Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain

Ver. 1.0

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Part 1. Basic Approach of Accounting

1. Introduction

1.1 Background

At present in Japan, as a measure against global warming, companies meeting certain criteria are accounting for and reporting their own greenhouse gas emissions, and national and regional government organizations are publicly disclosing their emissions data, in accordance with the Mandatory Greenhouse Gas Accounting and Reporting System (referred to below as the "Accounting and Reporting System") based on the Act on Promotion of Global Warming Countermeasures (referred to below as the "Global Warming Countermeasures Act") as well as various programs based on certain regional ordinances. In addition, many businesses are voluntarily disclosing data on their own emissions in reports on corporate social responsibility (CSR), and growing numbers of companies are taking steps to determine and reduce their own emissions. Meanwhile, the scope of emissions determined under the existing Accounting and Reporting System, CSR reporting, and the like is generally limited to the reporting company's own emissions, and therefore, contributions made through energy-saving products and the spread of products with lower greenhouse gas emissions are not reflected when companies evaluate their own emissions. The business activities of companies are linked through purchasing and sales in the supply chain; and although there may be a great deal of potential for reducing emissions, the potential for such reduction is not clarified when companies determine only their own emissions, and there are no incentives for taking action to reduce emissions through supply chain management. Therefore, in the determination and management of emissions, it is important to determine not only the reporting company's own emissions but also greenhouse gas emissions in the supply chain (referred to below as "supply chain emissions").

The following are global initiatives for standardization and information disclosure with regard to accounting and reporting of companies' supply chain emissions.

- Development of standards under the GHG Protocol[1]
- Study of greenhouse gas accounting guidelines by ISO
- Growing demand for disclosure under the Carbon Disclosure Project (CDP), etc.

Under the GHG Protocol, the "Corporate Value Chain (Scope 3) Accounting and Reporting Standard" (referred to below as the "Scope 3 Standard") is being developed to provide methods for the accounting and reporting of emissions in the value chain of a business. In 2008, a steering committee and technical working groups began studies toward the Scope 3[2] Standard. The process since then has included meetings with stakeholders to obtain feedback, road testing by over 60

[1] GHG Protocol: A process to develop greenhouse gas accounting and reporting standards based on agreement by the participants, which include a U.S. environmental NGO called the World Resources Institute (WRI), a worldwide economic council called the World Business Council for Sustainable Development (WBCSD), and a variety of interested parties from around the world including companies, government institutions, NGOs, and academic institutions.

[2] Scope 3: A concept related to the scope of emissions under the GHG Protocol. For details, see p. I-4.

companies, and public comments on draft versions. The completed Standard was published in October 2011.

The International Organization for Standardization (ISO) is currently developing ISO/TR 14069 ("Quantification and reporting of GHG emissions for organizations: Guidance for the application of ISO 14064-1"). This document, ISO/TR 14069, will provide guidelines concerning methodology for organizations to quantify and report their direct and indirect emissions, and consideration is being given to alignment with the Scope 3 Standard.

A move to demand disclosure of Scope 3 emissions data is emerging, including the Carbon Disclosure Project (CDP)[3] and the Climate Change Reporting Framework (CCRF)[4]. Some reports concerning Scope 3 emissions have been issued by 274 companies in the CDP's "Investor CDP 2011 Global 500 Report," and by 107 companies in its "Investor CDP Japan 500 Report 2011."

These developments are part of a rising global trend toward the determination and management of companies' supply chain emissions along with disclosure of related information. The need for such measures is expected to continue to grow in the future.

1.2 Significance of Japan's involvement and purpose of preparing guidelines

Japan has been actively engaged in measures to combat climate change, and in addition, considering the background described above, Japan is pursuing measures for the determination and reduction of supply chain emissions in order to further enhance its efforts against climate change.

The significance of Japan's efforts concerning supply chain emissions includes the following goals. To realize these goals, it will be necessary to improve understanding of supply chain emissions among a wide range of companies and to provide accounting methods that are easy for Japanese companies to use as a framework for efforts to reduce such emissions; and these guidelines have been prepared on that basis.

- Promoting rational measures to combat climate change
- Promoting coordinated efforts by a wide range of companies
- Presenting Japan's viewpoint with regard to moves for international standardization
- Building trust for Japanese companies' environmental technologies and contributions to reducing greenhouse gas emissions

(1) Promoting rational measures to combat climate change

[3] CDP: A project in which institutional investors from around the world send questionnaires concerning climate change to the world's major corporations and then evaluate and publish their responses.
[4] CCRF: An international framework for the disclosure of information related to climate change. The first version was issued in September 2010 by the Climate Disclosure Standards Board (CDSB).

The determination of an overall picture of emissions throughout the supply chain provides an understanding of the stages that involve higher emissions as well as the areas that have a high potential for reducing emissions. This kind of information makes it possible to plan and implement effective reduction measures with consideration for economic factors, contributing to competitive strength while also improving transparency.

(2) Promoting coordinated efforts by a wide range of companies

At present, many companies are calculating emissions from their own places of business and distribution activities under the Accounting and Reporting System, etc., and taking steps to reduce emissions on that basis. However, most efforts are being pursued by individual companies, and it is necessary to provide support for efforts involving collaboration by a variety of companies.

For example, it is anticipated that large, influential companies can help to promote measures to reduce emissions at small and medium enterprises by endeavoring to reduce emissions from the standpoint of their supply chains. Of course, in addition to measures between large companies and smaller ones, it is also anticipated that when large companies combine forces with each other, they will be able to achieve greater reductions in emissions than they could have achieved alone.

Therefore, accounting from the standpoint of the supply chain is expected to advance coordinated efforts by a wide range of companies.

(3) Presenting Japan's viewpoint with regard to moves for international standardization

Although the GHG Protocol and other initiatives have involved studies and other efforts to promote international standardization, their standards include portions that are difficult for Japanese companies to use or interpret directly. Therefore, it is important to develop a methodology that is based on such efforts for international standardization, but better suited to actual conditions in Japan and easier to use in Japan. In addition, the compilation of Japan's views, based on actual steps taken by various companies, will help to clarify the stance to be taken with respect to the international community.

(4) Building trust for Japanese companies' environmental technologies and contributions to reducing greenhouse gas emissions

Japanese companies have outstanding environmental technologies and are making important contributions to the reduction of emissions in consumer activities and transportation in Japan as well as emissions in the rest of the world, a fact that has not been adequately recognized. To improve this situation, the question of how to evaluate and disclose contributions to emissions reduction is being debated. To build confidence in such evaluations, it is important to show that Japanese companies are determining and managing emissions in terms of overall business activities, instead of presenting only a fragmentary view limited to their activities that contribute to reducing emissions. Therefore, it is necessary to engage in domestic and international measures in accounting for overall supply chain emissions and quantifying contributions to reducing emissions, as two halves of the whole.

1.3 Objectives and effects of supply chain emissions determination and management

The scope of supply chain emissions covers not only the emissions of the reporting company itself, but also all emissions related to business activities, including purchasing and sales by the company. Specifically, it includes emissions from the manufacturing and transportation of raw materials, products, and services purchased by the company, emissions from the company's own emission activities, and emissions from the distribution, use, and disposal of products and services that are produced and sold by the company. Calculating and determining such emissions at each stage of the supply chain makes it possible to discover those stages of the supply chain that involve higher levels of emissions, as well as those areas that offer greater potential for reducing emissions; and this allows companies to implement efficient measures for reducing emissions in the overall supply chain. (For an illustration of the scope of emissions in the supply chain and the reduction of emissions, see Fig. 1-1, Illustration of the scope of supply chain emissions and reduction measures.)

It is important to help to raise awareness among other companies that make up the supply chain and among product users by calling on them to provide information, etc., in the process of determining supply chain emissions, and to endeavor to collaborate with other companies, etc., in order to promote the reduction of greenhouse gas emissions through cooperation among the companies that make up the supply chain.

Companies can increase their accountability to stakeholders, including other companies that make up the supply chain, through visualization and voluntary disclosure of supply chain emissions.

