have a variety of avenues for communicating with stakeholders. Companies can disclose information through stand-alone corporate sustainability reports, mandatory government registries, industry groups, or through stakeholder-led reporting programs. Mandatory and voluntary reporting programs often offer companies assistance in setting GHG targets, provide industry-specific benchmarking information, and provide information on corporate activities to a specific stakeholder audience. An example of a global voluntary reporting program is the Carbon Disclosure Project, which requests corporate GHG performance information on behalf of a community of investors. Companies may also find that public reporting through a voluntary GHG reporting program can strengthen their standing with customers and differentiate them from their competitors.

Abengoa: Business objectives of scope 3 supplier engagement

For Abengoa - a global technology and engineering company operating in over 70 countries - engaging with its suppliers to build its greenhouse gas inventory is a key component of the company's overall sustainability goals. Abengoa believes that working closely with its suppliers is the best way to encourage broader GHG measurement and management and to calculate its scope 3 GHG inventory.

Abengoa utilizes a number of methods that support the completion of their scope 3 inventory. All suppliers must agree to introduce a GHG reporting system for the products and services purchased by Abengoa. Abengoa then provides detailed guidelines for suppliers to determine emissions, based on the GHG Protocol standards, and includes calculation guidance, databases and guidance on emissions factors. The guidance also includes data collection templates for suppliers to send to their suppliers further upstream, which introduces GHG emissions management throughout the overall Abengoa value chain. Abengoa also requires that supplier emissions data are verified by a third party, or are accompanied by the data used for calculating the GHG inventory. Finally, the company requires that all suppliers adhere to its Social Responsibility Code of Conduct, to ensure suppliers' senior management is committed to Abengoa's sustainability practices and objectives.

Abengoa believes that working closely with its suppliers is the best way to encourage broader GHG measurement and management

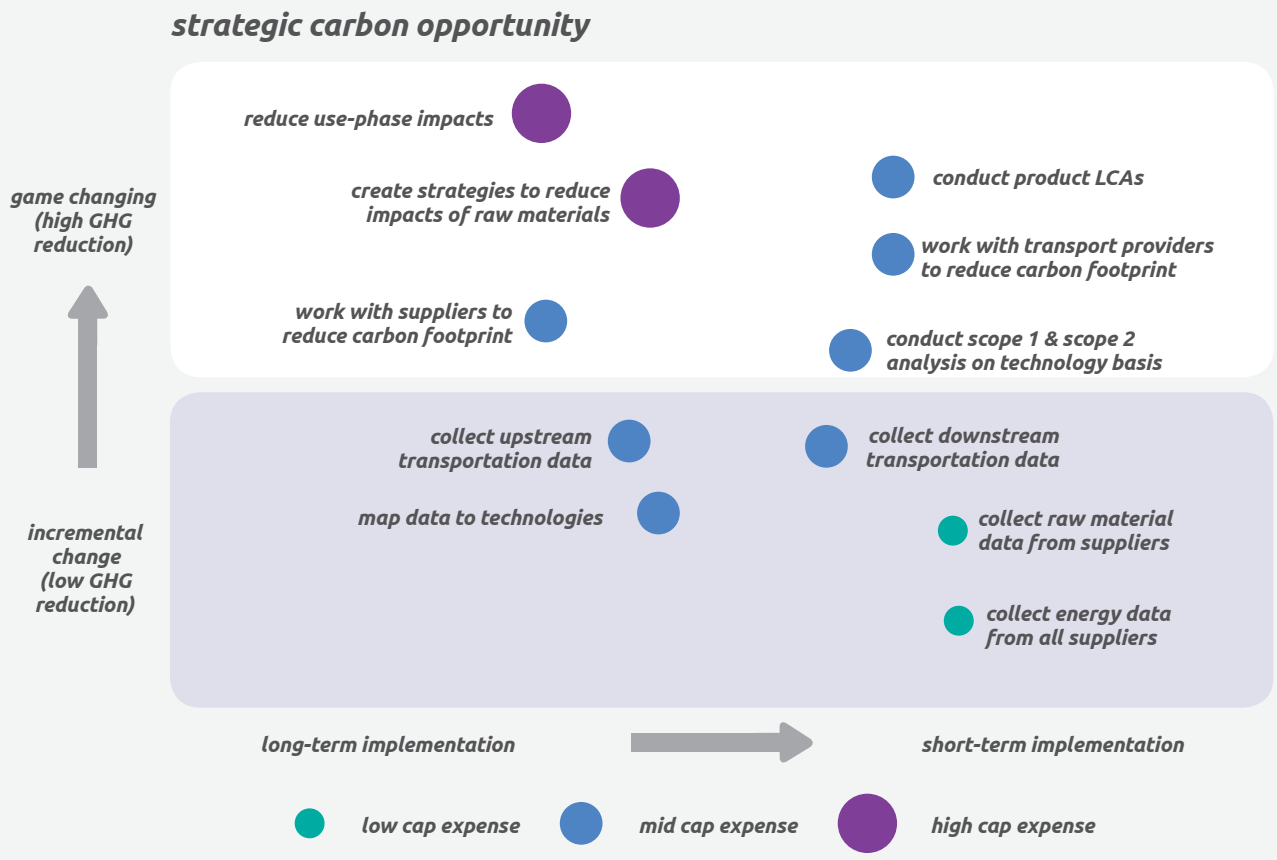
SC Johnson: Assessing scope 3 reduction opportunities

Making life better for people and the planet is a core mission at SC Johnson. The company completed a scope 3 inventory to better understand its scope 3 impacts and to provide input for the development of sustainability objectives in support of its core commitment to environmental leadership. Specific objectives of this effort were to:

- Gain a full understanding of the company's global carbon footprint to reveal potential hot spots and opportunities
- Provide a common carbon "currency" throughout the value chain to identify the highest-impact GHG reduction strategies and programs (see figure 2.1)
- Develop a framework to engage government, NGOs, supply chain partners, retailers, and consumers and to drive the innovation necessary to foster GHG improvements throughout the value chain

As a result of the scope 3 inventory effort, SC Johnson has initiated a process to incorporate scope 3 results into its sustainability program objective development, and has initiated outreach programs with its suppliers to help foster GHG improvements.

Figure [2.1] SC Johnson's framework to assess reduction opportunities along the value chain



03 Summary of Steps and Requirements

This chapter provides a summary of the steps involved in scope 3 accounting and reporting, as well as a list of the requirements that must be followed for a scope 3 inventory to be in conformance with this standard.

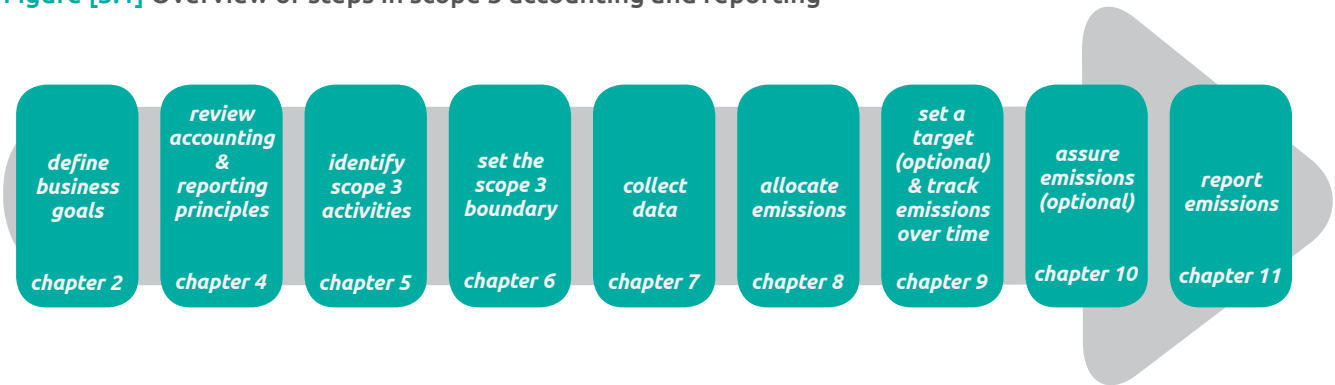
3.1 Scope 3 accounting and reporting steps

This standard is organized according to the steps a company should follow when developing a scope 3 inventory. Figure 3.1 provides an overview of the steps in scope 3 accounting and reporting. Each step is described in detail in the following chapters.

3.2 Terminology: shall, should, and may

This standard uses precise language to indicate which provisions of the standard are requirements, which are recommendations, and which are permissible or allowable options that companies may choose to follow. The term **"shall"** is used throughout this standard to indicate what is required in order for a GHG inventory

Figure [3.1] Overview of steps in scope 3 accounting and reporting



to be in conformance with the *GHG Protocol Scope 3 Standard*. The term **"should"** is used to indicate a recommendation, but not a requirement. The term **"may"** is used to indicate an option that is permissible or allowable. The term "required" is used in the guidance to refer to requirements in the standard. "Needs," "can," and "cannot" may be used to provide guidance on implementing a requirement or to indicate when an action is or is not possible.

3.3 Summary of requirements

This standard presents accounting and reporting requirements to help companies prepare a GHG inventory that represents a true and fair account of their scope 3 emissions. Standardized approaches and principles are designed to increase the consistency and transparency of scope 3 inventories. Table 3.1 provides a list of all the requirements included in this standard. Each requirement is further explained in the following chapters. Requirements are also presented in a box at the beginning of each chapter that contains requirements (chapters 4, 6, 9, and 11).

Table [3.1] List of requirements in this standard

Chapter	Requirements
Accounting and Reporting Principles **Chapter 4**	• GHG accounting and reporting of a scope 3 inventory shall be based on the following principles: relevance, completeness, consistency, transparency, and accuracy.
Setting the Scope 3 Boundary **Chapter 6**	• Companies shall account for all scope 3 emissions and disclose and justify any exclusions. • Companies shall account for emissions from each scope 3 category according to the minimum boundaries listed in table 5.4. • Companies shall account for scope 3 emissions of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6, if they are emitted in the value chain. • Biogenic CO_2 emissions that occur in the value chain shall not be included in the scopes, but shall be included and separately reported in the public report.
Setting a GHG Target and Tracking Emissions over Time **Chapter 9**	When companies choose to track performance or set a reduction target, companies shall: • Choose a scope 3 base year and specify their reasons for choosing that particular year; • Develop a base year emissions recalculation policy that articulates the basis for any recalculations; and • Recalculate base year emissions when significant changes in the company structure or inventory methodology occur.
Reporting **Chapter 11**	Companies shall publicly report the following information: • A scope 1 and scope 2 emissions report in conformance with the *GHG Protocol Corporate Standard* • Total scope 3 emissions reported separately by scope 3 category • For each scope 3 category, total GHG emissions reported in metric tons of CO_2 equivalent, excluding biogenic CO_2 emissions and independent of any GHG trades, such as purchases, sales, or transfers of offsets or allowances • A list of scope 3 categories and activities included in the inventory • A list of scope 3 categories or activities excluded from the inventory with justification of their exclusion • Once a base year has been established: the year chosen as the scope 3 base year; the rationale for choosing the base year; the base year emissions recalculation policy; scope 3 emissions by category in the base year, consistent with the base year emissions recalculation policy; and appropriate context for any significant emissions changes that triggered base year emissions recalculations • For each scope 3 category, any biogenic CO_2 emissions reported separately • For each scope 3 category, a description of the types and sources of data, including activity data, emission factors and global warming potential (GWP) values, used to calculate emissions, and a description of the data quality of reported emissions data • For each scope 3 category, a description of the methodologies, allocation methods, and assumptions used to calculate scope 3 emissions • For each scope 3 category, the percentage of emissions calculated using data obtained from suppliers or other value chain partners

04 Accounting and Reporting Principles

As with financial accounting and reporting, generally accepted GHG accounting principles are intended to underpin and guide GHG accounting and reporting to ensure the reported inventory represents a faithful, true, and fair account of a company's GHG emissions. The five principles described below are adapted from the GHG Protocol Corporate Standard and are intended to guide the accounting and reporting of a company's scope 3 inventory.

Requirements in this chapter

GHG accounting and reporting of a scope 3 inventory shall be based on the following principles: relevance, completeness, consistency, transparency, and accuracy.

GHG accounting and reporting of a scope 3 inventory shall be based on the following principles:

Relevance: Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external to the company.

Completeness: Account for and report on all GHG emission sources and activities within the inventory boundary. Disclose and justify any specific exclusions.

Consistency: Use consistent methodologies to allow for meaningful performance tracking of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

Transparency: Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

Accuracy: Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.

Guidance for applying the accounting and reporting principles

The primary function of these five principles is to guide the implementation of the *GHG Protocol Scope 3 Standard* and the assurance of the scope 3 inventory, particularly when application of the standard in specific situations is ambiguous.

In practice, companies may encounter tradeoffs between principles when completing a scope 3 inventory. For example, a company may find that achieving the most complete scope 3 inventory requires using less accurate data, compromising overall accuracy. Conversely, achieving the most accurate scope 3 inventory may require excluding activities with low accuracy, compromising overall completeness.

Companies should balance tradeoffs between principles depending on their individual business goals (see chapter 2 for more information). For example, tracking performance toward a specific scope 3 reduction target may require more accurate data. Over time, as the accuracy and completeness of scope 3 GHG data increases, the tradeoff between these accounting principles will likely diminish.

Relevance

A relevant GHG report contains the information that users – both internal and external to the company – need for their decision making. Companies should use the principle of relevance when determining whether to exclude any activities from the inventory boundary (see description of "Completeness" below). Companies should also use the principle of relevance as a guide when selecting data sources. Companies should collect data of sufficient quality to ensure that the inventory is relevant (i.e., that it appropriately reflects the GHG emissions of the company and serves the decision-making needs of users). Selection of data sources depends on a company's individual business goals. More information on relevance and data collection is provided in chapter 7.

Completeness

Companies should ensure that the scope 3 inventory appropriately reflects the GHG emissions of the company, and serves the decision-making needs of users, both internal and external to the company. In some situations, companies may be unable to estimate emissions due to a lack of data or other limiting factors. Companies should not exclude any activities from the scope 3 inventory that would compromise the relevance of the reported inventory. In the case of any exclusions, it is important that all exclusions be documented and justified. Assurance providers can determine the potential impact and relevance of the exclusion on the overall inventory report. More information on completeness is provided in chapter 6.

Consistency

Users of GHG information typically track emissions information over time in order to identify trends and assess the performance of the reporting company. The consistent application of accounting approaches, inventory boundary, and calculation methodologies is essential to producing comparable GHG emissions data over time. If there are changes to the inventory boundary (e.g., inclusion of previously excluded activities), methods, data, or other factors affecting emission estimates, they need to be transparently documented and justified, and may warrant recalculation of base year emissions. More information on consistency when tracking performance over time is provided in chapter 9.

Transparency

Transparency relates to the degree to which information on the processes, procedures, assumptions and limitations of the GHG inventory are disclosed in a clear, factual, neutral, and understandable manner based on clear documentation (i.e., an audit trail). Information should be recorded, compiled, and analyzed in a way that enables internal reviewers and external assurance providers to attest to its credibility. Specific exclusions need to be clearly identified and

Companies should balance tradeoffs between principles depending on their individual business goals.

justified, assumptions disclosed, and appropriate references provided for the methodologies applied and the data sources used. The information should be sufficient to enable a party external to the inventory process to derive the same results if provided with the same source data. A transparent report will provide a clear understanding of the relevant issues and a meaningful assessment of emissions performance of the company's scope 3 activities. More information on reporting is provided in chapter 11.

Accuracy

Data should be sufficiently accurate to enable intended users to make decisions with reasonable confidence that the reported information is credible. It is important that any estimated data be as accurate as possible to guide the decision-making needs of the company and ensure that the GHG inventory is relevant. GHG measurements, estimates, or calculations should be systemically neither over nor under the actual emissions value, as far as can be judged. Companies should reduce uncertainties in the quantification process as far as practicable and ensure the data are sufficiently accurate to serve decision-making needs. Reporting on measures taken to ensure accuracy and improve accuracy over time can help promote credibility and enhance transparency. More information on accuracy when collecting data is provided in chapter 7.

05 Identifying Scope 3 Emissions

This chapter provides an overview of scope 3 emissions, including the list of scope 3 categories and descriptions of each category.

5.1 Overview of the scopes

The *GHG Protocol Corporate Standard* divides a company's emissions into direct and indirect emissions.

- **Direct emissions** are emissions from sources that are owned or controlled by the reporting company.
- **Indirect emissions** are emissions that are a consequence of the activities of the reporting company, but occur at sources owned or controlled by another company.

Emissions are further divided into three scopes (see table 5.1). Direct emissions are included in scope 1. Indirect emissions are included in scope 2 and scope 3. While a company has control over its direct emissions, it has influence over its indirect emissions. A complete GHG inventory therefore includes scope 1, scope 2, and scope 3.

Scope 1, scope 2, and scope 3 are mutually exclusive for the reporting company, such that there is no double counting of emissions between the scopes. In other words, a company's scope 3 inventory does not include any emissions already accounted for as scope 1 or scope 2 by the same company. Combined, a company's scope 1, scope 2, and scope 3 emissions represent the total GHG emissions related to company activities.

By definition, scope 3 emissions occur from sources owned or controlled by other entities in the value chain (e.g., materials suppliers, third-party logistics providers, waste management suppliers, travel suppliers, lessees and lessors, franchisees, retailers, employees, and customers). The scopes are defined to ensure that two or more companies do not account for the same emission within scope 1 or scope 2. By properly accounting for emissions as scope 1, scope 2, and scope 3, companies avoid double counting within scope 1 and scope 2. (For more information, see the *GHG Protocol Corporate Standard*, chapter 4, "Setting Operational Boundaries.")

In certain cases, two or more companies may account for the same emission within scope 3. For example, the scope 1 emissions of a power generator are the scope 2 emissions of an electrical appliance user, which are in turn the scope 3 emissions of both the appliance manufacturer and the appliance retailer. Each of these four companies has different and often mutually exclusive opportunities to reduce emissions. The power generator can generate power using lower-carbon sources. The electrical appliance user can use the appliance more efficiently. The appliance manufacturer can increase the efficiency of the

Table [5.1] Overview of the scopes

Emissions type	*Scope*	*Definition*	*Examples*
Direct emissions	Scope 1	Emissions from operations that are owned or controlled by the reporting company	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment
Indirect emissions	Scope 2	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company	Use of purchased electricity, steam, heating, or cooling
	Scope 3	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions	Production of purchased products, transportation of purchased products, or use of sold products

appliance it produces, and the product retailer can offer more energy-efficient product choices.

By allowing for GHG accounting of direct and indirect emissions by multiple companies in a value chain, scope 1, scope 2, and scope 3 accounting facilitates the simultaneous action of multiple entities to reduce emissions throughout society. Because of this type of double counting, scope 3 emissions should not be aggregated across companies to determine total emissions in a given region. Note that while a single emission may be accounted for by more than one company as scope 3, in certain cases the emission is accounted for by each company in a different scope 3 category (see section 5.4). For more information on double counting within scope 3, see section 9.6.

5.2 Organizational boundaries and scope 3 emissions

Defining the organizational boundary is a key step in corporate GHG accounting. This step determines which operations are included in the company's organizational boundary and how emissions from each operation are consolidated by the reporting company. As detailed in the *GHG Protocol Corporate Standard*, a company has three options for defining its organizational boundaries as shown in table 5.2.

Companies should use a consistent consolidation approach across the scope 1, scope 2, and scope 3 inventories. The selection of a consolidation approach affects which activities in the company's value chain are categorized as direct emissions (i.e., scope 1 emissions) and indirect emissions (i.e., scope 2 and scope 3 emissions). Operations or activities that are excluded from a company's scope 1 and scope 2 inventories as a result of the organizational boundary definition (e.g., leased assets, investments, and

Table [5.2] Consolidation approaches

Consolidation approach	*Description*
Equity share	Under the equity share approach, a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation.
Financial control	Under the financial control approach, a company accounts for 100 percent of the GHG emissions over which it has financial control. It does not account for GHG emissions from operations in which it owns an interest but does not have financial control.
Operational control	Under the operational control approach, a company accounts for 100 percent of the GHG emissions over which it has operational control. It does not account for GHG emissions from operations in which it owns an interest but does not have operational control.

franchises) may become relevant when accounting for scope 3 emissions (see box 5.1).

Scope 3 includes:

- Emissions from activities in the value chain of the entities included in the company's organizational boundary
- Emissions from leased assets, investments, and franchises that are excluded from the company's organizational boundary but that the company partially or wholly owns or controls (see box 5.1)

For example, if a company selects the equity share approach, emissions from any asset the company partially or wholly owns are included in its direct emissions (i.e., scope 1), but emissions from any asset the company controls but does not partially or wholly own (e.g., a leased asset) are excluded from its direct emissions and should be included in its scope 3 inventory.[1]

Similarly, if a company selects the operational control approach, emissions from any asset the company controls are included in its direct emissions (i.e., scope 1), but emissions from any asset the company wholly or partially owns but does not control (e.g., investments) are excluded from its direct emissions and should be included in its scope 3 inventory.

See the *GHG Protocol Corporate Standard*, chapter 3, "Setting Organizational Boundaries" for more information on each of the consolidation approaches.

5.3 Upstream and downstream scope 3 emissions

This standard divides scope 3 emissions into upstream and downstream emissions. The distinction is based on the financial transactions of the reporting company.

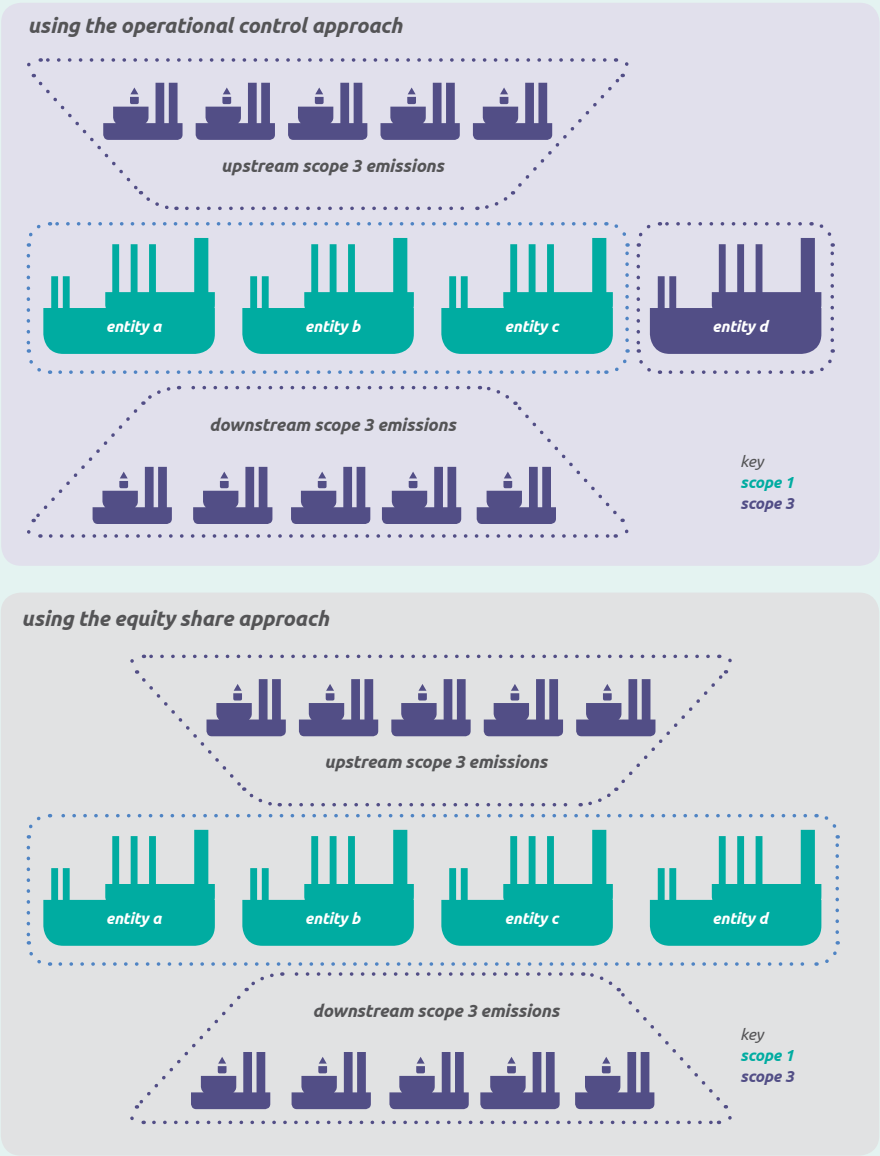
- **Upstream emissions** are indirect GHG emissions related to purchased or acquired goods and services.
- **Downstream emissions** are indirect GHG emissions related to sold[2] goods and services.

In the case of goods purchased or sold by the reporting company, upstream emissions occur up to the point of receipt by the reporting company, while downstream emissions occur subsequent to their sale by the reporting company and transfer of control from the reporting company to another entity (e.g., a customer). Emissions from activities under the ownership or control of the reporting company (i.e., direct emissions) are neither upstream nor downstream (see figure 5.2).

Box [5.1] Example of how the consolidation approach affects the scope 3 inventory

A reporting company has an equity share in four entities (Entities A, B, C and D) and has operational control over three of those entities (Entities A, B, and C). The company selects the operational control approach to define its organizational boundary. Emissions from sources controlled by Entities A, B, and C are included in the company's scope 1 inventory, while emissions from sources controlled by Entity D are excluded from the reporting company's scope 1 inventory. Emissions in the value chain of Entities A, B, and C are included in the company's scope 3 inventory. Emissions from the operation of Entity D are included in the reporting company's scope 3 inventory as an investment (according to the reporting company's share of equity in Entity D). If the company instead selects the equity share approach to define its organizational boundary, the company would instead include emissions from sources controlled by Entities A, B, C, and D in its scope 1 inventory, according to its share of equity in each entity. See figure 5.1.

Figure [5.1] Example of how the consolidation approach affects the scope 3 inventory



5.4 Overview of scope 3 categories

This standard categorizes scope 3 emissions into 15 distinct categories, as listed in figure 5.2 and table 5.3. The categories are intended to provide companies with a systematic framework to organize, understand, and report on the diversity of scope 3 activities within a corporate value chain. The categories are designed to be mutually exclusive, such that, for any one reporting company, there is no double counting of emissions between categories.[3] Each scope 3 category is comprised of multiple scope 3 activities that individually result in emissions.

Table 5.4 includes descriptions of each of the 15 categories that comprise scope 3 emissions. Each category is described in detail in section 5.5. Companies are required to report scope 3 emissions by scope 3 category. Any scope 3 activities not captured by the list of scope 3 categories may be reported separately (see chapter 11).

Minimum boundaries of scope 3 categories

Table 5.4 identifies the minimum boundaries of each scope 3 category in order to standardize the boundaries of each category and help companies understand which activities should be accounted for. The minimum boundaries are intended to ensure that major activities are included in the scope 3 inventory, while clarifying that companies need not account for the value chain emissions of each entity in its value chain, ad infinitum. Companies may include emissions from optional activities within each category. Companies may exclude scope 3 activities included in the minimum boundary of each category, provided that any exclusion is disclosed and justified. (For more information, see chapter 6.)

For some scope 3 categories (e.g., purchased goods and services, capital goods, fuel- and energy-related activities), the minimum boundary includes all upstream (cradle-to-gate[4]) emissions of purchased products to

Figure [5.2] Overview of GHG Protocol scopes and emissions across the value chain

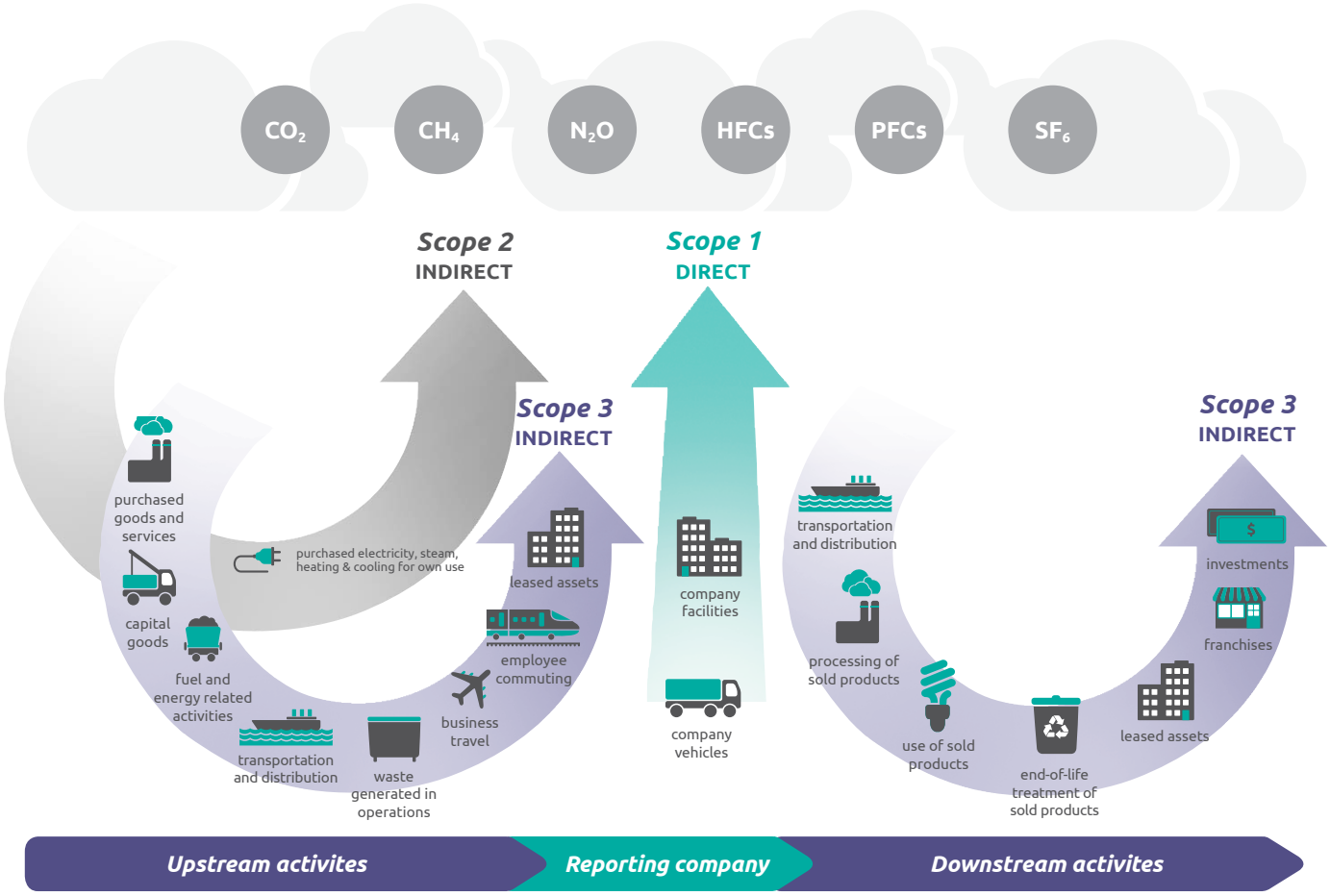


Table [5.3] List of scope 3 categories

Upstream or downstream	*Scope 3 category*
Upstream scope 3 emissions	**1.** Purchased goods and services **2.** Capital goods **3.** Fuel- and energy-related activities (not included in scope 1 or scope 2) **4.** Upstream transportation and distribution **5.** Waste generated in operations **6.** Business travel **7.** Employee commuting **8.** Upstream leased assets
Downstream scope 3 emissions	**9.** Downstream transportation and distribution **10.** Processing of sold products **11.** Use of sold products **12.** End-of-life treatment of sold products **13.** Downstream leased assets **14.** Franchises **15.** Investments

ensure that the inventory captures the GHG emissions of products wherever they occur in the life cycle, from raw material extraction through purchase by the reporting company. For other categories (e.g., transportation and distribution, waste generated in operations, business travel, employee commuting, leased assets, franchises, use of sold products, etc.), the minimum boundary includes the scope 1 and scope 2 emissions of the relevant value chain partner (e.g., the transportation provider, waste management company, transportation carrier, employee, lessor, franchisor, consumer, etc.). For these categories, the major emissions related to the scope 3 category result from scope 1 and scope 2 activities of the entity (e.g., the fuel consumed in an airplane for business travel), rather than the emissions associated with manufacturing capital goods or infrastructure (e.g., the construction of an airplane or airport for business travel). Companies may account for additional emissions beyond the minimum boundary where relevant.

Time boundary of scope 3 categories

This standard is designed to account for all emissions related to the reporting company's activities in the reporting year (e.g., emissions related to products purchased or sold in the reporting year). For some scope 3 categories, emissions occur simultaneously with the activity (e.g., from combustion of energy), so emissions occur in the same year as the company's activities (see figure 5.3). For some categories, emissions may have occurred in previous years. For other scope 3 categories, emissions are expected to occur in future years because the activities in the reporting year have long-term emissions impacts. For these categories, reported emissions have not yet happened, but are expected to happen as a result of the waste generated, investments made, and products sold in the reporting year. For these categories, the reported data should not be interpreted to mean that emissions have already occurred, but that emissions are expected to occur as a result of activities that occurred in the reporting year.