In addition, the determination of a company's supply chain emissions is closely related to determination of a product's life cycle emissions (carbon footprint). If a company has determined emissions from procurement of raw materials, processing, use, and disposal of each of its products, it can then determine the company's total emissions by combining data for all of its products.[5] Meanwhile, a company's supply chain emissions includes capital goods, business travel, employee commuting, and other emission sources that are generally not taken into consideration when determining the carbon footprint. Although some differences exist between a company's supply chain emissions and the carbon footprint, measures to reduce the carbon footprint will contribute to reducing the company's supply chain emissions as well; and therefore, measures to reduce a company's emissions and measures to reduce the emissions of its products can be pursued in a way that is mutually interconnected. Because carbon footprint reduction measures can lead to better transparency and trust for consumers while providing cost savings by modifying inefficient processes, the results include stronger product competitiveness in addition to lower emissions; and it is important to promote understanding of supply chain emissions from this perspective as well.

These guidelines indicate a basic approach to accounting for supply chain emissions; however, in the future, it will be necessary to resolve issues related to calculation methods while compiling information from individual cases and monitoring trends in

[5] However, there may be some differences in the accounting procedures. For example, in the actual determination of emissions, procurement of raw materials by a company could be measured in terms of transaction units, rather than in units of the company's products.

international debate. In addition, it will be necessary to flesh out the details of calculation methods and establish systems for data collection in the determination of each company's supply chain emissions. Therefore, it is important to proceed by stages, based on the objectives of supply chain emissions determination and management as discussed above.

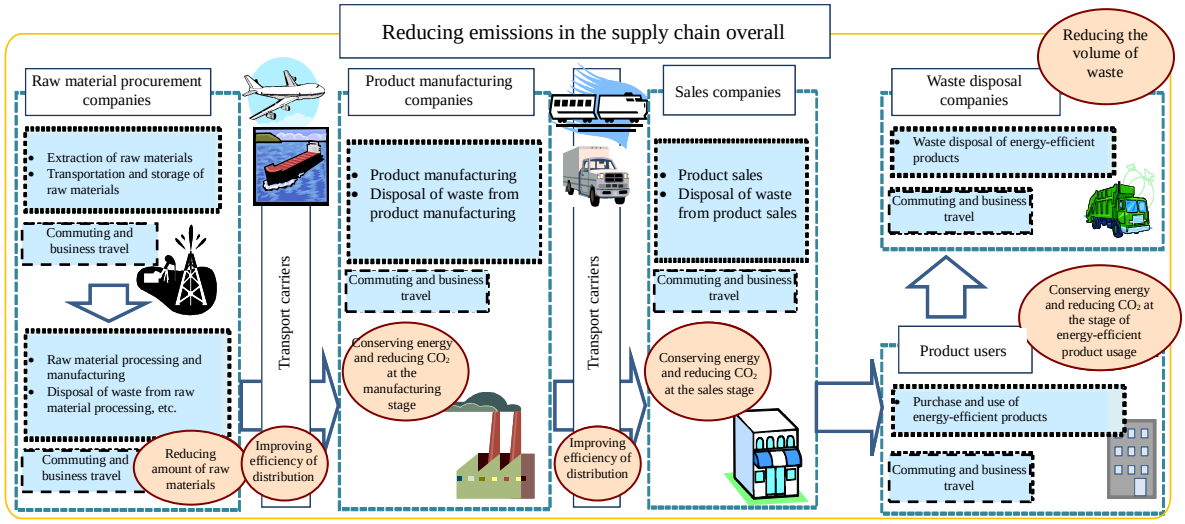


Fig. 1-1. Illustration of the scope of supply chain emissions and reduction measures

2. Role and usage of this document

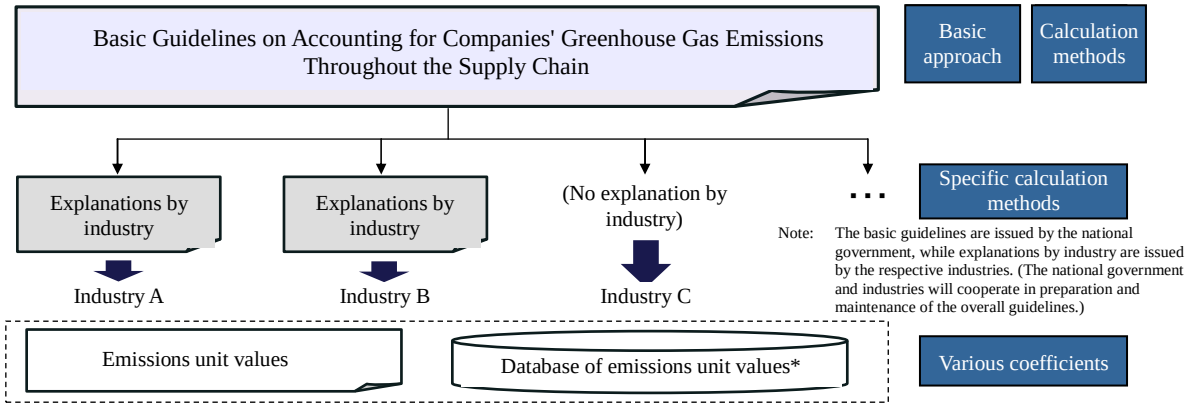
This document presents the approach taken by Japanese companies in calculating supply chain emissions, based on the status of existing endeavors in Japan as well as international trends. While pursuing consistency with the Scope 3 Standard, etc., these are Japanese guidelines formulated in accordance with conditions in Japan.

The guidelines indicate common calculation methods for all industries, making it possible to calculate supply chain emissions using this document alone.

Based on the situation of each industry, explanations by industry are provided with regard to certain industries. Companies belonging to those industries should perform calculations by applying this document in combination with the respective explanations by industry.

This document does not provide the specific emissions unit values which are needed for calculations. For details concerning emissions unit values, please refer to the "Report on Emissions Unit Values for Calculation of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain" (abbreviated below as "Report on Emissions Unit Values" and the separate database of emissions unit values.

The figure below illustrates the overall composition of guidelines on accounting for supply chain emissions, including the role of this document.



* This indicates the emissions unit values related to these guidelines. Companies may decide whether or not to use these unit values at their own discretion.

Fig. 2-1. Composition of overall guidelines and role of this document

This document will be revised in the future as necessary based on the progress of endeavors related to supply chain emissions and other factors.

3. Glossary

(1) Company:

A private business, public institution, or other organization which conducts business activities and is an entity subject to emissions accounting. The term "organization" below includes companies, constituents of companies, and organizations that are not included under companies.

(2) Supply chain emissions:

All greenhouse gas emissions from business activities in a company's supply chain, comprising direct emissions (Scope 1 emissions), energy-derived indirect emissions (Scope 2 emissions), and other indirect emissions (Scope 3 emissions).

(3) Direct emissions (Scope 1 emissions):

Emissions of greenhouse gases released directly into the atmosphere from emission sources within organizational boundaries. This corresponds to direct greenhouse gas emissions under JIS Q 14064-1, and to Scope 1 emissions under the GHG Protocol Scope 3 Standard.

(4) Energy-derived indirect emissions (Scope 2 emissions):

Carbon dioxide emissions due to the use of electricity and heat supplied by others, released at the stage of generation of such electricity and heat. This corresponds to energy-derived indirect greenhouse gas emissions under JIS Q 14064-1, and to Scope 2 emissions under the GHG Protocol Scope 3 Standard, limited to carbon dioxide emissions only. It includes power transmission losses and in-house power consumption at power plants, which are not included in the GHG Protocol Scope 3 Standard.

(5) Other indirect emissions (Scope 3 emissions):

Indirect greenhouse gas emissions from business activities in a company's supply chain, other than direct emissions and energy-derived indirect emissions. This corresponds to other indirect greenhouse gas emissions under JIS Q 14064-1, and to Scope 3 emissions under the GHG Protocol Scope 3 Standard.

Note: There are differences based on the definitions of energy-derived indirect emissions (Scope 2 emissions).

(6) Organizational boundaries:

Boundaries determining the scope of business activities owned or controlled by an organization. This corresponds to organizational boundaries under the GHG Protocol Scope 3 Standard. Investment ratios and controlling interests are the standards used for setting organizational boundaries. In these guidelines, as a general rule, controlling interest is considered to be the standard, and companies subject to consolidation are included within the organizational boundaries.

(7) Investment ratio standard:

A method for consolidation of emissions, in which emissions from the business in question are calculated in accordance with the ratio of investment in that business (equity share).