Figure [5.3] Time boundary of scope 3 categories

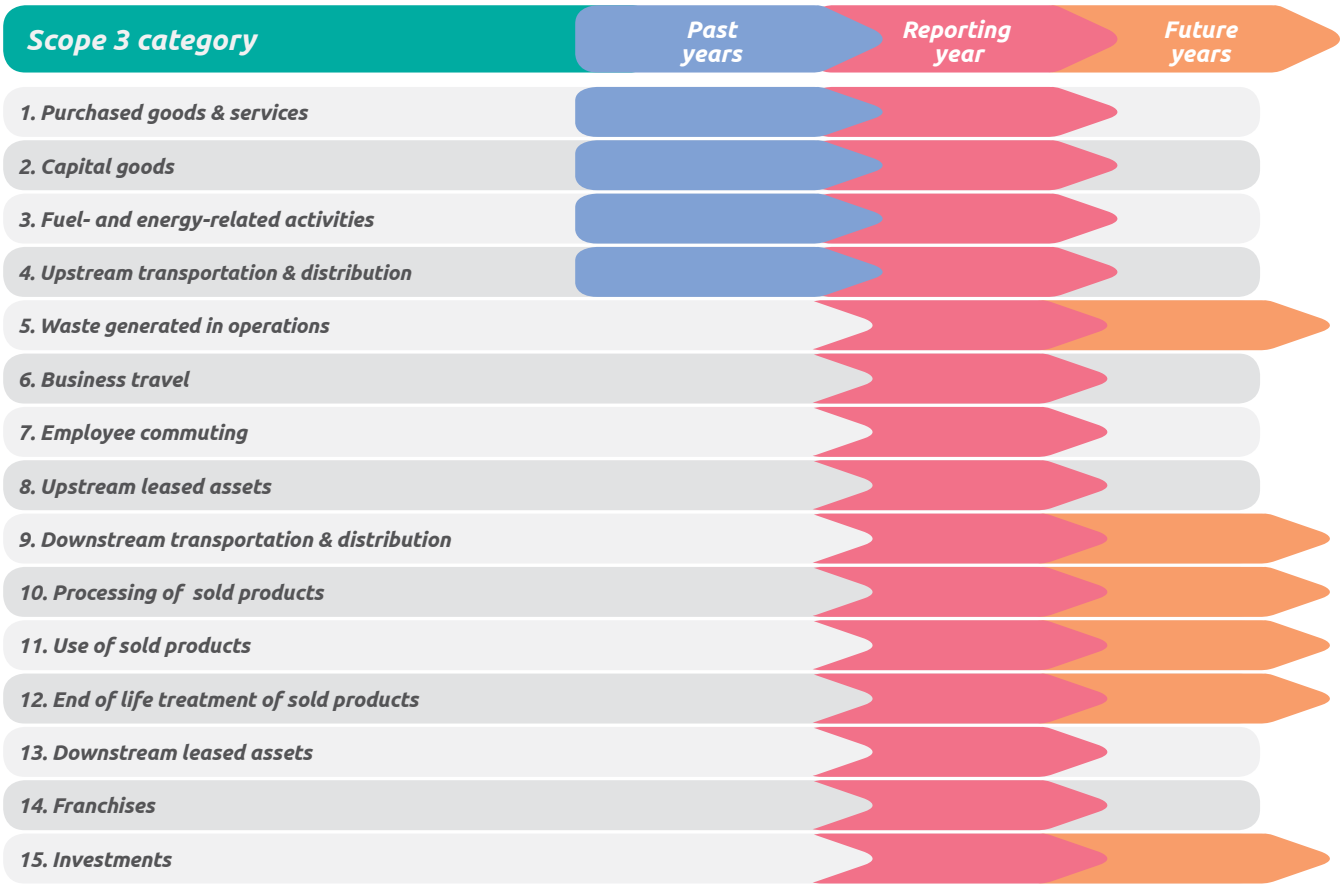


Table [5.4] **Description and boundaries of scope 3 categories**

Upstream scope 3 emissions

Category	*Category description*	*Minimum boundary*
1. Purchased goods and services	• Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8	• All upstream (cradle-to-gate) emissions of purchased goods and services
2. Capital goods	• Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year	• All upstream (cradle-to-gate) emissions of purchased capital goods
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	• Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in scope 1 or scope 2, including: **a.** Upstream emissions of purchased fuels (extraction, production, and transportation of fuels consumed by the reporting company) **b.** Upstream emissions of purchased electricity (extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling consumed by the reporting company) **c.** Transmission and distribution (T&D) losses (generation of electricity, steam, heating and cooling that is consumed (i.e., lost) in a T&D system) – reported by end user **d.** Generation of purchased electricity that is sold to end users (generation of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users) – reported by utility company or energy retailer only	**a.** For upstream emissions of purchased fuels: All upstream (cradle-to-gate) emissions of purchased fuels (from raw material extraction up to the point of, but excluding combustion) **b.** For upstream emissions of purchased electricity: All upstream (cradle-to-gate) emissions of purchased fuels (from raw material extraction up to the point of, but excluding, combustion by a power generator) **c.** For T&D losses: All upstream (cradle-to-gate) emissions of energy consumed in a T&D system, including emissions from combustion **d.** For generation of purchased electricity that is sold to end users: Emissions from the generation of purchased energy

Table [5.4] **Description and boundaries of scope 3 categories (continued)**

Upstream scope 3 emissions

Category	*Category description*	*Minimum boundary*
4. Upstream transportation and distribution	• Transportation and distribution of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company) • Transportation and distribution services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company)	• The scope 1 and scope 2 emissions of transportation and distribution providers that occur during use of vehicles and facilities (e.g., from energy use) • ***Optional:*** The life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure
5. Waste generated in operations	• Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company)	• The scope 1 and scope 2 emissions of waste management suppliers that occur during disposal or treatment • ***Optional:*** Emissions from transportation of waste
6. Business travel	• Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company)	• The scope 1 and scope 2 emissions of transportation carriers that occur during use of vehicles (e.g., from energy use) • ***Optional:*** The life cycle emissions associated with manufacturing vehicles or infrastructure
7. Employee commuting	• Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company)	• The scope 1 and scope 2 emissions of employees and transportation providers that occur during use of vehicles (e.g., from energy use) • ***Optional:*** Emissions from employee teleworking
8. Upstream leased assets	• Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 – reported by lessee	• The scope 1 and scope 2 emissions of lessors that occur during the reporting company's operation of leased assets (e.g., from energy use) • ***Optional:*** The life cycle emissions associated with manufacturing or constructing leased assets

Table [5.4] **Description and boundaries of scope 3 categories (continued)**

Downstream scope 3 emissions

Category	*Category description*	*Minimum boundary*
9. Downstream transportation and distribution	• Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company)	• The scope 1 and scope 2 emissions of transportation providers, distributors, and retailers that occur during use of vehicles and facilities (e.g., from energy use) • ***Optional:*** The life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure
10. Processing of sold products	• Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers)	• The scope 1 and scope 2 emissions of downstream companies that occur during processing (e.g., from energy use)
11. Use of sold products	• End use of goods and services sold by the reporting company in the reporting year	• The direct use-phase emissions of sold products over their expected lifetime (i.e., the scope 1 and scope 2 emissions of end users that occur from the use of: products that directly consume energy (fuels or electricity) during use; fuels and feedstocks; and GHGs and products that contain or form GHGs that are emitted during use) • ***Optional:*** The indirect use-phase emissions of sold products over their expected lifetime (i.e., emissions from the use of products that indirectly consume energy (fuels or electricity) during use)
12. End-of-life treatment of sold products	• Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life	• The scope 1 and scope 2 emissions of waste management companies that occur during disposal or treatment of sold products
13. Downstream leased assets	• Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 – reported by lessor	• The scope 1 and scope 2 emissions of lessees that occur during operation of leased assets (e.g., from energy use). • ***Optional:*** The life cycle emissions associated with manufacturing or constructing leased assets

Table [5.4] **Description and boundaries of scope 3 categories (continued)**

Downstream scope 3 emissions

Category	*Category description*	*Minimum boundary*
14. Franchises	• Operation of franchises in the reporting year, not included in scope 1 and scope 2 – reported by franchisor	• The scope 1 and scope 2 emissions of franchisees that occur during operation of franchises (e.g., from energy use) • ***Optional:*** The life cycle emissions associated with manufacturing or constructing franchises
15. Investments	• Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in scope 1 or scope 2	• See the description of category 15 (Investments) in section 5.5 for the required and optional boundaries

5.5 Descriptions of scope 3 categories

This section provides detailed descriptions of each scope 3 category.

Category 1: Purchased goods and services

This category includes all upstream (i.e., cradle-to-gate) emissions from the production of products purchased or acquired by the reporting company in the reporting year. Products include both goods (tangible products) and services (intangible products).

This category includes emissions from all purchased goods and services not otherwise included in the other categories of upstream scope 3 emissions (i.e., category 2 through category 8). Specific categories of upstream emissions are separately reported in category 2 through category 8 to enhance the transparency and consistency of scope 3 reports.

Cradle-to-gate emissions include all emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company). Cradle-to-gate emissions may include:

- Extraction of raw materials
- Agricultural activities
- Manufacturing, production, and processing
- Generation of electricity consumed by upstream activities
- Disposal/treatment of waste generated by upstream activities
- Land use and land-use change[5]
- Transportation of materials and products between suppliers
- Any other activities prior to acquisition by the reporting company

Emissions from the use of products purchased by the reporting company are accounted for in either scope 1 (e.g., for fuel use) or scope 2 (e.g., for electricity use), rather than scope 3.

Companies may find it useful to differentiate between purchases of production-related and non-production-related products. Doing so may be aligned with existing procurement practices and therefore may be a useful way to more efficiently organize and collect data (see box 5.2).

Companies may also find it useful to differentiate between purchases of intermediate products, final products, and capital goods (see box 5.3).

Box [5.2] Production-related and non-production-related procurement

A company's purchases can be divided into two types:

- Production-related procurement
- Non-production-related procurement

Production-related procurement (often called direct procurement) consists of purchased goods that are directly related to the production of a company's products. Production-related procurement includes:

- Intermediate goods (e.g., materials, components, and parts) that the company purchases to process, transform, or include in another product
- Final goods purchased for resale (for retail and distribution companies only)
- Capital goods (e.g., plant, property, and equipment) that the company uses to manufacture a product, provide a service, or sell, store, and deliver merchandise

Non-production-related procurement (often called indirect procurement) consists of purchased goods and services that are not integral to the company's products, but are instead used to enable operations. Non-production-related procurement may include capital goods, such as furniture, office equipment, and computers. Non-production-related procurement includes:

- Operations resource management: Products used in office settings such as office supplies, office furniture, computers, telephones, travel services, IT support, outsourced administrative functions, consulting services, and janitorial and landscaping services
- Maintenance, repairs, and operations: Products used in manufacturing settings, such as spare parts and replacement parts

Box [5.3] Intermediate products, final products, and capital goods

Intermediate products are inputs to the production of other goods or services that require further processing, transformation, or inclusion in another product before use by the end consumer. Intermediate products are not consumed by the end user in their current form.

Final products are goods and services that are consumed by the end user in their current form, without further processing, transformation, or inclusion in another product. Final products include:

- Products consumed by end consumers
- Products sold to retailers for resale to end consumers (e.g., consumer products)
- Products consumed by businesses in their current form (e.g., office supplies)

Capital goods are final goods that are not immediately consumed or further processed by the company, but are instead used in their current form by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. Scope 3 emissions from capital goods are reported in category 2 (Capital goods), rather than category 1 (Purchased goods and services).

Intermediate goods and capital goods are both inputs to a company's operations. The distinction between intermediate goods and capital goods depends on the circumstances. For example, if a company includes an electrical motor in another product (e.g., a motor vehicle), the electrical motor is an intermediate good. If a company uses the electrical motor to produce other goods, it is a capital good consumed by the reporting company.

Category 2: Capital goods

This category includes all upstream (i.e., cradle-to-gate) emissions from the production of capital goods purchased or acquired by the reporting company in the reporting year. Emissions from the use of capital goods by the reporting company are accounted for in either scope 1 (e.g., for fuel use) or scope 2 (e.g., for electricity use), rather than scope 3.

Capital goods are final products that have an extended life and are used by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or as plant, property, and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles.

In certain cases, there may be ambiguity over whether a particular purchased product is a capital good (to be reported in category 2) or a purchased good (to be reported in category 1). Companies should follow their own financial accounting procedures to determine whether to account for a purchased product as a capital good in this category or as a purchased good or service in category 1. Companies should not double count emissions between category 1 and category 2.

Box [5.4] Accounting for emissions from capital goods

In financial accounting, capital goods (sometimes called "capital assets") are typically depreciated or amortized over the life of the asset. For purposes of accounting for scope 3 emissions companies should not depreciate, discount, or amortize the emissions from the production of capital goods over time. Instead companies should account for the total cradle-to-gate emissions of purchased capital goods in the year of acquisition, the same way the company accounts for emissions from other purchased products in category 1. If major capital purchases occur only once every few years, scope 3 emissions from capital goods may fluctuate significantly from year to year. Companies should provide appropriate context in the public report (e.g., by highlighting exceptional or non-recurring capital investments).

BASF: Scope 3 emissions from purchased goods and services

BASF, a global chemical company, is committed to acting responsibly throughout its entire value chain in order to build stable and sustainable relationships with business partners. When making decisions, BASF chooses carriers, service providers, and suppliers not just on the basis of price, but also on the basis of their performance in environmental and social responsibility. When calculating scope 3 emissions from category 1 (Purchased goods and services), BASF accounted for emissions from raw materials, components, packaging materials, and other goods and services not included in the other upstream scope 3 categories. BASF found that, in 2009, scope 3 emissions from category 1 (Purchased goods and services) accounted for 24 percent of its total scope 3 emissions and 20 percent of its combined scope 1, scope 2, and scope 3 emissions.

Calculating emissions from raw materials

BASF accounted for scope 3 emissions from 100 percent of its procured raw materials and component manufacturing at its suppliers' facilities (by weight). BASF calculated the cradle-to-gate emissions of raw materials, including all direct GHG emissions from raw material extraction, precursor manufacturing, and transport, as well as indirect emissions from energy use. To do so, BASF determined the quantity of each product purchased, then applied cradle-to-gate emission factors for about 90 percent of the purchased products (by weight), obtained from commercially and publically available data sources as well as from its own life cycle assessment database, which is based mainly on primary data. BASF multiplied the CO_2e emissions per kilogram of each product by the respective quantity of the product purchased to determine cradle-to-gate emissions. Finally, BASF extrapolated the resulting scope 3 emissions to 100 percent of total purchases in order to account for all procured raw materials and components.

Calculating emissions from packaging

BASF first determined the types and quantities of packaging materials purchased in the reporting year (such as plastic, paper board, and steel) based on the number of containers purchased and the fractions of materials used in each container. BASF then calculated GHG emissions by multiplying the total amount of various materials by their respective cradle-to gate emission factors.

Results

BASF found that 93 percent of its category 1 GHG emissions result from the raw materials purchased, while packaging, services and, equipment account for only 7 percent. This finding suggests the need to prioritize future scope 3 accounting and reduction efforts on raw materials. Working with suppliers to improve GHG performance will help BASF reduce its scope 3 emissions from raw materials over time. The company's results could also inform the development of sector-specific guidance for the chemical industry, by focusing on raw materials and components for the chemical sector.

Scope 3 emissions from category 1 (Purchased goods and services) accounted for 24 percent of BASF's total scope 3 emissions and 20 percent of its combined scope 1, scope 2, and scope 3 emissions.

Category 3: Fuel- and energy-related emissions not included in scope 1 or scope 2

This category includes emissions related to the production of fuels and energy purchased and consumed by the reporting company in the reporting year that are not included in scope 1 or scope 2.

Category 3 excludes emissions from the combustion of fuels or electricity consumed by the reporting company, since they are already included in scope 1 or scope 2. Scope 1 includes emissions from the combustion of fuels by sources owned or controlled by the reporting company. Scope 2 includes the emissions from the combustion of fuels to generate electricity, steam, heating, and cooling purchased and consumed by the reporting company.

This category includes emissions from four distinct activities (see table 5.5).

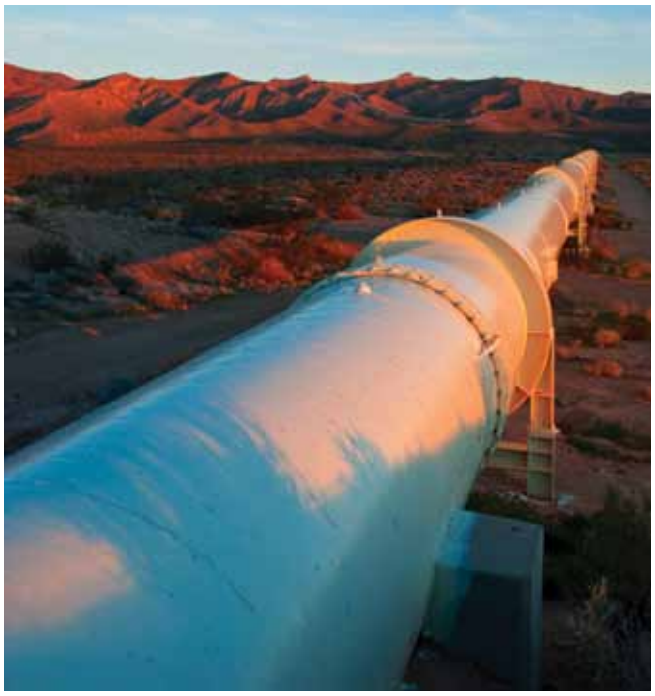


Table [5.5] Activities included in category 3 (Fuel- and energy-related emissions not included in scope 1 or scope 2)

Activity	*Description*	*Applicability*
a. Upstream emissions of purchased fuels	Extraction, production, and transportation of fuels consumed by the reporting company • Examples include mining of coal, refining of gasoline, transmission and distribution of natural gas, production of biofuels, etc.	Applicable to end users of fuels
b. Upstream emissions of purchased electricity	Extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling that is consumed by the reporting company • Examples include mining of coal, refining of fuels, extraction of natural gas, etc.	Applicable to end users of electricity, steam, heating and cooling
c. T&D losses	Generation of electricity, steam, heating, and cooling that is consumed (i.e., lost) in a T&D system – reported by end user	Applicable to end users of electricity, steam, heating and cooling
d. Generation of purchased electricity that is sold to end users	Generation of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users – reported by utility company or energy retailer • Note: This activity is particularly relevant for utility companies that purchase wholesale electricity supplied by independent power producers for resale to their customers.	Applicable to utility companies and energy retailers

Box [5.5] Accounting for emissions from the production, transmission, and use of electricity

Figure [5.4] Emissions across an electricity value chain

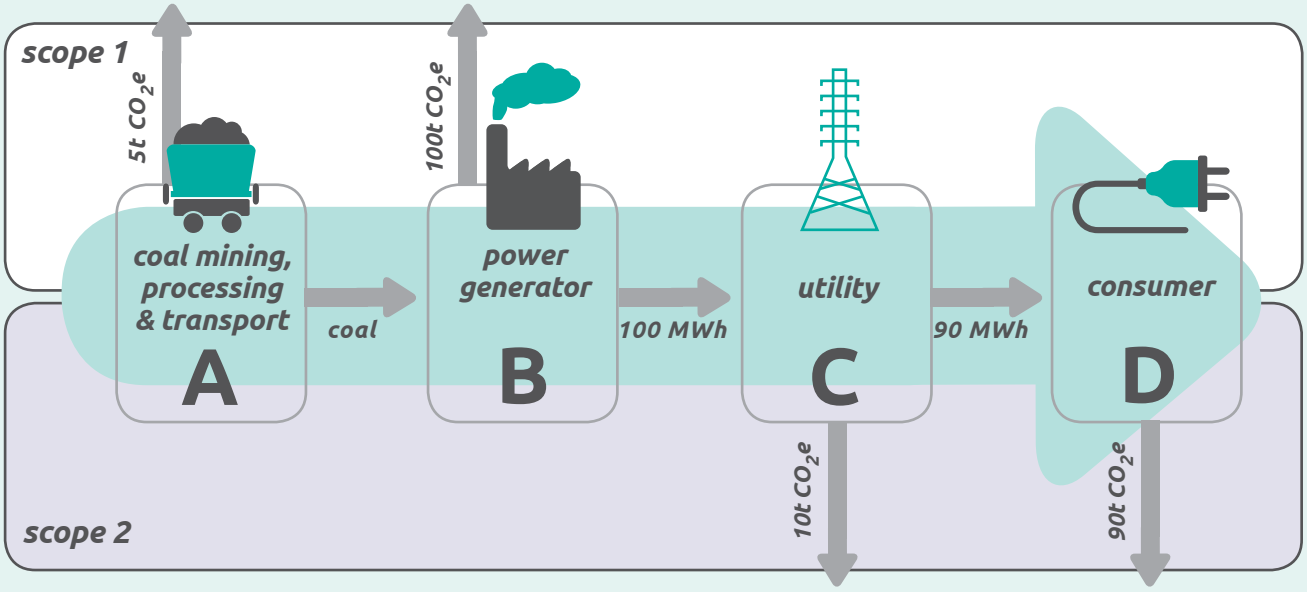


Figure 5.4 illustrates an electricity value chain. A coal mining and processing company (A) directly emits 5 metric tons of CO_2e per year from its operations and sells coal to a power generator (B), which generates 100 MWh of electricity and directly emits 100 metric tons of CO_2e per year. A utility (C) that owns and operates a T&D system purchases all of the generator's electricity. The utility consumes 10 MWh due to T&D losses (corresponding to 10 metric tons CO_2e of scope 2 emissions per year) and delivers the remaining 90 MWh to an end user (D), which consumes 90 MWh (corresponding to 90 metric tons CO_2e of scope 2 emissions per year).

Table 5.6 explains how each company accounts for GHG emissions. In this example, the emission factor of the electricity sold by Company B is 1 t CO_2e/MWh. All numbers are illustrative only.

Box [5.5] Accounting for emissions from the production, transmission, and use of electricity (continued)

Table [5.6] Accounting for emissions across an electricity value chain

Reporting company	*Scope 1*	*Scope 2*	*Scope 3*
Coal mining, processing, and transport (Company A)	5 t CO_2e	0 (unless electricity is used during coal mining and processing)	100 t CO_2e from the combustion of sold products (i.e., coal) *Reported in category 11 (Use of sold products)*
Power generator (Company B)	100 t CO_2e	0	5 t CO_2e from the extraction, production, and transportation of fuel (i.e., coal) consumed by the reporting company *Reported in Category 3 (Fuel- and energy-related activities)* Note: The generator does not account for scope 3 emissions associated with sold electricity because the emissions are already accounted for in scope 1.
Utility (Company C)	0 (unless SF_6 is released from the T&D system)	10 t CO_2e from the generation of electricity purchased and consumed by Company C	0.5 t CO_2e from the extraction, production, and transportation of fuels (i.e., coal) consumed in the generation of electricity consumed by Company C (5 tons from coal mining x 10 percent of electricity generated by B that is consumed by C) 90 t CO_2e from the generation of electricity purchased by Company C and sold to Company D *Both are reported in category 3 (Fuel- and energy-related activities)*
End consumer of electricity (Company D)	0	90 t CO_2e from the generation of electricity purchased and consumed by Company D	4.5 t CO_2e from the extraction, production, and transportation of coal consumed in the generation of electricity consumed by Company D 10 t CO_2e from the generation of electricity that is consumed (i.e., lost) in transmission and distribution *Both are reported in category 3 (Fuel- and energy-related activities)*

Category 4: Upstream transportation and distribution

This category includes emissions from the transportation and distribution of products (excluding fuel and energy products) purchased or acquired by the reporting company in the reporting year in vehicles and facilities not owned or operated by the reporting company, as well as other transportation and distribution services purchased by the reporting company in the reporting year (including both inbound and outbound logistics).

Specifically, this category includes:

- Transportation and distribution of products purchased by the reporting company in the reporting year, between a company's tier 1 suppliers[6] and its own operations (including multi-modal shipping where multiple carriers are involved in the delivery of a product)
- Third-party transportation and distribution services purchased by the reporting company in the reporting year (either directly or through an intermediary), including inbound logistics, outbound logistics (e.g., of sold products), and third-party transportation and distribution between a company's own facilities

Emissions may arise from the following transportation and distribution activities throughout the value chain:

- Air transport
- Rail transport
- Road transport
- Marine transport
- Storage of purchased products in warehouses, distribution centers, and retail facilities

Outbound logistics services purchased by the reporting company are categorized as upstream because they are a purchased service. Emissions from transportation and distribution of purchased products upstream of the reporting company's tier 1 suppliers (e.g., transportation between a company's tier 2 and tier 1 suppliers) are accounted for in scope 3, category 1 (Purchased goods and services). Table 5.7 explains the scope and scope 3 category where each type of transportation and distribution activity should be accounted for.

A reporting company's scope 3 emissions from upstream transportation and distribution include the scope 1 and scope 2 emissions of third-party transportation companies.

Category 5: Waste generated in operations

This category includes emissions from third-party disposal and treatment of waste that is generated in the reporting company's owned or controlled operations in the reporting year. This category includes emissions from disposal of both solid waste and wastewater. Only waste treatment in facilities owned or operated by third parties is included in scope 3. Waste treatment at facilities owned or controlled by the reporting company is accounted for in scope 1 and scope 2. Treatment of waste generated in operations is categorized as an upstream scope 3 category because waste management services are purchased by the reporting company.

This category includes all future emissions that result from waste generated in the reporting year. (See section 5.4 for more information on the time boundary of scope 3 categories.)

Waste treatment activities may include:

- Disposal in a landfill
- Disposal in a landfill with landfill-gas-to-energy (LFGTE) – i.e., combustion of landfill gas to generate electricity
- Recovery for recycling
- Incineration
- Composting
- Waste-to-energy (WTE) or energy-from-waste (EfW) – i.e., combustion of municipal solid waste (MSW) to generate electricity
- Wastewater treatment

Companies may optionally include emissions from transportation of waste.

See box 5.6 for guidance on accounting for emissions from recycling.

A reporting company's scope 3 emissions from waste generated in operations include the scope 1 and scope 2 emissions of solid waste and wastewater management companies.

Table [5.7] Accounting for emissions from transportation and distribution activities in the value chain

Transportation and distribution activity in the value chain	*Scope and scope 3 category*
Transportation and distribution in vehicles and facilities owned or controlled by the reporting company	**Scope 1 (for fuel use) or scope 2 (for electricity use)**
Transportation and distribution in vehicles and facilities leased by and operated by the reporting company (and not already included in scope 1 or scope 2)	**Scope 3, category 8 (Upstream leased assets)**
Transportation and distribution of purchased products, upstream of the reporting company's tier 1 suppliers (e.g., transportation between a company's tier 2 and tier 1 suppliers)	**Scope 3, category 1 (Purchased goods and services), since emissions from transportation are already included in the cradle-to-gate emissions of purchased products. These emissions are not required to be reported separately from category 1.**
Production of vehicles (e.g., ships, trucks, planes) purchased or acquired by the reporting company	**Account for the upstream (i.e., cradle-to-gate) emissions associated with manufacturing vehicles in Scope 3, category 2 (Capital goods)**
Transportation of fuels and energy consumed by the reporting company	**Scope 3, category 3 (Fuel- and energy-related emissions not included in scope 1 or scope 2)**
Transportation and distribution of products purchased by the reporting company, between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company)	**Scope 3, category 4 (Upstream transportation and distribution)**
Transportation and distribution services purchased by the reporting company in the reporting year (either directly or through an intermediary), including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company)	
Transportation and distribution of products sold by the reporting company between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company)	**Scope 3, category 9 (Downstream transportation and distribution)**

Box [5.6] Accounting for emissions from recycling

Companies (e.g., plastic bottle manufacturers) may both purchase materials with recycled content (e.g., plastic) and sell products that are recyclable (e.g., plastic bottles). In this case, accounting for emissions from the recycling processes both upstream and downstream would double count emissions from recycling. To avoid double counting of emissions from recycling processes by the same company, companies should account for upstream emissions from recycling processes in category 1 and category 2 when the company purchases goods or materials with recycled content. In category 5 and category 12, companies should account for emissions from recovering materials at the end of their life for recycling, but should not account for emissions from recycling processes themselves (these are instead included in category 1 and category 2 by purchasers of recycled materials).

Companies should not report negative or avoided emissions associated with recycling in category 5 or category 12. Any claims of avoided emissions associated with recycling should not be included in, or deducted from, the scope 3 inventory, but may instead be reported separately from scope 1, scope 2, and scope 3 emissions. Companies that report avoided emissions should also provide data to support the claim that emissions are avoided (e.g., that recycled materials are collected, recycled, and used) and report the methodology, data sources, system boundary, time period, and other assumptions used to calculate avoided emissions. For more information on avoided emissions, see section 9.5.

Category 6: Business travel

This category includes emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars.

Emissions from transportation in vehicles owned or controlled by the reporting company are accounted for in either scope 1 (for fuel use) or scope 2 (for electricity use). Emissions from leased vehicles operated by the reporting company not included in scope 1 or scope 2 are accounted for in scope 3, category 8 (Upstream leased assets). Emissions from transportation of employees to and from work are accounted for in scope 3, category 7 (Employee commuting).

Emissions from business travel may arise from:

- Air travel
- Rail travel
- Bus travel
- Automobile travel (e.g., business travel in rental cars or employee-owned vehicles other than employee commuting to and from work)
- Other modes of travel

Companies may optionally include emissions from business travelers staying in hotels.

A reporting company's scope 3 emissions from business travel include the scope 1 and scope 2 emissions of transportation companies (e.g., airlines).

Category 7: Employee commuting

This category includes emissions from the transportation of employees[7] between their homes and their worksites.

Emissions from employee commuting may arise from:

- Automobile travel
- Bus travel
- Rail travel
- Air travel
- Other modes of transportation

Companies may include emissions from teleworking (i.e., employees working remotely) in this category.

A reporting company's scope 3 emissions from employee commuting include the scope 1 and scope 2 emissions of employees and third-party transportation providers.

Even though employee commuting is not always purchased or reimbursed by the reporting company, it is categorized as an upstream scope 3 category because it is a service that enables company operations, similar to purchased or acquired goods and services.

Category 8: Upstream leased assets

This category includes emissions from the operation of assets that are leased by the reporting company in the reporting year and not already included in the reporting company's scope 1 or scope 2 inventories. This category is only applicable to companies that operate leased assets (i.e., lessees). For companies that own and lease assets to others (i.e., lessors), see category 13 (Downstream leased assets).

Leased assets may be included in a company's scope 1 or scope 2 inventory depending on the type of lease and the consolidation approach the company uses to define its organizational boundaries (see section 5.2).

If the reporting company leases an asset for only part of the reporting year, it should account for emissions for the portion of the year that the asset was leased. A reporting company's scope 3 emissions from upstream leased assets include the scope 1 and scope 2 emissions of lessors (depending on the lessor's consolidation approach).

See Appendix A for more information on accounting for emissions from leased assets.

Category 9: Downstream transportation and distribution

This category includes emissions from transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), in vehicles and facilities not owned or controlled by the reporting company. This category includes emissions from retail and storage. Outbound transportation and distribution services that are purchased by the reporting company are excluded from category 9 and included in category 4 (Upstream transportation and distribution) because the reporting company purchases the service. Category 9 only includes transportation- and distribution-related emissions that occur after the reporting company pays to produce and distribute its products. See table 5.7 for guidance on accounting for emissions from transportation and distribution in the value chain.

Emissions from downstream transportation and distribution can arise from:

- Storage of sold products in warehouses and distribution centers
- Storage of sold products in retail facilities
- Air transport
- Rail transport
- Road transport
- Marine transport

Companies may include emissions from customers traveling to retail stores in this category, which can be significant for companies that own or operate retail facilities. See section 5.6 for guidance on the applicability of category 9 to final products and intermediate products sold by the reporting company. A reporting company's scope 3 emissions from downstream transportation and distribution include the scope 1 and scope 2 emissions of transportation companies, distribution companies, retailers, and (optionally) customers.

Category 10: Processing of sold products

This category includes emissions from processing of sold intermediate products by third parties (e.g., manufacturers) subsequent to sale by the reporting company. Intermediate products are products that require further processing, transformation, or inclusion in another product before use (see box 5.3), and therefore result in emissions from processing subsequent to sale by the reporting company and before use by the end consumer. Emissions from processing should be allocated to the intermediate product.

In certain cases, the eventual end use of sold intermediate products may be unknown. For example, a company may produce an intermediate product with many potential downstream applications, each of which has a different GHG emissions profile, and be unable to reasonably estimate the downstream emissions associated with the various end uses of the intermediate product. See section 6.4 for guidance in cases where downstream emissions associated with sold intermediate products are unknown.

Companies may calculate emissions from category 10 without collecting data from customers or other value chain partners. For more information, see *Guidance for*

Calculating Scope 3 Emissions, available online at www.ghgprotocol.org. See also section 5.6 for guidance on the applicability of category 10 to final products and intermediate products sold by the reporting company. A reporting company's scope 3 emissions from processing of sold intermediate products include the scope 1 and scope 2 emissions of downstream value chain partners (e.g., manufacturers).

Category 11: Use of sold products

This category includes emissions from the use of goods and services sold by the reporting company in the reporting year. A reporting company's scope 3 emissions from use of sold products include the scope 1 and scope 2 emissions of end users. End users include both consumers and business customers that use final products.

This standard divides emissions from the use of sold products into two types:

- Direct use-phase emissions
- Indirect use-phase emissions

The minimum boundary of category 11 includes direct use-phase emissions of sold products. Companies may also account for indirect use-phase emissions of sold products, and should do so when indirect use-phase emissions are expected to be significant. See table 5.8 for descriptions and examples of direct and indirect use-phase emissions.

This category includes the total expected lifetime emissions from all relevant products sold in the reporting year across the company's product portfolio. By doing so, the scope 3 inventory accounts for a company's total GHG emissions associated with its activities in the reporting year. (Refer to section 5.4 for more information on the time boundary of scope 3 categories.) See box 5.7 for an example of reporting product lifetime emissions and box 5.8 for guidance related to product lifetime and durability. Refer to the *GHG Protocol Product Standard* for information on accounting for GHG emissions from individual products over their life cycle.

Companies may optionally include emissions associated with maintenance of sold products during use.

See section 5.6 for guidance on the applicability of category 11 to final products and intermediate products sold by the reporting company.

Companies may calculate emissions from category 11 without collecting data from customers or consumers.

Table [5.8] Emissions from use of sold products

Type of emissions	*Product type*	*Examples*
Direct use-phase emissions (*Required*)	Products that directly consume energy (fuels or electricity) during use	Automobiles, aircraft, engines, motors, power plants, buildings, appliances, electronics, lighting, data centers, web-based software
	Fuels and feedstocks	Petroleum products, natural gas, coal, biofuels, and crude oil
	Greenhouse gases and products that contain or form greenhouse gases that are emitted during use	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, refrigeration and air-conditioning equipment, industrial gases, fire extinguishers, fertilizers
Indirect use-phase emissions (*Optional*)	Products that indirectly consume energy (fuels or electricity) during use	Apparel (requires washing and drying), food (requires cooking and refrigeration), pots and pans (require heating), and soaps and detergents (require heated water)

Calculating emissions from category 11 typically requires product design specifications and assumptions about how consumers use products (e.g., use profiles, assumed product lifetimes, etc.). For more information, see *Guidance for Calculating Scope 3 Emissions*, available online at www.ghgprotocol.org. Companies are required to report a description of the methodologies and assumptions used to calculate emissions (see chapter 11).

Where relevant, companies should report additional information on product performance when reporting scope 3 emissions in order to provide additional transparency on steps companies are taking to reduce GHG emissions from sold products. Such information may include GHG intensity metrics, energy intensity metrics, and annual emissions from the use of sold products (see section 11.3). See section 9.3 for guidance on recalculating base year emissions when methodologies or assumptions related to category 11 change over time.

Any claims of avoided emissions related to a company's sold products must be reported separately from the company's scope 1, scope 2, and scope 3 inventories. (For more information, see section 9.5.)

Box [5.7] Example of reporting product lifetime emissions

An automaker sells one million cars in 2010. Each car has an expected lifetime of ten years. The company reports the anticipated use-phase emissions of the one million cars it sold in 2010 over their ten year expected lifetime. The company also reports corporate average fuel economy (km per liter) and corporate average emissions (kg CO_2e/km) as relevant emissions-intensity metrics.

Box [5.8] Product lifetime and durability

Because the scope 3 inventory accounts for total lifetime emissions of sold products, companies that produce more durable products with longer lifetimes could appear to be penalized because, as product lifetimes increase, scope 3 emissions increase, assuming all else is constant. To reduce the potential for emissions data to be misinterpreted, companies should also report relevant information such as product lifetimes and emissions intensity metrics to demonstrate product performance over time. Relevant emissions intensity metrics may include annual emissions per product, energy efficiency per product, emissions per hour of use, emissions per kilometer driven, emissions per functional unit, etc.

Category 12: End-of-life treatment of sold products

This category includes emissions from the waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life.

This category includes the total expected end-of-life emissions from all products sold in the reporting year. (See section 5.4 for more information on the time boundary of scope 3 categories.) End-of-life treatment methods (e.g. landfilling, incineration) are described in category 5 (Waste generated in operations). A reporting company's scope 3 emissions from end-of-life treatment of sold products include the scope 1 and scope 2 emissions of waste management companies.

See section 5.6 for guidance on the applicability of category 12 to final products and intermediate products sold by the reporting company and box 5.6 for guidance on accounting for emissions from recycling, which applies to both category 5 and category 12. Calculating emissions from category 12 requires assumptions about the end-of-life treatment methods used by consumers. For more information, see *Guidance for Calculating Scope 3 Emissions*, available online at www.ghgprotocol.org. Companies are required to report a description of the methodologies and assumptions used to calculate emissions (see chapter 11).

IKEA: Scope 3 emissions from the use of sold products

IKEA, an international home furnishings retailer, estimated its scope 3 emissions from all sold products that consume energy during the use-phase. The products included all types of appliances (e.g., refrigerators, freezers, stoves, and ovens) and lighting (e.g., incandescent light bulbs, compact fluorescent bulbs, and halogen lights) sold in approximately 25 countries. IKEA calculated GHG emissions by first grouping hundreds of products into 15 distinct product groups, then determining the average power demand (in watts), average annual use time, and average product lifetimes for each product group. IKEA obtained information on product-use profiles and lifetimes from IKEA's suppliers and other experts. IKEA calculated the products' expected lifetime energy use and applied an average electricity emission factor to calculate the expected lifetime GHG emissions.

IKEA has adopted a target that, by 2015, all products sold will be 50 percent more efficient on average than the products on the market in 2008.

The results showed that the use of sold products accounted for 20 percent of IKEA's combined scope 1, scope 2, and scope 3 emissions, or approximately 6 million metric tons of GHG emissions. With the help of the scope 3 inventory, IKEA realized that small changes in the efficiency of its sold products would have significant effects on IKEA's total GHG emissions. As a result, IKEA has adopted a target that, by 2015, all products sold will be 50 percent more efficient on average than the products on the market in 2008. IKEA expects this strategy to achieve annual GHG reductions of several million metric tons, significantly more than the company's total scope 1 and scope 2 emissions, which in 2010 was approximately 800,000 metric tons of CO_2e.

Category 13: Downstream leased assets

This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in scope 1 or scope 2. This category is applicable to lessors (i.e., companies that receive payments from lessees). Companies that operate leased assets (i.e., lessees) should refer to category 8 (Upstream leased assets).