(8) Controlling interest standard:

A method for consolidation of emissions, in which 100% of emissions from wholly controlled businesses are calculated. Even if there is a high investment ratio, emissions are not calculated unless there is a controlling interest. Here, "controlling interest" can be defined either from the standpoint of financial control (having the power to decide the financial and management policies of the company in question) or from the standpoint of management control (having full authority to introduce and implement its own management policy on the company in question). In these guidelines, companies are generally included within the organizational boundaries if they are subject to consolidation under either of these standards.

(9) Upstream:

In general, activities related to products and services that are purchased. (See section 4.1 for details.)

(10) Reporting company:

The scope within a company's organizational boundaries. As a general rule, this includes the reporting company itself (corporation, etc.) and all business activities owned or controlled by the company, such as companies subject to consolidation.

Note: The same applies if the company is some other type of organization than a business firm.

(11) Downstream:

In general, activities related to products and services that are sold. (See section 4.1 for details.)

(12) Amount of activity:

An indicator of the scale of a company's activities. This includes amounts of electricity used, amounts of freight transported, amounts of waste processed, transaction values, and other amounts determined by the company.

(13) Emissions unit value:

Amount of greenhouse gas emissions per unit amount of activity. For example, there are emissions unit values for the amount of carbon dioxide emissions per kilowatt-hour of electric power used, the amount of carbon dioxide emissions per

ton-kilometer of freight transported, and the amount of carbon dioxide emissions per ton of waste incinerated.

(14) 5.5 gases:

The six gases subject to accounting of supply chain emissions (carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6)), with the exclusion of energy-derived carbon dioxide.

4. Overview of supply chain emissions accounting

4.1 Overview of emissions accounting

In order to effectively determine and manage supply chain emissions, it is desirable for the reporting company to collaborate with other companies to collect actual emissions data at each stage of the supply chain and then calculate the combined emissions. However, in practice, it may not be easy to obtain emissions data for some of these stages. Therefore, to allow calculations based on data that is relatively easy to determine in cases where actual emissions data is not available, we have developed an approach based on separate calculations for each of the divisions indicated in Table 4-1, dividing the supply chain into the reporting company itself, upstream portions, and downstream portions. In these guidelines, the terms "upstream" and "downstream" are defined as follows.

Definitions of "upstream" and "downstream"[6]

- Upstream: In general, activities related to products and services that are purchased.
- Downstream: In general, activities related to products and services that are sold.

Table 4-1. Approach of accounting methodology

Division	Approach of accounting methodology
Reporting company	Data on amounts of activities at the reporting company itself, such as amounts of fuel used, is multiplied by emissions unit values.
Upstream	The reporting company's input and output of raw materials, wastes, etc., (in terms of amounts or values) is multiplied by unit values for emissions going back to the stage of resource extraction (referred to below as "emissions unit values"). It is anticipated that most such calculations will be based on transaction units.
Downstream	Using product use scenarios as needed, data is obtained on amounts of activity for each product at the stages of distribution, use, and disposal, as well as emissions unit values, etc., and this data is combined to calculate emissions.

In supply chain emissions accounting, which covers a wide range of emissions, it is important to determine emissions systematically at each stage of the supply chain for the sake of continuous emissions management and highly transparent information disclosure. Therefore, in these guidelines, the divisions of the supply chain other than the reporting company's own activities (upstream and downstream portions) are further subdivided into 15 categories (Table 4-2), and specific accounting methods are indicated for each category. The 15 categories presented here are basically the same as the categories used in the Scope 3 Standard.

In the GHG Protocol, the scope of a company's emissions is defined as Scopes 1 to 3, as follows. (See Fig. 4-1.)

Scope 1: Direct greenhouse gas emissions by the reporting company itself.

[6] These are general definitions of the concepts of "upstream" and "downstream," but for certain activities, the distinction may be made by different criteria than purchasing and sales. For example, the flow of goods is used to identify upstream and downstream activities in cases such as the purchasing of transportation services for goods and products, or the purchasing of waste processing services for wastes.

Scope 2: Indirect emissions from the use of electricity, heat, or steam supplied by others.
Scope 3: Other indirect emissions besides Scope 2 (Emissions by others related to the company's activities).

The GHG Protocol provides guidelines for businesses to use in emissions accounting, the "Corporate Accounting and Reporting Standard," as well as guidelines for Scope 3 emissions accounting, the "Corporate Value Chain (Scope 3) Accounting and Reporting Standard."

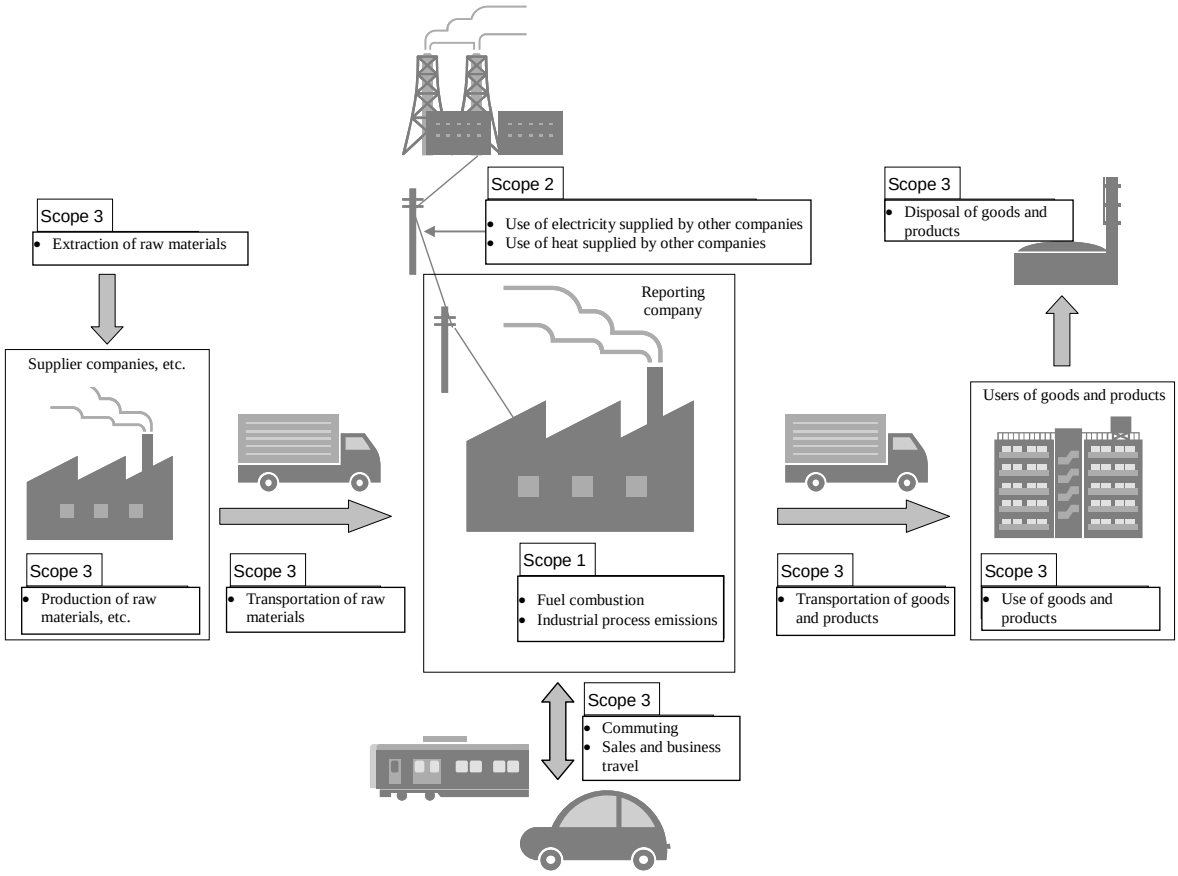


Fig. 4-1. Illustration of Scopes 1, 2, and 3 in supply chain emissions

In these guidelines, supply chain emissions include all emissions under Scopes 1, 2, and 3.

Supply chain emissions = Scope 1 emissions + Scope 2 emissions + Scope 3 emissions

Table 4-2. Emissions categories

Division		Category	Emissions subject to accounting
Reporting company			
		Direct emissions (Scope 1)	Direct emissions from the use of fuel and industrial processes by the reporting company
		Energy-derived indirect emissions (Scope 2)	Indirect emissions from the use of electricity and heat purchased by the reporting company
Other indirect emissions (Scope 3)			
Upstream	1	Purchased goods and services	Emissions from activities up to manufacturing of raw materials, parts, purchased goods, sales-related materials, etc.
	2	Capital goods	Emissions from construction and manufacturing of the reporting company's capital goods
	3	Fuel and energy related activities not included in Scope 1 or 2	Emissions from procurement of fuel used in power generation, etc., for electricity and heat procured from other entities
	4	Transportation and delivery (upstream)	Emissions from distribution of raw materials, parts, purchased goods, sales-related materials, etc., up to delivery to the reporting company
	5	Waste generated in operations	Emissions from transportation and processing of waste generated by the reporting company
	6	Business travel	Emissions from business travel by employees
	7	Employee commuting	Emissions from transportation of employees when commuting to and from the place of business
	8	Leased assets (upstream)	Emissions from operation of assets leased to the reporting company (excluding emissions calculated under Scope 1 or 2)
Downstream	9	Transportation and delivery (downstream)	Emissions from transport, storage, cargo handling, and retail sales of products
	10	Processing of sold products	Emissions from processing of intermediate products by the reporting company
	11	Use of sold products	Emissions from use of products by users (consumers and companies)
	12	End-of-life treatment of sold products	Emissions from transportation and processing of products upon disposal by users (consumers and companies)
	13	Leased assets (downstream)	Emissions from operation of assets leased to other entities
	14	Franchises	Emissions from franchises
	15	Investments	Emissions from operation of investments
		Other	Emissions from daily lives of employees and consumers, etc.

Based on the above definitions, a reporting company's other indirect emissions (Scope 3 emissions) necessarily correspond to direct emissions (Scope 1 emissions) of other parties, and it is possible that a single source of emissions may be treated as upstream or downstream emissions in the supply chains of multiple parties. Therefore, double counting does occur with Scope 3 emissions of other parties.

4.2 Relationship to the Accounting and Reporting System

In Japan, since the introduction of the Accounting and Reporting System based on the Global Warming Countermeasures Act, companies subject to this program (referred to below as "specified emitters") must calculate their emissions from emission activities

subject to accounting and report to the national government each year. The scope of emissions to be determined by specified emitters includes some indirect emissions from consigners, etc., in addition to emissions from the reporting company's own activities, so some emissions other than the reporting company's own emissions are reported under the existing Accounting and Reporting System as well.

The following is an explanation of the relationships between the scope of emissions to be determined under the Accounting and Reporting System and the categories of supply chain emissions, for each of the types of companies subject to the Accounting and Reporting System.

- Specified emitters (other than specified consigners) under the Accounting and Reporting System

  Companies having specified facilities must calculate greenhouse gas emissions which are emitted at their own places of business, as well as energy-derived carbon dioxide emissions from the use of electric power and heat supplied by others.

  In addition, specified transportation emitters other than specified consigners must calculate energy-derived carbon dioxide emissions from the transportation activities of vehicles, railways, ships, and aircraft which they themselves operate.

  All of these emissions are included as the reporting company's own emissions (Scopes 1 and 2 of supply chain emissions) as shown in Table 4-2.

- Specified consigners under the Accounting and Reporting System

  Specified consigners must calculate energy-derived carbon dioxide emissions from the transportation of freight for which they themselves are the consigner. These emissions are included in Category 4 (Transportation and delivery, upstream) or Category 9 (Transportation and delivery, downstream) under Scope 3 of supply chain emissions, as shown in Table 4-2.

For example, Fig. 4-2 indicates the relationship of the scopes covered by supply chain emissions and the Accounting and Reporting System in a case where the reporting company is a manufacturer.

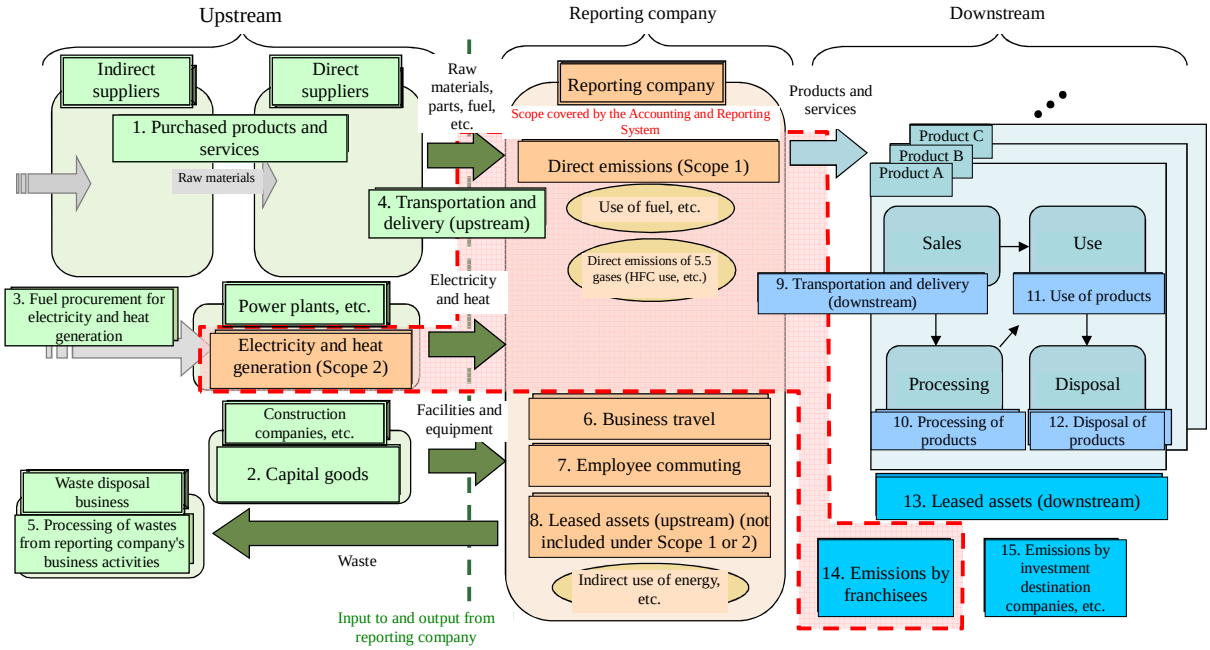


Fig. 4-2. Relationship of accounting scopes under supply chain emissions and the Accounting and Reporting System (example of a manufacturer as reporting company)

5. Basic approach to accounting

5.1 Principles of accounting

In the determination of a wide scope of supply chain emissions subject to accounting, from the standpoint of continuous emissions management and highly transparent information disclosure, it is important to systematically determine emissions at each stage of the supply chain. Therefore, in the accounting of supply chain emissions, it is expected that calculations will be performed for each category, clarifying the scope subject to accounting, the data used, and the calculation methods, etc.

Fig. 5-1 shows the general flow of accounting of supply chain emissions.