Leased assets may be included in a company's scope 1 or scope 2 inventory depending on the type of lease and the consolidation approach the company uses to define its organizational boundaries. (See section 5.2 for more information.) If the reporting company leases an asset for only part of the reporting year, the reporting company should account for emissions from the portion of the year that the asset was leased. See Appendix A for more information on accounting for emissions from leased assets.

In some cases, companies may not find value in distinguishing between products sold to customers (accounted for in category 11) and products leased to customers (accounted for in category 13). Companies may account for products leased to customers the same way the company accounts for products sold to customers (i.e., by accounting for the total expected lifetime emissions from all relevant products leased to other entities in the reporting year). In this case, companies should report emissions from leased products in category 11 (Use of sold products), rather than category 13 (Downstream leased assets) and avoid double counting between categories.

A reporting company's scope 3 emissions from downstream leased assets include the scope 1 and scope 2 emissions of lessees (depending on the lessee's consolidation approach).

Category 14: Franchises

This category includes emissions from the operation of franchises not included in scope 1 or scope 2. A franchise is a business operating under a license to sell or distribute another company's goods or services within a certain location. This category is applicable to franchisors (i.e., companies that grant licenses to other entities to sell or distribute its goods or services in return for payments, such as royalties for the use of trademarks and other services). Franchisors should account for emissions that occur from the operation of franchises (i.e., the scope 1 and 2 emissions of franchisees) in this category.

Franchisees (i.e., companies that operate franchises and pay fees to a franchisor) should include emissions from operations under their control in this category if they have not included those emissions in scope 1 and scope 2 due to their choice of consolidation approach. Franchisees may optionally report upstream scope 3 emissions associated with the franchisor's operations (i.e., the scope 1 and scope 2 emissions of the franchisor) in category 1 (Purchased goods and services).

Category 15: Investments

This category includes scope 3 emissions associated with the reporting company's investments in the reporting year, not already included in scope 1 or scope 2. This category is applicable to investors (i.e., companies that make an investment with the objective of making a profit) and companies that provide financial services. Investments are categorized as a downstream scope 3 category because the provision of capital or financing is a service provided by the reporting company.[8]

Category 15 is designed primarily for private financial institutions (e.g., commercial banks), but is also relevant to public financial institutions (e.g., multilateral development banks, export credit agencies, etc.) and other entities with investments not included in scope 1 and scope 2.

Investments may be included in a company's scope 1 or scope 2 inventory depending on how the company defines its organizational boundaries. For example, companies that use the equity share approach include emissions from equity investments in scope 1 and scope 2. Companies that use a control approach account only for those equity investments that are under the company's control in scope 1 and scope 2. Investments not included in the company's scope 1 or scope 2 emissions are included in scope 3, in this category. A reporting company's scope 3 emissions from investments are the scope 1 and scope 2 emissions of investees.

For purposes of GHG accounting, this standard divides financial investments into four types:

- Equity investments
- Debt investments
- Project finance
- Managed investments and client services

Table 5.9 and table 5.10 provide GHG accounting guidance for each type of financial investment. Table 5.9 provides the types of investments included in the minimum boundary of this category. Table 5.10 identifies types of investments that companies may optionally report, in addition to those provided in table 5.9.

Emissions from investments should be allocated to the reporting company based on the reporting company's proportional share of investment in the investee. Because investment portfolios are dynamic and can change frequently throughout the reporting year, companies should identify investments by choosing a fixed point in time, such as December 31 of the reporting year, or using a representative average over the course of the reporting year.

Songquan Deng / Shutterstock.com

Table [5.9] Accounting for emissions from investments (required)
(Additional guidance on italicized terms is provided on the next page)

Financial investment/ service	*Description*	*GHG accounting approach (Required)*
Equity investments	Equity investments made by the reporting company using the company's own capital and balance sheet, including: • Equity investments in **subsidiaries** (or group companies), where the reporting company has financial control (typically more than 50 percent ownership) • Equity investments in **associate companies** (or affiliated companies), where the reporting company has significant influence but not financial control (typically 20-50 percent ownership) • Equity investments in **joint ventures** (Non-incorporated joint ventures/ partnerships/ operations), where partners have joint financial control	In general, companies in the financial services sector should account for emissions from equity investments in scope 1 and scope 2 by using the equity share consolidation approach to obtain representative scope 1 and scope 2 inventories. If emissions from equity investments are not included in scope 1 or scope 2 (because the reporting company uses either the operational control or financial control consolidation approach and does not have control over the investee), account for *proportional scope 1 and scope 2 emissions* of equity investments that occur in the reporting year in scope 3, category 15 (Investments).
	• Equity investments made by the reporting company using the company's own capital and balance sheet, where the reporting company has **neither financial control nor significant influence** over the emitting entity (and typically has less than 20 percent ownership)	If not included in the reporting company's scope 1 and scope 2 inventories: Account for *proportional scope 1 and scope 2 emissions* of equity investments that occur in the reporting year in scope 3, category 15 (Investments). Companies may establish a materiality threshold (e.g., equity share of 1 percent) below which the company excludes equity investments from the inventory, if disclosed and justified.
Debt investments (with known use of proceeds)	Corporate debt holdings held in the reporting company's portfolio, including corporate debt instruments (such as bonds or convertible bonds prior to conversion) or commercial loans, **with known use of proceeds** (i.e., where the use of proceeds is identified as going to a particular project, such as to build a specific power plant)	For each year during the term of the investment, companies should account for *proportional scope 1 and scope 2 emissions* of *relevant projects* that occur in the reporting year in scope 3, category 15 (Investments). In addition, if the reporting company is an initial sponsor or lender of a project: Also account for the *total projected lifetime scope 1 and scope 2 emissions* of *relevant projects* financed during the reporting year and report those emissions separately from scope 3.
Project finance	Long-term financing of projects (e.g., infrastructure and industrial projects) by the reporting company as either an equity investor (sponsor) or debt investor (financier)	

Additional guidance on key concepts italicized in table 5.9 is provided below.

- **Proportional** emissions from equity investments should be allocated to the investor based on the investor's proportional share of equity in the investee. Proportional emissions from project finance and debt investments with known use of proceeds should be allocated to the investor based on the investor's proportional share of total project costs (total equity plus debt). Companies may separately report additional metrics, such as total emissions of the investee, the investor's proportional share of capital investment in the investee, etc.
- **Scope 1 and scope 2 emissions** include the direct (scope 1) emissions of the investee or project, as well as the indirect scope 2 emissions from the generation of electricity consumed by the investee or project. Where relevant, companies should also account for the scope 3 emissions of the investee or project. For example, if a financial institution provides equity or debt financing to a light bulb manufacturer, the financial institution is required to account for the scope 1 and scope 2 emissions of the light bulb manufacturer (i.e., direct emissions during manufacturing and indirect emissions from electricity consumed during manufacturing). The financial institution should account for the scope 3 emissions of the light bulb producer (e.g., scope 3 emissions from consumer use of light bulbs sold by the manufacturer) when scope 3 emissions are significant compared to other source of emissions or otherwise relevant.
- **Relevant projects** include those in GHG-intensive sectors (e.g., power generation), projects exceeding a specified emissions threshold (developed by the company or industry sector), or projects that meet other criteria developed by the company or industry sector. Companies should account for emissions from the GHG-emitting project financed by the reporting company, regardless of any financial intermediaries involved in the transaction.
- **Total projected lifetime** emissions are reported in the initial year the project is financed, not in subsequent years. Where there is uncertainty around a project's anticipated lifetime, companies may report a range of likely values (e.g., for a coal-fired power plant, a company may report a range over a 30- to 60-year time period). Companies should report the assumptions used to estimate total anticipated lifetime emissions. If project financing occurs only once every few years, emissions from project finance may fluctuate significantly from year to year. Companies should provide appropriate context in the public report (e.g., by highlighting exceptional or non-recurring project financing). See section 5.4 for more information on the time boundary of scope 3 categories.

Citi: Scope 3 emissions from project finance

Citi, a global financial services company, annually reports GHG emissions from power plants it finances through its project finance business worldwide. Citi reports these emissions to provide transparency in GHG emissions from its project finance portfolio. Citi's reporting includes emissions from closed (i.e., completed) project financings of new capacity only, including expansions of existing plants, but not re-financings of existing plants. Emissions data are derived from the power plant's capacity and heat rate, the carbon content of the fuel, and projected capacity utilization. Citi accounts for the total estimated lifetime emissions of projects financed in the reporting year, and calculates project-specific emissions for both a 30- and 60-year assumed plant lifetime. To allocate power plant emissions to Citi, total emissions are multiplied by the ratio of Citi's project finance loan to total project costs (total debt plus equity).

In 2009, Citi financed one thermal power project via project finance with an estimated lifetime emissions of 8.7 to 17.4 million metric tons of CO_2e. (The lower end of the range represents a 30-year plant life and the higher number represents a 60-year plant life.) In 2008, Citi reported zero emissions from power plants, since Citi did not finance any fossil-fuel fired power plants in 2008.

Table [5.10] Accounting for emissions from investments (optional)

Financial investment/ service	*Description*	*GHG accounting approach (Optional)*
Debt investments (without known use of proceeds)	General corporate purposes debt holdings (such as bonds or loans) held in the reporting company's portfolio where the use of proceeds is not specified	Companies may account for scope 1 and scope 2 emissions of the investee that occur in the reporting year in scope 3, category 15 (Investments)
Managed investments and client services	Investments managed by the reporting company on behalf of clients (using clients' capital) or services provided by the reporting company to clients, including: • Investment and asset management (equity or fixed income funds managed on behalf of clients, using clients' capital) • Corporate underwriting and issuance for clients seeking equity or debt capital • Financial advisory services for clients seeking assistance with mergers and acquisitions or requesting other advisory services	Companies may account for emissions from managed investments and client services in scope 3, category 15 (Investments)
Other investments or financial services	Other investments, financial contracts, or financial services not included above (e.g., pension funds, retirement accounts, securitized products, insurance contracts, credit guarantees, financial guarantees, export credit insurance, credit default swaps, etc.)	Companies may account for emissions from other investments in scope 3, category 15 (Investments)

5.6 Applicability of downstream scope 3 categories to final and intermediate products

Upstream emissions are applicable for all types of purchased products. The applicability of downstream scope 3 categories depends on whether products sold by the reporting company are final products or intermediate products. (See box 5.3 for descriptions of final and intermediate products.) If a company produces an intermediate product (e.g., a motor), which becomes part of a final product (e.g., an automobile), the company accounts for downstream emissions associated with the intermediate product (the motor), not the final product (the automobile). Table 5.11 explains the applicability of downstream scope 3 categories to final and intermediate products sold by the reporting company. See section 6.4 for guidance on disclosing and justifying exclusions of downstream emissions from sold intermediate goods when their eventual end use is unknown.

Table [5.11] Applicability of downstream scope 3 categories to final and intermediate products sold by the reporting company

Scope 3 category	*Applicability to final products*	*Applicability to intermediate products*
9. Downstream transportation and distribution	Transportation and distribution of ***final*** products, between the point of sale by the reporting company to the end consumer, including retail and storage	Transportation and distribution of ***intermediate*** products between the point of sale by the reporting company and either 1) the end consumer (if the eventual end use of the intermediate product is known) or 2) business customers (if the eventual end use of the intermediate product is unknown)
10. Processing of sold products	Not applicable to final products	Processing of sold intermediate products by customers (e.g., manufacturers)
11. Use of sold products	The direct use-phase emissions of sold ***final*** products by the end user (i.e., emissions resulting from the use of sold ***final*** products that directly consume fuel or electricity during use, fuels and feedstocks, and GHGs or products that contain GHGs that are released during use). Companies may optionally include the indirect use-phase emissions of sold final products (see table 5.8)	The direct use-phase emissions of sold ***intermediate*** products[9] by the end user (i.e., emissions resulting from the use of sold ***intermediate*** products that directly consume fuel or electricity during use, fuels and feedstocks, and GHGs or products that contain GHGs that are released during use). Companies may optionally include the indirect use-phase emissions of sold intermediate products (see table 5.8)
12. End-of-life treatment of sold products	Emissions from disposing of sold ***final*** products at the end of their life	Emissions from disposing of sold ***intermediate*** products at the end of their life
13. Downstream leased assets	*Unrelated to product type:* Applicable to all companies with downstream leased assets	
14. Franchises	*Unrelated to product type*: Applicable to all companies with franchises	
15. Investments	*Unrelated to product type*: Applicable to all companies with investments	

Endnotes

1 In certain cases, assets controlled by the reporting company that are excluded from its organizational boundary may not be captured by the list of scope 3 categories. In such a case, emissions from these assets should be reported separately as an "other" scope 3 activity.

2 Downstream emissions also include emissions from products that are distributed but not sold (i.e., without receiving payment).

3 If a company identifies any potential double counting of emissions between scope 3 categories or within a scope 3 category, the company should avoid double counting by only reporting scope 3 emissions from the activity once, clearly explaining where the emissions are reported, and providing cross-references, if needed.

4 Cradle-to-gate emissions include all emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).

5 For more information on land use and land-use change, refer to Appendix B of the *GHG Protocol Product Standard*.

6 Tier 1 suppliers are companies with which the reporting company has a purchase order for goods or services (e.g., materials, parts, components, etc.). Tier 2 suppliers are companies with which Tier 1 suppliers have a purchase order for goods and services (see figure 7.3).

7 "Employees" refers to employees of entities and facilities owned, operated, or leased by the reporting company. Companies may include employees of other relevant entities (e.g., franchises or outsourced operations) in this category, as well as consultants, contractors, and other individuals who are not employees of the company, but commute to facilities owned and operated by the company.

8 Equity investments do not easily fit into the upstream and downstream definitions, but are included along with other types of investments in Category 15 so that all investments are included in a single category.

9 In the case of a motor (an intermediate product) that becomes part of an automobile (a final product), the direct use phase emissions of the intermediate product by the end consumer are the emissions resulting from use of the motor, not the emissions resulting from use of the automobile. This estimation involves allocating emissions (see chapter 8).

06 Setting the Scope 3 Boundary

Determining which scope 3 emissions to include in the inventory (i.e., setting the boundary) is a critical decision in the inventory process. The GHG Protocol Corporate Standard allows companies flexibility in choosing which, if any, scope 3 activities to include in the GHG inventory when the company defines its operational boundaries. The GHG Protocol Scope 3 Standard is designed to create additional completeness and consistency in scope 3 accounting and reporting by defining scope 3 boundary requirements.

Requirements in this chapter

- ***Companies shall account for all scope 3 emissions and disclose and justify any exclusions.***
- ***Companies shall account for emissions from each scope 3 category according to the minimum boundaries provided in table 5.4.***
- ***Companies shall account for scope 3 emissions of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6, if they are emitted in the value chain.***
- ***Biogenic CO_2 emissions that occur in the reporting company's value chain shall not be included in the scopes, but shall be included and separately reported in the public report.***

6.1 Mapping the value chain

Companies should map the value chain as a first step toward identifying the scope 3 activities that are included in the inventory. This step is a useful internal exercise to help companies identify scope 3 activities. To the extent possible, companies should create a complete value chain map and/or a complete list of activities in the company's value chain that includes:

- Each of the scope 3 categories and activities included in table 5.4
- A list of purchased goods and services and a list of sold goods and services
- A list of suppliers and other relevant value chain partners (either by name, type, or spend category)

Because supply chains are dynamic and a company's supply chain partners can change frequently throughout the reporting year, companies may find it useful to choose a fixed point in time (such as December 31 of the reporting year) or use a representative average of products and suppliers over the course of the reporting year.

Companies should strive for completeness in mapping the value chain, but it is acknowledged that achieving 100 percent completeness may not be feasible. Companies may establish their own policy for mapping the value chain, which may include creating representative, rather than exhaustive, lists of purchased products, sold products, suppliers, and other value chain partners.

6.2 Boundary requirements

Companies shall account for all scope 3 emissions as defined in this standard and disclose and justify any exclusions. Companies shall account for emissions from each scope 3 category according to the minimum boundaries provided in table 5.4. Companies may include emissions from optional activities within each category. Companies shall account for scope 3 emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6), if they are emitted in the value chain. Companies may exclude scope 3 activities from the inventory, provided that any exclusion is disclosed and justified.

Biogenic CO_2 emissions (e.g., CO_2 from the combustion of biomass) that occur in the reporting company's value chain shall not be included in the scopes, but shall be included and separately reported in the public report. Any GHG removals (e.g., biological GHG sequestration) shall not be included in scope 3, but may be reported separately. (For more information, see section 6.5 and chapter 11.)

6.3 Disclosing and justifying exclusions

Companies should strive for completeness, but it is acknowledged that accounting for all scope 3 emissions may not be feasible. Some categories may not be applicable to all companies. For example, some companies may not have leased assets or franchises. In such cases, companies should report zero emissions or "not applicable" for any categories that are not applicable.

In some situations, companies may have scope 3 activities, but be unable to estimate emissions due to a lack of data or other limiting factors. For example, companies may find that based on initial estimates, some scope 3 activities are expected to be insignificant in size (compared to the company's other sources of emissions) and that for these activities, the ability to collect data and influence GHG reductions is limited. In such cases, companies may exclude scope 3 activities from the report, provided that any exclusion is disclosed and justified.

Companies should follow the principles of relevance, completeness, accuracy, consistency, and transparency when deciding whether to exclude any activities from the scope 3 inventory. Companies should not exclude any activity that would compromise the relevance of the reported inventory. (See table 6.1 for a list of criteria for determining relevance.) Companies should ensure that the scope 3 inventory appropriately reflects the GHG emissions of the company, and serves the decision-making needs of users, both internal and external to the company.

In particular, companies should not exclude any activity that is expected to contribute significantly to the company's total scope 3 emissions. (See section 7.1 for guidance on prioritizing emissions.)

Companies are required to disclose and justify any exclusions in the public report (see chapter 11).

See box 6.1 for an example of disclosing and justifying exclusions.

6.4 Accounting for downstream emissions

The applicability of downstream scope 3 categories depends on whether products sold by the reporting company are final products or intermediate products (see section 5.6). In certain cases, the eventual end use of sold intermediate products may be unknown. For example, a company may produce an intermediate product with many potential downstream applications, each of which has a different GHG emissions profile, and be unable to reasonably estimate the downstream emissions associated with the various end uses of the intermediate product. In such a case, companies may disclose and justify the exclusion of downstream emissions from categories 9, 10, 11, and 12 in the report (but should not selectively exclude a subset of those categories).

Table [6.1] Criteria for identifying relevant scope 3 activities

Criteria	*Description*
Size	They contribute significantly to the company's total anticipated scope 3 emissions (see section 7.1 for guidance on using initial estimation methods)
Influence	There are potential emissions reductions that could be undertaken or influenced by the company (see box 6.2)
Risk	They contribute to the company's risk exposure (e.g., climate change related risks such as financial, regulatory, supply chain, product and customer, litigation, and reputational risks) (see table 2.2)
Stakeholders	They are deemed critical by key stakeholders (e.g., customers, suppliers, investors, or civil society)
Outsourcing	They are outsourced activities previously performed in-house or activities outsourced by the reporting company that are typically performed in-house by other companies in the reporting company's sector
Sector guidance	They have been identified as significant by sector-specific guidance
Other	They meet any additional criteria for determining relevance developed by the company or industry sector

Box [6.1] Example of disclosing & justifying exclusions

After mapping its value chain, a company uses initial GHG estimation methods to estimate the emissions from the various spend categories within category 1 (Purchased goods and services). The company finds that emissions from production-related procurement are significant compared to its other sources of scope 3 emissions. The company determines that emissions from non-production-related procurement are difficult to calculate and are not expected to contribute significantly to total scope 3 emissions. The company uses more accurate methods to calculate emissions from production-related procurement, but decides to exclude emissions from non-production-related procurement. The company discloses and justifies the exclusion of non-production-related procurement based on limited data availability and its expected insignificant contribution to total scope 3 emissions.

Box [6.2] Influence

By definition, scope 3 emissions occur from sources that are not owned or controlled by the reporting company, but occur from sources owned and controlled by other entities in the value chain (e.g., contract manufacturers, materials suppliers, third-party logistics providers, waste management suppliers, travel suppliers, lessees and lessors, franchisees, retailers, employees, and customers). Nevertheless, scope 3 emissions can be influenced by the activities of the reporting company, such that companies often have the ability to influence GHG reductions upstream and downstream of their operations. Companies should prioritize activities in the value chain where the reporting company has the potential to influence GHG reductions. See table 9.7 for illustrative examples of actions to influence scope 3 reductions.

6.5 Accounting for emissions and removals from biogenic sources

The *GHG Protocol Corporate Standard* requires that direct CO_2 emissions from the combustion of biomass be included in the public report, but reported separately from the scopes, rather than included in scope 1. The separate reporting requirement also applies to scope 3. Biogenic CO_2 emissions (e.g., CO_2 from the combustion of biomass) that occur in the reporting company's value chain are required to be included in the public report, but reported separately from scope 3 (see chapter 11).

The requirement to report biogenic CO_2 emissions separately refers to CO_2 emissions from combustion or biodegradation of biomass only, not to emissions of any other GHGs (e.g., CH_4 and N_2O), or to any GHG emissions that occur in the life cycle of biomass other than from combustion or biodegradation (e.g., GHG emissions from processing or transporting biomass).

Scope 1, scope 2, and scope 3 inventories include only emissions, not removals. Any removals (e.g., biological GHG sequestration) may be reported separately from the scopes. See examples 6.1 and 6.2.

Example [6.1] Accounting for biogenic emissions

A manufacturing company contracts with a third-party transportation provider that uses both diesel and biodiesel in its vehicle fleet. The manufacturer accounts for upstream GHG emissions from the combustion of diesel fuel in scope 3, category 4 (Upstream transportation and distribution), since emissions from diesel fuel are of fossil origin. The manufacturer reports biogenic CO_2 emissions from the combustion of biodiesel separately. The manufacturer does not report any removals associated with the production of biodiesel in scope 3.

PSEG: Setting the scope 3 boundary

Public Service Enterprise Group (PSEG), a diversified energy company and one of the ten largest electric companies in the U.S., developed a scope 3 inventory to understand its climate-related risks and opportunities along the value chain and to communicate this information transparently to stakeholders.

To set the inventory boundary, PSEG first identified all company assets and operations and developed detailed process maps to define all upstream and downstream activities that could emit GHGs. PSEG included all activities in each of the fifteen scope 3 categories, with the exception of certain types of financial investments and health-care expenses, which were determined to be immaterial. PSEG disclosed and justified exclusions consistent with the completeness and transparency principles.

To develop the inventory, PSEG used higher quality primary data for all activities that were significant in size, where data could easily be attained, or where having higher quality data was otherwise important. For activities that were small or immaterial, or where data was hard to obtain, PSEG relied upon secondary or proxy data to estimate scope 3 emissions.

The scope 3 inventory gave PSEG greater clarity on its emissions risks and opportunities throughout the entire value chain. PSEG found significant downstream scope 3 emissions from category 11 (Use of sold products), which helped PSEG better understand the GHG emissions embedded in the electricity and natural gas that it delivers to its customers and the need to help customers reduce these emissions by investing in renewable energy and energy-efficiency programs. PSEG also found significant upstream scope 3 emissions in its fossil fuel supply chain. These insights provide business value by informing PSEG's strategy to provide safe, reliable, economic, and green energy well into the 21st century.

The scope 3 inventory gave PSEG greater clarity on its emissions risks and opportunities throughout the entire value chain.

Example [6.2] Accounting for biogenic emissions and removals

A paper manufacturer purchases wood pulp from suppliers and sells finished paper products to consumers. The company accounts for GHG emissions from the production of wood pulp in scope 3, category 1 (Purchased goods and services). The company does not account for upstream CO_2 removals from biological carbon sequestration that occurs in trees in scope 3, but instead may report CO_2 removals separately. The company also does not account for downstream biogenic CO_2 emissions from the incineration of sold paper products at the end of their life in scope 3, but instead reports those emissions separately.

Ocean Spray: Setting the scope 3 boundary

Ocean Spray, a leading producer of bottled juice drinks and dried fruit in North America, developed its first scope 3 inventory with the goal of informing an effective GHG-reduction strategy. At the outset, Ocean Spray identified a tension between the completeness of the inventory and the specificity of data used to calculate emissions. Ocean Spray decided that to best inform the company's GHG-reduction strategy, it should develop a scope 3 inventory by focusing on completeness over precision, and to disclose the sources and uncertainty of data used.

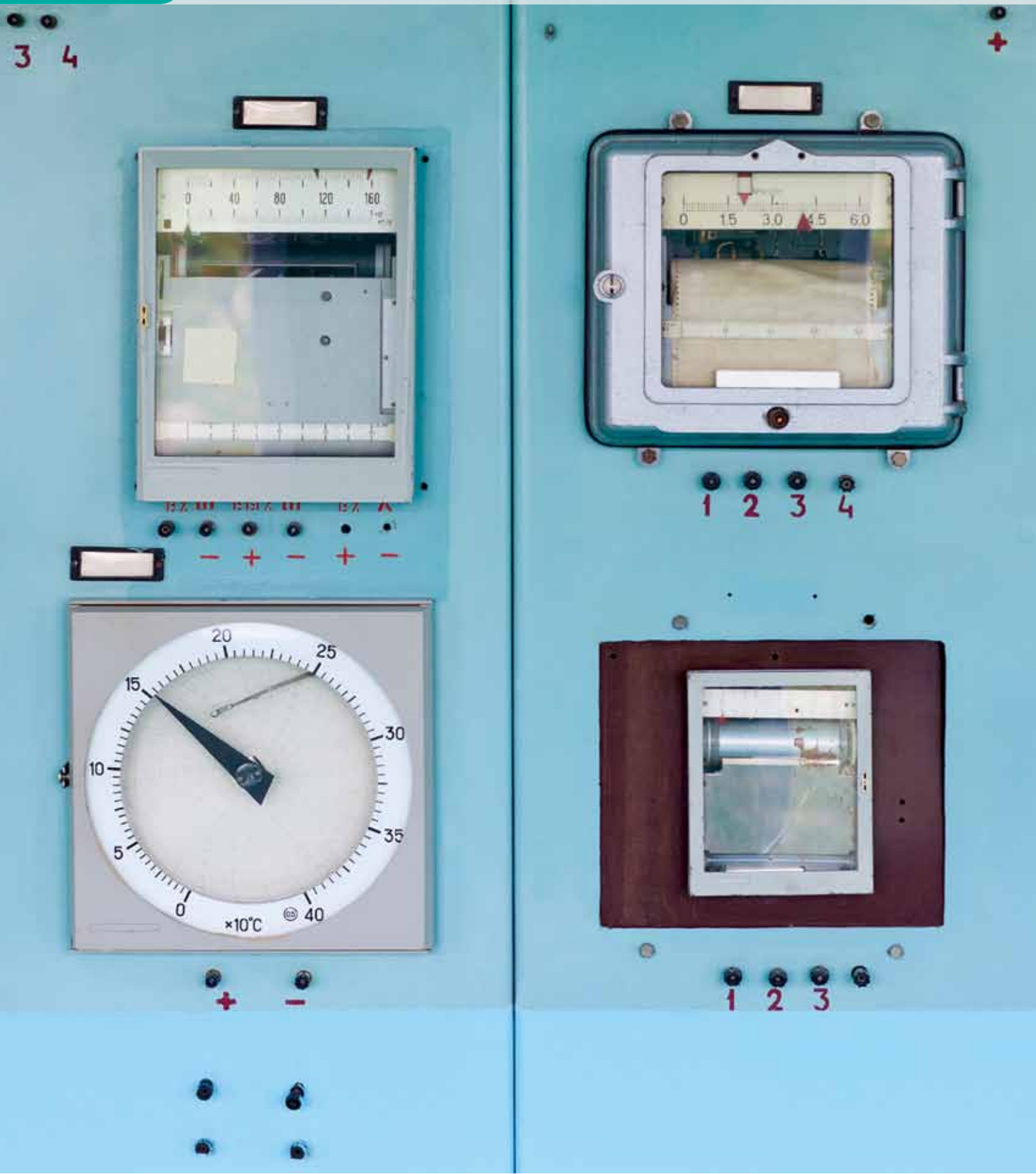
A complete inventory showed Ocean Spray the full picture of its value chain GHG emissions, revealed the greatest reduction opportunities, and enabled effective decision making, which would have been hindered by excluding scope 3 activities from the inventory.

A complete inventory showed Ocean Spray the full picture of its value chain GHG emissions, revealed the greatest reduction opportunities, and enabled effective decision making

To develop a complete inventory, Ocean Spray first identified all scope 3 activities, such as growing and processing fruit, transforming fruit into food and beverage products, distributing products to customers, and use and disposal by consumers. Ocean Spray then collected primary data for activities such as the economic value of upstream ingredients, materials, and services. The company used economic input-output assessment to calculate emissions using the cost data on upstream suppliers. Where primary data was not available, the company calculated estimates based on assumptions, especially for downstream activities such as consumer disposal.

Through the scope 3 inventory process, Ocean Spray learned that scope 3 emissions account for most of its total scope 1, scope 2, and scope 3 emissions. The company's largest source of GHG emissions came from category 1 (Purchased goods and services) which accounted for more than half of combined scope 1, scope 2, and scope 3 emissions, driven primarily by raw material inputs.

07 Collecting Data



After a company has identified the activities to include in its scope 3 boundary, the next step is to collect the necessary data to calculate the company's scope 3 emissions.

Collecting scope 3 emissions data is likely to require wider engagement within the reporting company, as well as with suppliers and partners outside of the company, than is needed to collect scope 1 and scope 2 emissions data. Companies may need to engage several internal departments, such as procurement, energy, manufacturing, marketing, research and development, product design, logistics, and accounting.

This chapter provides a four-step approach to collecting and evaluating data (see figure 7.1).

Guidance for calculating scope 3 emissions from each scope 3 category is provided in a separate document, *Guidance for Calculating Scope 3 Emissions*, which is available at www.ghgprotocol.org.

7.1 Guidance for prioritizing data collection efforts

Companies should prioritize data collection efforts on the scope 3 activities that are expected to have the most significant GHG emissions, offer the most significant GHG reduction opportunities, and are most relevant to the company's business goals. Collecting higher quality data for priority activities allows companies to focus resources on the most significant GHG emissions in the value chain, more effectively set reduction targets, and track and demonstrate GHG reductions over time (see chapter 9).

Companies may use a combination of approaches and criteria to identify priority activities. For example, companies may seek higher quality data for all activities

Figure [7.1] Iterative process for collecting and evaluating data

that are significant in size, activities that present the most significant risks and opportunities in the value chain, and activities where more accurate data can be easily obtained. Companies may choose to rely on relatively less accurate data for activities that are expected to have insignificant emissions or where accurate data is difficult to obtain. (See Appendix C for guidance on developing a data management plan, including strategies for obtaining more accurate data over time).

Prioritizing activities based on the magnitude of GHG emissions

The most rigorous approach to identifying priority activities is to use initial GHG estimation (or screening) methods to determine which scope 3 activities are expected to be most significant in size. A quantitative approach gives the most accurate understanding of the relative magnitudes of various scope 3 activities. To prioritize activities based on their expected GHG emissions, companies should:

- use initial GHG estimation (or screening) methods to estimate the emissions from each scope 3 activity (e.g., by using industry-average data, environmentally-extended input output data (see box 7.1), proxy data, or rough estimates); and
- rank all scope 3 activities from largest to smallest according to their estimated GHG emissions to determine which scope 3 activities have the most significant impact.

Calculation methods for each scope 3 category that can be used for screening are provided in a separate document, *Guidance for Calculating Scope 3 Emissions*, which is available at www.ghgprotocol.org.

Prioritizing activities based on financial spend or revenue

As an alternative to ranking scope 3 activities based on their estimated GHG emissions, companies may choose to prioritize scope 3 activities based on their relative financial significance. Companies may use a financial spend analysis to rank upstream types of purchased products by their contribution to the company's total spend or expenditure (for an example, see the AkzoNobel case study). For downstream emissions, companies may likewise rank types of sold products by their contribution to the company's total revenue.

Companies should use caution in prioritizing activities based on financial contribution, because spend and revenue may not correlate well with emissions. For example, some activities have a high market value, but have relatively low emissions. Conversely, some activities have a low market value, but have relatively high emissions. As a result, companies should also prioritize activities that do not contribute significantly to financial spend or revenue, but are expected to have a significant GHG impact.

Prioritizing activities based on other criteria

In addition to prioritizing data collection efforts on activities expected to contribute significantly to total scope 3 emissions or to spend, companies may prioritize any other activities expected to be most relevant for the company or its stakeholders, including activities that:

- the company has influence over;
- contribute to the company's risk exposure;
- stakeholders deem critical;
- have been identified as significant by sector-specific guidance; or
- meet any additional criteria developed by the company or industry sector (see table 6.1 for more information).

Box [7.1] Environmentally-extended input output (EEIO) models

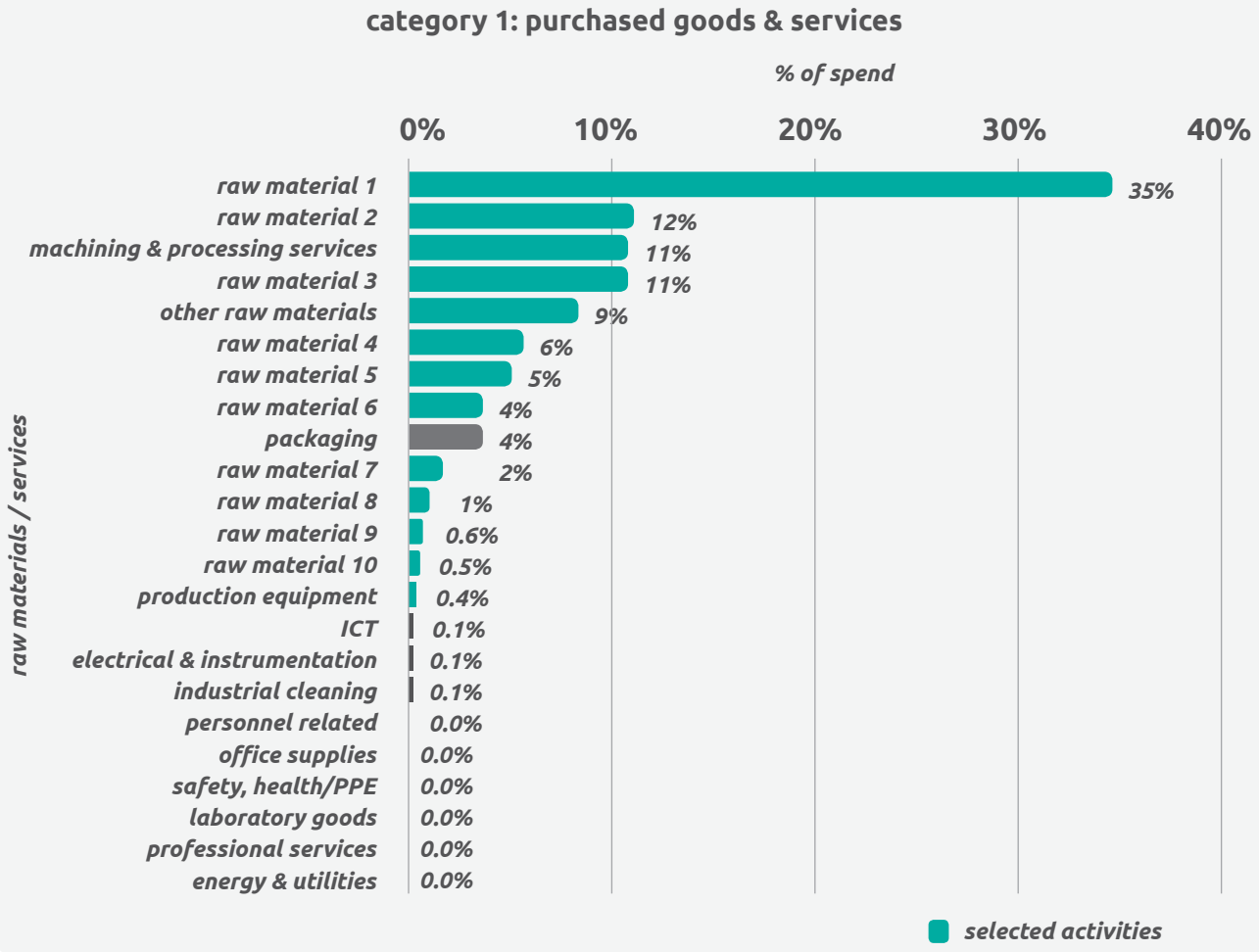
Environmentally-extended input output (EEIO) models estimate energy use and/or GHG emissions resulting from the production and upstream supply chain activities of different sectors and products within an economy. The resulting EEIO emissions factors can be used to estimate GHG emissions for a given industry or product category. EEIO data are particularly useful in screening emission sources when prioritizing data collection efforts.