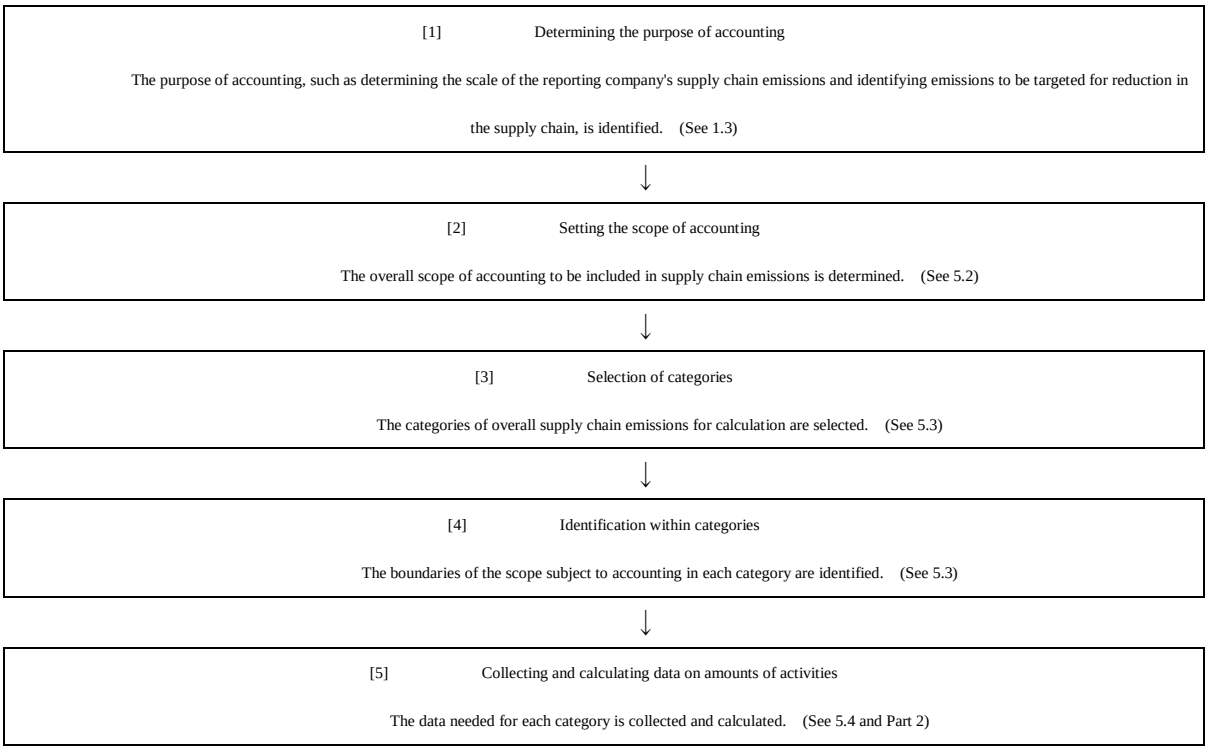


Fig. 5-1 Flow of supply chain emissions accounting

5.2 Scope subject to accounting

The scope of supply chain emissions subject to accounting under these guidelines consists of emissions related to the products and services provided by a company. When calculating the supply chain emissions of each category, the scope subject to accounting is generally as shown in Table 5-1.

As a general rule, the organizational boundaries for accounting by the reporting company include the reporting company itself (corporation, etc.) and all business activities owned or controlled by the company, such as companies subject to consolidation.

Table 5-1. Scope of supply chain emissions subject to accounting

Division	Scope subject to accounting (as a general rule)
Greenhouse gases	• Energy-derived carbon dioxide • Non-energy derived carbon dioxide • Methane (CH_4) • Nitrous oxide (N_2O) • Hydrofluorocarbons (HFC) • Perfluorocarbons (PFC) • Sulfur hexafluoride (SF_6) (Same as the greenhouse gas categories under the Accounting and Reporting System)
Organizational boundaries (Numerals to the right indicate category numbers.)	[At the reporting company:] • All of the reporting company's divisions and places of business • The company's affiliates (companies subject to consolidation) [Upstream:] 1. Companies from extraction to production of raw materials, products, etc. 2. Construction companies of the reporting company's facilities and manufacturing companies of the reporting company's equipment 3. Companies corresponding to categories 1, 4, and 5 of the supply chain among electric power and heat supply companies that supply electricity and heat to the reporting company 4. Companies that transport raw materials, products, etc. 5. Companies that transport and process wastes of the reporting company 6. Transportation companies used for business travel 7. Transportation companies used for commuting [Downstream:] 9. Companies that transport manufactured and sold products 10. Companies that process sold products 11. Users of sold products 12. Companies that perform transport and processing of sold products upon disposal 13. Users of leased assets 14. Franchisees 15. Investment destination companies
Geographic scope	• Domestic and foreign
Types of activities	• All activities related to greenhouse gas emissions in the supply chain (all activities corresponding to the activities of each category shown in Table 4-2 of Part 1)
Time period	• Supply chain emissions from business activities during a one-year period

Note: When accounting for emissions of greenhouse gases other than carbon dioxide, amounts are multiplied by a global warming coefficient for conversion into amounts of carbon dioxide emissions.

Regarding the scope of time, although emissions from the reporting company's activities are those emissions which actually occurred during the time period subject to calculations, accounting determines the emissions from the reporting company's activities including purchasing and sales; so the times of upstream and downstream emissions of the supply chain may be in a different fiscal year than the times of greenhouse gas emissions from the company's own activities. For example, it is conceivable that raw materials may have been produced earlier than the fiscal year preceding the accounting year; and in such a case, emissions which occurred prior to

the accounting year are included in calculations. Also, future emissions are estimated with regard to the use and disposal of products.

Table 5-2 shows the relationships of times when emissions from activities subject to accounting actually occurred when calculating supply chain emissions for a certain fiscal year (year X) in each category.

Table 5-2. Fiscal years when emissions from activities subject to accounting actually occurred

Division	Proposed accounting category		Fiscal year of actual emissions from activities			Emissions subject to accounting as supply chain emissions in fiscal year X
			Year X-1 or earlier	Year X	Year X+1 or later	
Upstream	1	Purchased goods and services	○		—	Emissions from production of raw materials and services procured in year X
	2	Capital goods	○		—	Emissions from construction and manufacturing of facilities and equipment manufactured or installed in year X
	3	Fuel and energy related activities not included in Scope 1 or 2	○		—	Emissions from fuel procurement for generation of electricity and heat used by reporting company in year X
	4	Transportation and delivery (upstream)	○		—	
	5	Waste generated in operations	—	○		Emissions from waste disposal commissioned by reporting company in year X
	6	Business travel	—	○	—	Emissions from activities in year X
	7	Employee commuting	—	○	—	
	8	Leased assets (upstream)	—	○	—	
Downstream	9	Transportation and delivery (downstream)	—	○		Emissions from distribution of products and services manufactured or sold in year X
	10	Processing of sold products	—	○		Emissions from processing of products and services manufactured or sold in year X
	11	Use of sold products	—	○		Emissions from use of products and services manufactured or sold in year X
	12	End-of-life treatment of sold products	—	○		Emissions from disposal of products and services manufactured or sold in year X
	13	Leased assets (downstream)	—	○	—	Emissions from activities in year X
	14	Franchises	—	○	—	Emissions from activities in year X
	15	Investments	—	○		Emissions from activities in year X

5.3 Approach to categorization

Supply chain emissions are calculated for each of the categories shown in Table 4-2. It is desirable to calculate emissions for all categories, but it is also conceivable that certain categories could be selected for accounting, based on the purpose of accounting, the degree of influence on overall emissions, and the burden of accounting including data collection. Specifically, the following are possible criteria for excluding certain categories from the scope of accounting.

- If there were no activities corresponding to that category
- If the level of emissions is low, with only a small effect on overall supply chain emissions
- If it is not feasible for the company to influence emissions or measures to reduce emissions
- If it is not feasible to collect the necessary data to calculate emissions
- If the category is unnecessary in terms of the purpose of emissions accounting established by the reporting company

It is also possible to limit the scope subject to accounting within a category, based on the purpose of accounting, the degree of influence on overall emissions, and the burden of accounting including data collection. Specifically, the following are possible criteria for excluding certain portions from the scope of accounting.

- If there were no activities corresponding to that portion
- If the level of emissions is low, with only a small effect on overall supply chain emissions
- If there is no significant effect on overall supply chain emissions (or, in cases of evaluation and disclosure of emissions by category, there is no significant effect on emissions within the category), and:
  - it is not feasible for the company to influence emissions or measures to reduce emissions; or
  - it is not feasible to collect the necessary data to calculate emissions
- If that portion is unnecessary in terms of the purpose of emissions accounting established by the reporting company

If a reporting company limits the scope subject to accounting, then it must disclose the scope of accounting and the reasons along with the amounts of calculated emissions in its information disclosure, in order to clearly indicate the scope covered by accounting (or the scope that was excluded from accounting) and the reasons.

5.4 Overview of accounting methodology

There are two methods for determining a company's supply chain emissions, as follows:

[1] Obtaining emissions information from related trading partners

[2] Performing calculations with formulas (Emissions = Amount of activity x Emissions unit value)

From the standpoint of accurately determining the actual status of emissions and managing emissions in cooperation with suppliers, it would be desirable to obtain emissions information from trading partners. However, this is not practicable in some cases. Therefore, considering factors such as the availability of data, these guidelines are generally written in terms of method [2] above, using a formula that multiplies the amount of activity by an emissions unit value.