EEIO models are derived by allocating national GHG emissions to groups of finished products based on economic flows between industry sectors. EEIO models vary in the number of sectors and products included and how often they are updated. EEIO data are often comprehensive, but the level of granularity is relatively low compared to other sources of data.

AkzoNobel: Prioritizing scope 3 emissions from purchased goods and services

AkzoNobel, the largest global paints and coatings company and a major producer of specialty chemicals, applied a financial spend analysis to prioritize its purchased goods and services before collecting data for category 1. In three representative businesses used, AkzoNobel set out to identify the purchased goods and services that collectively accounted for at least 80% of the total spend, as well as any category in the remaining 20% that was individually more than 1% of total spend. The graph below illustrates the results of a financial spend analysis for one of AkzoNobel's businesses. Based on the analysis, AkzoNobel focused data collection efforts on the raw materials that represented over 95% of total spend, marked in the graph.

AkzoNobel focused data collection efforts on the raw materials that represented over 95 percent of total spend.



To prioritize scope 3 activities, companies may also assess whether any GHG- or energy-intensive materials or activities appear in the value chain of purchased and sold products.

7.2 Overview of quantification methods and data types

There are two main methods to quantify emissions: direct measurement and calculation (see table 7.1). Each requires different types of data.

In practice, calculation will be used most often to quantify scope 3 emissions, which requires the use of two types of data: activity data and emission factors.

Activity data

Activity data is a quantitative measure of a level of activity that results in GHG emissions. Examples of activity data are provided in table 7.2.

Emission factors

An emission factor is a factor that converts activity data into GHG emissions data. Examples of emission factors are provided in table 7.2.

Companies are required to report a description of the types and sources of activity data and emission factors used to calculate the inventory (see chapter 11).

Table [7.1] Quantification methods

Quantification method	*Description*	*Relevant data types*
Direct measurement	Quantification of GHG emissions using direct monitoring, mass balance or stoichiometry **GHG = Emissions Data x GWP**	Direct emissions data
Calculation	Quantification of GHG emissions by multiplying activity data by an emission factor **GHG = Activity Data x Emission Factor x GWP**	Activity data Emission factors

Table [7.2] Examples of activity data and emission factors

Examples of activity data	*Examples of emission factors*
• Liters of fuel consumed	• kg CO_2 emitted per liter of fuel consumed
• Kilowatt-hours of electricity consumed	• kg CO_2 emitted per kWh of electricity consumed
• Kilograms of material consumed	• kg PFC emitted per kg of material consumed
• Kilometers of distance traveled	• t CO_2 emitted per kilometer traveled
• Hours of time operated	• kg SF_6 emitted per hour of time operated
• Square meters of area occupied	• g N_2O emitted per square meter of area
• Kilograms of waste generated	• g CH_4 emitted per kg of waste generated
• Kilograms of product sold	• kg HFC emitted per kg of product sold
• Quantity of money spent	• kg CO_2 emitted per unit of currency spent

Energy emission factors

Two types of emission factors are used to convert energy activity data into emissions data:

- Combustion emission factors, which include only the emissions that occur from combusting the fuel
- Life cycle emission factors, which include not only the emissions that occur from combusting the fuel, but all other emissions that occur in the life cycle of the fuel such as emissions from extraction, processing, and transportation of fuels

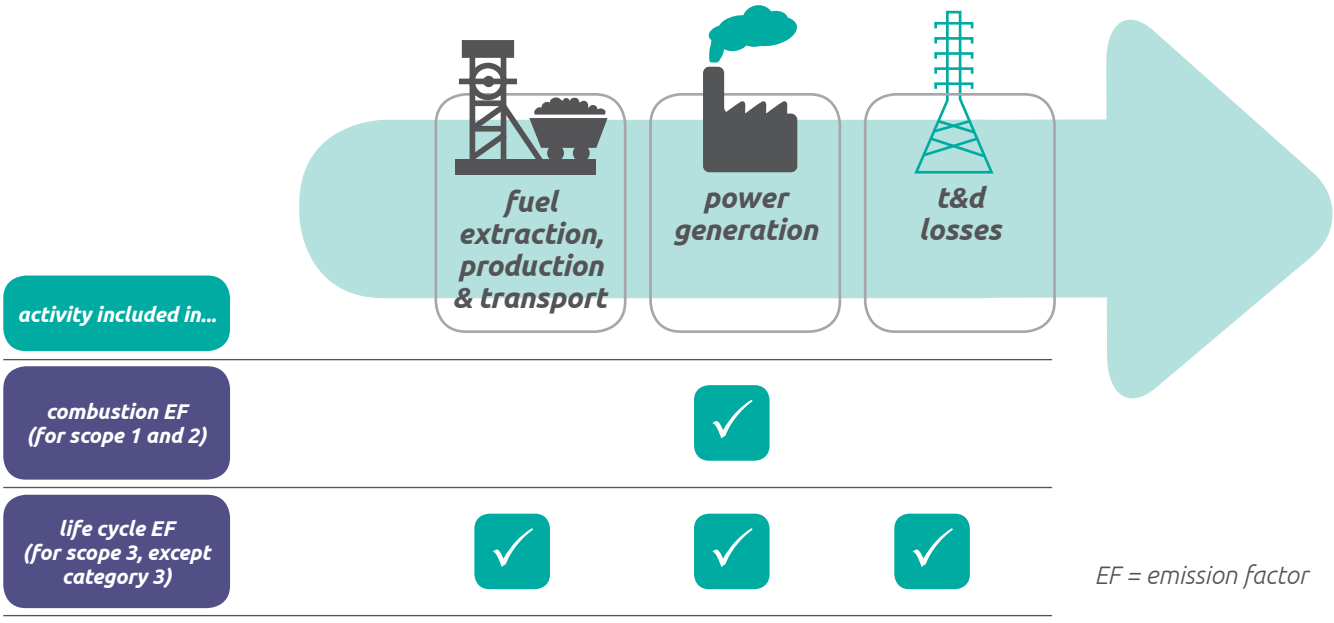
Combustion emission factors are used in the *GHG Protocol Corporate Standard* to calculate scope 1 emissions (in the case of fuels) and scope 2 emissions (in the case of electricity). Life cycle emission factors are used in the *GHG Protocol Product Standard* to calculate emissions from fuels and electricity. These two types of emission factors and their use are described in more detail below.

Energy emission factors in scope 1 and scope 2 accounting

Scope 1 and scope 2 emissions are calculated using combustion emission factors following the *GHG Protocol Corporate Standard*. Scope 1 and scope 2 are defined to avoid double counting by two or more companies of the same emission within the same scope (see table 5.1).

Scope 2 includes emissions from the generation of purchased electricity, steam, heating, and cooling that is consumed by the reporting company. In some regions, electricity emission factors may include life cycle activities related to electricity, such as transmission and distribution of electricity, or extraction, processing and transportation of fuels used to generate electricity. Non-generation activities related to electricity are accounted for in scope 3, category 3 (Fuel- and energy-related activities not included in scope 1 or scope 2), rather than scope 2. As a result, companies should seek (and emission factor developers should provide) transparent, disaggregated electricity emission factors that allow separate accounting of emissions from electricity generation in scope 2 and non-generation activities related to electricity in scope 3. Proper accounting creates consistency in scope 2 accounting and reporting between companies and avoids double counting of the same emission within scope 2 by more than one company. See figure 7.2 for more information on different types of electricity emission factors.

Figure [7.2] Activities included in each type of electricity emission factor



Energy emission factors in scope 3 accounting

Companies should use life cycle emission factors to calculate scope 3 emissions related to fuels and energy consumed in the reporting company's value chain, except for category 3 (fuel- and energy-related activities not included in scope 1 or scope 2) (see below). Compared to combustion emission factors, life cycle emission factors represent all emissions in the upstream supply chain of fuels and energy. Where possible, companies should use life cycle emission factors that are as specific as possible to the type and source of fuel consumed (e.g., specific to the technology used to produce a fuel).

Emission factors for scope 3, category 3 (Fuel- and energy-related activities not included in scope 1 or scope 2)

Two activities within category 3 require special consideration when selecting emission factors:

- Upstream emissions of purchased fuels (i.e., extraction, production, and transportation of fuels consumed by the reporting company)
- Upstream emissions of purchased electricity (i.e., extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling that is consumed by the reporting company)

To calculate emissions from these activities, companies should use life cycle emission factors that exclude emissions from combustion, since emissions from combustion are accounted for in scope 1 (in the case of fuels), in scope 2 (in the case of electricity), and in a separate memo item (in the case of direct CO_2 emissions from combustion of biomass or biofuels).

Global warming potential (GWP) values

Global warming potential (GWP) values describe the radiative forcing impact (or degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of carbon dioxide. GWP values convert GHG emissions data for non-CO_2 gases into units of carbon dioxide equivalent (CO_2e).

Companies should use GWP values provided by the Intergovernmental Panel on Climate Change (IPCC) based on a 100-year time horizon. Companies may either use the IPCC GWP values agreed to by United Nations Framework Convention on Climate Change (UNFCCC) or the most recent GWP values published by the IPCC. Companies should use consistent GWP values across their scope 1, scope 2, and scope 3 inventory and should maintain consistency in the source of GWP values used over time (by consistently following guidance provided by either the UNFCCC or IPCC, once selected). Companies that have already developed scope 1 and scope 2 GHG inventories should use the same GWP values for scope 3 to maintain consistency across the scopes. Companies that have not previously developed a corporate GHG inventory should use the most recent GWP values.

Companies are required to disclose the source of GWP values used to calculate the inventory (see chapter 11).

Overview of primary data and secondary data

Companies may use two types of data to calculate scope 3 emissions:

- Primary data
- Secondary data

Table 7.3 provides definitions of these two types of data.

Table [7.3] Types of data

Data type	*Description*
Primary Data	Data from specific activities within a company's value chain
Secondary Data	Data that is not from specific activities within a company's value chain

Primary data includes data provided by suppliers or other value chain partners related to specific activities in the reporting company's value chain. Such data may take the form of primary activity data, or emissions data calculated by suppliers that are specific to suppliers' activities.

Secondary data includes industry-average data (e.g., from published databases, government statistics, literature studies, and industry associations), financial data, proxy data, and other generic data. In certain cases, companies may use specific data from one activity in the value chain to estimate emissions for another activity in the value chain. This type of data (i.e., proxy data) is considered secondary data, since it is not specific to the activity whose emissions are being calculated.

Table 7.4 provides examples of primary and secondary data by scope 3 category.

Kraft Foods: Collecting scope 3 data

For its first scope 3 inventory, Kraft Foods, a U.S.-based global food products company, focused on achieving a complete inventory of all scope 3 emissions, with the goal of supporting high-level strategic evaluations and internal understanding of its value chain GHG emissions.

Kraft Foods found that scope 3 emissions comprise more than 90 percent of the company's combined scope 1, scope 2, and scope 3 emissions.

To accomplish this goal, the company obtained industry-average life cycle inventory data from various public and commercial sources. Kraft Foods matched the emission factors with its own internal data on activities and purchases. For the company's supply chain, the secondary data approach allowed the company to understand its total scope 3 emissions with reasonable accuracy, cost, and speed, and with the ability to update as more precise secondary data became available.

Using secondary data also fit Kraft Foods' needs given that a large portion of its purchased commodities are produced in a global market where tracking the agricultural source of origin is challenging.

Kraft Foods found that scope 3 emissions comprise more than 90 percent of the company's combined scope 1, scope 2, and scope 3 emissions. Within scope 3, the company found that emissions from category 1 (Purchased goods and services), including raw materials, comprised 70 percent of its total scope 3 emissions, while transportation and distribution, energy-related activities, and the use of sold products accounted for the majority of the remaining 30 percent. Kraft Foods included an estimated uncertainty range for each scope 3 category in order to provide additional transparency.

Kraft Foods plans to continuously improve the quality of its GHG inventory to better understand the company's influence on climate change. Using the inventory results, the company will continue to expand and enhance its efforts to develop effective GHG-reduction strategies.

Table [7.4] **Examples of primary and secondary data by scope 3 category**

Upstream scope 3 emissions

Category	*Examples of primary data*	*Examples of secondary data*
1. Purchased goods and services	• Product-level cradle-to-gate GHG data from suppliers calculated using site-specific data • Site-specific energy use or emissions data from suppliers	• Industry average emission factors per material consumed from life cycle inventory databases
2. Capital goods	• Product-level cradle-to-gate GHG data from suppliers calculated using site-specific data • Site-specific energy use or emissions data from capital goods suppliers	• Industry average emission factors per material consumed from life cycle inventory databases
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	• Company-specific data on upstream emissions (e.g. extraction of fuels) • Grid-specific T&D loss rate • Company-specific power purchase data and generator-specific emission rate for purchased power	• National average data on upstream emissions (e.g. from life cycle inventory database) • National average T&D loss rate • National average power purchase data
4. Upstream transportation and distribution	• Activity-specific energy use or emissions data from third-party transportation and distribution suppliers • Actual distance traveled • Carrier-specific emission factors	• Estimated distance traveled by mode based on industry-average data
5. Waste generated in operations	• Site-specific emissions data from waste management companies • Company-specific metric tons of waste generated • Company-specific emission factors	• Estimated metric tons of waste generated based on industry-average data • Industry average emission factors
6. Business travel	• Activity-specific data from transportation suppliers (e.g., airlines) • Carrier-specific emission factors	• Estimated distance traveled based on industry-average data
7. Employee commuting	• Specific distance traveled and mode of transport collected from employees	• Estimated distance traveled based on industry-average data
8. Upstream leased assets	• Site-specific energy use data collected by utility bills or meters	• Estimated emissions based on industry-average data (e.g. energy use per floor space by building type)

Table [7.4] Examples of primary and secondary data by scope 3 category (continued)

Downstream scope 3 emissions

Category	*Examples of primary data*	*Examples of secondary data*
9. Transportation and distribution of sold products	• Activity-specific energy use or emissions data from third-party transportation and distribution partners • Activity-specific distance traveled • Company-specific emission factors (e.g., per metric ton-km)	• Estimated distance traveled based on industry-average data • National average emission factors
10. Processing of sold products	• Site-specific energy use or emissions from downstream value chain partners	• Estimated energy use based on industry-average data
11. Use of sold products	• Specific data collected from consumers	• Estimated energy used based on national average statistics on product use
12. End-of-life treatment of sold products	• Specific data collected from consumers on disposal rates • Specific data collected from waste management providers on emissions rates or energy use	• Estimated disposal rates based on national average statistics • Estimated emissions or energy use based on national average statistics
13. Downstream leased assets	• Site-specific energy use data collected by utility bills or meters	• Estimated emissions based on industry-average data (e.g., energy use per floor space by building type)
14. Franchises	• Site-specific energy use data collected by utility bills or meters	• Estimated emissions based on industry-average data (e.g., energy use per floor space by building type)
15. Investments	• Site-specific energy use or emissions data	• Estimated emissions based on industry-average data

7.3 Guidance for selecting data

The quality of the scope 3 inventory depends on the quality of the data used to calculate emissions. Companies should collect data of sufficient quality to ensure that the inventory appropriately reflects the GHG emissions of the company, supports the company's goals, and serves the decision-making needs of users, both internal and external to the company. After prioritizing scope 3 activities (see section 7.1), companies should select data based on the following:

- The company's business goals (see chapter 2)
- The relative significance of scope 3 activities (see section 7.1)
- The availability of primary and secondary data
- The quality of available data

Companies may use any combination of primary and secondary data to calculate scope 3 emissions. See table 7.5 for a list of advantages and disadvantages of primary data and secondary data.

In general, companies should collect high quality, primary data for high priority activities (see section 7.1). To most effectively track performance, companies should use primary data collected from suppliers and other value chain partners for scope 3 activities targeted for achieving GHG reductions.

In some cases, primary data may not be available or may not be of sufficient quality. In such cases, secondary data

Table [7.5] Advantages and disadvantages of primary data and secondary data

	Primary data (e.g., supplier-specific data)	***Secondary data (e.g., industry-average data)***
Advantages	• Provide better representation of the company's specific value chain activities • Enables performance tracking and benchmarking of individual value chain partners by allowing companies to track operational changes from actions taken to reduce emissions at individual facilities/companies and to distinguish between suppliers in the same sector based on GHG performance • Expands GHG awareness, transparency, and management throughout the supply chain to the companies that have direct control over emissions • Allows companies to better track progress toward GHG reduction targets (see chapter 9)	• Allows companies to calculate emissions when primary data is unavailable or of insufficient quality • Can be useful for accounting for emissions from minor activities • Can be more cost-effective and easier to collect • Allows companies to more readily understand the relative magnitude of various scope 3 activities, identify hot spots, and prioritize efforts in primary data collection, supplier engagement, and GHG reduction efforts
Disadvantages	• May be costly • May be difficult to determine or verify the source and quality of data supplied by value chain partners	• Data may not be representative of the company's specific activities • Does not reflect operational changes undertaken by value chain partners to reduce emissions • Could be difficult to quantify GHG reductions from actions taken by specific facilities or value chain partners • May limit the ability to track progress toward GHG reduction targets (see chapter 9)

may be of higher quality than the available primary data for a given activity. Data selection depends on business goals. If the company's main goal is to set GHG reduction targets, track performance from specific operations within the value chain, or engage suppliers, the company should select primary data. If the company's main goal is to understand the relative magnitude of various scope 3 activities, identify hot spots, and prioritize efforts in primary data collection, the company should select secondary data. In general, companies should collect secondary data for:

- Activities not prioritized based on initial estimation methods or other criteria (see section 7.1)
- Activities for which primary data is not available (e.g., where a value chain partner is unable to provide data)
- Activities for which the quality of secondary data is higher than primary data (e.g., when a value chain partner is unable to provide data of sufficient quality)[1]

Companies are required to report a description of the types and sources of data (including activity data, emission factors, and GWP values) used to calculate emissions, and the percentage of emissions calculated using data obtained from suppliers or other value chain partners (see chapter 11).

Data quality

Sources of primary data and secondary data can vary in quality. When selecting data sources, companies should use the data quality indicators in table 7.6 as a guide to obtaining the highest quality data available for a given emissions activity. The data quality indicators describe the representativeness of data (in terms of technology, time, and geography) and the quality of data measurements (i.e., completeness and reliability of data).

Companies should select data that are the most representative in terms of technology, time, and geography; most complete; and most reliable. Companies should determine the most useful method for applying the data quality indicators when selecting data and evaluating data quality. One example of applying the data quality indicators is presented in box 7.2.

To ensure transparency and avoid misinterpretation of data, companies are required to report a description of the data quality of reported emissions data (see chapter 11).

Because scope 3 emissions are emissions from activities not under the reporting company's ownership or control, companies are likely to face additional challenges related to collecting data and ensuring data quality for scope 3 than for activities under the reporting company's ownership or control. Scope 3 data collection challenges include:

- Reliance on value chain partners to provide data
- Lesser degree of influence over data collection and management practices
- Lesser degree of knowledge about data types, data sources, and data quality
- Broader need for secondary data
- Broader need for assumptions and modeling

These data collection challenges contribute to uncertainty in scope 3 accounting. Higher uncertainty for scope 3 calculations is acceptable as long as the data quality of the inventory is sufficient to support the company's goals and ensures that the scope 3 inventory is relevant (i.e., the inventory appropriately reflects the GHG emissions of the company, and serves the decision-making needs of users, both internal and external to the company). For example, companies may seek to ensure that data quality is sufficient to understand the relative magnitude of scope 3 activities across the value chain and to enable consistent tracking of scope 3 emissions over time. See Appendix B for more information on uncertainty.

To facilitate quality assurance and quality control when collecting data, companies should develop a data management plan that documents the GHG inventory process and the internal quality assurance and quality control (QA/QC) procedures in place to enable the preparation of the inventory from its inception through final reporting. For more information, see Appendix C.

Companies should select data that are the most representative in terms of technology, time, and geography; most complete; and most reliable.

Table [7.6] Data quality indicators

Indicator	*Description*
Technological representativeness	The degree to which the data set reflects the actual technology(ies) used
Temporal representativeness	The degree to which the data set reflects the actual time (e.g., year) or age of the activity
Geographical representativeness	The degree to which the data set reflects the actual geographic location of the activity (e.g., country or site)
Completeness	The degree to which the data is statistically representative of the relevant activity. Completeness includes the percentage of locations for which data is available and used out of the total number that relate to a specific activity. Completeness also addresses seasonal and other normal fluctuations in data.
Reliability	The degree to which the sources, data collection methods and verification procedures[2] used to obtain the data are dependable.

Adapted from B.P. Weidema and M.S. Wesnaes, "Data quality management for life cycle inventories – an example of using data quality indicators," Journal of Cleaner Production 4 no. 3-4 (1996): 167-174.

Box [7.2] Example of criteria to evaluate the data quality indicators

A qualitative approach to data quality assessment uses rating descriptions for each of the data quality indicators on direct emissions data, activity data, and emission factors as applicable. This rating system has elements of subjectivity. For example, some fuel emission factors have not changed significantly in many years. Therefore, a fuel emission factor that is over 10 years old, which would be assigned a temporal score of poor with the data quality in the table below, may not be different than a factor less than 6 years old (a temporal rating of good). Companies should consider the individual circumstances of the data when using the data quality results as a basis for collecting new data or evaluating data quality.

Score	*Representativeness to the activity in terms of:*				
	Technology	*Time*	*Geography*	*Completeness*	*Reliability*
Very good	Data generated using the same technology	Data with less than 3 years of difference	Data from the same area	Data from all relevant sites over an adequate time period to even out normal fluctuations	Verified[3] data based on measurements[4]
Good	Data generated using a similar but different technology	Data with less than 6 years of difference	Data from a similar area	Data from more than 50 percent of sites for an adequate time period to even out normal fluctuations	Verified data partly based on assumptions or non-verified data based on measurements
Fair	Data generated using a different technology	Data with less than 10 years of difference	Data from a different area	Data from less than 50 percent of sites for an adequate time period to even out normal fluctuations or more than 50 percent of sites but for a shorter time period	Non-verified data partly based on assumptions, or a qualified estimate (e.g. by a sector expert)
Poor	Data where technology is unknown	Data with more than 10 years of difference or the age of the data are unknown	Data from an area that is unknown	Data from less than 50 percent of sites for shorter time period or representativeness is unknown	Non-qualified estimate

Adapted from B.P. Weidema and M.S. Wesnaes, "Data quality management for life cycle inventories – an example of using data quality indicators," Journal of Cleaner Production 4 no. 3-4 (1996): 167-174.

7.4 Guidance for collecting primary data

Primary activity data may be obtained through meter readings, purchase records, utility bills, engineering models, direct monitoring, mass balance, stoichiometry, or other methods for obtaining data from specific activities in the company's value chain.

Where possible, companies should collect energy or emissions data from suppliers and other value chain partners in order to obtain site-specific data for priority scope 3 categories and activities. To do so, companies should identify relevant suppliers from which to seek GHG data. Suppliers may include contract manufacturers, materials and parts suppliers, capital equipment suppliers, fuel suppliers, third party logistics providers, waste management companies, and other companies that provide goods and services to the reporting company.

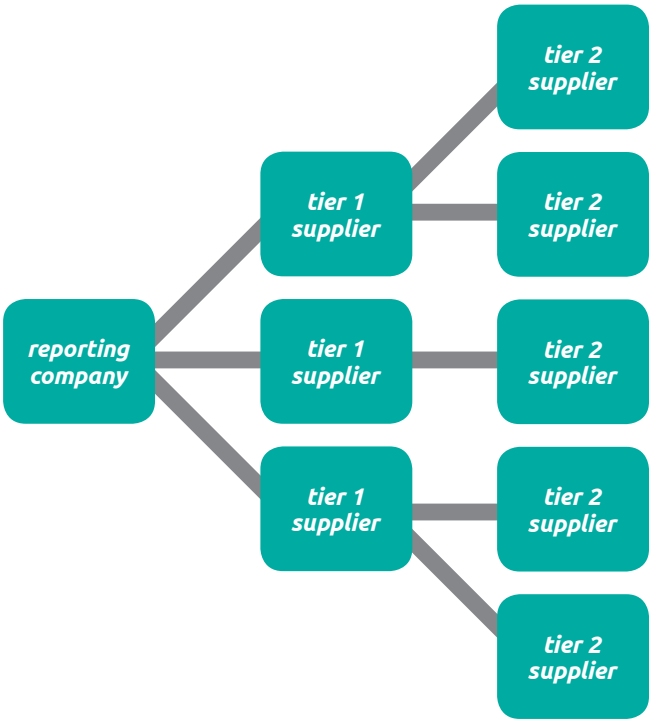
Companies should first engage relevant tier 1 suppliers (see figure 7.3). Tier 1 suppliers are companies with which the reporting company has a purchase order for goods or services (e.g., materials, parts, components, etc.). Tier 1 suppliers have contractual obligations with the reporting company, providing the leverage needed to request GHG inventory data.

To be comprehensive, companies may seek to obtain GHG emissions data from all tier 1 suppliers. However, a company may have many small tier 1 suppliers that together comprise only a small share of a company's total activities and spending. Companies may develop their own policy for selecting relevant suppliers to target for primary data collection. For example, a company may select suppliers based on their contribution to its total spend (see box 7.3). A company may also seek data from tier 2 suppliers, where relevant (see box 7.5). Tier 2 suppliers are companies with which tier 1 suppliers have a purchase order for goods and services (see figure 7.3). Companies should use secondary data to calculate emissions from activities where supplier-specific data is not collected or is incomplete.

Companies are required to report the percentage of emissions calculated using data obtained from suppliers or other value chain partners (see chapter 11).

It is unlikely that all of a company's relevant suppliers will be able to provide GHG inventory data to the company. (See table 7.8 for a list of challenges and guidance for collecting primary data from suppliers.) In such cases, companies should encourage suppliers to develop GHG inventories in the future and may communicate their efforts to encourage more suppliers to provide GHG emissions data in the public report.

Figure [7.3] Tier 1 suppliers in a supply chain



After selecting relevant suppliers, companies should determine the type and level of data to request from suppliers.

Type of data

The type of data that should be collected varies by scope 3 category. For example, companies may send questionnaires to each relevant supplier or other value chain partner requesting the following items:

- Product life cycle GHG emissions data following the *GHG Protocol Product Standard*
- Scope 1 and scope 2 emissions data[5] for the reporting year[6] following the *GHG Protocol Corporate Standard* and according to the hierarchy provided in table 7.7
- The supplier's upstream scope 3 emissions and/or the types of activities that occur upstream of the supplier (if applicable)

- A description of the methodologies used to quantify emissions and a description of the data sources used (including emission factors and GWP values)[7]
- The method(s) the supplier used to allocate emissions, or information the reporting company would need to allocate emissions (see chapter 8)
- Whether the data has been assured/verified, and if so, the type of assurance achieved
- Any other relevant information

For more information on types of data to collect by scope 3 category, see the GHG Protocol *Guidance for Calculating Scope 3 Emissions*, available at www.ghgprotocol.org.

Level of data

Activity data and emissions data may be collected at varying levels of detail and granularity. When collecting primary data from value chain partners, companies should obtain the most product-specific data available (see table 7.7). Product-level data is more precise because it relates to the specific good or service purchased by the reporting company and avoids the need for allocation (see chapter 8).

In general, companies should seek activity data or emissions data from suppliers that is as specific as possible to the product purchased from the supplier, following the hierarchy in table 7.7. If product-level data is not available, suppliers should try to provide data at the activity-, process-, or production line-level. If activity-level data is not available, suppliers should try to provide data at the facility level, and so on. Collecting more granular data is especially important from diversified suppliers that produce a wide variety of products (see box 7.4). Data collected at the activity, production line, facility, business unit, or corporate level may require allocation. (For guidance, see chapter 8.)

For more guidance on collecting primary data from suppliers, see *Guidance for Collecting Data from Suppliers*, available at www.ghgprotocol.org.

Quality of supplier data

The quality of supplier data may vary widely and be difficult to determine. Suppliers should use the data-quality indicators in section 7.3 to select data that are most representative of their activities in terms of technology, time, and geography, and that are the most complete and reliable. Reporting companies should use the data-quality indicators to assess the quality of suppliers' data. To do so, companies should request that suppliers provide supporting documentation to explain their methodology and the sources and quality of data used. Companies may request that suppliers perform first party or third party assurance of their data to ensure its accuracy and completeness (see chapter 10).

See table 7.8 for a list of challenges and guidance for collecting primary data from suppliers.

Box [7.3] Example of prioritizing suppliers based on contribution to the company's total spend

As an example, a company may prioritize suppliers by following these steps:

1. Obtain a complete list of the reporting company's total spend or expenditure, by supplier
2. Rank tier 1 suppliers according to their contribution to the reporting company's total spend
3. Select the largest tier 1 suppliers that collectively account for at least 80 percent[8] of spend (see figure 7.4)
4. Within the remaining 20 percent of spend, select any additional suppliers that are individually more than 1 percent of spend or that are relevant to the company for other reasons (e.g., contract manufacturers, suppliers that are expected to have significant GHG emissions, suppliers that produce or emit HFCs, PFCs, or SF_6, suppliers of high emitting materials, suppliers in priority spend categories as defined by the company, etc.)

Figure [7.4] Ranking a company's tier 1 suppliers according to spend

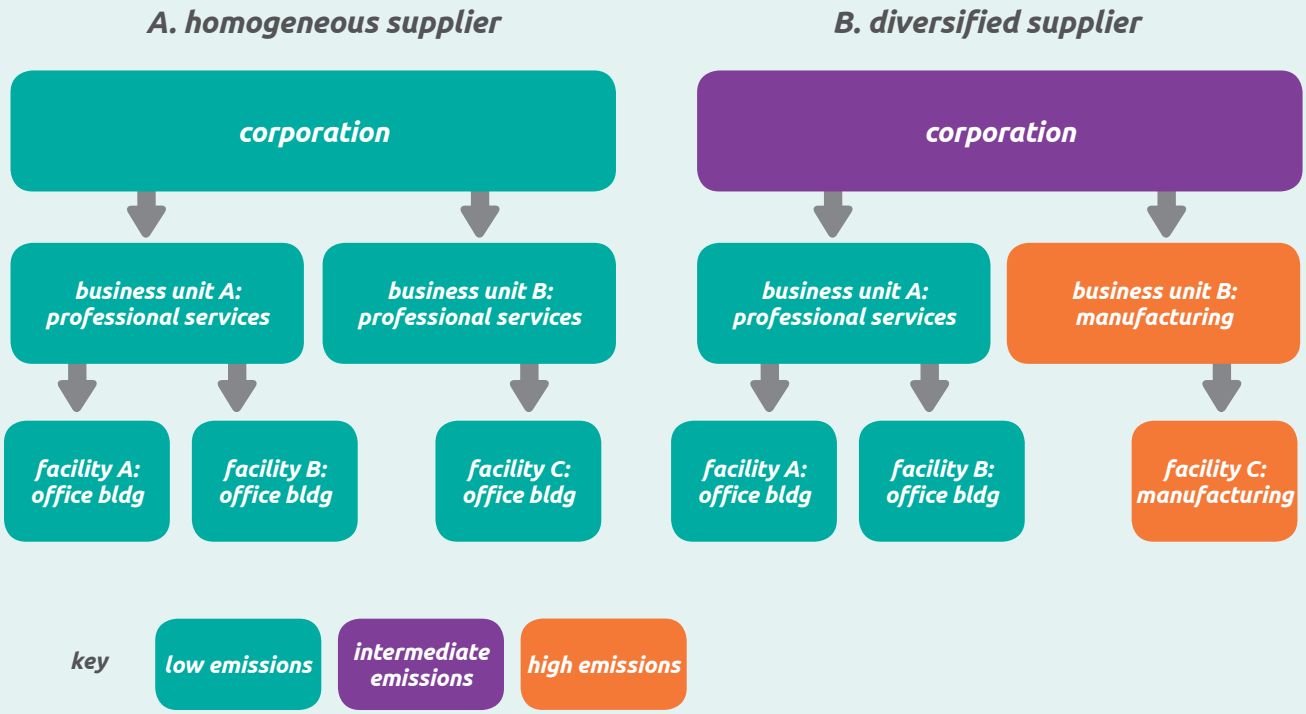
In this example, A-Z represent individual suppliers. The company selects suppliers A through I because they collectively account for 80 percent of the company's spend. The company also selects supplier J because it individually represents more than 1 percent of supplier spend. The company uses secondary data to calculate emissions from activities where supplier-specific data is not collected or is incomplete.

Table [7.7] Levels of data (ranked in order of specificity)

Data type	*Description*
Product-level data	Cradle-to-gate[9] GHG emissions for the product of interest
Activity-, process- or production line-level data	GHG emissions and/or activity data for the activities, processes, or production lines that produce the product of interest
Facility-level data	GHG emissions and/or activity data for the facilities or operations that produce the product of interest
Business unit-level data	GHG emissions and/or activity data for the business units that produce the product of interest
Corporate-level data	GHG emissions and/or activity data for the entire corporation

Box [7.4] Level of data and supplier type

The need to collect granular data from a supplier depends in part on the variety and diversity of products the supplier produces. Collecting data at the product, production line, or facility level is more important for diversified companies than for relatively homogeneous companies, for which business unit- or corporate-level data may yield representative GHG estimates. Below are two examples: A) a homogeneous supplier with relatively uniform emissions throughout its operations and B) a diversified supplier where GHG intensity varies widely between business units and facilities.

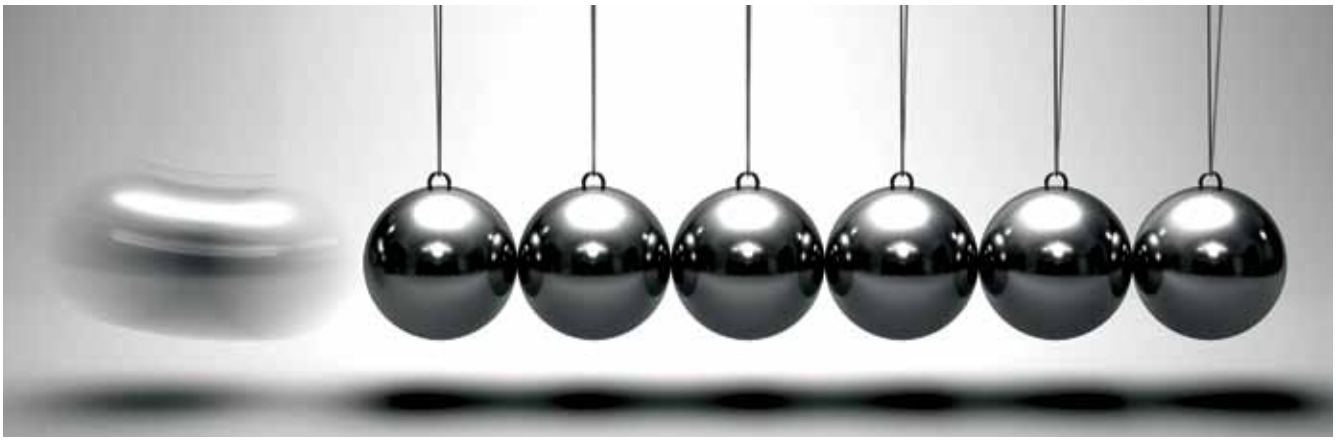


The reporting company purchases the same type of professional services from both suppliers. The reporting company needs to decide whether collecting corporate-level emissions from the suppliers will accurately reflect emissions related to the purchased product. The company makes a qualitative determination based on the nature of each supplier's business activities.

For Supplier A, the reporting company decides to use corporate level data to estimate emissions from the purchased service because the supplier only produces professional services, each of which has a similar GHG intensity. For Supplier B, however, the reporting company decides not to use corporate-level emissions data because the company is diversified and has business units in both professional services and manufacturing, which have widely different GHG intensities. As a result, using corporate-level data would not accurately reflect emissions from the purchased service. More granular data (e.g., facility- or business unit-level data) should be used instead.

Table [7.8] Challenges and guidance for collecting primary data from value chain partners

Challenges	*Guidance*
Large number of suppliers	• Target most relevant suppliers based on spend and/or anticipated emissions impact • Target suppliers where the reporting company has a higher degree of influence (e.g., contract manufacturers or suppliers where the reporting company accounts for a significant share of the supplier's total sales)
Lack of supplier knowledge and experience with GHG inventories and accounting	• Target suppliers with prior experience developing GHG inventories • Identify the correct subject-matter expert at the company • Explain the business value of investing in GHG accounting and management • Request data suppliers already have collected, such as energy-use data, rather than emissions data • Provide clear instructions and guidance with the data request • Provide training, support, and follow-up
Lack of supplier capacity and resources for tracking data	• Make the data request as simple as possible • Use a simple, user-friendly, standardized data template or questionnaire • Provide a clear list of data required and where to find data (e.g., utility bills) • Use an automated online data collection system to streamline data entry • Consider use of a third party database to collect data • Engage and leverage resources from suppliers' trade associations • Coordinate GHG data request with other requests • Follow up with suppliers
Lack of transparency in the quality of supplier data	• Request documentation on methodology and data sources used, inclusions, exclusions, assumptions, etc. • Minimize errors by requesting activity data (e.g., kWh electricity used, kg of fuels used) and calculating GHG emissions separately • Consider third party assurance
Confidentiality concerns of suppliers	• Protect suppliers' confidential and proprietary information (e.g., through nondisclosure agreements, firewalls, etc.) • Ask suppliers to obtain third party assurance rather than submitting detailed activity data to avoid providing confidential information
Language barriers	• Translate the questionnaire and communications into local languages



Box [7.5] Expanding supplier GHG management beyond tier 1 suppliers

While companies should first engage tier 1 suppliers, significant value chain GHG impacts often lie upstream of a company's tier 1 suppliers. Tier 1 suppliers may outsource manufacturing or be several layers removed from the most GHG-intensive operations in a supply chain (e.g., raw material extraction or manufacturing).

As a result, companies may want to promote further proliferation of GHG management throughout the supply chain. As tier 1 data is gathered, companies may consider whether and how to approach deeper levels of the supply chain. Possible approaches include:

- Encouraging or requiring tier 1 suppliers to encourage their own tier 1 suppliers (i.e., the reporting company's tier 2 suppliers) to report their GHG inventories. Eventually ask tier 2 suppliers to require their tier 1 suppliers to do the same.
- Target specific tier 2 suppliers for GHG data requests in cases where tier 2 suppliers are responsible for the majority of GHG emissions associated with a product provided by a tier 1 supplier. In practice, this approach is likely to be difficult without close cooperation between a company and its complete supply chain. As an example, a firm that sells food products may work closely with both growers and processors in its supply chain.

Cascading GHG accounting and reporting throughout supply chains expands the number of companies directly involved in managing GHG emissions. Companies undertaking supply chain engagement efforts may optionally provide information about such efforts in the public report (see chapter 11).

7.5 Guidance for collecting secondary data and filling data gaps

Collecting secondary data

When using secondary databases, companies should prioritize databases and publications that are internationally recognized, provided by national governments, or peer-reviewed. Companies should use the data-quality indicators in section 7.3 when selecting secondary data sources. The data-quality indicators should be used to select secondary data that are the most representative to the company's activities in terms of technology, time, and geography, and that are the most complete and reliable. A list of available secondary data sources is available at www.ghgprotocol.org.

Using proxy data to fill data gaps

Companies should use the guidance in section 7.3 to assess the quality of available data. If data of sufficient quality are not available, companies may use proxy data to fill data gaps. Proxy data is data from a similar activity that is used as a stand-in for the given activity. Proxy data can be extrapolated, scaled up, or customized to be more representative of the given activity (e.g., partial data for an activity that is extrapolated or scaled up to represent 100 percent of the activity).

Examples of proxy data include:

- An emission factor exists for electricity in Ukraine, but not for Moldova. A company uses the electricity emission factor from Ukraine as a proxy for electricity in Moldova.
- A company collects data for 80 percent of its production for a given product category, but 20 percent is unknown. The company assumes the unknown 20 percent has similar characteristics to the known 80 percent so applies a linear extrapolation to estimate 100 percent of the production data.

7.6 Improving data quality over time

Collecting data, assessing data quality, and improving data quality is an iterative process. Companies should first apply data quality indicators and assess data quality when selecting data sources (see section 7.3), then review the quality of data used in the inventory after data has been collected, using the same data quality assessment approach. In the initial years of scope 3 data collection, companies may need to use data of relatively low quality due to limited data availability. Over time, companies should seek to improve the data quality of the inventory by replacing lower quality data with higher quality data as it becomes available. In particular, companies should prioritize data quality improvement for activities that have the following:

- Relatively low data quality (based on the data quality guidance in section 7.3)
- Relatively high emissions

Companies are required to provide a description of the data quality of reported scope 3 emissions data to ensure transparency and avoid misinterpretation of data (see chapter 11). Refer to section 7.3 for guidance on describing data quality; Appendix B for guidance on uncertainty; and section 9.3 for guidance on recalculating base year emissions when making significant improvements in data quality over time.

Endnotes

1 For example, activity-specific secondary data may be of higher quality than corporate-level primary data received from a supplier.
2 Verification may take place in several ways, for example by on-site checking, reviewing calculations, mass balance calculations, or cross-checks with other sources.
3 Verification may take place in several ways, for example by on-site checking, reviewing calculations, mass balance calculations, or cross-checks with other sources.
4 Includes calculated data (e.g., emissions calculated using activity data) when the basis for calculation is measurements (e.g., measured inputs). If the calculation is based partly on assumptions, the score should be 'Good' or 'Fair.'
5 Suppliers' scope 1 and scope 2 emissions data should include emissions of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6, and may be aggregated to units of carbon dioxide equivalent rather than separately reported by individual greenhouse gas.
6 Some suppliers may collect data on a fiscal year basis, while others collect data on a calendar year basis. To the greatest extent possible, reporting companies should collect or adjust data to reflect a consistent 12-month period.
7 To the greatest extent possible, companies should encourage consistent use of sources of emission factors and GWP values across suppliers.
8 Eighty percent is an example threshold. Companies may define their own threshold. The percentage can be increased over time as the reporting company and its suppliers gain experience in managing GHG emissions.
9 Cradle-to-gate GHG emissions include all emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).

08 Allocating Emissions

This chapter provides guidance on allocating emissions to calculate scope 3 emissions, including:

- *Overview of allocation (section 8.1)*
- *How to avoid or minimize allocation, if possible (section 8.2)*
- *Allocation methods (section 8.3)*
- *Examples of allocating emissions (section 8.4)*

8.1 Overview of allocation

When companies use primary data from suppliers or other value chain partners to calculate scope 3 emissions (see section 7.4), companies may need to allocate emissions. Likewise, companies may need to allocate emissions when providing primary data to customers that are accounting for their scope 3 emissions.

Allocation is the process of partitioning GHG emissions from a single facility or other system[1] (e.g., activity, vehicle, production line, business unit, etc.) among its various outputs (see figure 8.1).

When allocation is needed

Allocation is necessary when:

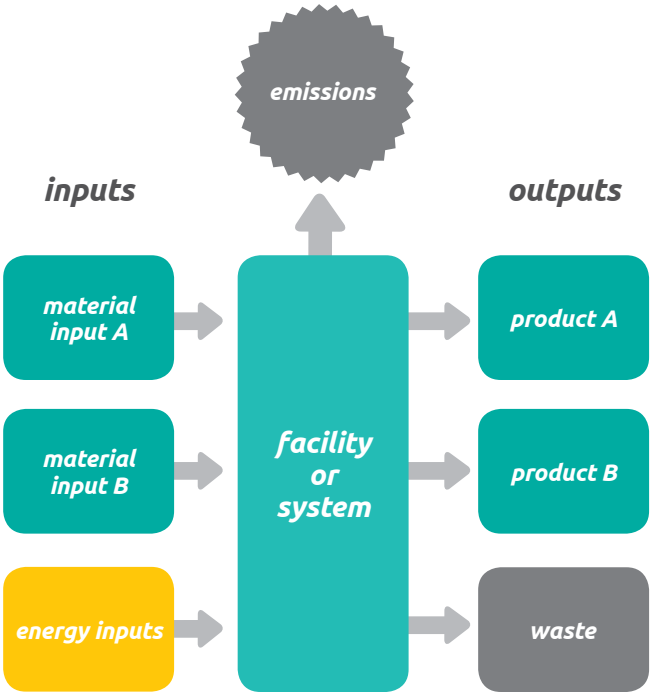
- a single facility or other system produces multiple outputs; and
- emissions are only quantified for the entire facility or system as a whole.

In such a case, emissions from the shared facility or other system need to be allocated to (or divided between) the various outputs (see figure 8.1).

For example, a single production facility may produce many different products and co-products, while activity data (used to calculate GHG emissions) is collected for the plant as a whole. In this case, the facility's energy use and emissions need to be allocated to its various outputs.

Similarly, a company may purchase components from a supplier that manufactures a wide variety of products for many different customers. In this case, the supplier's activity data or emissions data need to be allocated among the various products so its customers know the emissions attributable to the specific products they buy, based on the fraction of total supplier production that is related to the customer's purchases.

Figure [8.1] The need for allocation



When allocation is not needed

When using primary data, allocation is not necessary if:

- a facility or other system produces only one output; or
- emissions from producing each output are separately quantified.

Allocation is not typically necessary when using secondary data to calculate scope 3 emissions, since the activity data and emission factors are typically in reference to a single product (e.g., calculating emissions from third-party transportation by multiplying weight-distance traveled by an emission factor).

8.2 Avoid or minimize allocation if possible

When using primary data to calculate scope 3 emissions, companies should avoid or minimize allocation if possible. Allocation adds uncertainty to the emissions estimates and may be especially inaccurate when an activity or facility produces a wide variety of products that differ significantly in their GHG contribution.

For example, a supplier may manufacture twenty different types of products and only supply one type of product to the reporting company. Allocating the scope 1 and scope 2 emissions of the supplier would be inaccurate if the type of good supplied to the reporting company has a lower or higher emissions intensity than the average emissions intensity of the twenty products manufactured by the supplier. Therefore, allocation should be used only when more accurate data is not available.

Companies should avoid or minimize allocation by collecting more detailed data through one of the following approaches:

- Obtaining product-level GHG data from value chain partners following the *GHG Protocol Product Standard*[2]
- Separately sub-metering energy use and other activity data (e.g., at the production line level)[3]
- Using engineering models to separately estimate emissions related to each product produced[4]

8.3 Allocation methods

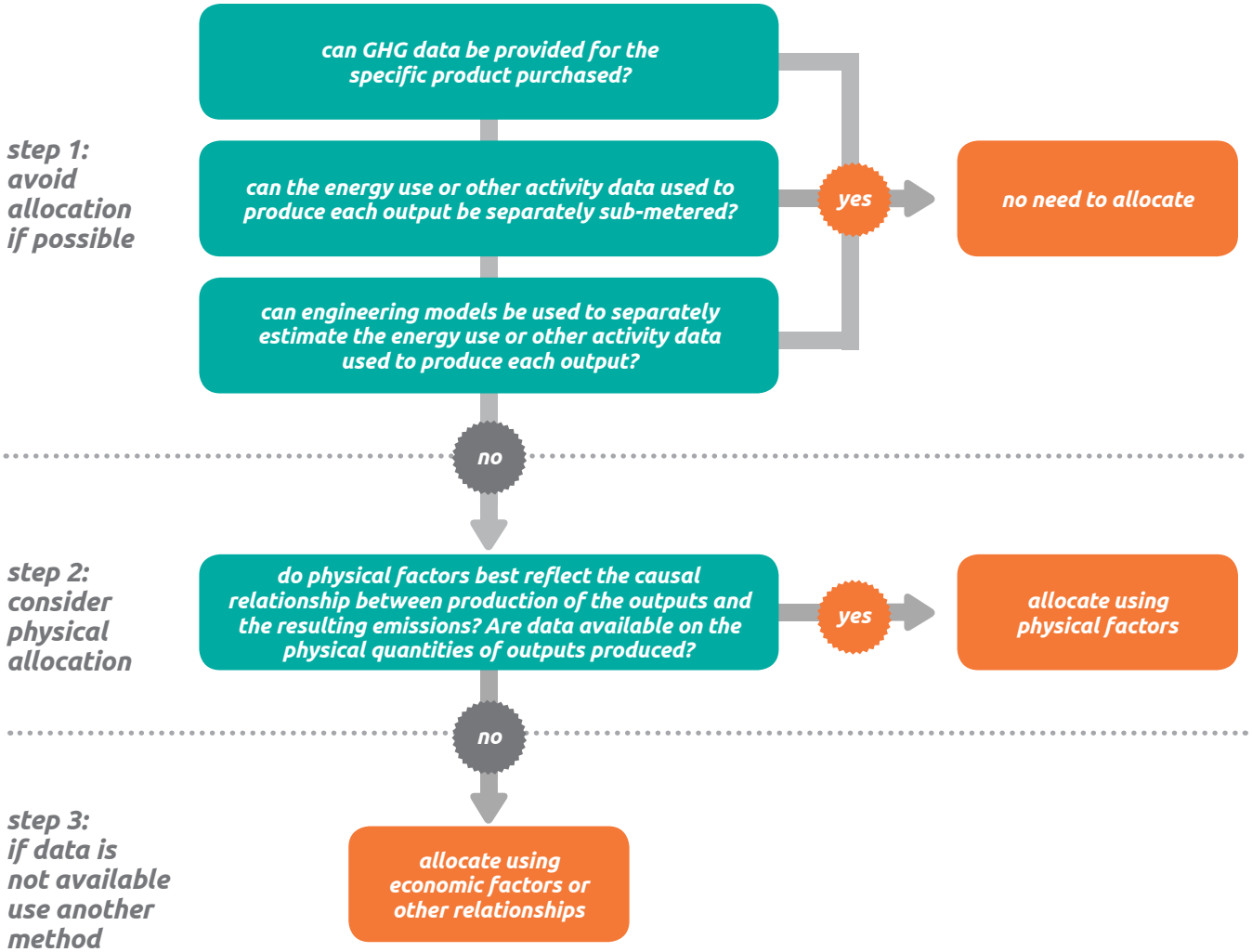
If avoiding allocation is not possible, companies should first determine total facility or system emissions, then determine the most appropriate method and factor for allocating emissions. (See table 8.1 for a list of allocation methods and factors.)

As a general rule, companies should follow the decision tree in figure 8.2 when deciding if allocation is needed and selecting an allocation method. However, the most appropriate allocation method for a given activity depends on individual circumstances (see section 8.4 for examples). Companies should select the allocation approach that:

- best reflects the causal relationship between the production of the outputs and the resulting emissions;
- results in the most accurate and credible emissions estimates;
- best supports effective decision-making and GHG reduction activities; and
- otherwise adheres to the principles of relevance, accuracy, completeness, consistency and transparency.

Different allocation methods may yield significantly different results. Companies that have a choice between multiple methods for a given activity should evaluate each method to determine the range of possible results

Figure [8.2] Decision tree for selecting an allocation approach



before selecting a single method (e.g., conduct a sensitivity analysis).

Companies may use a combination of different allocation methods and factors to estimate emissions from the various activities in the scope 3 inventory. However, for each individual facility or system, a single, consistent allocation factor should be used to allocate emissions throughout the facility or system. The sum of the allocated emissions for each output of a system should equal 100 percent of emissions from the system. The use of multiple allocation methods for a single system can result in over-counting or under-counting of total emissions from the system.

To allocate emissions from a facility, multiply total facility emissions by the reporting company's purchases as a fraction of total production (see box 8.1). Either the reporting company or its suppliers can allocate supplier emissions to the reporting company (see box 8.2).

See table 8.2 for allocation guidance by scope 3 category.

Companies are required to report a description of the allocation methods used to calculate scope 3 emissions (see chapter 11). Where applicable, companies should disclose the range of results obtained through sensitivity analysis.

No allocation for waste generated in production (e.g., within category 1, category 2, and category 10)

Waste is an output of a system that has no market value. While companies generate revenue through the sale of co-products, companies receive no revenue from waste and may instead pay to dispose of it. Waste may be generated from production processes included in category 1 (Purchased goods and services), category 2 (Capital goods), or category 10 (Processing of sold products). If a facility produces waste during production, no emissions from the facility should be allocated to the waste. All emissions from the facility should instead be allocated among the facility's other outputs. If waste becomes useful and marketable for use in another system, it is no longer considered waste and should be treated like other types of outputs.

The preceding guidance does not apply to category 5 (Waste generated in operations) or category 12 (End-of-life treatment of sold products). Companies should account for all emissions related to waste within category 5 and category 12.

Box [8.1] Equation for allocating emissions from a facility

$$\textit{Allocated Facility Emissions} = \textit{Total Facility Emissions} \times \frac{\textit{Reporting Company's Purchases from the Facility}}{\textit{Total Facility Production}}$$

Where both "Reporting Company's Purchases from the Facility" and "Total Facility Production" are measured in the same units (e.g., mass, volume, market value, number of products)

Box [8.2] Two approaches to allocating GHG emissions from suppliers

Companies may use two basic approaches for collecting and allocating GHG emissions from suppliers:

- **Supplier allocation:** Individual suppliers report pre-allocated emissions data to the reporting company and disclose the allocation metric used
- **Reporting company allocation:** The reporting company allocates supplier emissions by obtaining two types of data from individual suppliers: 1) total supplier GHG emissions data (e.g., at the facility or business unit level), and 2) the reporting company's share of the supplier's total production, based on either physical factors (e.g., units of production, mass, volume, or other metrics) or economic factors (e.g., revenue, spend)

Reporting company allocation is likely to ensure more consistency in methodologies for the reporting company, while the supplier allocation approach may be more practical by avoiding the need for suppliers to report confidential business information.

Table [8.1] Allocation methods and factors

Physical allocation: ***Allocating the emissions of an activity based on an underlying physical relationship between the multiple inputs/outputs and the quantity of emissions generated***

Allocation factors	*Examples of allocation factors and formulas*
Mass	Mass of co-products $\textit{Allocated Facility Emissions} = \frac{\textit{Mass of Products Purchased}}{\textit{Total Mass of Products Produced}} \times \textit{Total Emissions}$
Volume	Volume of cargo transported $\textit{Allocated Facility Emissions} = \frac{\textit{Volume of Products Purchased}}{\textit{Total Volume of Products Produced}} \times \textit{Total Emissions}$
Energy	Energy content of heat and electricity co-products $\textit{Allocated Facility Emissions} = \frac{\textit{Energy Content of Products Purchased}}{\textit{Total Energy Content of Products Produced}} \times \textit{Total Emissions}$
Chemical	Chemical composition of chemical co-products $\textit{Allocated Facility Emissions} = \frac{\textit{Chemical Content of Products Purchased}}{\textit{Total Chemical Content of Products Produced}} \times \textit{Total Emissions}$
Number of units	Number of units shipped $\textit{Allocated Facility Emissions} = \frac{\textit{Number of Units Purchased}}{\textit{Total Number of Units Produced}} \times \textit{Total Emissions}$
Other factors	Protein content of food co-products, floor space occupied by products *Other formulas*

Economic allocation: ***Allocating the emissions of an activity based on the market value of each output/product***

Allocation factors	*Examples of allocation factors and formulas*
Market value[5]	Market value of co-products $\textit{Allocated Facility Emissions} = \frac{\textit{Market Value of Products Purchased}}{\textit{Total Market Value of Products Produced}} \times \textit{Total Emissions}$

Other methods: ***Allocating the emissions of an activity based on industry-specific or company-specific allocation methods***

Allocation factors	*Examples of allocation factors and formulas*
Other factors	*Other formulas*

8.4 Examples of allocating emissions

This section provides examples and guidance for determining the most appropriate allocation method to use for various situations. The most appropriate method for a given activity is the one that best reflects the causal relationship between the production of the product and the resulting emissions, and depends on individual circumstances. Companies should establish a consistent policy for allocating emissions for various activities in the value chain. Table 8.2 provides guidance on choosing allocation methods for each scope 3 category.

Using physical allocation

Physical allocation is expected to yield more representative emissions estimates in several situations, outlined below.

Manufacturing

In certain cases, manufacturing facilities may produce multiple products, each of which requires similar energy and material inputs to produce, but which differ significantly in market value (e.g., due to higher brand value of one product than another). While the market value of the products differs, the physical quantity of

Table [8.2] Allocation guidance by scope 3 category

Upstream scope 3 emissions

Category	Examples of primary data requiring allocation	Allocation guidance
1. Purchased goods and services	• Site-specific energy use or emissions data from suppliers	• Physical or economic allocation
2. Capital goods	• Site-specific energy use or emissions data from capital goods suppliers	• Physical or economic allocation
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	• Company-specific data on upstream emissions (e.g. extraction of fuels) • Actual power purchase data for purchased power	• Physical allocation (energy)
4. Upstream transportation and distribution	• Activity-specific energy use or emissions data from third-party transportation and distribution suppliers	• Physical allocation (mass or volume) for shared vehicles • Physical allocation (volume or area) for shared facilities
5. Waste generated in operations	• Site-specific emissions data from waste management companies	• Physical or economic allocation
6. Business travel	• Activity-specific emissions data from transportation suppliers (e.g., airlines)	• Physical allocation for shared vehicles (e.g., area occupied)
7. Employee commuting	• Specific distance traveled and mode of transport collected from employees	• Physical allocation for shared vehicles (e.g., area occupied)
8. Upstream leased assets	• Site-specific energy use data collected by utility bills or meters	• Physical allocation for shared facilities (e.g., area or volume)

emissions resulting from the production of each product is similar.

In such a case, physical factors are more closely correlated with emissions and better approximate actual emissions associated with producing each product. Companies should select the physical factor that most closely correlates to emissions, which may include units of production, mass, volume, energy, or other metrics. Companies should consider multiple physical factors when selecting the factor that is most appropriate.

Transportation

Allocating emissions from the transportation of cargo (or freight) occurs when:

- a single vehicle (e.g., ship, aircraft, train, or truck) transports multiple products;
- activity data (e.g., fuel use) is collected at the vehicle level; and
- a company chooses to estimate emissions by allocating total vehicle emissions to one or more of the products shipped.

Table [8.2] Allocation guidance by scope 3 category (continued)

Downstream scope 3 emissions

Category	*Examples of primary data requiring allocation*	*Allocation guidance*
9. Downstream transportation and distribution	• Activity-specific energy use or emissions data from third party transportation and distribution partners	• Physical allocation for shared vehicles (mass or volume) • Physical allocation for shared facilities (volume or area)
10. Processing of sold products	• Site-specific energy use or emissions from downstream value chain partners	• Physical or economic allocation
11. Use of sold products	• Specific data collected from consumers	• Physical allocation, where applicable
12. End-of-life treatment of sold products	• Specific data collected from waste management providers on emissions rates or energy use	• Physical allocation, where applicable
13. Downstream leased assets	• Site-specific energy use data collected by utility bills or meters	• Physical allocation for shared facilities (volume or area)
14. Franchises	• Site-specific energy use data collected by utility bills or meters	• Physical allocation for shared facilities (volume or area)
15. Investments	• Site-specific energy use or emissions data	• Economic allocation based on the company's proportional share of equity or debt in the investee

Companies should allocate emissions using physical allocation, since physical factors are expected to best reflect the causal relationship between the transportation of products and the resulting emissions. Companies should allocate using either weight, volume, or a combination of weight and volume, depending on whether the capacity of the vehicle is limited by weight, volume, or a combination of the two. The limiting factor depends on the mode of transportation (road, rail, air, or marine transport). For example, ocean-going vessels tend to be limited by volume, while trucks tend to be limited by weight.

Companies may also calculate emissions without allocating emissions by using secondary data (e.g., industry-average emission factors based on metric ton-km traveled).

Commercial buildings (e.g., leased assets, franchises)

Commercial buildings include retail facilities, warehouses, distribution centers, and owned or leased office buildings. Allocating emissions from commercial buildings occurs when:

- activity data is collected at the facility/building level; and
- a company chooses to estimate emissions for a subset of products by allocating total facility emissions to one or more products located at the facility.

Companies should allocate emissions using physical allocation, since physical factors are expected to best reflect the causal relationship between the storage of products and the resulting emissions. Companies should allocate using either volume or area, depending on whether the capacity of the facility is limited by volume or area, and which is most closely correlated with energy use and emissions.

For example, to allocate emissions from a retail facility, a company may divide total facility emissions by the relative volume (e.g., quantity of shelf space) occupied by a given product within a retail facility.

Companies should obtain more accurate estimates by first separating total facility energy use and total quantity of products sold between refrigerated storage and non-refrigerated storage. Where the same product is stacked on pallets or shelves, companies may divide emissions per unit of volume or floor space by the total number of products occupying that area to determine emissions per unit of product.

Companies may also calculate emissions from retail and warehousing without allocating emissions by using secondary data (e.g., industry average emission factors expressed in units of emissions per volume or floor space).

Box [8.3] Equation for allocating vehicle emissions based on volume

$$\text{Allocated Emissions} = \frac{\text{Volume of Vehicle Occupied By The Product}}{\text{Total Volume of Vehicle}} \times \text{Total Vehicle Emissions}$$

Note: This equation assumes the distance traveled by each product is the same.

Box [8.4] Equation for allocating emissions from a building based on area

$$\text{Allocated Emissions} = \frac{\text{Volume of Retail Facility Occupied By The Product}}{\text{Total Volume of Retail Facility}} \times \text{Total Retail Facility Emissions}$$

Using economic allocation

Economic allocation is expected to yield more representative emissions estimates in certain situations, such as:

- when a physical relationship cannot be established;
- when a co-product would not be produced by the common facility or system without the market demand for the primary product and/or other valuable co-products (e.g., by-catch from lobster harvesting);
- when a co-product was previously a waste output that acquires value in the marketplace as a replacement for another product (e.g., fly ash in cement production);
- investments, where emissions should be allocated to the reporting company based on the reporting company's proportional share of equity or debt in the investee (see section 5.5, category 15); and
- other situations where economic allocation best reflects the causal relationship between the production of the outputs and the resulting emissions.

In situations other than those outlined above, companies should use economic allocation with caution, since economic allocation may yield misleading GHG estimates, especially when:

- prices change significantly or frequently over time;
- companies pay different prices for the same product (due to different negotiated prices); or
- prices are not well-correlated with underlying physical properties and GHG emissions (e.g., for luxury goods, products with high brand value, and products whose price reflects high research and development, marketing, or other costs, apart from production).

Levi Strauss & Company: Allocating scope 3 emissions

Levi Strauss & Co. (LS&Co.) used multiple allocation methods within its scope 3 inventory depending on the types and granularity of data available.

Category 1:
Purchased goods and services (upstream)
LS&Co. collected primary data from a sample of suppliers throughout its supply chain, including fabric mills (facilities that create denim fabric from cotton fiber) and garment manufactures (facilities that assemble and finish final denim products). Allocation was necessary because both types of suppliers provided aggregated data at the facility level on total material use, energy use, production throughput, and waste streams for their full annual production. GHG emissions per product could be reasonably allocated by dividing total facility emissions by facility throughput, since both types of suppliers produce relatively uniform outputs (i.e., denim products).

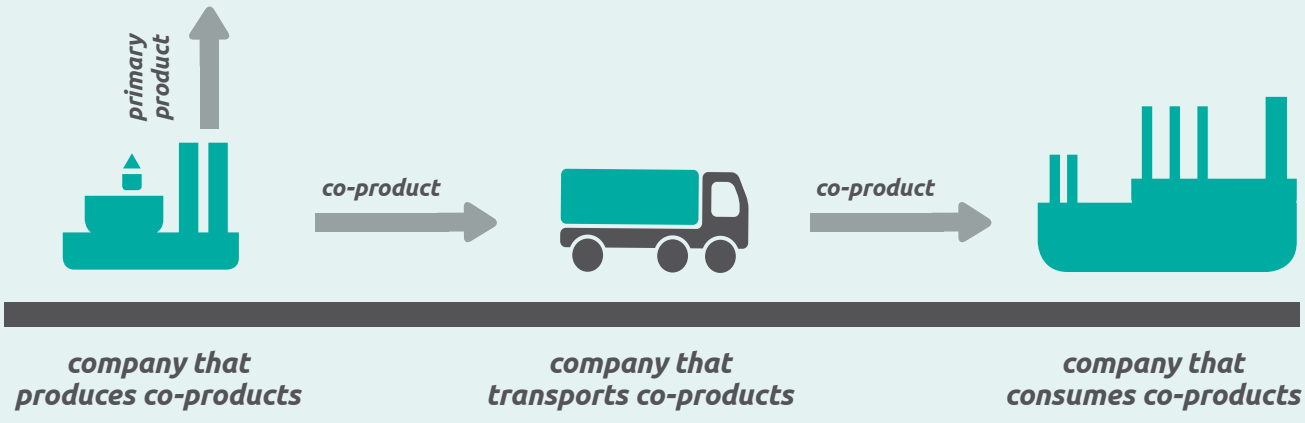
LS&Co. allocated emissions from the fabric mills by mass, since mass is one of the main quantifiable determinants of material and energy inputs during the milling process and best reflects the causal relationship between production and emissions. LS&Co. allocated emissions from the garment manufacturers by the number of products produced at a facility, since assembly and finishing are similar across a variety of denim products and emissions per unit are expected to be similar. Emissions per product were multiplied by the total number of units purchased by LS&Co. per facility to obtain total scope 3 emissions attributable to LS&Co.

Category 9:
Downstream transportation and distribution
Distribution Centers: After production, jeans are sent to a distribution center that packages and ships various products. LS&Co. estimated emissions per product by collecting primary data for total energy and materials used, allocated by total units of product shipped during a year. This method assumes that all units shipped result in the same emissions, which LS&Co. considered reasonable since all products go through the same processes at the distribution center.

Retail: Jeans are shipped from distribution centers to retail stores. Each retail store sells a variety of products, which requires allocating total store emissions to each product type. LS&Co. allocated emissions according to the retail floor space occupied by each product compared to the entire store. LS&Co. determined the average floor space and emissions of a retail store and the floor area (physical space) occupied by each product to determine emissions per individual unit from retail.

Box [8.5] Example of allocating emissions across a value chain

In this example, Company A produces a co-product during the production of a primary product. Company B transports the co-product to Company C, who consumes the co-product in its production process. The table below explains how each company should account for emissions from each activity.



Activity	How Company A accounts for emissions	How Company C accounts for emissions
Production of co-products (by Company A)	**Scope:** Scope 1 because the facility that produces the co-product is owned and operated by Company A **Allocation approach:** No need to allocate emissions; all emissions are accounted as scope 1 because the facility is owned and operated by Company A	**Scope:** Scope 3, "Purchased goods and services," because the co-product is a purchased material produced by a third party **Allocation approach:** Scope 3 emissions from co-product production by Company A should be allocated using physical allocation if physical factors best reflect the causal relationship between production of the outputs and the resulting emissions and data are available on the physical quantities of outputs produced
Transportation of co-products (by Company B)	**Scope:** Scope 3, "Downstream transportation and distribution" because the vehicles are owned and operated by a third party and not paid for by Company A **Allocation approach:** If vehicles transport multiple types of products and emissions are calculated using primary data provided by the transportation company: scope 3 emissions should be allocated to the co-product using physical allocation (mass or volume) (see section 8.4). Secondary data (based on metric ton-km traveled) may be used instead, which does not require allocation.	**Scope:** Scope 3, "Upstream transportation and distribution" because the vehicles are owned and operated by a third party and transporting products purchased by Company C **Allocation approach:** If vehicles transport multiple types of products and emissions are calculated using primary data provided by the transportation company: scope 3 emissions should be allocated to the co-product using physical allocation (mass or volume) (see section 8.4). Secondary data (based on metric ton-km traveled) may be used instead, which does not require allocation.

Box [8.5] Example of allocating emissions across a value chain (continued)

Activity	*How Company A accounts for emissions*	*How Company C accounts for emissions*
Consumption of co-products (by Company C)	**Scope:** Scope 3, "Processing of sold products," because the co-product is an intermediate product sold by Company A	**Scope:** Scope 1 because the facility is owned and operated by Company C **Allocation approach:** No need to allocate emissions; all emissions are accounted as scope 1 because the facility is owned and operated by Company C

Endnotes

1 In this chapter, the term "system" is used to refer to any source of emissions (e.g., an activity, vehicle, production line, business unit, facility, etc.).

2 Product-level data refers to the cradle-to-gate GHG emissions of an individual product, i.e., all emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).

3 Separately sub-metering a production line allows a company to read an energy meter first before the line starts and again when the run of a product finishes. Sub-metering yields the quantity of the energy used to a specific product without the need for allocation.

4 Avoiding allocation by subdividing a process is called "process subdivision" in the *GHG Protocol Product Standard*.

5 When determining the "market value," companies should use the selling price (i.e., the price the reporting company pays to acquire products from the supplier), rather than the supplier's production cost (i.e., the costs incurred by the suppler to manufacture its products).

09 Setting a GHG Reduction Target and Tracking Emissions Over Time

Greenhouse gas accounting and reporting allows companies to track and report their emissions performance over time. Companies may track scope 3 emissions in response to a variety of business goals (see chapter 2), including demonstrating performance toward achieving GHG reduction targets, managing risks and opportunities, and addressing the needs of stakeholders.

This chapter is organized according to the steps a company should follow to track scope 3 performance over time:

- Choosing a base year and determining base year emissions
- Setting scope 3 reduction goals
- Recalculating base year emissions (if necessary)
- Accounting for scope 3 emissions and reductions over time

The guidance in this chapter is adapted from the *GHG Protocol Corporate Standard* (chapters 5, 8, and 11).

Requirements in this chapter

When companies choose to track performance or set a reduction target, companies shall:

- ***choose a scope 3 base year and specify their reasons for choosing that particular year;***
- ***develop a base year emissions recalculation policy that articulates the basis for any recalculations; and***
- ***recalculate base year emissions when significant changes in the company structure or inventory methodology occur.***

9.1 Choosing a base year and determining base year emissions

A meaningful and consistent comparison of emissions over time requires that companies establish a base year against which to track performance. When companies choose to track scope 3 performance or set a scope 3 reduction target, companies shall choose a scope 3 base year and specify their reasons for choosing that particular year.

Companies should establish a single base year for scope 1, scope 2, and scope 3 emissions to enable comprehensive and consistent tracking of total corporate GHG emissions across all three scopes. However, companies that have already established a base year for scope 1 and scope 2 emissions may choose a more recent year for the scope 3 base year (e.g., the first year for which companies have complete and reliable scope 3 emissions data).

The scope 3 base year does not need to be the first year for which scope 3 emissions are reported. For example, a company may wait until the second or third year of scope 3 reporting to set a scope 3 base year, when the scope 3 inventory is sufficiently complete and reliable. In this case, the company is required to report the scope 3 base year only after it has established a scope 3 base year. Until a scope 3 base year is set, companies should report that they have not yet established a scope 3 base year.

When a base year is chosen, companies should determine base year emissions by following the requirements and guidance contained in this standard.

When setting a base year, companies shall develop a base year emissions recalculation policy (see section 9.3).

9.2 Setting scope 3 reduction targets

Any robust business strategy requires setting targets for revenues, sales, and other core business indicators, as well as tracking performance against those targets. Likewise, a key component of effective GHG management is setting a GHG target. Companies are not required to set a scope 3 reduction target, but should consider setting a target in the context of their business goals (see chapter 2).

Companies should consider several questions when setting a scope 3 GHG reduction target (see table 9.1).

Target boundary

Companies may set a variety of scope 3 reduction goals, including:

- A single target for total scope 1 + scope 2 + scope 3 emissions
- A single target for total scope 3 emissions
- Separate targets for individual scope 3 categories
- A combination of targets, for example a target for total scope 1 + 2 + 3 emissions as well as targets for individual scope 3 categories

Each type of target boundary has advantages and disadvantages (see table 9.2).

Regardless of the type(s) of reduction targets set, companies should establish a single base year for all scope 3 categories. A single base year for all scope 3 categories simplifies scope 3 emissions tracking, avoids "cherry picking" of base years (or the perception thereof), and allows clearer communication of GHG emissions to stakeholders.