Concerning the amounts of activity and emissions unit values in calculations by method [2], the level of accuracy and scope of accounting (rate of coverage) varies according to the types of data used (the types of data which are available). For example, more accurate determinations are possible in a case where the amount of use of each type of energy can be determined as a measure of activity, compared to a case where it is only possible to determine the physical amounts or the purchase/sale prices. In the latter case as well, the level of accuracy will vary between calculations based on physical amounts and added-up life cycle assessment (LCA) emissions unit values, and calculations based on a monetary amounts and emissions unit values from the correspondence table by industry. In cases where it is difficult to determine the amount of activity, the rate of coverage can be improved by using secondary data such as statistical values and industry averages, although this method is thought to be less accurate. In addition, estimates based on specifications and catalog values are expected to differ from calculations based on actual product usage.

Of course, it would be desirable to collect highly accurate data while also ensuring a high rate of coverage. However, in practice, there are cases where higher levels of accuracy means lower rates of coverage, or higher rates of coverage mean lower levels of accuracy.

In cases where there are tradeoffs between accuracy and coverage, the question of which to pursue depends on the purpose of accounting by the company. However, when calculations are performed for the purpose of identifying categories with higher emissions in the overall supply chain and categories where there is greater potential to reduce emissions, it is important to increase the rate of coverage when determining emissions in the overall supply chain. Therefore, to maximize the rate of coverage, these guidelines indicate calculation methods based on the kinds of activity measure data that are readily obtainable by companies. (For emissions unit values, please refer to the Report on Emissions Unit Values.)

Meanwhile, when companies are performing accounting for the purpose of accurately determining changes in their emissions over time due to individual measures implemented in the supply chain, it is desirable to use emissions unit values and

calculation methods that are more closely matched to the company's actual activities, instead of standard emissions unit values based on the correspondence table by industry that are fixed values regardless of measures taken. This also promotes visualization of a company's efforts to reduce emissions in its supply chain.

Therefore, while this is partially dependent on the purpose of accounting, it is necessary to proceed by stages, as follows.

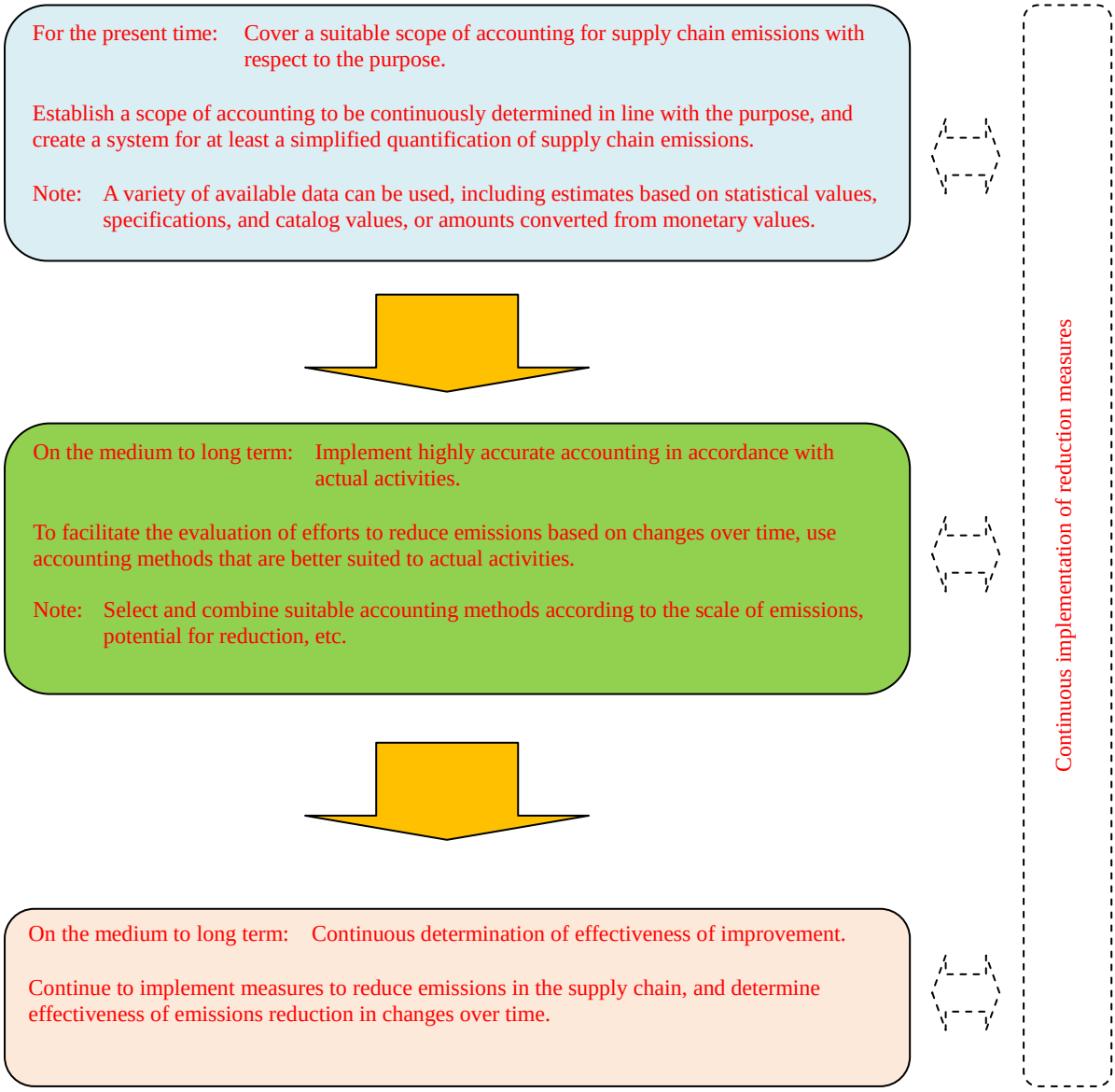


Fig. 5-2. Stages in supply chain emissions accounting

6. Using the results of accounting

6.1 Using supply chain emissions data

Data from supply chain emissions accounting could be used in a variety of ways depending on the purpose of accounting. Many issues remain with regard to comparison among businesses, so at the present stage, the anticipated uses are as follows.

- Determining the scale of the reporting company's supply chain emissions and identifying reduction targets in the supply chain
- Quantifying reductions by determining changes in the reporting company's supply chain emissions over time, in order to confirm the progress of the reporting company's measures to reduce emissions
- Disclosing the reporting company's supply chain emissions to build understanding among investors, consumers, community residents, and other stakeholders.

It is important to proceed by stages, according to the purpose and the way in which the results will be used. For example, a company could proceed according to the stages indicated above.

It is anticipated that the results of accounting will not be limited to the results of supply chain emissions calculations, but will also include various insights through the accounting process which will become useful in measures for reduction.

6.2 Evaluation in terms of unit values

In general, changes in the scale of business lead to changes in supply chain emissions. In addition to supply chain emissions, it may also be possible to use unit values denominated by sales volume or production volume, etc., to evaluate progress in efforts to control emissions in a way that is commensurate with a company's growth.

6.3 Approach to quantification of reductions

Continuously determining supply chain emissions and examining changes over time will make it possible to understand increases or decreases in supply chain emissions and determine the progress of measures to reduce emissions. For example, it will be possible to evaluate the following kinds of measures.

- Providing energy-efficient products to reduce emissions during use
- Collaborating with suppliers to reduce upstream emissions from procured items
- Improving transport efficiency to reduce emissions from transportation and delivery

Still, it is necessary to recognize that increases or decreases in emissions may be affected by other possible factors besides measures taken to reduce emissions, such as the following.

- Changes in amounts of business activity such as increases or decreases in production volume

- Changes in business structure including areas of business

- Changes in society such as ways that products are used

Therefore, it is desirable to identify the scope affected by reduction measures and use methods that allow effects of measures to reduce emissions to be determined as directly as possible, such as the use of unit values.

In addition to this kind of record-keeping approach to evaluation, another approach would be to develop a hypothetical description of what would have occurred in the absence of such measures to reduce emissions and then to compare that description to actual emissions. With this approach, it would be possible either to evaluate reductions within the scope of a company's own supply chain emissions, or to evaluate reductions beyond that scope (society in general) as well. These guidelines do not provide evaluation methods based on such approaches.