Table [9.1] Considerations when setting a GHG reduction target

Issue	*Description*
Target type	Whether to set an absolute or intensity target
Target completion date	The duration of the target (e.g., short term or long term target)
Target level	The numerical value of the reduction target
Use of offsets or credits	Whether to use offsets or credits to meet GHG reduction targets

Target type

Companies can set either absolute targets, intensity targets, or a combination of absolute and intensity targets. An absolute target is expressed as a reduction in GHG emissions to the atmosphere over time in units of metric tons of CO_2e. An intensity target is expressed as a reduction in the ratio of GHG emissions relative to a business metric, such as output, production, sales or revenue. Advantages and disadvantages of each type of target are provided in table 9.3.

To ensure transparency, companies using an intensity target should also report the absolute emissions from sources covered by the target. Companies may find it most useful and credible to implement both absolute and intensity targets. For example, companies may establish an absolute target at the corporate level and a combination of intensity targets at lower levels of the company, or an absolute target for total scope 3 emissions and a combination of intensity targets for individual scope 3 categories.

Table [9.2] Advantages and disadvantages of different target boundaries

Target boundary	*Advantages*	*Disadvantages*
A single target for total scope 1 + scope 2 + scope 3 emissions	• Ensures more comprehensive management of emissions across the entire value chain (i.e., all three scopes) • Offers greater flexibility on where and how to achieve the most cost-effective GHG reductions • Simple to communicate to stakeholders • Does not require base year recalculation for shifting activities between scopes (e.g., outsourcing)	• May provide less transparency for each scope 3 category (if detail is not provided at the scope 3 category level) • Requires the same base year for scope 1, scope 2, and scope 3 emissions, which may be difficult if scope 1 and scope 2 base years have already been established
A single target for total scope 3 emissions	• Ensures more comprehensive GHG management and greater flexibility on how to achieve GHG reductions across all scope 3 categories (compared to separate targets for selected scope 3 categories) • Relatively simple to communicate to stakeholders	• May provide less transparency for each scope 3 category (if detail is not provided at the scope 3 category level) • May require base year recalculation for shifting activities between scopes (e.g., outsourcing)
Separate targets for individual scope 3 categories	• Allows customization of targets for different scope 3 categories based on different circumstances • Provides more transparency for each scope 3 category • Provides additional metrics to track progress • Does not require base year recalculations for adding additional scope 3 categories to the inventory • Easier to track performance of specific activities	• May result in less comprehensive GHG management across the value chain (if multiple scope 3 targets are not set) • May result in "cherry picking" (or the perception thereof) by setting targets only for categories that are easier to achieve • More complicated to communicate to stakeholders • May require base year recalculation for outsourcing or insourcing

For more information on setting targets, see chapter 11 of the *GHG Protocol Corporate Standard*.

Target completion date

The target completion date determines whether the target is relatively short- or long-term. In general, companies should set long-term targets (e.g., a target period of ten years), since they facilitate long-term planning and large capital investments with significant GHG benefits. Companies may also set shorter-term targets to measure progress more frequently.

Target level

The target level represents the level of ambition of the reduction target. To inform the numerical value of the target, companies should examine potential GHG reduction opportunities (see table 9.7) and estimate their effects on total GHG emissions. In general, companies should set an ambitious target that reduces emissions significantly below the company's business-as-usual scope 3 emissions trajectory. A "stretch goal" is expected to drive greater innovation within the company and the value chain and be seen as most credible by stakeholders.

Use of offsets or credits

A GHG target can be met entirely from internal reductions at sources included in the target boundary, or can be met through additionally using offsets that are generated from GHG reduction projects that reduce emissions (or enhance sinks) at sources external to the target boundary. Companies should strive to achieve reduction targets entirely from internal reductions from within the target boundary. Companies that are unable to meet GHG targets through internal reductions may use offsets generated from sources external to the target boundary.

Companies should specify whether offsets are used and, if so, how much of the target reduction was achieved using offsets. Companies should report

Table [9.3] Comparing absolute targets and intensity targets

Target type	Examples	Advantages	Disadvantages
Absolute target	• Reduce total scope 3 emissions by 10 percent from 2010 levels by 2015 • Reduce scope 3 emissions from the use of sold products by 20 percent from 2010 levels by 2015	• Designed to achieve a reduction in a specified quantify of GHGs emitted to the atmosphere • Environmentally robust and more credible to stakeholders as it entails a commitment to reduce total GHGs by a specified amount	• Does not allow comparisons of GHG intensity/efficiency • Reported reductions can result from declines in production/output rather than improvements in performance
Intensity target	• Reduce scope 3 emissions per unit of revenue by 25 percent from 2010 levels by 2015 • Improve the energy efficiency of sold products by 30 percent from 2010 levels by 2015	• Reflects GHG performance improvements independent of business growth or decline • May increase the comparability of GHG emissions among companies	• Less environmentally robust and less credible to stakeholders because absolute emissions may rise even if intensity decreases (e.g., because output increases more than GHG intensity decreases). If a monetary metric is used, such as dollar of revenue or sales, recalculation may be necessary for changes in product prices and inflation.

internal emissions in separate accounts from offsets used to meet the target, rather than providing a net figure. Any purchases or sales of offsets are required to be reported separately (see chapter 11).

Any offsets used should be based on credible accounting standards (for more information, see the *GHG Protocol for Project Accounting*). Companies should avoid double counting of offsets by multiple entities or in multiple GHG targets, for example through contracts between buyers and sellers that transfer ownership of offsets. For additional guidance on avoiding double counting of offsets, see chapter 11 of the *GHG Protocol Corporate Standard*.

Box [9.1] Setting a reduction target for category 11 (Use of sold products)

Companies that set a reduction target for category 11 should carefully choose the most appropriate metric to track performance and measure progress. Category 11 includes the total expected lifetime emissions from products sold in the reporting year. By doing so, the scope 3 inventory accounts for a company's total GHG impact associated with its activities that occur in the reporting year.

Tracking scope 3 emissions from category 11 can show GHG reductions from efficiency improvements, but not from durability improvements. Because the scope 3 inventory accounts for total lifetime emissions of sold products, increasing product durability has the effect of increasing reported scope 3 emissions from category 11. For example, a manufacturer of light bulbs may shift from selling incandescent bulbs to selling LED bulbs. LED bulbs are both more efficient and more durable than incandescent bulbs. Because the increase in durability is greater than the increase in efficiency, shifting to LED bulbs may have the effect of increasing reported scope 3 emissions.

In cases where product durability may change significantly over time, companies should consider using additional metrics to track and report emissions and performance, such as:

- Intensity metrics (e.g., average GHG intensity of sold products, average energy efficiency of sold products, average emissions per hour of use, average emissions per kilometer driven, etc.)
- Annual emissions from the use of sold products (i.e., emissions that occur in a single year from products sold in the reporting year)
- GHG emissions per functional unit (see *GHG Protocol Product Standard*)
- Average lifetime/durability of sold products
- Other metrics developed by the company or industry sector

Companies that use an additional metric to track performance are also required to report the total expected lifetime emissions from products sold in the reporting year in category 11. Companies should report the methodologies and assumptions used to calculate any additional metrics. To reduce the potential for emissions data to be misinterpreted, companies should also report additional information to provide context, such as the average lifetime/durability of sold products and a statement explaining why emissions from category 11 have increased or decreased over time.

9.3 Recalculating base year emissions

To consistently track scope 3 emissions over time, companies shall recalculate base year emissions when significant changes in company structure or inventory methodology occur. In such cases, recalculating base year emissions is necessary to maintain consistency and enable meaningful comparisons of the inventory over time.

Companies are required to recalculate base year emissions when the following changes occur and have a significant impact on the inventory:

- Structural changes in the reporting organization, such as mergers, acquisitions, divestments, outsourcing, and insourcing
- Changes in calculation methodologies, improvements in data accuracy, or discovery of significant errors
- Changes in the categories or activities included in the scope 3 inventory

In such cases, recalculating base year emissions is necessary to ensure the consistency and relevance of the reported GHG emissions data. Companies shall recalculate base year emissions for both GHG emissions increases and decreases. Significant changes result not only from single large changes, but also from several small changes that are cumulatively significant. As an alternative to recalculating base year emissions in the event of a major structural change, companies may reestablish the base year as a more recent year. Each type of change is elaborated further in the sections below.

Establishing a base year recalculation policy

When setting a base year, companies shall develop a base year emissions recalculation policy and clearly articulate the basis and context for any recalculations. Whether base year emissions are recalculated depends on the significance of the changes. A significance threshold is a qualitative and/or quantitative criterion used to define any significant change to the data, inventory boundaries, methods, or any other relevant factors. For example, a significant change could be defined as one that alters base year emissions by at least ten percent. As part of the base year emissions recalculation policy, companies shall establish and disclose the significance threshold that triggers base year emissions recalculations. Companies shall apply the recalculation policy in a consistent manner.

Recalculations for structural changes in ownership or control

Companies are required to retroactively recalculate base year emissions when significant structural changes occur in the reporting organization, such as mergers, acquisitions, or divestments. Structural changes trigger recalculation because they merely transfer emissions from one company to another without any change in emissions released to the atmosphere (e.g., an acquisition or divestment only transfers existing GHG emissions from one company's inventory to another).

For example, if a company divests a subsidiary in the third year of reporting, the company should recalculate its base year emissions by removing the scope 3 emissions of the subsidiary from the company's base year inventory. Doing so allows the company and its stakeholders to understand that the apparent decrease in emissions in the third year of reporting is a result of a structural change rather than a change in GHG management practices.

Recalculations for outsourcing or insourcing

Scope 3 emissions include outsourced activities. If a company is reporting comprehensively on scope 1, scope 2, and scope 3, a change in ownership or control can have the effect of shifting emitting activities between the scopes.

If a company outsources an in-house activity to a third party, the activity shifts from scope 1 or scope 2 to scope 3. Conversely, a company may shift emissions from scope 3 to scope 1 or scope 2 by performing operations in-house that were previously performed by a third party.

Whether the outsourcing or insourcing of an activity triggers a base year emissions recalculation depends on whether:

- the company previously reported emissions from the activity;
- the company has a single base year or GHG target for all scopes or separate base years and GHG targets for each scope; and
- the outsourced or insourced activity contributes significantly to the company's emissions.

See table 9.4 for guidance on whether a recalculation of base year emissions is necessary.

Recalculations for changes in the scope 3 activities included in the inventory over time

Companies may add new activities or change the activities included in the scope 3 inventory over time. For example, a company may add a new scope 3 category to its inventory in the second year of reporting. In the third year of reporting, the company may add a new activity such as emissions from non-production-related procurement to category 1 (Purchased goods and services). Such changes may trigger base year emissions recalculations, depending on whether the company has established:

- A single base year and GHG target for total scope 3 emissions; or
- Separate base years and GHG targets for individual scope 3 categories.

See table 9.5 for guidance on whether a recalculation of base year emissions is necessary.

If the cumulative effect of adding or changing scope 3 categories or activities is significant, the company should include the new categories or activities in the base year inventory and backcast data for the base year based on available historical activity data (e.g., bill of materials data, spend data, product sales data, etc.).

Table [9.4] Criteria for determining whether to recalculate base year emissions due to changes in outsourcing or insourcing

	The company previously reported emissions from the activity	*The company did not previously report emissions from the activity*
The company has a single base year or GHG target for total scope 1 + 2 + 3 emissions	**No Recalculation**	**Recalculate** (if the cumulative effect of outsourcing or insourcing is significant)
The company has separate base years or GHG targets for individual scopes (1, 2, or 3) or individual scope 3 categories	**Recalculate** (if the cumulative effect of outsourcing or insourcing is significant)	**Recalculate** (if the cumulative effect of outsourcing or insourcing is significant)

Table [9.5] Criteria for determining whether to recalculate base year emissions for adding or changing the categories or activities included in the scope 3 inventory

	Add entire categories	*Add or change activities within categories*
The company has a single base year and GHG target for total scope 3 emissions	**Recalculate** (if the cumulative effect of adding or changing the scope 3 categories or activities included in the inventory is significant)	**Recalculate** (if the cumulative effect of adding or changing the scope 3 categories or activities included in the inventory is significant)
The company has separate base years and GHG targets for individual scope 3 categories	**No Recalculation**	**Recalculate** (if the cumulative effect of adding or changing the scope 3 categories or activities included in the inventory is significant)

Recalculations for changes in calculation methodology or improvements in data accuracy over time

A company might report the same sources of GHG emissions as in previous years, but measure or calculate them differently over time. For example, in its third year of reporting scope 3 emissions, a company may significantly improve its data quality by collecting more data from suppliers or increasing the accuracy and precision of emissions estimates. The company should ensure that changes in the inventory over time are a result of actual emissions increases or decreases, not changes in methodology, so that the company tracks "like with like" over time. Therefore, if changes in methodology or data sources result in significant differences in emissions estimates, companies are required to recalculate base year emissions applying the new data sources and/or methodology.

Sometimes the more accurate data input may not reasonably be applied to all past years or new data points may not be available for past years. The company may then have to backcast these data points, or the change in data source may simply be acknowledged without recalculation. This acknowledgment should be made in the report each year in order to enhance transparency and avoid misinterpretation of data by users of the report.

Any changes in emission factors or activity data that reflect real changes in emissions (i.e., changes in fuel type or technology) do not trigger a recalculation.

No recalculation for organic growth or decline

Base year emissions and any historic data are not recalculated for organic growth and decline. Organic growth/decline refers to increases or decreases in production output, changes in product mix, and closures and openings of operating units that are owned or controlled by the company. The rationale for this is that organic growth or decline results in a change of emissions to the atmosphere and therefore needs to be accounted for as an increase or decrease in the company's emissions profile over time.

Box [9.2] Recalculations for category 11 (Use of sold products)

Category 11 (Use of sold products) includes total expected lifetime emissions from the use of sold products, including emissions from future years expected to happen but that have not yet occurred. In certain cases, the assumptions underlying estimates of emissions from category 11 may change after products have been sold and emissions have been reported (e.g., due to changes in policy, technology, or consumer behavior that were unforeseen in the reporting year), making previously reported emissions estimates inaccurate. To address the inaccuracy and enable consistent tracking of emissions over time, companies should recalculate base year emissions for category 11 with updated product use assumptions when any significant changes in assumptions occur.

9.4 Accounting for scope 3 emissions and reductions over time

There are two basic approaches to account for GHG reductions (see table 9.6). This standard uses the inventory method to account for changes in scope 3 emissions over time (see box 9.3). Reductions in corporate emissions are calculated by comparing changes in the company's actual emissions inventory over time relative to a base year. The inventory method allows companies to track the aggregate effect of their activities on total corporate GHG emissions over time.

Accounting for actual reductions in indirect emissions (i.e., scope 2 or scope 3 emissions) to the atmosphere is more complex than accounting for actual reductions in direct emissions (i.e., scope 1) to the atmosphere. Changes in a company's scope 2 or scope 3 inventory over time may not always correspond to actual changes in GHG emissions to the atmosphere, since there is not always a direct cause-and-effect relationship between the reporting company's activities and the resulting GHG emissions. For example, a reduction in business travel would reduce a company's scope 3 emissions from business travel (since the reduction is usually quantified based on an average emission factor of fuel use per passenger). However, how a reduction in business travel actually translates into a change in GHG

emissions to the atmosphere depends on several factors, including whether another person takes the "empty seat" or whether the unused seat contributes to reduced air traffic over the longer term. Generally, as long as the accounting of scope 3 emissions over time recognizes activities that in aggregate change global emissions, any such concerns should not inhibit companies from reporting and tracking their scope 3 emissions over time.

Companies may use the project method to undertake more detailed assessments of actual reductions from discrete scope 3 GHG mitigation projects (such as those listed in table 9.7), in addition to reporting comprehensive scope 3 GHG emissions using the inventory method. Any project-based reductions must be reported separately from the company's scope 1, scope 2, and scope 3 emissions. For more information on quantifying project-based GHG reductions, refer to the *GHG Protocol for Project Accounting* (available at www.ghgprotocol.org).

9.5 Accounting for avoided emissions

This standard is intended to assist companies in quantifying and reporting scope 3 reductions, where GHG reductions are determined by comparing changes in the company's scope 3 emissions from the fifteen scope 3 categories over time relative to a base year. In some cases, GHG reduction opportunities lie beyond a company's scope 1, scope 2, and scope 3 inventories. For example, some companies may track not only the emissions that arise from the use of their products (category 11), but also the avoided emissions in society that result from the use of their products and solutions compared to alternative products and solutions. Avoided emissions may also arise when accounting for emissions from recycling (category 5 or 13), or from activities in other scope 3 categories.

Accounting for avoided emissions that occur outside of a company's scope 1, scope 2, and scope 3 inventories requires a project accounting methodology. Any estimates of avoided emissions must be reported separately from a company's scope 1, scope 2, and scope 3 emissions, rather than included or deducted from the scope 3 inventory. Box 9.4 elaborates on accounting for avoided emissions from the use of sold products.

Table [9.6] Methods for accounting for GHG reductions

Method	Description	Relevant GHG Protocol Publication
Inventory method	Accounts for GHG reductions by comparing changes in the company's actual emissions inventory over time relative to a base year	*GHG Protocol Corporate Standard* *GHG Protocol Scope 3 Standard*
Project method	Accounts for GHG reductions by quantifying impacts from individual GHG mitigation projects relative to a baseline (i.e., a hypothetical scenario of what emissions would have been in the absence of the project)	*GHG Protocol for Project Accounting*

Box [9.3] Quantifying changes in scope 3 emissions over time

Change in emissions from a scope 3 category =
Current year emissions from the scope 3 category - Base year emissions from the scope 3 category

9.6 Addressing double counting of scope 3 reductions among multiple entities in a value chain

Scope 3 emissions are by definition the direct emissions of another entity. Multiple entities in a value chain influence both emissions and reductions, including raw material suppliers, manufacturers, distributors, retailers, consumers, and others. As a result, changes in emissions are not easily attributable to any single entity.

Double counting or double claiming occurs when two or more companies claim ownership for a single GHG reduction within the same scope. The *GHG Protocol Corporate Standard* defines scope 1 and scope 2 to ensure that two or more companies do not account for the same emissions within the same scope. (For more information, see chapter 4 of the *GHG Protocol Corporate Standard*.) By properly accounting for emissions as scope 1, scope 2, and scope 3, companies avoid double counting within scope 1 and scope 2.

Double counting within scope 3 occurs when two entities in the same value chain account for the scope 3 emissions from a single emissions source – for example, if a manufacturer and a retailer both account for the scope 3 emissions resulting from the third-party transportation of goods between them (see figure 9.1). This type of double counting is an inherent part of scope 3 accounting. Each entity in the value chain has some degree of influence over emissions and reductions. Scope 3 accounting facilitates the simultaneous action of multiple entities to reduce emissions throughout society. Because of this type of double counting, scope 3 emissions should not be aggregated across companies to determine total emissions in a given region. Note that while a single emission may be accounted for by more than one company as scope 3, in certain cases the emission is accounted for by each company in a different scope 3 category.

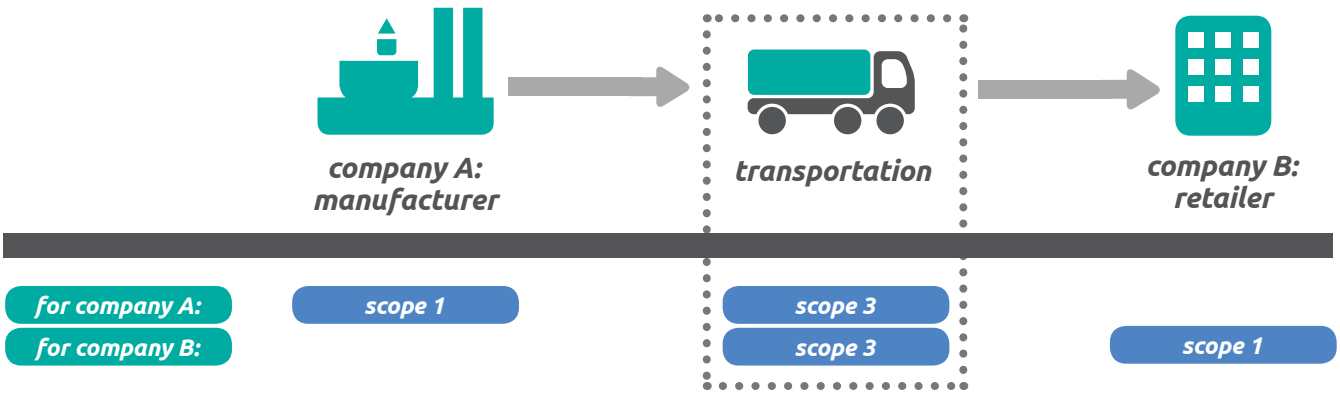
Companies may find double counting within scope 3 to be acceptable for purposes of reporting scope 3 emissions to stakeholders, driving reductions in value chain emissions, and tracking progress toward a scope 3 reduction target. To ensure transparency and avoid misinterpretation of data, companies should acknowledge any potential double counting of reductions or credits when making claims about scope 3 reductions. For example, a company may claim that it is working jointly with partners to reduce emissions, rather than taking exclusive credit for scope 3 reductions.

If GHG reductions take on a monetary value or receive credit in a GHG reduction program, companies should avoid double counting of credits from such reductions. To avoid double crediting, companies should specify exclusive ownership of reductions through contractual agreements.

9.7 Examples of actions to reduce scope 3 emissions

Companies may implement a variety of actions to reduce scope 3 emissions. Table 9.7 provides an illustrative list of actions that companies can take to reduce emissions in the value chain.

Figure [9.1] Type of double counting within scope 3



Box [9.4] Accounting for avoided emissions from the use of sold products

To reduce scope 3 emissions from the use of sold products (category 11), companies may implement various GHG reduction strategies, such as redesigning products to be more efficient in the use-phase or replacing existing product lines with new zero-emitting product lines. These reduction activities can be tracked by comparing a company's scope 3 emissions inventory over time.

A company's products can also have broader impacts on GHG emissions in society when they provide the same or similar function as existing products in the marketplace but with significantly less GHG emissions. For example, a manufacturer of renewable energy technologies may be interested not only in tracking the emissions and reductions that occur during the use of its products, but also in assessing the reduction in society's GHG emissions as a result of using renewable energy technologies compared to generating electricity by combusting fossil fuels.

Examples of such products and solutions may include:

- Wind turbines or solar panels, compared to fossil fuel power plants
- LED bulbs, compared to incandescent bulbs
- Triple-pane windows, compared to double- or single-pane windows
- Insulation in a building, compared to no insulation
- Online meeting software, compared to business travel

Developing new products and solutions that achieve GHG reductions in society compared to other products and solutions is an important component of corporate sustainability strategies and offers significant opportunities for achieving large scale GHG reductions. These reductions are accounted for in scope 3 emissions to the extent that they decrease a company's emissions from the use of sold products over time, for example by redesigning products or replacing existing product lines with new product lines.

Avoided emissions from the use of sold products compared to a baseline are not included in a company's scope 3 emissions. Accounting for such reductions requires a project-based accounting methodology (see section 9.4) and poses several accounting challenges to ensuring that reduction claims are accurate and credible. Challenges include how to:

- Determine an appropriate baseline scenario (e.g., which technologies to compare)
- Determine the system boundaries (e.g., which emissions to include)
- Determine the time period (e.g., how many years to include)
- Accurately quantify avoided emissions
- Avoid "cherry picking" (e.g., account for both emissions increases and decreases across the company's entire product portfolio)
- Allocate reductions among multiple entities in a value chain (e.g., avoid double counting of reductions between producers of intermediate goods, producers of final goods, retailers, etc.)

If a company chooses to account for avoided emissions from the use of sold products, avoided emissions are not included in or deducted from the scope 3 inventory, but instead reported separately from scope 1, scope 2, and scope 3 emissions. Companies that report avoided emissions should also report the methodology and data sources used to calculate avoided emissions, the system boundaries, the time period considered, the baseline (and baseline assumptions) used to make the comparison, as well as a statement on completeness (avoiding "cherry picking") and ownership (avoiding double counting of reductions). For more information on quantifying project-based GHG reductions, refer to the *GHG Protocol for Project Accounting*, available at www.ghgprotocol.org.

Table [9.7] **Illustrative examples of actions to reduce scope 3 emissions**

Upstream scope 3 emissions

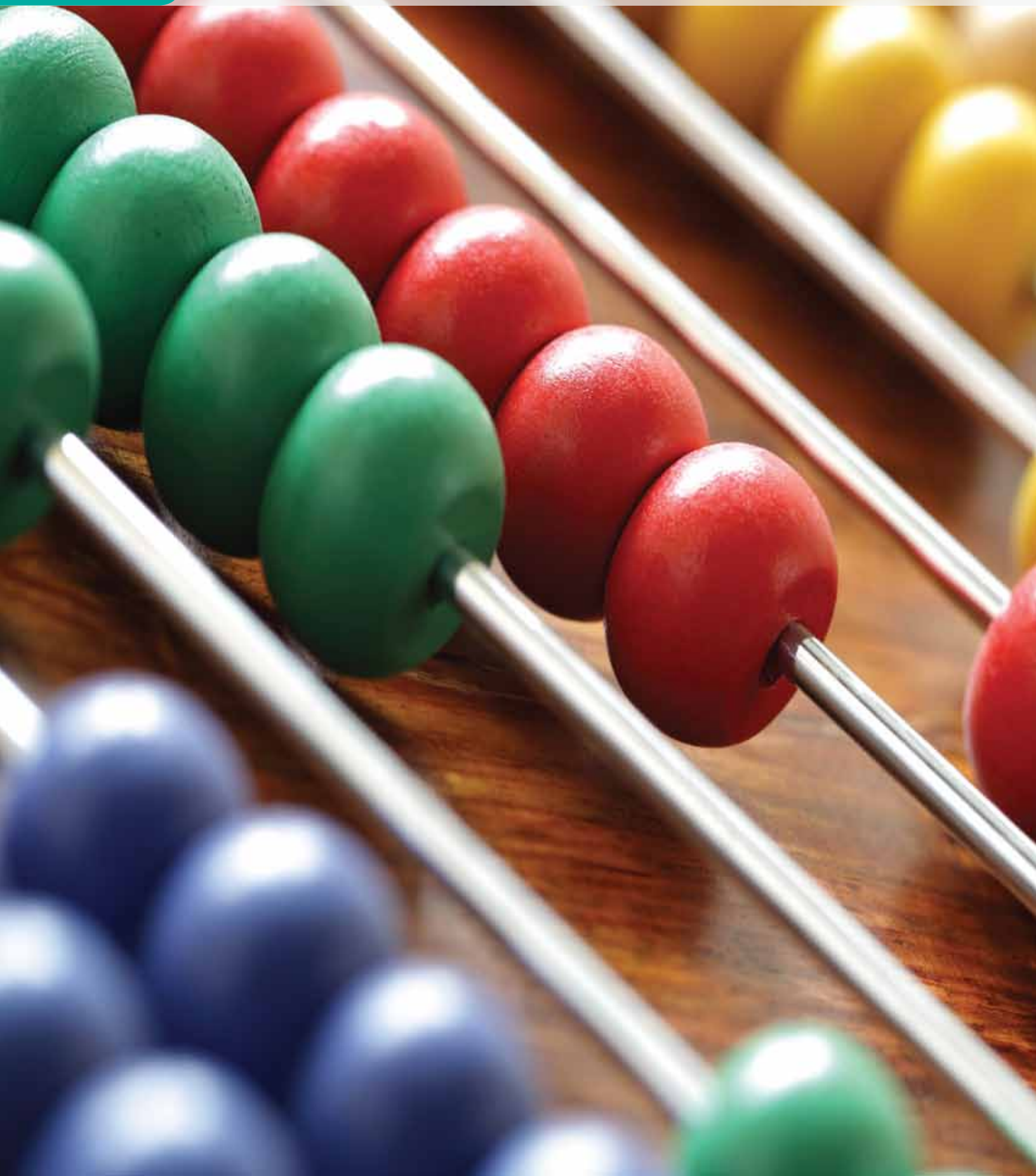
Category	*Examples of actions to reduce scope 3 emissions*
1. Purchased goods and services	• Replace high-GHG-emitting raw materials with low-GHG-emitting raw materials • Implement low-GHG-procurement/purchasing policies • Encourage tier 1 suppliers to engage their tier 1 suppliers (i.e., the reporting company's tier 2 suppliers) and disclose these scope 3 emissions to the customer in order to propagate GHG reporting throughout the supply chain
2. Capital goods	• Replace high-GHG-emitting capital goods with low-GHG-emitting capital goods
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	• Reduce energy consumption • Change energy source (e.g., shift toward lower-emitting fuel/energy sources) • Generate energy on site using renewable sources
4. Upstream transportation and distribution	• Reduce distance between supplier and customer • Source materials locally if it leads to net GHG reductions • Optimize efficiency of transportation and distribution • Replace higher-emitting transportation modes (e.g. air transport) with lower-emitting transportation modes (e.g. marine transport) • Shift toward lower-emitting fuel sources
5. Waste generated in operations	• Reduce quantity of waste generated in operations • Implement recycling measures that lead to net GHG reductions • Implement lower-emitting waste treatment methods
6. Business travel	• Reduce the amount of business travel (e.g., encourage video conferencing and web-based meetings as an alternative to in-person meetings) • Encourage more efficient travel • Encourage lower-emitting modes of travel (e.g., rail instead of plane)
7. Employee commuting	• Reduce commuting distance (e.g., locate offices/facilities near urban centers and public transit facilities) • Create disincentives for commuting by car (e.g., parking policies) • Provide incentives for use of public transit, bicycling, carpooling, etc. • Implement teleworking/telecommuting programs • Reduce number of days worked per week (e.g., 4 days x 10 hour schedule instead of 5 days x 8 hour schedule)
8. Upstream leased assets	• Increase energy efficiency of operations • Shift toward lower-emitting fuel sources

Table [9.7] **Illustrative examples of actions to reduce scope 3 emissions**

Downstream scope 3 emissions

Category	*Examples of actions to reduce scope 3 emissions*
9. Transportation and distribution of sold products	• Reduce distance between supplier and customer • Optimize efficiency of transportation and distribution • Replace higher emitting transportation modes (e.g. air transport) with lower emitting transportation modes (e.g. marine transport) • Shift toward lower-emitting fuel sources
10. Processing of sold products	• Improve efficiency of processing • Redesign products to reduce processing required • Use lower-GHG energy sources
11. Use of sold products	• Develop new low- or zero-emitting products • Increase the energy efficiency of energy-consuming goods or eliminate the need for energy use • Shift away from products that contain or emit GHGs • Reduce the quantity of GHGs contained/released by products • Decrease the use-phase GHG intensity of the reporting company's entire product portfolio • Change the user instructions to promote efficient use of products
12. End-of-life treatment of sold products	• Make products recyclable if it leads to net GHG reductions • Implement product packaging measures that lead to net GHG reductions (e.g., decrease amount of packaging in sold products, develop new GHG-saving packaging materials, etc.) • Implement recycling measures that lead to net GHG reductions
13. Downstream leased assets	• Increase energy efficiency of operations • Shift toward lower-emitting fuel sources
14. Franchises	• Increase energy efficiency of operations (e.g., set efficiency standards) • Shift toward lower-emitting fuel sources
15. Investments	• Invest in lower-emitting investments, technologies, and projects

10 Assurance



Assurance is the level of confidence that the inventory is complete, accurate, consistent, transparent, relevant, and without material misstatements.[1] While assurance is not a requirement of this standard, obtaining assurance over the scope 3 inventory is valuable for reporting companies and other stakeholders when making decisions using the inventory results.

10.1 Benefits of assurance

Assuring scope 3 inventory results can provide a variety of benefits, including:

- Increased senior management confidence in the reported information on which to base reduction targets and related decisions
- Enhanced internal accounting and reporting practices (e.g. data collection, calculation, and internal reporting systems), and facilitation of learning and knowledge transfer
- Improved efficiency in subsequent inventory update processes
- Greater stakeholder confidence in the reported information

Carefully and comprehensively documenting the inventory process in a data management plan is a vital step in preparing for assurance (see Appendix C).

10.2 Relationships of parties in the assurance process

Three key parties are involved in the assurance process:

1) The reporting company seeking assurance

2) Stakeholders using the inventory report

3) The assurer(s)

When the reporting company also performs the assurance, this is known as first party assurance. When a party other than the reporting company performs the assurance, this is known as third party assurance. These types are further described in table 10.1.

Companies should choose assurers that are independent of, and have no conflicts of interest with, the scope 3 inventory development and reporting process.

Table [10.1] Types of assurance

Type of assurance	*Description*	*Independence mechanism*
First party assurance	Person(s) from within the reporting company but independent of the GHG inventory process conducts internal assurance	Different lines of reporting
Third party assurance	Person(s) from an organization independent of the scope 3 inventory process conduct third party assurance	Different business entity from the reporting company

Both first and third party assurers should follow similar procedures and processes. For external stakeholders, third party assurance is likely to increase the credibility of the GHG inventory. However, first party assurance can also provide confidence in the reliability of the inventory report, and it can be a worthwhile learning experience for a company prior to commissioning third party assurance.

Inherently, assurance provided by a third party offers a higher degree of objectivity and independence. Typical threats to independence may include financial and other conflicts of interest between the reporting company and the assurer. These threats should be assessed throughout the assurance process. Companies receiving first party assurance should report how potential conflicts of interest were avoided during the assurance process.

10.3 Competencies of assurers

Selecting a competent assurer is important for the assurance findings to have the credibility needed to support the reporting company's business goals and stakeholder needs. A competent scope 3 GHG inventory assurer has the following characteristics:

- Assurance expertise and experience using assurance frameworks
- Knowledge and experience in corporate GHG accounting and/or life cycle assessment, including familiarity with key steps in the scope 3 inventory process
- Knowledge of the company's activities and industry sector
- Ability to assess emission sources and the magnitude of potential errors, omissions, and misrepresentations
- Credibility, independence, and professional skepticism to challenge data and information

10.4 Assurance process

Assurance engagements,[2] whether performed by a first or third party, have common elements, including:

1. Planning and scoping (e.g., determining risks and material misstatements)
2. Identifying emission sources included in the scope 3 inventory
3. Performing the assurance process (e.g. gathering evidence, performing analytics, etc.)
4. Evaluating results
5. Determining and reporting conclusions

The nature and extent of assurance procedures can vary depending on whether the assurance engagement is designed to obtain reasonable or limited assurance.

Levels of assurance: Limited and reasonable assurance

The level of assurance refers to the degree of confidence that stakeholders can have over the information in the inventory report. There are two levels of assurance: limited and reasonable. The level of assurance requested by the reporting company will determine the rigor of the assurance process and the amount of evidence required.

Table [10.2] Limited and reasonable assurance opinions

Assurance opinion	*Nature of opinion*	*Example wording of opinion*
Limited assurance	Negative opinion	"Based on our review, we are not aware of any material modifications that should be made to the company's assertion that their scope 3 inventory is in conformance with the requirements of the *GHG Protocol Scope 3 Standard*."
Reasonable assurance	Positive opinion	"In our opinion the reporting company's assertion of their scope 3 emissions by category, as reported in the inventory report, is fairly stated, in all material respects, and is in conformance with the *GHG Protocol Scope 3 Standard*."

The highest level of assurance that can be provided is a reasonable level of assurance. Absolute assurance is never provided since 100 percent of the inputs to the GHG inventory cannot be tested due to practical limitations.

The thoroughness with which the assurance evidence is obtained is less rigorous in limited assurance than with reasonable assurance. Table 10.2 provides examples of limited and reasonable assurance opinions for an assertion of scope 3 inventory emissions.

Timing of the assurance process

The assurance process is conducted before the public release of the inventory report by the reporting company. This allows for material misstatements to be corrected prior to the release of the opinion (or revised opinion) and assertion. The work should be initiated far enough in advance of the inventory report release so that the assurance work is useful in improving the inventory when applicable. The period for assurance is dependent on the nature and complexity of the subject matter and the level of assurance.

10.5 Key concepts in assurance

In the assurance field many different terms are used to describe various assurance processes (e.g. verification, validation, quality assurance, quality control, audit, etc.). Though not comprehensive, table 10.3 includes many key terms and concepts used in the assurance process that reporting companies may encounter.

Materiality

A material misstatement occurs when individual or aggregate errors, omissions, and misrepresentations have a significant impact on the GHG inventory results and could influence a user's decisions. Materiality has both quantitative and qualitative aspects. The assurer and reporting company should determine an appropriate threshold or benchmark of materiality during the assurance process.