Part 2. Explanations of Accounting Methodology

1. Reporting company's emissions

1.1. Direct emissions: Scope 1

1.1.1. Scope of accounting

Scope 1 covers emissions from domestic and foreign business activities owned or controlled by the reporting company, and accounts for direct emissions including emissions from the use of fuel and industrial processes. Scope 1, combined with Scope 2 which is described in section 1.2, has similar coverage to the Accounting and Reporting System under the Global Warming Countermeasures Act in cases of reporting by a company alone. (In supply chain emissions accounting under these guidelines, the scope of accounting also includes companies subject to consolidation under the reporting company.)

However, there are also some emissions activities that go beyond the scope of accounting under the Accounting and Reporting System. These can be optionally included in supply chain emissions accounting. One example is HFC leakage during everyday use of air conditioners and showcases. (Under the current Accounting and Reporting System, this is subject to accounting at the time of starting use, times of maintenance (recovery and re-encapsulation), and the time of disposal, but leakage during everyday use is not covered.)

The Accounting and Reporting System also excludes emissions from the use of construction machinery at construction sites, as well as emissions from the use of company-owned passenger cars at companies other than transportation companies. However, the scope of supply chain emissions accounting includes all emission activities related to the reporting company's activities, so those emissions are also covered in Scope 1.

Category divisions for emissions from freight transport vary according to the purpose of transportation, and can be summarized as follows.

(Companies other than transportation companies:)

- Transporting raw materials to the reporting company → Scope 3, Category 4, Transportation and delivery (upstream)
- Transporting wastes from the reporting company → Scope 3, Category 5, Waste generated in operations
- Company-owned cars → Scope 1 (covers all driving, including empty return haulage)
- Transporting products of the reporting company → Scope 3, Category 4, Transportation and delivery (upstream) or Category 9, Transportation and delivery (downstream)

(Transportation companies:)

- Transporting raw materials to the reporting company → Scope 3, Category 4, Transportation and delivery (upstream)

- Transportation to subcontracted transportation companies for subcontracted services → Scope 3, Category 4, Transportation and delivery (upstream)

- Transporting wastes from the reporting company → Scope 3, Category 5, Waste generated in operations

- Company-owned cars → Scope 1 (covers all driving, including empty return haulage)

Accounting for Scope 1 needs to cover not only the reporting company, but also all business activities owned or controlled by the reporting company including companies subject to consolidation, construction sites, etc. The organizational boundaries determining the scope of consolidated companies are identified by the investment ratio standard or the controlling interest standard, as described below.

Investment ratio standard: Emissions from the business in question are calculated in accordance with the ratio of investment in that business (equity share).

Controlling interest standard: 100% of emissions from controlled businesses are calculated. Even if there is a high investment ratio, emissions are not calculated unless there is a controlling interest.*

* "Controlling interest" can be defined either from the standpoint of financial control (having the power to decide the financial and management policies of the company in question) or from the standpoint of management control (having full authority to introduce and implement its own management policy on the company in question).

Table 1-1 shows a comparison of the scope of accounting of the reporting company's emissions under these guidelines (Scope 1 and Scope 2) and the Accounting and Reporting System. Table 1-2 shows the activities subject to accounting under the Accounting and Reporting System.

Table 1-1. Comparison of the scope of accounting of reporting company emissions under these guidelines and the Accounting and Reporting System

	Reporting company's emissions under these guidelines (≈GHG Protocol)		Accounting and Reporting System			
				Scope of accounting		
	Geographic scope	Scope of accounting[1]	Geographic scope	Specified facility emitters[2]	Specified transportation emitters (excluding specified consigners)[3]	Specified consigners[4]
Direct emissions from reporting company's use of fuel	Domestic and foreign	○	Domestic	○		
Direct emissions from use of company-owned means of transportation		○			○	
Indirect emissions from use of supplied electricity and heat (Scope 2)		○		○		
Direct emissions of 5.5 gases by the reporting company		○		○		
Activities not covered by the current Accounting and Reporting System		○ (Optional)[5]				

1 Scope of organizational boundaries defined by the investment ratio standard or the controlling interest standard (reporting company's places of business, vehicles, companies subject to consolidation, construction sites, etc.)
2 Reporting company's places of business
3 Means of transportation owned by the reporting company
4 Transportation of freight owned by the reporting company (corresponds to Scope 3, Category 4 or Category 9).
5 Under the GHG Protocol, this is mandatory as a general rule. (Exclusions may be established individually.)

Table 1-2. Activities covered by the Accounting and Reporting System

Energy-derived carbon dioxide
Use of fuel
Use of electric power supplied by others
Use of heat supplied by others

Non-energy-derived carbon dioxide
Prospecting for and production of crude oil or natural gas
Cement manufacturing
Quicklime manufacturing
Manufacturing of soda lime glass or steel
Soda ash manufacturing
Use of soda ash
Ammonia manufacturing
Silicon carbide manufacturing
Calcium carbide manufacturing
Ethylene manufacturing
Use of acetylene derived from calcium carbide
Manufacturing of crude steel using electric furnaces
Use of dry ice
Use of aerosol sprays
Waste incineration or use of waste in product manufacturing or as fuel

Methane (CH_4)
Use of fuel in facilities and equipment for fuel combustion
Use of electric power in electric furnaces
Coal mining
Prospecting for and production of crude oil or natural gas
Crude oil refining
Manufacturing of city gas
Manufacturing of chemical products such as carbon black
Livestock feeding
Management of livestock excreta
Rice cultivation
Agricultural waste incineration
Land-filling of waste
Factory wastewater processing
Processing of sewage, excreta, etc.
Waste incineration or use of waste in product manufacturing or as fuel

Nitrous oxide (N_2O)
Use of fuel in facilities and equipment for fuel combustion
Prospecting for and production of crude oil or natural gas
Manufacturing of chemical products such as adipic acid
Use of anesthetics
Management of livestock excreta
Use of fertilizer on farmland
Use of crop waste as fertilizer on farmland
Agricultural waste incineration
Factory wastewater processing
Processing of sewage, excreta, etc.
Waste incineration or use of waste in product manufacturing or as fuel

Hydrofluorocarbons (HFC)
Manufacturing of chlorofluoromethane (HCFC-22)
Manufacturing of hydrofluorocarbons (HFC)
HFC encapsulation in manufacturing of HFC encapsulation products such as household electric refrigerators
HFC encapsulation in beginning use of commercial freezer, refrigeration, and air conditioning equipment
HFC recovery and encapsulation in maintenance work on commercial freezer, refrigeration, and air conditioning equipment
HFC recovery in disposal of HFC encapsulation products such as household electric refrigerators
Use of HFC as blowing agent in plastic production
HFC encapsulation in manufacturing of aerosol sprays and fire extinguishing agents
Use of aerosol sprays
Use in of HFCs in dry etching and other processing for semiconductor devices, etc.
Use of HFCs as solvents, etc.

Perfluorocarbons (PFC)
Manufacturing of aluminum
Manufacturing of PFCs
Use of PFCs in dry etching and other processing for semiconductor devices, etc.
Use of PFCs as solvents, etc.

Sulfur hexafluoride (SF_6)
Casting of magnesium alloys
Manufacturing of SF_6
SF_6 encapsulation in manufacturing and beginning use of electrical equipment such as transformers
Use of electrical equipment such as transformers
SF_6 recovery in inspection of electrical equipment such as transformers
SF_6 recovery in disposal of electrical equipment such as transformers
Use of SF_6 in dry etching and other processing for semiconductor devices, etc.

Based on the approach taken in the Accounting and Reporting System, the scope of accounting for emissions of owners and tenants of buildings, etc. is set as follows.

Table 1-3. Scope of accounting for owners and tenants in Scope 1

Accounting by	Owner	Tenants
Common portions	○	×
Exclusive portions	△ (only equipment under its management authority)	○

Double counting by the reporting company is eliminated.*

* Double counting refers to cases where both the reporting company and others included within its organizational boundaries (such as companies subject to consolidation) account for emission sources that they share.

1.1.2. Accounting methodology

(1) Accounting methods

Accounting is performed by calculation methods equivalent to those of the Accounting and Reporting System, as indicated below.