Quantitative materiality is typically calculated as a percentage of the inventory (in total or on an individual line item basis). In determining the quantitative materiality benchmark, assurers should contemplate the risk of a potential misstatement and the history of previous misstatements. A materiality threshold (e.g. a point at which a discrepancy becomes material) can be pre-defined by the assurer. Qualitative misstatements tend to be those that have immaterial quantitative effects but could materially affect the reporting company's emissions in the future as well as those that mislead the intended user.

Table [10.3] Key assurance concepts

Assurance concept	*Description*
Assertion	A statement by the reporting company on the company's scope 3 emissions by category. The assertion is presented to the assurer. Example: The reported scope 3 emissions by category are calculated in conformance with the *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard* as supplemented by our company-specific policies and methodologies described in the inventory report.
Subject matter	Scope 3 emissions by category and supporting information included in the inventory report. The type of assurance performed will determine which subject matter(s) should be assessed.
Criteria	The benchmarks used to evaluate or measure the subject matter. Criteria include the standard's requirements, methodological choices, data quality and uncertainty, and others determined to be suitable by the reporting company and assurer for public reporting.
Evidence	Data sources and documentation used to calculate emissions and support the subject matter of the reporting company's assertion. Evidence should be sufficient in quantity and appropriate in quality.
Assurance standards	Standards, used by assurers, which set requirements on how the assurance process is performed. (For example, ISO 14064-3: Specification with Guidance for the Validation and Verification of Greenhouse Gas Assertions).
Assurance opinion	The results of the assurer's assessment of the reporting company's assertion. In the event that the assurer determines that a conclusion cannot be expressed, the statement should cite the reason.

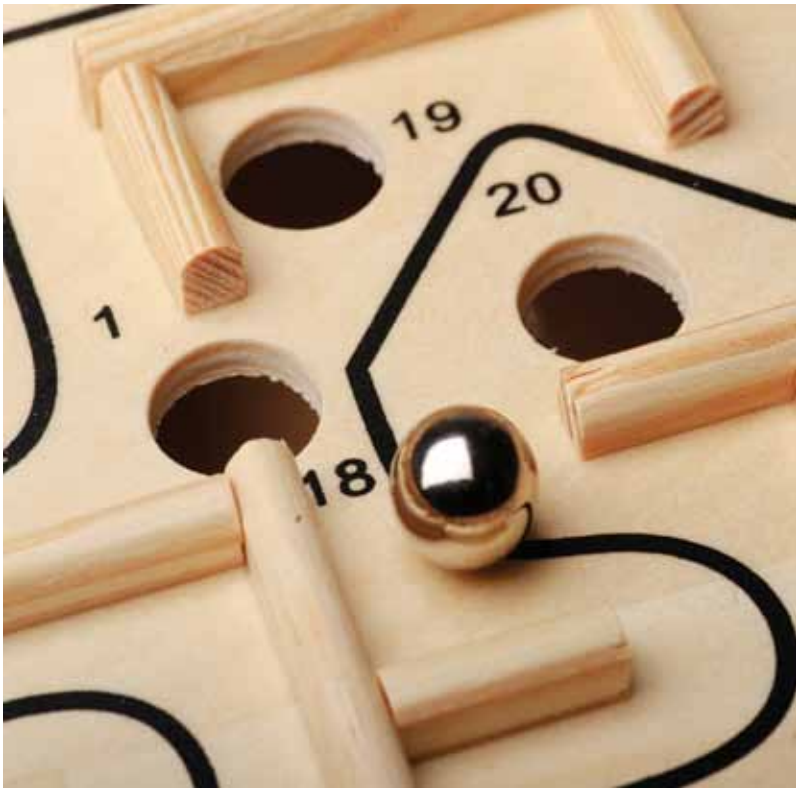
Uncertainty is a separate concept from materiality because it is not a known error, but rather an indicator of how well the data represents the processes in the inventory.

10.6 Preparing for assurance

Preparing for assurance is a matter of ensuring that the evidence that the assurer requires is available or easily accessed. The type of evidence and documentation requested by the assurer will depend on the subject matter, the industry, and the type of assurance being sought. Maintaining documentation of the inventory process through the use of a data management plan (see Appendix C) is helpful for ensuring the assurance evidence is available.

Prior to starting the assurance process, the reporting company should ensure that the following are prepared and available to the assurer:

- The company's written assertion (e.g., inventory results)
- The complete data management plan (see Appendix C)
- Access to sufficient and appropriate evidence (e.g. invoices, bills of sale, etc.)



10.7 Assurance challenges

There are several challenges in assuring scope 3 inventories. Emissions calculations rely on a mixture of data sources and assumptions. Inventory uncertainty, including scenario uncertainty related to the use and end-of-life treatment of sold products, may affect the quality of the inventory. It is important to consider the state of data collection systems and the integrity of the data and methodological choices when performing assurance.

One of the primary challenges is that the emission sources are removed from the reporting company's control, reducing the assurer's ability to obtain sufficient appropriate evidence.

Two approaches to addressing this diminishing control are to:

1. Change the level of assurance, or
2. Rely on the assurance statement of another assurer for emission and removal sources outside of the company's control (i.e., assurance over a supplier's emission sources by a different assurance firm)

10.8 Assurance statement

The assurance statement conveys the assurer's conclusion about the inventory results. It may take different forms depending on whether the assurance was performed by a first or third party. The assurance statement should include the following:

Introduction

- A description of the reporting company
- A reference to the reporting company's assertion included in the inventory report

Description of Assurance Process

- The relevant competencies of the assurers
- A summary of the assurance process and work performed
- Description of the reporting company's and assurer's responsibilities
- List of the assurance criteria
- Whether the assurance was performed by a first or third party
- The assurance standard used to perform assurance
- How any potential conflicts of interest were avoided for first party assurance

Conclusion Paragraph

- Level of assurance achieved (limited or reasonable)
- The materiality threshold or benchmark, if set
- Any additional details regarding the assurer's conclusion, including details regarding any exceptions noted or issues encountered in performing the assurance

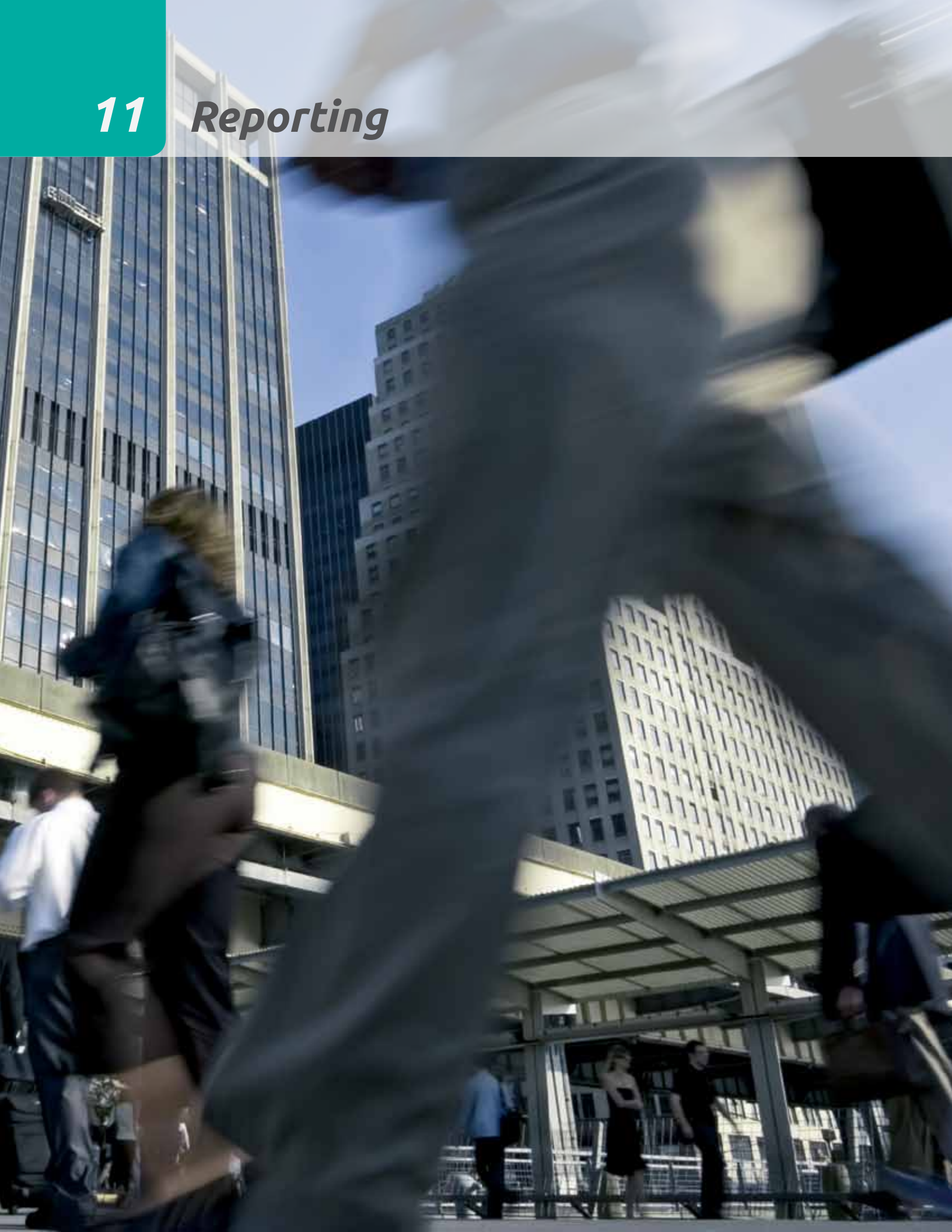
When there are material departures in the assertion from the assurance criteria, the reporting company should report the effect of the departures. Companies may report any recommendations from the assurer on improvements in future updates of the inventory.

Endnotes

1 Adapted from ISO 14064-3, "Specification with guidance for the validation and verification of greenhouse gas assertions" (2005).

2 The process is referred to as verification in the *GHG Protocol Product Standard* to distinguish it from the critical review process that also provides assurance over product GHG inventories. The term verification is also used in chapter 10 of the *GHG Protocol Corporate Standard.*

11 Reporting



A credible GHG emissions report presents information based on the principles of relevance, accuracy, completeness, consistency, and transparency. It should be based on the best data available and be transparent about its limitations.

Requirements in this chapter

Companies shall publicly report the information listed in section 11.1.

11.1 Required information

Companies shall publicly report the following information:

- A scope 1 and scope 2 emissions report in conformance with the *GHG Protocol Corporate Standard*
- Total scope 3 emissions reported separately by scope 3 category
- For each scope 3 category, total emissions of GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) reported in metric tons of CO_2 equivalent, excluding biogenic CO_2 emissions and independent of any GHG trades, such as purchases, sales, or transfers of offsets or allowances
- A list of scope 3 categories and activities included in the inventory
- A list of scope 3 categories or activities excluded from the inventory with justification of their exclusion
- Once a base year has been established: the year chosen as the scope 3 base year; the rationale for choosing the base year; the base year emissions recalculation policy; scope 3 emissions by category in the base year, consistent with the base year emissions recalculation policy; and appropriate context for any significant emissions changes that triggered base year emissions recalculations
- For each scope 3 category, any biogenic CO_2 emissions reported separately
- For each scope 3 category, a description of the types and sources of data, including activity data, emission factors and GWP values, used to calculate emissions, and a description of the data quality of reported emissions data
- For each scope 3 category, a description of the methodologies, allocation methods, and assumptions used to calculate scope 3 emissions
- For each scope 3 category, the percentage of emissions calculated using data obtained from suppliers or other value chain partners

11.2 Optional information

A public GHG emissions report should include, when applicable, the following additional information:

- Emissions data further subdivided where this adds relevance and transparency (e.g., by business unit, facility, country, source type, activity type, etc.)
- Emissions data further disaggregated within scope 3 categories where this adds relevance and transparency (e.g., reporting by different types of purchased materials within category 1, or different types of sold products within category 11)
- Emissions from scope 3 activities not included in the list of scope 3 categories (e.g., transportation of attendees to conferences/events), reported separately (e.g., in an "other" scope 3 category)
- Emissions of GHGs reported in metric tons of each individual gas
- Emissions of any GHGs other than CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 whose 100-year GWP values have been identified by the IPCC to the extent they are emitted in the company's value chain (e.g., CFCs, HCFCs, NF_3, NO_X, etc.) and a list of any additional GHGs included in the inventory
- Historic scope 3 emissions that have previously occurred, reported separately from future scope 3 emissions expected to occur as a result of the reporting company's activities in the reporting year (e.g., from Waste generated in operations, Use of sold products, End-of-life treatment of sold products)
- Qualitative information about emission sources not quantified
- Information on any GHG sequestration or removals, reported separately from scope 1, scope 2 and scope 3 emissions
- Information on project-based GHG reductions calculated using the project method (e.g., using the *GHG Protocol for Project Accounting*), reported separately from scope 1, scope 2, and scope 3 emissions
- Information on avoided emissions (e.g., from the use of sold products), reported separately from scope 1, scope 2, and scope 3 emissions
- Quantitative assessments of data quality
- Information on inventory uncertainty (e.g., information on the causes and magnitude of uncertainties in emission estimates) and an outline of policies in place to improve inventory quality
- The type of assurance performed (first or third party), the relevant competencies of the assurance provider(s), and the opinion issued by the assurance provider
- Relevant performance indicators and intensity ratios
- Information on the company's GHG management and reduction activities, including scope 3 reduction targets, supplier engagement strategies, product GHG reduction initiatives, etc.
- Information on supplier/partner engagement and performance
- Information on product performance
- A description of performance measured against internal and external benchmarks
- Information on purchases of GHG reduction instruments, such as emissions allowances and offsets, from outside the inventory boundary
- Information on reductions at sources inside the inventory boundary that have been sold/transferred as offsets to a third party
- Information on any contractual provisions addressing GHG-related risks or obligations
- Information on the causes of emissions changes that did not trigger a scope 3 base year emissions recalculation
- GHG emissions data for all years between the scope 3 base year and the reporting year (including details of and reasons for recalculations, if appropriate)
- Additional explanations to provide context to the data

11.3 Reporting guidance

By following the *GHG Protocol Scope 3 Standard* reporting requirements, companies adopt a comprehensive standard with the necessary detail and transparency for credible public reporting. The appropriate level of reporting of optional information categories can be determined by the objectives and intended audience for the report. For national or voluntary GHG programs, or for internal management purposes, reporting requirements may vary.

For public reporting, it is important to differentiate between a summary of a public report that is, for example, published on the internet or in sustainability/

corporate social responsibility reporting and a full public report that contains all the necessary data as specified by this standard. Not every circulated report must contain all information as specified by this standard, but a link or reference needs to be made to a publicly available full report where all information is available to be in conformance with the *Scope 3 Standard*.

Companies should strive to create a report that is as relevant, transparent, accurate, consistent and complete as possible. Including a discussion of the reporting company's strategy and goals for GHG accounting, any particular challenges or tradeoffs encountered, the context of decisions on boundaries and other accounting parameters, and an analysis of emissions trends will provide a more complete picture of the company's inventory efforts.

Guidance is provided below for implementing selected reporting requirements and optional information listed in sections 11.1 and 11.2. See the relevant chapters of this standard for guidance on implementing reporting requirements not listed below. A sample GHG reporting form is provided at www.ghgprotocol.org.

Required reporting: For each scope 3 category, total GHG emissions reported in metric tons of CO_2 equivalent, excluding biogenic CO_2 emissions

Companies are required to include emissions of each of the 6 required greenhouse gases (i.e., CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the reported scope 3 emissions data, but are not required to separately report scope 3 emissions by individual gas. Companies may report aggregated emissions in units of CO_2e only.

Required reporting: For each scope 3 category, a description of the methodologies, allocation methods, and assumptions used to calculate scope 3 emissions

Companies should report assumptions underlying reported emissions for each of the 15 scope 3 categories. For example, for category 11 (Use of sold products), companies should report information on average use profiles, assumed product lifetimes and other underlying assumptions. For category 12 (End-of-life treatment of sold products), companies should report underlying assumptions related to product lifetimes and waste treatment methods. Companies should also specify the time boundary of each scope 3 category.

Optional reporting: Information on supplier/partner engagement and performance

Scope 3 accounting is focused on tracking the emissions associated with specific activities in the value chain, such as the production of purchased products, transportation of purchased products, and use of sold products. Because scope 3 emissions include the scope 1 and scope 2 emissions of a company's partners in the value chain (including suppliers, customers, service providers, etc.), reporting on a company's efforts to engage their partners in the value chain provides additional transparency on a company's scope 3 management and reduction activities.

A public GHG emissions report should include, when applicable, the following additional information:

- Supplier/partner engagement metrics, such as the number and percentage of suppliers and other partners that have:
  - Received a request from the reporting company to provide primary GHG emissions data
  - Provided primary GHG emissions data to the reporting company
  - Publicly reported entity-wide GHG emissions
  - Established a publicly-available entity-wide GHG reduction target
- Supplier/partner performance metrics, including the GHG emissions performance of suppliers and other partners over time
  - For example, the sum of the reporting company's tier 1 suppliers' scope 1 and scope 2 emissions, allocated to the reporting company; the methodology used to quantify and allocate supplier emissions data; and the percentage of tier 1 suppliers accounted for (as a percentage of the reporting company's total spend)
- Other relevant information

Optional reporting: Information on product performance

To provide appropriate context related to category 11 (Use of sold products), a public GHG emissions report should include, when applicable, the following additional information:

- Product performance indicators and intensity metrics (e.g., average GHG intensity of sold products, average energy efficiency of sold products, average emissions per hour of use, average fuel efficiency of sold vehicles, average emissions per kilometer driven, GHG intensity of sold fuels, average emissions per functional unit, etc.)
- Annual emissions from the use of sold products (i.e., emissions that occur in a single year from products sold in the reporting year)
- Average lifetime/durability of sold products
- The methodologies and assumptions used to calculate product performance indicators and intensity metrics
- The percentage of sold products that are compliant with standards, regulations, and certifications, where applicable
- A statement explaining why emissions from category 11 (Use of sold products) have increased or decreased over time
- Any sold products not included in the inventory, with justification for their exclusion
- Other relevant information

Optional reporting: Historic scope 3 emissions that have previously occurred, reported separately from future scope 3 emissions expected to occur as a result of the reporting company's activities in the reporting year

Emissions reported for category 5 (Waste generated in operations), category 11 (Use of sold products), and category 12 (End-of-life treatment of sold products) should not be interpreted to mean that emissions have already occurred, but rather that the reported emissions are expected to occur as a result of activities that occurred in the reporting year. Companies may separately report historic emissions (that have already occurred) from future emissions (that have not yet occurred) in order to avoid misinterpretation by stakeholders.

Optional reporting: Information on uncertainty

Companies should describe the level of uncertainty of reported data, qualitatively or quantitatively, to ensure transparency and avoid misinterpretation of data. In cases where data uncertainty is high, companies should also describe efforts to address uncertainty. See Appendix B for more information on uncertainty.

Appendices

Appendix A. Accounting for Emissions from Leased Assets

This appendix provides additional guidance on accounting for emissions from leased assets.

Introduction[1]

Many companies either lease assets (e.g., buildings, vehicles) to other entities or lease assets from other entities. This appendix explains whether to account for emissions from leased assets as scope 1 emissions, scope 2 emissions, scope 3 emissions in category 8 (Upstream leased assets), or scope 3 emissions in category 13 (Downstream leased assets).

How emissions from leased assets are accounted for in a company's GHG inventory depends on the company's selected organizational boundary approach (i.e., equity share, financial control, or operational control), and the type of lease.

Differentiating types of leased assets

The first step in determining how to categorize emissions from leased assets is to understand the two different types of leases: finance or capital leases, and operating leases. One way to determine the type of lease is to check the company's audited financial statements.

- **Finance or capital lease:** This type of lease enables the lessee to operate an asset and also gives the lessee all the risks and rewards of owning the asset. Assets leased under a capital or finance lease are considered wholly owned assets in financial accounting and are recorded as such on the balance sheet.
- **Operating lease:** This type of lease enables the lessee to operate an asset, like a building or vehicle, but does not give the lessee any of the risks or rewards of owning the asset. Any lease that is not a finance or capital lease is an operating lease.[2]

The next step is to determine whether the emissions associated with the leased assets are categorized as scope 1, scope 2, or scope 3 by the reporting company. Proper categorization of emissions from leased assets by lessors and lessees ensures that emissions in scopes 1 and 2 are not double-counted. For example, if a lessee categorizes emissions from the use of purchased electricity as scope 2, the lessor categorizes the same emissions as scope 3, and vice versa.

Table [A.1] Leasing agreements and boundaries (lessee's perspective)

	Type of leasing arrangement	
	Finance/capital lease	***Operating lease***
Equity share or financial control approach used	Lessee has ownership and financial control, therefore emissions associated with fuel combustion are scope 1 and use of purchased electricity are scope 2.	Lessee does not have ownership or financial control, therefore emissions associated with fuel combustion and use of purchased electricity are scope 3 (Upstream leased assets).
Operational control approach used	Lessee has operational control, therefore emissions associated with fuel combustion are scope 1 and use of purchased electricity are scope 2.	Lessee does have operational control, therefore emissions associated with fuel combustion at sources in the leased space are scope 1 and use of purchased electricity are scope 2.[3]

Table [A.2] Leasing agreements and boundaries (lessor's perspective)

	Type of leasing arrangement	
	Finance/capital lease	***Operating lease***
Equity share or financial control approach used	Lessor does not have ownership or financial control, therefore emissions associated with fuel combustion and use of purchased electricity are scope 3 (Downstream leased assets).	Lessor has ownership and financial control, therefore emissions associated with fuel combustion are scope 1 and use of purchased electricity are scope 2.
Operational control approach used	Lessor does not have operational control, therefore emissions associated with fuel combustion and use of purchased electricity are scope 3 (Downstream leased assets).	Lessor does not have operational control, therefore emissions associated with fuel combustion and use of purchased electricity are scope 3 (Downstream leased assets).[4]

Lessee's perspective: Categorizing emissions from leased assets

Many companies lease assets from other companies (e.g., companies that lease office or retail space from real estate companies). Whether emissions from these assets are categorized by the lessee as scope 1, scope 2, or scope 3 depends on the organizational boundary approach and the type of leasing arrangement. See table A.1.

Lessor's perspective: Categorizing emissions from leased assets

Some companies act as lessors and lease assets to other companies (e.g., real estate companies that lease office or retail space or vehicle companies that lease vehicle fleets). Whether emissions from these assets are categorized by the lessor as scope 1, scope 2, or scope 3 depends on the organizational boundary approach and the type of leasing arrangement. See table A.2.

Endnotes

1 This text is adapted from GHG Protocol, "Categorizing GHG Emissions from Leased Assets," GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition), Appendix F, June 2006, Version 1.0, provided at www.ghgprotocol.org.

2 Financial Accounting Standards Board, "Accounting for Leases," Statement of Financial Accounting Standards, no. 13 (1976).

3 Some companies may be able to demonstrate that they do not have operational control over a leased asset held under an operating lease. In this case, the company may report emissions from the leased asset as scope 3 as long as the decision is disclosed and justified in the public report.

4 Some companies may be able to demonstrate that they do have operational control over an asset leased to another company under an operating lease, especially when operational control is not perceived by the lessee. In this case, the lessor may report emissions from fuel combustion as scope 1 and emissions from the use of purchased electricity as scope 2 as long as the decision is disclosed and justified in the public report.

Appendix B. Uncertainty in Scope 3 Emissions

This appendix provides an overview of concepts and procedures for evaluating sources of uncertainty in a scope 3 inventory.

Introduction

Understanding uncertainty can be crucial for properly interpreting scope 3 inventory results. The term uncertainty assessment refers to a systematic procedure to quantify and/or qualify the sources of uncertainty in a scope 3 inventory. Identifying and documenting sources of uncertainty can assist companies in understanding the steps required to help improve the inventory quality and increase the level of confidence users have in the inventory results. Because the audience of a scope 3 inventory report is diverse, companies should make a thorough yet practical effort to communicate key sources of uncertainty in the inventory results.

Guide to the uncertainty assessment process

Uncertainty assessment can be used within the GHG inventory process as a tool for guiding data quality improvements, as well as a tool for reporting uncertainty results. Companies should identify and track key uncertainty sources throughout the inventory process and iteratively check whether the confidence level of the results is adequate for the company's business goals. Identifying, assessing, and managing uncertainty is most effective when done during the inventory process.

Companies may choose a qualitative and/or quantitative approach to uncertainty assessment. Quantitative uncertainty assessment can provide more robust results than a qualitative assessment and better assist companies in prioritizing data improvement efforts on the sources that contribute most to uncertainty. Including quantitative uncertainty results in the inventory report also adds clarity and transparency to users of the inventory report. Companies should present both qualitative and quantitative (if completed) uncertainty information in the inventory report. Companies should also describe their efforts to reduce uncertainty in future revisions of the inventory.

Overview of uncertainty types

Uncertainty is divided into three categories: parameter uncertainty, scenario uncertainty and model uncertainty. The categories are not mutually exclusive, but they can be evaluated and reported in different ways. Table B.1 illustrates these types of uncertainties and corresponding sources.

Parameter uncertainty

Parameter uncertainty is uncertainty regarding whether a value used in the inventory accurately represents the activity in the company's value chain. If parameter

Table [B.1] Types of uncertainties and corresponding sources

Types of Uncertainty	Sources
Parameter Uncertainty	• Direct emissions data • Activity data • Emission factor data • Global warming potential (GWP) values
Scenario Uncertainty	• Methodological choices
Model Uncertainty	• Model limitations

uncertainty can be determined, it can typically be represented as a probability distribution of possible values that include the chosen value used in the inventory results. In assessing the uncertainty of a result, parameter uncertainties can be propagated to provide a quantitative measure (also as a probability distribution) of uncertainty in the final inventory result.

Single parameter uncertainty

Single parameter uncertainty refers to incomplete knowledge about the true value of a parameter.[1] Parameter uncertainty addresses how well data used to represent a parameter fits the activity in the company's value chain. Single parameter uncertainty can arise in three data types: direct emissions data, activity data, and emission factors. Measurement errors, inaccurate approximation, and how the data was modeled to fit the conditions of the activity influence parameter uncertainty. For example, two data points of similar measurement precision may result in very different levels of uncertainty depending on how the points represent the activity's specific context (i.e. in temporal, technological, and geographical representativeness, and completeness terms).

EXAMPLE

An emission factor for the production of plastic used in a toner cartridge is 4.5 kg of CO_2 per kg of plastic resin produced. The emission factor data might be based on a limited sampling of producers of resin and may be from an older timeframe or different geography than that in which the current resin is produced. Therefore, there is parameter uncertainty in the emission factor value being used.

Parameter uncertainty can be quantified based on one or more of the following:

- Measurement uncertainty (represented by standard deviations);
- Data quality indicators (see chapter 7);[2]
- Default uncertainty parameters defined for specific activities or industry data and reported in literature sources or elsewhere;[3]
- Probability distributions in databases or other data sources for data they contain; and
- Other approaches reported by literature.

Propagated parameter uncertainty

Propagated parameter uncertainty is the combined effect of each parameter's uncertainty on the total inventory result. Methods are available to propagate parameter uncertainty from single data points. Two prominent methods are by random sampling (such as in the Monte Carlo method) and by analytical formulas (such as in the Taylor Series expansion method). These methods are described in the quantitative uncertainty guidance available at www.ghgprotocol.org.

EXAMPLE

A company estimates total scope 3 emissions from business travel to be 155,000 metric tons CO_2e. The activity data, emission factor data and GWP values applied in this calculation each have a level of parameter uncertainty. This uncertainty is determined based on the impact of all of the single parameter uncertainties. The propagated parameter uncertainty assessment shows that there is a 95 percent confidence that the true value of business travel emissions is between 140,000 and 170,000 metric tons CO_2e. This can also be presented in the inventory total as 155,000 metric tons CO_2e (+/-15,000 metric tons CO_2e).

Box [B.1] Uncertainty of global warming potential (GWP) values

The uncertainty of the GWP values for the six main greenhouse gases is estimated to be ± 35% for the 90% confidence interval (5% to 95% of the distribution). This is based on information provided in the IPCC's Fourth Assessment Report. The range reflects the uncertainty in converting individual GHG emissions into units of CO_2e. Companies that choose to quantify inventory uncertainty may include the uncertainty of GWP values in their calculations.

Scenario uncertainty

While parameter uncertainty is a measure of how close the data used to calculate emissions are to the true (though unknown) actual data and emissions, scenario uncertainty refers to variation in calculated emissions due to methodological choices. When there are multiple methodological choices available in the standard (e.g., the selection of appropriate allocation methods), scenario uncertainty is created. The use of standards results in a reduction in scenario uncertainty by constraining choices the user may make in their methodology. For example, the boundary setting requirements standardize the inventory approach for all companies.

Methodological choices may include:

- Allocation methods;
- Product use assumptions; and
- End-of-life assumptions.

To identify the influence of these selections on results, parameters (or combinations of parameters) are varied in an exercise known as scenario analysis. Scenario analysis is also commonly called sensitivity analysis. Scenario analysis can reveal differences in the inventory results due to methodological choices.[4]

EXAMPLE

A company may choose to allocate facility electricity consumption between toner production and other production lines using physical allocation (e.g., the number of units produced). Using this factor, 30 percent of electricity consumption is allocated to the toner production process. However, using economic allocation, 40 percent of electricity consumption is allocated to the toner production process.

Model uncertainty

Model uncertainty arises from limitations in the ability of the modeling approaches used to reflect the real world. Simplifying the real world into a numeric model always introduces some inaccuracies. In many cases, model uncertainties can be represented, at least in part, through the parameter or scenario approaches described above. However, some aspects of model uncertainty might not be captured by those classifications and are otherwise very difficult to quantify.

EXAMPLE

In representing the transport of materials to the site of toner cartridge manufacture, a model is used that predicts transport distances and modes based on known transport networks, likely routes, and speeds of travel. The model cannot perfectly predict the true transport logistics and so there is uncertainty regarding the true modes and distances that are used.

A model of soy production is involved in predicting emissions from the production of the cartridge's soy-based ink. Emissions of N_2O due to application of nitrogen fertilizers are based on a linear modeling of interactions of the fertilizer with the soil and plant systems. As these interactions are more complicated than the model assumes, there is uncertainty regarding the emissions resulting from this model.

Reporting uncertainty

Uncertainty can be reported in many ways, including qualitative descriptions of uncertainty sources, and quantitative representations, such as error bars, histograms, probability density functions, etc. It is useful to provide as complete a disclosure of uncertainty information as is possible. Users of the information may then weigh the total set of information provided in judging their confidence in the information.

Endnotes

1 Parameter refers to the value(s) assigned to activities within a company's value chain.

2 B.P. Weidema and M.S. Wesnaes, "Data quality management for life cycle inventories – an example of using data quality indicators," Journal of Cleaner Production 4 no. 3-4 (1996): 167-174.

3 See, for example, S.M. Lloyd and R. Ries, "Characterizing, Propagating, and Analyzing Uncertainty in Life-Cycle Assessment: A Survey of Quantitative Approaches," Journal of Industrial Ecology 11 (2007): 161–179.

4 Mark A. J. Huijbregts, "Application of uncertainty and variability in LCA. Part I: A general framework for the analysis of uncertainty and variability in life cycle assessment," International Journal of Life Cycle Assessment 3 no. 5 (1998): 273 - 280.

Appendix C. Data Management Plan

A data management plan documents the GHG inventory process and the internal quality assurance and quality control (QA/QC) procedures in place to enable the preparation of the inventory from its inception through to final reporting. The data management plan is a valuable tool to manage data and track progress of the inventory over time. Companies may already have similar procedures in place for other data collection efforts to guide their inventory process to meet the accounting requirements of the GHG Protocol, or for ISO standards. Where possible, these processes should be aligned to reduce data management burdens.

The data management plan can also be useful as an assurance readiness measure as it contains much of the data that an assurance provider needs to perform assurance. The plan should be made available to assurance providers (internal or external to the reporting company), as a helpful tool to guide the assurance process.

The data management plan should be divided into two portions, quality control (QC) and quality assurance (QA), explained below.

Quality control

The quality control portion of the data management plan outlines a system of routine technical activities to determine and control the quality of the inventory data and the data management processes. The purpose is to ensure that the inventory does not contain misstatements, including identifying and reducing errors and omissions; providing routine checks to maximize consistency in the accounting process; and facilitating internal and external inventory review and assurance.

Quality assurance

The quality assurance portion of the data management plan involves peer review and audits to assess the quality of the inventory. Peer review involves reviewing the documentation of the GHG accounting methodology and results but does not rigorously review the data used or the references. This review aims to reduce or eliminate any inherent error or bias in the process used to develop the inventory and assess the effectiveness of the internal quality control procedures. The audit evaluates whether the inventory complies with the quality control specifications outlined in the data management plan. Peer review and audits should be conducted by someone not involved in the development of the product inventory.

At a minimum the data management plan should contain:

- Description of the scope 3 categories and activities included in the inventory
- Information on the entity(ies) or person(s) responsible for measurement and data collection procedures
- Data collection procedures
- Data sources, including activity data, emission factors and other data, and the results of any data quality assessment performed
- Calculation methodologies including unit conversions and data aggregation
- Length of time the data should be archived
- Data transmission, storage and backup procedures
- All QA/QC procedures for data collection, input and handling activities, data documentation and emissions calculations.

The process of setting up a data management system should involve establishing standard procedures to address all of the data management activities, including the quality control and quality assurance aspects of developing an inventory.

Creating a data management plan

To develop a data management plan, the following steps should be undertaken and documented.

1. ***Establish a GHG accounting quality person/ team.*** This person/team should be responsible for implementing and maintaining the data management plan, continually improving the quality of the inventory, and coordinating internal data exchanges and external interactions (such as with suppliers, reporting programs and assurance providers).
2. ***Develop data management plan.*** The data management plan should cover the components outlined in the section above and in table C.1. Documenting this information should assist with updating the inventory, and assessing and improving the quality of the inventory over time. Development of the data management plan should begin before any data is collected to ensure all relevant information about the inventory is documented as it proceeds. The plan should evolve over time as data collection and processes are refined.
3. ***Perform generic data quality checks based on data management plan.*** Checks should be applied to all aspects of the inventory process, focusing on data quality, data handling, documentation, and calculation procedures (see table C.2 for data control activities).
4. ***Perform specific data quality checks.*** More in-depth checks should be made for those sources, processes and/or activities that are significant to the inventory and/or have high levels of uncertainty (see Appendix B for information on assessing uncertainty).
5. ***Review final inventory and report.*** Review procedures should be established that match the purpose of the inventory and the type of assurance that will be performed. Internal reviews should be undertaken in preparation for the assurance process by the appropriate department within a company, such as an internal audit or accounting department.
6. ***Establish formal feedback loops to improve data collection, handling and documentation processes.*** Feedback loops can improve the quality of the inventory over time and to correct any errors or inconsistencies identified in the review process.
7. ***Establish reporting, documentation and archiving procedures.*** Establish record-keeping processes for what information should be documented to support data collection and calculation methodologies, and how the data should be stored over time. The process may also involve aligning or developing relevant database systems for record keeping. Systems may take time to develop and it is important to ensure that all relevant information is collected prior to the establishment of the system and then transferred to the system once it is operational.

The data management plan is likely to be an evolving document that is updated as data sources change, data handling procedures are refined, calculation methodologies improve, inventory responsibilities change within a company, or the business objectives of the inventory are updated.

The data management plan checklist in table C.1 outlines what components should be included in a data management plan and can be used as a guide for creating a plan or for pulling together existing documents to constitute the plan.

Table [C.1] Data management plan checklist

Component	*Information*	*Rationale*

Responsibilities	Name and contact details of persons responsible for:
	• Management of GHG inventory
	• Data collection for each process
	• Internal audit procedures
	• External audit procedures
		• This ensures institutional knowledge is maintained and allows relevant person(s) to be identified for:
		  • Confirming and checking information during any internal or external audit procedures
		  • Producing consistent future GHG inventories

Boundary and inventory description	• Description of the boundary decision based on the *GHG Protocol Corporate Standard* • Description of what scope 3 categories and activities are included in the inventory • Description of what categories are excluded and why (as the company may begin including these, as data becomes available, for example)	• To provide internal auditors, assurance providers, and those doing future GHG inventories sufficient information on the activities and categories included in the corporate inventory.
Data summary	• Data collection procedures, including data sources for each process	• Records all data sources and allows others to locate data sources (for audit and updates to inventory). Also provides information on which suppliers have been approached for data.
	• Quality of data collected for each process and if and how a data quality assessment was undertaken	• Enables data quality to be tracked over time and improved
	• Gap analysis identifying where better quality data is preferable and plan for how to improve that data	• Identifies where data sources should be improved over time, including those suppliers who were asked to provide data and those that were not
	• Information on how data assumptions were determined, including use profiles of sold products, product lifetimes, waste treatment profiles, and other relevant assumptions	• Allows internal auditors, assurance providers, and those doing future inventories sufficient information on how assumptions were determined, and identifies how this information may be improved

Table [C.1] Data management plan checklist (continued)

Component	*Information*	*Rationale*
Data summary (continued)	• Information on criteria used to determine when an inventory is to be re-evaluated, including the relevant information needed to be tracked, and how this should be tracked over time.	• This allows data and information sources to be tracked and compared overtime. It may also involve identifying a system (e.g., document tracking and identification system) to ensure data and information is easily located and under what conditions this information/ data was used or collected
Emissions calculations	• Calculation methodologies used (and references), as well as areas where calculation methodologies are needed for the inventory but not available • Changes in calculation methodologies over time	• Provides internal auditors, assurance providers, and those doing future inventories details on how emissions were calculated • Noting methodological changes should allow discrepancies between inventories to be checked and ensures that the most updated methodologies are used
Data storage procedures	• How and where data is stored • Length of time data is archived • Backup procedures	• Allows information to be easily located • Keeps a record of how long information is stored to prevent looking for information that is no longer kept • Ensures backup procedures are implemented
QA/QC procedures	• QA/QC procedures used (see table C.2 for detailed guidance)	• Ensures that adequate processes are in place to check data collection, input and handling, data documentation, and emissions calculations

Table [C.2] Quality assurance/quality control procedures

Activity	*Procedure*
Data collection, input and handling activities	
• **Transcription errors in primary and secondary data**	• Check a sample of input data in each process (both direct measures and calculated estimations) for transcription errors
• **Uncertainty estimates**	• Check that any calculated uncertainties are complete and calculated correctly

Table [C.2] Quality assurance/quality control procedures (continued)

Activity	*Procedure*
Data documentation	
• **Transcription errors in references and storage of all references used**	• Confirm bibliographical data references are properly cited • Ensure all relevant references are archived
• **Storing information on data and data quality**	• Check that emissions categories, boundaries, GHGs included, allocation methodologies uses, data sources and any relevant assumptions are documented and archived • Check that all data quality indicators are described, documented and archived for each process
• **Recording parameter and unit information**	• Check that all units are appropriately labeled in calculation sheets • Check all units are correctly transferred through all calculations and aggregation of emissions in all processes • Check conversion factors are correct
• **Recording calculation methodologies**	• Check that all calculation methodologies are documented • Check that any changes to calculation methodologies are documented
• **Database/calculation sheet integrity**	• Ensure all fields and their units are labeled in database/calculation sheet • Ensure database/calculation sheet is documented and the structure and operating details of the database/calculations sheets are archived
• **Review of internal documentation and archiving**	• Check there is sufficient internal documentation to support the estimates and enable the reproduction of the emissions and data quality assessment, and uncertainty estimations • Check all data, supporting data and records are archived and stored to facilitate a detailed review • Check that the archive is securely stored
Calculating emissions and checking calculations	
• **Aggregation of emissions**	• Ensure that the aggregation of emissions from all emissions activities is correct
• **Emissions trends**	• Where possible compare emissions from each activity to previous estimates. If significant departures, check data inputs, assumptions and calculation methodologies
• **Calculation methodology(ies)**	• Reproduce a sample set of emissions and removals calculations to cross-check application of calculation methodologies • Where possible, cross-check calculation methodologies used against more or less complex methodologies to ensure similar results are achieved

Abbreviations

CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
EEIO	Environmentally-Extended Input Output
EfW	Energy-from-Waste
g	Grams
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
IAS	International Accounting Standard
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
kg	Kilogram
km	Kilometer
kWh	Kilowatt-hour
LCA	Life Cycle Assessment
LFGTE	Landfill-gas-to-energy
MSW	Municipal Solid Waste
MWh	Megawatt-hour
NGO	Non-Governmental Organization
N_2O	Nitrous Oxide
PFCs	Perfluorocarbons
PP&E	Plant, Property, and Equipment
PSEG	Public Service Enterprise Group
QA	Quality Assurance
QC	Quality Control
SF_6	Sulphur Hexafluoride
t	Metric tons
T&D	Transmission and Distribution
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
WTE	Waste-to-Energy

Glossary

Activity	See "Scope 3 Activity"
Activity data	A quantitative measure of a level of activity that results in GHG emissions. Activity data is multiplied by an emissions factor to derive the GHG emissions associated with a process or an operation. Examples of activity data include kilowatt-hours of electricity used, quantity of fuel used, output of a process, hours equipment is operated, distance traveled, and floor area of a building.
Allocation	The process of partitioning GHG emissions from a single facility or other system (e.g., vehicle, business unit, corporation) among its various outputs.
Associate	An entity in which the parent company has significant influence but neither financial control nor joint financial control. (section 5.5, category 15 (Investments))
Assurance	The level of confidence that the inventory and report are complete, accurate, consistent, transparent, relevant, and without material misstatements.
Assurer	A competent individual or body who is conducting the assurance process, whether internally within the company or externally.
Audit trail	Well organized and transparent historical records documenting how the GHG inventory was compiled.
Base year	A historical datum (e.g., year) against which a company's emissions are tracked over time. (chapter 9)
Base year emissions	GHG emissions in the base year. (chapter 9)
Base year emissions recalculation	Recalculation of emissions in the base year to reflect a change in the structure of the company or a change in the accounting methodology used, to ensure data consistency over time. (chapter 9)
Baseline	A hypothetical scenario for what GHG emissions would have been in the absence of a GHG project or reduction activity. (chapter 9)
Biomass	Any material or fuel produced by biological processes of living organisms, including organic non-fossil material of biological origin (e.g., plant material), biofuels (e.g., liquid fuels produced from biomass feedstocks), biogenic gas (e.g., landfill gas), and biogenic waste (e.g., municipal solid waste from biogenic sources).
Biogenic CO_2 emissions	CO_2 emissions from the combustion or biodegradation of biomass.
Business travel	Transportation of employees for business-related activities.

Capital goods	Final goods that have an extended life and are used by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or plant, property and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles.
Category	See "Scope 3 category"
CO_2 equivalent (CO_2e)	The universal unit of measurement to indicate the global warming potential (GWP) of each greenhouse gas, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.
Company	The term company is used in this standard as shorthand to refer to the entity developing a scope 3 GHG inventory, which may include any organization or institution, either public or private, such as businesses, corporations, government agencies, non-profit organizations, assurers and verifiers, universities, etc.
Component	An intermediate product.
Consumer	The end consumer or final user of a product.
Control	The ability of a company to direct the policies of another operation. More specifically, it is defined as either operational control (the organization or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation) or financial control (the organization has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities).
Co-product	One of multiple products produced by a facility or other system that has a market value. (chapter 8)
Cradle-to-gate	All emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).
Customer	An entity that purchases or acquires the products of another entity (i.e., a supplier). A customer may be a business customer or an end consumer.
Debt investment	Investment in an entity (e.g., through loans or bonds) for a fixed period of time that entitles the holder to repayment of the original investment (i.e., principal sum) plus interest, but does not entitle the investor to ownership in the entity. (section 5.5, category 15 (Investments))
Direct emissions	Emissions from sources that are owned or controlled by the reporting company.

Downstream emissions	Indirect GHG emissions from sold goods and services. Downstream emissions also include emissions from products that are distributed but not sold (i.e., without receiving payment).
Economic allocation	Allocating the emissions of an activity based on the market value of each output/product.
Emission factor	A factor that converts activity data into GHG emissions data (e.g., kg CO_2e emitted per liter of fuel consumed, kg CO_2e emitted per kilometer traveled, etc.).
Emissions	The release of greenhouse gases into the atmosphere.
Employee commuting	Transportation of employees between their homes and their worksites.
Equity investment	A share of equity interest in an entity. The most common form is common stock. Equity entitles the holder to a pro rata ownership in the company. (section 5.5, category 15 (Investments))
Equity share approach	A consolidation approach whereby a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation.
Extrapolated data	Data from a similar process or activity that is used as a stand-in for the given process or activity, and has been customized to be more representative of the given process or activity.
Final product	Goods and services that are consumed by the end user in their current form, without further processing, transformation, or inclusion in another product. Final products include not only products consumed by end consumers, but also products consumed by businesses in the current form (e.g., capital goods) and products sold to retailers for resale to end consumers (e.g., consumer products).
Financial control	The ability to direct the financial and operating policies of an entity with a view to gaining economic benefits from its activities. (chapter 5)
Financial control approach	A consolidation approach whereby a company accounts for 100 percent of the GHG emissions over which it has financial control. It does not account for GHG emissions from operations in which it owns an interest but does not have financial control. (chapter 5)
First party assurance	Person(s) from within the reporting company but independent of the GHG inventory process conducts internal assurance. (Also called "self-" or "internal-assurance.")
Franchise	A business operating under a license (granted by a franchisor) to sell or distribute the franchisor's goods or services within a certain location.
Franchisee	An entity that operates a franchise and pays fees to a company (i.e., the franchisor) for the license to sell or distribute the franchisor's goods or services.

Franchisor — A company that grants licenses to other entities (i.e., franchisees) to sell or distribute its goods or services, and in return receives payments, such as royalties for the use of trademarks and other services.

Global warming potential (GWP) — A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO_2.

Good — A tangible product.

Greenhouse gas inventory — A quantified list of an organization's GHG emissions and sources.

Greenhouse gases (GHG) — For the purposes of this standard, GHGs are the six gases covered by the UNFCCC: carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF_6).

Indirect emissions — Emissions that are a consequence of the activities of the reporting company, but occur at sources owned or controlled by another company.

Intermediate product	Goods that are inputs to the production of other goods or services that require further processing, transformation, or inclusion in another product before use by the end consumer. Intermediate products are not consumed by the end user in their current form.
Leased asset	Any asset that is leased (e.g., facilities, vehicles, etc.).
Lessee	An entity that has the right to use an asset through a contract with the owner of the asset (i.e., the lessor).
Lessor	An entity that owns an asset and leases it to a third party (i.e., the lessee).
Level of assurance	Refers to the degree of confidence stakeholders can have over the information in the inventory report.
Life cycle	Consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to end of life.
Life cycle assessment	Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.
Material misstatement	Individual or aggregate errors, omissions and misrepresentations that significantly impact the GHG inventory results and could influence a user's decisions.
Materiality	Concept that individual or the aggregation of errors, omissions and misrepresentations could affect the GHG inventory and could influence the intended users' decisions.
Non-production-related procurement	Purchased goods and services that are not integral to the company's products, but are instead used to enable operations (also called indirect procurement).
Operational boundaries	The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company.
Operational control	A consolidation approach whereby a company accounts for 100 percent of the GHG emissions over which it has operational control. It does not account for GHG emissions from operations in which it owns an interest but does not have operational control.
Organizational boundaries	The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).
Outsourcing	The contracting out of activities to other businesses.
Parent company	An entity that has one or more subsidiaries. (section 5.5, category 15 (Investments))
Physical allocation	Allocating the emissions of an activity based on an underlying physical relationship between the multiple inputs/outputs and the quantity of emissions generated.

Primary data	Data from specific activities within a company's value chain.
Process	A set of interrelated or interacting activities that transforms or transports a product.
Product	Any good or service.
Production-related procurement	Purchased goods that are directly related to the production of a company's products (also called direct procurement).
Project finance	Long term financing of projects (e.g., infrastructure and industrial projects) by equity investors (sponsors) and debt investors (financiers), based on the projected cash flows of the project rather than the balance sheet of the sponsors/lenders. (section 5.5, category 15 (Investments))
Proxy data	Data from a similar process or activity that is used as a stand-in for the given process or activity without being customized to be more representative of the given process or activity.
Reporting	Presenting data to internal management and external users such as regulators, shareholders, the general public or specific stakeholder groups.
Reporting year	The year for which emissions are reported.
Scope 1 emissions	Emissions from operations that are owned or controlled by the reporting company.
Scope 2 emissions	Emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by the reporting company.
Scope 3 activity	An individual source of emissions included in a scope 3 category.
Scope 3 category	One of the 15 types of scope 3 emissions.
Scope 3 emissions	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.
Secondary data	Data that is not from specific activities within a company's value chain.
Service	An intangible product.
Significant influence	Power to participate in the financial and operating policy decisions but not control them. A holding of 20 percent or more of the voting power (directly or through subsidiaries) will indicate significant influence unless it can be clearly demonstrated otherwise. See International Accounting Standard (IAS) 28 for additional criteria for determining significant influence. (section 5.5, category 15 (Investments))

Subsidiary	An entity over which the parent company has control, including incorporated and non-incorporated joint ventures and partnerships over which the parent company has control. (section 5.5, category 15 (Investments))
Supplier	An entity that provides or sells products to another entity (i.e., a customer).
Supply chain	A network of organizations (e.g., manufacturers, wholesalers, distributors and retailers) involved in the production, delivery, and sale of a product to the consumer.
Third party assurance	Person(s) from an organization independent of the GHG inventory process conducts third party assurance. (Also called "External assurance.")
Tier 1 supplier	A supplier that provides or sells products directly to the reporting company. A tier 1 supplier is a company with which the reporting company has a purchase order for goods or services.
Tier 2 supplier	A supplier that provides or sells products directly to the reporting company's tier 1 supplier. A tier 2 supplier is a company with which the reporting company's tier 1 supplier has a purchase order for goods and services.
Uncertainty	1. Quantitative definition: Measurement that characterizes the dispersion of values that could reasonably be attributed to a parameter. 2. Qualitative definition: A general and imprecise term that refers to the lack of certainty in data and methodology choices, such as the application of non-representative factors or methods, incomplete data on sources and sinks, lack of transparency etc.
Upstream emissions	Indirect GHG emissions from purchased or acquired goods and services.
Value chain	In this standard, "value chain" refers to all of the upstream and downstream activities associated with the operations of the reporting company, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use.
Value chain emissions	Emissions from the upstream and downstream activities associated with the operations of the reporting company.
Waste	An output of a process that has no market value.

References

Financial Accounting Standards Board. "Accounting for Leases." *Statement of Financial Accounting Standards,* no. 13 (1976).

Huijbregts, Mark A. J. "Application of uncertainty and variability in LCA. Part I: A general framework for the analysis of uncertainty and variability in life cycle assessment." *International Journal of Life Cycle Assessment* 3 no. 5 (1998): 273-280.

International Organization for Standardization (ISO). "ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions." (2005).

IPCC. Summary for Policymakers. In *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* ed. B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2007.

Lloyd, S. M. and R. Ries. "Characterizing, Propagating, and Analyzing Uncertainty in Life-Cycle Assessment: A Survey of Quantitative Approaches." *Journal of Industrial Ecology* 11 (2007): 161-179.

Weidema, B.P. and M.S. Wesnaes. "Data quality management for life cycle inventories – an example of using data quality indicators." *Journal of Cleaner Production* 4 no. 3-4 (1996): 167-174.

WRI/WBCSD GHG Protocol. "Categorizing GHG Emissions from Leased Assets." *GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition),* Appendix F, June 2006, Version 1.0, provided at www.ghgprotocol.org.

Recognitions

Advisors

Fabio Peyer, Amcor Ltd.
Jannie Bell, Dell Inc.
Björn Hannappel, Deutsche Post DHL
Carina Alles, DuPont
Lisa Grice, ENVIRON International Corporation
Matthew Bateson, World Business Council for Sustainable Development
Jennifer Morgan, World Resources Institute
Janet Ranganathan, World Resources Institute
Ranping Song, World Resources Institute

Road Testing Companies

Abengoa
Acer
Airbus
AkzoNobel
Amcor Ltd.
Autodesk, Inc.
Baosteel Group Corporation
BASF
Coca-Cola Erfrischungsgetränke AG
Danisco
Deutsche Post DHL
Deutsche Telekom AG
Ford Motor Company
IBM Corporation
IKEA
Italcementi Group
Kraft Foods
Levi Strauss & Co.
National Grid
New Belgium Brewing
Ocean Spray Cranberries, Inc.
PE INTERNATIONAL
Pfizer Inc.
Pinchin Environmental Ltd.
PricewaterhouseCoopers Hong Kong
Public Service Enterprise Group, Inc.
SAP
S.C. Johnson & Son, Inc.
Shanghai Zidan Food Packaging and Printing Co., Ltd.
Siemens AG
Suzano Pulp and Paper
United States General Services Administration
Veolia Water
Webcor Builders

Technical Working Group Members

Fiona van den Brink, AkzoNobel
Peter J. Nieuwenhuizen, AkzoNobel
Erik van Agtmaal, Altimedes Consulting
Marijn Vervoorn, Arthur D. Little
Sam Kramer, Baker & McKenzie LLP
Nicola Paczkowski, BASF SE
Marianna Pierobon, BASF
Peter Saling, BASF
George Gosieski, Business Ecosystems
Ryan Schuchard, BSR
Kathryn Thomsen, The Cadmus Group, Inc.
Andrea C. H. Smith, Carbon Disclosure Project (CDP)
Frances Way, Carbon Disclosure Project (CDP)
Christopher Weber, Carnegie Mellon University
Rosa Maria Jimenez, CESPEDES
Gemma Heddle, Chevron
Brian Glazebrook, Cisco Systems **(Chair)**
Darrel Stickler, Cisco Systems
Renaud des Rosiers, Cleargreen Advisors
Jens Rupp, Coca-Cola Hellenic Bottling Company

Technical Working Group Members (continued)

S Majumdar, Confederation of Indian Industry
Rob Sinclair, Conscious Brands
Brian Bahor, Covanta Energy
Michael Van Brunt, Covanta Energy
Arthur Lee, Chevron Services Company
Jordi Avellaneda, Damco
Yasushi Iwao, Deloitte-TECO
Kenneth Stanvick, Design Chain Associates LLC
Peter Klein, EducatedChange Ltd
Laura Lundbeck, Ernst & Young
Alice Ryan, Google
Jay Celorie, HP
Jay Dietrich, IBM Corporation
Peter Clarke, ICF International
Olle Blidholm, IKEA
Xander van der Spree, IKEA
Jacob Kottackal Ninan, Independent Consultant
Enrique Ortega, Industrias Peñoles
Andrea Zomosa, Industrias Peñoles
Ted Reichelt, Intel
Chris Bayliss, International Aluminium Institute
Christine Copley, International Council on Mining and Metals (ICMM)
Manfred Lenzen, The University of Sydney
Yoshikazu Kato, The Japan Gas Association
Jochen Harnisch, KFW Development Bank
Rohitesh Dhawan, KPMG
Marianna Herold, KPMG
Ann Smith, Landcare Research, NZ Ltd.
Fabien Bronès, Natura Cosméticos
Nathan Sandwick, Natural Resources Defense Council
Reid Miner, NCASI
Harri Artinaho, Nokia
Timo Kolemainen, Nokia
Paivi Pirhonen, Nokia
Ari Virta, Nokia
Jostein Soreide, Norsk Hydro
Stefan Seum, Öko Institut
Peter Haenke, Origin Energy
Hiroko Kamei, Osaka Gas Co., Ltd.
Tomohito Okamura, Osaka Gas Co., Ltd.
Yuichiro Yamaguchi, Osaka Gas Co., Ltd.
Hannes Partl, PE INTERNATIONAL
Johannes Partl, PE INTERNATIONAL
Michael Spielmann, PE INTERNATIONAL
Vicente Schmall, Petroleo Brasileiro S.A. – Petrobras
Mark Goedkoop, PRé Consultants
Susan Cosper, PricewaterhouseCoopers, LLP
Marne L. Doman, PricewaterhouseCoopers, LLP
Nancy Newman-Limata, PricewaterhouseCooopers, LLP
Nick Shufro, PricewaterhouseCoopers, LLP **(Chair)**
Jon Dettling, Quantis International
Damien Friot, Quantis International
Rainer Ochsenkuehn, ROC One, LLC.
Stefan Johansson, Royal Institute of Technology, Stockholm
Charlotta Barthelson, Saab
Mats Jacobsson, Saab
Lori Duvall, SAP
Axel Brenner, Siemens AG
Ralf Pfitzner, Siemens AG
Joe Harriman, Stantec Consulting Ltd.
Kathryn Scales, Suncor Energy
Sam Balch, UK Department of Environment Food and Rural Affairs
Steve Leffin, United Parcel Service
Sara Hartwell, United States Environmental Protection Agency Office of Solid Waste
Barbara J. Moser, United Technologies Corporation
Dennis Pamlin, World Wildlife Fund
Alina Racoviceanu, World Wildlife Fund Canada
Christopher Dey, The University of Sydney
Joy Murray, The University of Sydney
Karen R.H. Utt, Tennessee Valley Authority
Mark Newton, The Timberland Company
Patrick Racz, Trucost
James Salo, Trucost
Gu A'Lun, Tsinghua University
Laura Doze, Xcel Energy
Jim Turner, Xcel Energy

Contributors

Jannick Schmidt, Aalborg University
Andrés Zancada Ruiz, Abengoa
Sam Lin, Acer
Hiroo Takahashi, AGC Group
Bruno Costes, Airbus
Ashley Crepiat, Airbus
Fiona van den Brink, AkzoNobel
Peter Remco Vellinga, AkzoNobel
Julian Maruschke, Apple
Arturo Cepeda, Artequim.com Ltd.
Shuichiro Sugimoto, Asahi Glass Co., Ltd.
Ben Thompson, Autodesk, Inc.
Yinghao Liu, Baosteel Group Corporation
Tao Liu, Baosteel Group Corporation
Hongzhi Shi, Baosteel Group Corporation
Christopher Bray, Barclays Capital
Rachelle Marburg, Barclays Capital
Nicola Paczkowski, BASF
Peter Saling, BASF
Gregory LeMay, Beverage Industry Environmental Roundtable,
Gabrielle Giner, BT plc
Annalisa Schilla, California Air Resources Board
Ian Lipton, The Carbon Accounting Company
Lois Guthrie, Carbon Disclosure Project (CDP)
James Leaton, Carbon Tracker
Patricia Ludewig, Caterpillar
Claude Loréa, CEMBUREAU
Jen McGraw, Center for Neighborhood Technology
Tommy Wiedmann, Centre for Sustainability Accounting
Meg Crawford, Ceres
Andrea Moffat, Ceres
Eliza Eubank, Citi
Corinne Reich-Weiser, Climate Earth
Peggy Foran, The Climate Registry
Christopher Gleadle, The CMG Consultancy
Harald Steinke, Coca-Cola Erfrischungsgetränke AG
Rudi Sueys, Coca-Cola Erfrischungsgetränke AG
Andrew Aulisi, Credit Suisse
Jette Hansen, Danisco
Steven Moore, Deloitte Touche Tohmatsu Limited
Björn Hannappel, Deutsche Post DHL
Klaus Hufschlag, Deutsche Post DHL
Mathis Lappenkpüper, Deutsche Post DHL
Patric Pütz, Deutsche Post DHL
Stephan Schablinski, Deutsche Post DHL
Hans-Jürgen Gerhardy, Deutsche Telekom AG
Reiner Lemke, Deutsche Telekom AG
Michael Zalan, Deutsche Telekom AG
Ivar Barlindhaug, Devoateam DaVinnci
Toshihide Maruyama, Diacel Chemical Industries, Ltd.
Dawn Rittenhouse, DuPont
Susan Veith, DuPont
Bo Weidema, Ecoinvent
Matt Molinaro, Ecolab Inc
Ali Rivers, Ecometrica
Nigel Carter, En-Venture
Mary Stewart, Energetics
Ines Sousa, ENXSUITE
Switzerland, Niels Jungbluth, ESU-services Ltd.
James Mahoney, Export-Import Bank of the U.S.
Jonathan Newton, Ford Motor Company
Monique Oxender, Ford Motor Company
Daniel Hall, Forest Ethics
Franky Mo, Gap Inc.
Angela Fisher, GE Global Research
William Flanagan, GE Global Research
Juergen Ritzek, GreenBusinessConsulting (GBC)
Terrie Boguski, Harmony Environmental, LLC
Thaddeus Owen, Herman Miller, Inc
Yoshiaki Ichikawa, Hitachi, Ltd.
Silvana Paniagua Tufinio, i4b
Hemant Bundele, ibLaunch Energy, Inc.
Thomas Schaefer, IKEA
Don Bain, Independent Consultant
Rose Nangah Mankaa, Italcementi Group
Manuela Ojan, Italcementi Group
Jeffrey Tseng, Integrated Service Technology
Tim Higgs, Intel
Milena Breisinger, Inter-American Development Bank
Shilpa Patel, International Finance Corporation
Naoki Aoki, Japan Cement Association
Yasutoshi Hattori, The Japanese Gas Association
Yoshikazu Kato, The Japan Gas Association
Kato Yoshikazu, The Japan Gas Association
Dan Pettit, Kraft Foods

Contributors (continued)

John Andrews, Landcare Research, NZ Ltd
Suzie Greenhalgh, Landcare Research, NZ Ltd
Janet Kidner, Lend Lease Europe
Barruch Ben-Zekry, Levi Strauss & Co.
Steve Priddy, London School of Business & Finance
Mads Stensen, Maersk Line
Kara E Reeve, Massachusetts Institute of Technology
Kenji Shima, Mitsubishi Chemical Holdings Corporation
Nana-Ama Appiah, National Grid
Leah Fry , National Grid
Juliana Grando, National Grid
David Goldstein, Natural Resources Defense Council
Rosemary Bissett, National Australia Bank
Jenn Orgolini, New Belgium Brewing
Brad Beck, Nike
Hitoshi Morooka, Nippon Steel-Blast-Furnace Slag Cement Co. Ltd.
Claus Frier, Novozymes A/S
Pauline Jeong, Ocean Spray Cranberries, Inc.
Narito Shibaike, Panasonic Corporation
Jonathan Sykes, Parsons Brinckerhoff
Julie Fox Gorte, PaxWorld Management LLC
Barbara Nebel, PE INTERNATIONAL
Robert ter Kuile, PepsiCo
Brian Sullivan, Pfizer Inc.
Christopher Ho, PricewaterhouseCoopers, LLP
Brigham McNaughton, PricewaterhouseCoopers, LLP
Kristine Chung, PricewaterhouseCoopers Hong Kong
Inez Ng, PricewaterhouseCoopers Hong Kong
Diederik Schowanek, Proctor & Gamble
Mark Scorsolini, Public Service Enterprise Group, Inc.
Josephine Przewodnik, Recarbon Deutschland GmbH
Hicham Elhalaby, Rogers Communications
Sandra Pocsay, SAP
Jim Sullivan, SAP
Alyssa Farrell, SAS
Daniel Lawson, S. C. Johnson & Son, Inc.
Franklyn Ericson, S. C. Johnson & Son, Inc.
Fubo Mu, Shanghai Zidan Food Packaging and Printing Co., Ltd.
Xavier Riera-Palou, Shell
Ronald Neuhaus, Siemens AG
Zoltán Hajdu, Soltub Ltd. Hungary
Hilary Zheng, Sovereign
Seigo Ishiguro, Sumitomo Metal Industries, Ltd.
Kazuki Inatsu, Sumitomo Osaka Cement Co., Ltd.
Marina Carlini, Suzano Pulp and Paper
Samuel Kwong, Swire Beverages
Makiki Ito, Tokyo Gas Co., Ltd
Sachio Hosohara, Toray Industries, Inc.
Gordon MacLeod, Transport Scotland
James Salo, Trucost
Verena Radulovic, United States Environmental Protection Agency
Nancy Gillis, United States General Services Administration
Guillaume Arama, Veolia Water
Laurence Hamon, Veolia Water
David Houdusse, Veolia Water
Sandeep Mehndiratta, Verdaes
Lisbeth Dahllöf, Volvo Technology
Barbara Harrison, VT plc
Janet Godfrey, Webcor Builders
Ted Huang, Webcor Builders
Phil Williams, Webcor Builders
Edie Sonne Hall, Weyerhaeuser Company
Antonia Gawel, World Business Council for Sustainable Development
Bernhard Gruenauer, World Business Council for Sustainable Development
John Finisdore, World Resources Institute
Stacy Kotorac, World Resources Institute
Laura Pocknell, World Resources Institute
Samantha Putt del Pino, World Resources Institute
Mary Sotos, World Resources Institute
Jon Strahl, World Resources Institute
Shally Venugopal, World Resources Institute
Chris Daniels, Xstrata

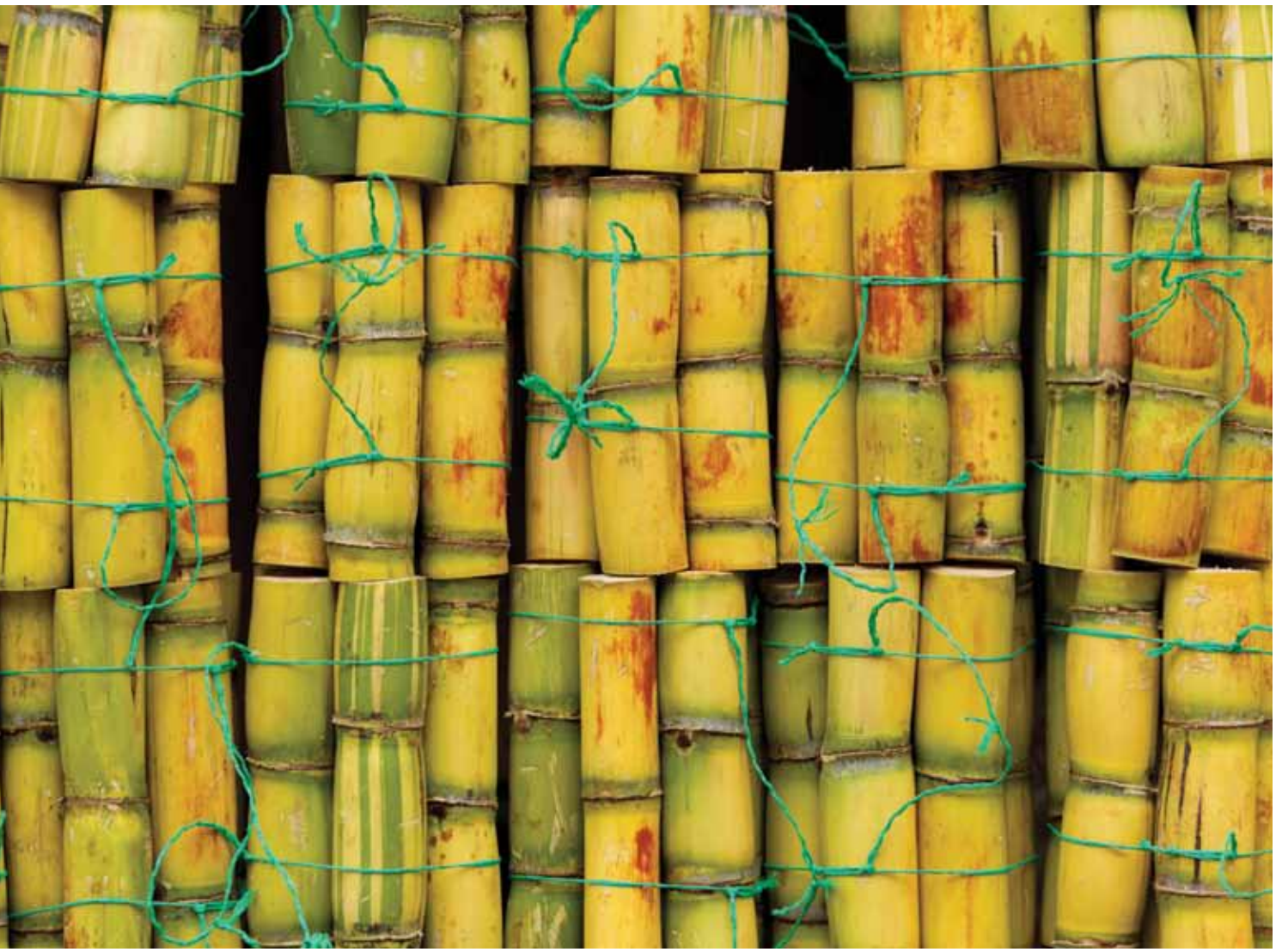
In-Kind Road Testing Support

The Carbon Trust
China National Institute of Standardization
DNV
KPMG
PE Consulting
PRé Consultants
PricewaterhouseCoopers, LLP
SGS-CSTC Standards Technical Services Co., Ltd.
SGS Hong Kong Limited

Consultants

China National Institute of Standardization
PricewaterhouseCoopers, LLP
Quantis
RESET Carbon

WRI and WBCSD would like to thank the following organizations for their generous financial support: Alcoa Foundation, BP Foundation, Dell Inc., EMC Corporation, Intel Corporation, Kimberly Clark Corporation, PepsiCo, PricewaterhouseCoopers, LLP, Robertson Foundation, SC Johnson & Son, Inc., Siemens, United States Agency for International Development (USAID), United States Environmental Protection Agency (US EPA), United Technologies Corporation, UPS Foundation, and Walmart Foundation. WBCSD, funded by its member companies, also provided direct financial support.



ISBN 978-1-56973-772-9

Printed in USA

MIX Paper from responsible sources FSC® C102520

PRINTED ON RECYCLED PAPER

PRINTED WITH SOY INK

Printed on Chorus Art Silk, an FSC-certified paper with 55% recycled and 30% pcw content and with inks that are of soy content.

Design: Alston Taggart, Studio Red Design
Cover: Futerra Sustainability Communications

World Business Council for Sustainable Development (WBCSD)

The WBCSD is a CEO-led, global coalition of some 200 companies advocating for progress on sustainable development. Its mission is to be a catalyst for innovation and sustainable growth in a world where resources are increasingly limited. The Council provides a platform for companies to share experiences and best practices on sustainable development issues and advocate for their implementation, working with governments, non-governmental and intergovernmental organizations. The membership has annual revenues of USD 7 trillion, spans more than 35 countries and represents 20 major industrial sectors. The Council also benefits from a network of 60 national and regional business councils and partner organizations, a majority of which are based in developing countries.

Disclaimer

The *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, a supplement to the *GHG Protocol Corporate Accounting and Reporting Standard,* is designed to promote best practice GHG accounting and reporting. It has been developed through an inclusive multi-stakeholder process involving experts from businesses, non-governmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). While WBCSD and WRI encourage use of the *Scope 3 Standard* by all corporations and organizations, the preparation and publication of reports or program specifications based fully or partially on this standard is the full responsibility of those producing them. Neither WBCSD, WRI, nor other individuals who contributed to this standard assume responsibility for any consequences or damages resulting directly or indirectly from its use in the preparation of reports or program specifications or the use of reported data based on the *Scope 3 Standard.*

World Resources Institute (WRI)

The World Resources Institute is a global environmental think tank that goes beyond research to put ideas into action. We work with governments, companies, and civil society to build solutions to urgent environmental challenges. WRI's transformative ideas protect the earth and promote development because sustainability is essential to meeting human needs and fulfilling human aspirations in the future.

WRI spurs progress by providing practical strategies for change and effective tools to implement them. We measure our success in the form of new policies, products, and practices that shift the ways governments work, companies operate, and people act.

We operate globally because today's problems know no boundaries. We are avid communicators because people everywhere are inspired by ideas, empowered by knowledge, and moved to change by greater understanding. We provide innovative paths to a sustainable planet through work that is accurate, fair, and independent.

WRI organizes its work around four key goals:

- **People & Ecosystems:** Reverse rapid degradation of ecosystems and assure their capacity to provide humans with needed goods and services.
- **Governance:** Empower people and strengthen institutions to foster environmentally sound and socially equitable decision-making.
- **Climate Protection:** Protect the global climate system from further harm due to emissions of greenhouse gases and help humanity and the natural world adapt to unavoidable climate change.
- **Markets & Enterprise:** Harness markets and enterprise to expand economic opportunity and protect the environment.

In all its policy research and work with institutions, WRI tries to build bridges between ideas and action, meshing the insights of scientific research, economic and institutional analyses, and practical experience with the need for open and participatory decision-making.

GREENHOUSE GAS PROTOCOL

The Greenhouse Gas Protocol provides the foundation for sustainable climate strategies and more efficient, resilient and profitable organizations. GHG Protocol standards are the most widely used accounting tools to measure, manage and report greenhouse gas emissions.