When accounting for emissions activities that are not covered by that system, the reporting company should use actual measurements or perform calculations using the methods used in the national inventory of Japan or domestically and internationally approved emissions accounting methods such as the IPCC guidelines.

At present, the calculation methods under consideration for emissions due to leakage of coolant during use of refrigeration and air-conditioning equipment are as follows.

- Calculating the amount of leakage during everyday use based on the amount added during maintenance and the amount recovered:

  CO_2 emissions = Σ {(Amount of coolant added to equipment operated during the emissions accounting period – Amount recovered and appropriately processed) x Global warming coefficient } ・・・（I-1）

- Calculating the amount of leakage during everyday use based on leakage rate:

  CO_2 emissions = Σ [{(Amount of coolant contained in equipment operated during the emissions accounting period x Emissions unit value during use*) – Amount recovered and appropriately processed } x Global warming coefficient] ・・・（I-2）

In accounting for emissions at overseas places of businesses, if calculation methods are specified by systems of the countries where such places of business are located, then those methods are used. If that is not feasible, calculations are performed using methods based on the IPCC guidelines.

For emissions unit values, please refer to the Report on Emissions Unit Values.

See the greenhouse gas emissions accounting and reporting manual of the Accounting and Reporting System.
http://www.env.go.jp/earth/ghg-santeikohyo/manual/index.html

(2) Amount of activity

The amounts of activity used in calculations under the Accounting and Reporting System may be used.

See the greenhouse gas emissions accounting and reporting manual of the Accounting and Reporting System.
http://www.env.go.jp/earth/ghg-santeikohyo/manual/index.html

1.2. Energy-derived indirect emissions: Scope 2

1.2.1. Scope of accounting

Scope 2 covers emissions from the use of heat and electric power purchased by the reporting company in Japan and overseas. Along with Scope 1 as described in section 1.1, it has similar coverage to the Accounting and Reporting System under the Global Warming Countermeasures Act in cases of reporting by a company alone. However, it also includes emissions from the use of facilities and construction machinery at construction sites using electricity, as well as emissions, etc., from the use of company-owned passenger cars using electricity at companies other than transportation companies.

In addition, the emission coefficient for electricity under the Accounting and Reporting System includes power transmission losses and in-house power consumption at power plants (net demand emission coefficient), so the scope of accounting covers all of these emissions from fuel combustion at power plants (emissions from in-house power consumption at power plants, power transmission losses, and final consumption by utility customers).

Note: Comparison to the GHG Protocol

Under the GHG Protocol, power transmission losses and in-house power consumption at power plants are accounted for under Category 3 of Scope 3 (fuel and energy related activities not included under Scope 1 and 2). Meanwhile, under these guidelines, those emissions are accounted for under Scope 2, and Category 3 does not cover emissions from power transmission losses and in-house power consumption at power plants.

Therefore, Scope 2 of the GHG Protocol and Scope 2 of these guidelines do not cover strictly the same scope of emissions related to the use of electricity. However, the same coverage is obtained by combining Scope 2 with Scope 3, Category 3.

There is also a difference in the gases subject to accounting, since Scope 2 of these guidelines covers carbon dioxide only, while Scope 2 of the GHG Protocol is not limited to carbon dioxide. However, this difference in covered gases is thought to have practically no effect, because according to the National Greenhouse Gas Inventory Report of Japan, carbon dioxide accounts for over 99% of greenhouse gas emissions in the energy conversion sector.

Based on the approach taken in the Accounting and Reporting System, the scope of accounting for emissions of owners and tenants of buildings, etc., is set as follows.

Table 1-4. Scope of accounting for owners and tenants in Scope 2

Accounting by	Owner	Tenants
Common portions	○	×
Exclusive portions	△ (only equipment under its management authority)	○

Double counting* by the reporting company is eliminated.

* Double counting refers to cases where both the reporting company and others included within its organizational boundaries (such as companies subject to consolidation) account for emission sources that they share.

1.2.2. Accounting methodology

(1) Accounting methods

Accounting is performed by calculation methods equivalent to those of the Accounting and Reporting System, as indicated below.

For details on emissions unit values, please refer to the Approach to Emissions Unit Values.

See the greenhouse gas emissions accounting and reporting manual of the Accounting and Reporting System.
http://www.env.go.jp/earth/ghg-santeikohyo/manual/index.html

(2) Amount of activity

The amounts of activity used in calculations under the Accounting and Reporting System may be used.

See the greenhouse gas emissions accounting and reporting manual of the Accounting and Reporting System.
http://www.env.go.jp/earth/ghg-santeikohyo/manual/index.html

2. Other indirect emissions: Scope 3

2.1. Category 1: Purchased goods and services

2.1.1. Scope of accounting

As shown in Fig. 2-1, the scope of accounting for Category 1 consists of emissions from the stage of resource extraction to the stage of manufacturing for all goods (raw materials, parts, purchased items, sales-related materials, etc.) and services purchased or acquired by the reporting company. Goods and services indicate all raw materials, parts, products, and services, etc., brought into the reporting company, including the types indicated below; however, goods and so on that are not directly purchased by the reporting company and are beyond its control may be excluded from accounting. Transportation from the stage of resource extraction to the primary supplier is also included in Category 1. (However, transportation from the primary supplier to the reporting company falls under Category 4.)

- Raw materials, intermediate products, and final products purchased or acquired by the reporting company (including purchased items)

- Software and other services purchased or acquired by the reporting company

Notes:
- Emissions from the extraction and manufacturing, etc., of purchased fuel and energy are calculated under Category 3.
- Category 1 does not include emissions included under Categories 2-8 as described below.
- Category 1 includes not only direct procurement (such as goods directly related to manufacturing of the company's products) but also indirect procurement (goods and services that are not directly related to product manufacturing).

From the standpoint of accurately determining emissions and managing emissions in cooperation with suppliers, it would be desirable to obtain emissions data from all suppliers involved from the resource extraction stage to the manufacturing stage of all goods and services purchased or acquired by the reporting company; but in practice, this is not feasible in many cases because of the time burden or in light of relationships with suppliers. Therefore, in cases where it is not feasible to obtain emissions data from suppliers, data is determined on the physical amounts and monetary values of goods and services purchased or acquired by the reporting company, and accounting is performed over a scope that includes the stage of resource extraction by using emissions unit values that go back to the stage of resource extraction for calculations with such data.

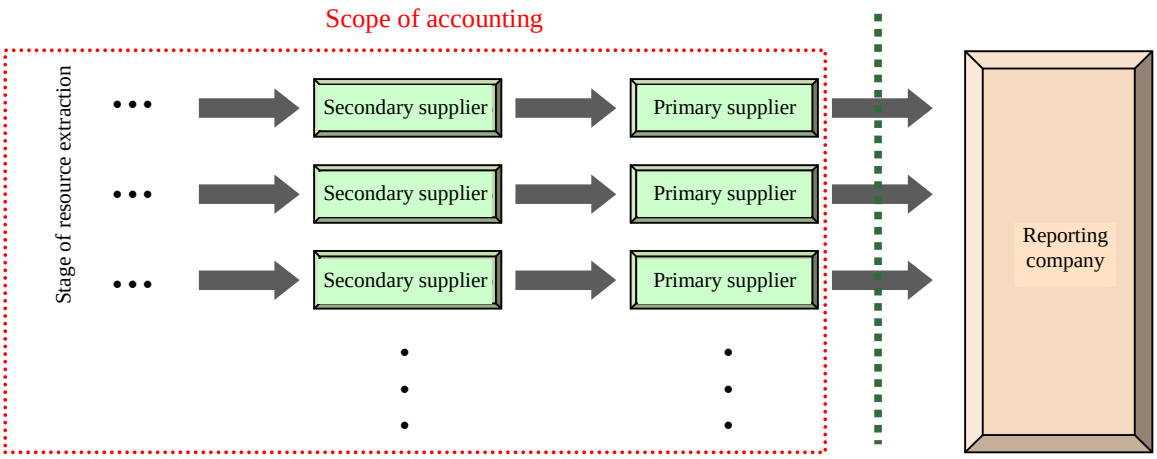


Fig. 2-1. Scope of accounting in Category 1

2.1.2. Accounting methodology

(1) Accounting methods

There are two methods of accounting, as follows: [1] Determining emissions for goods and services purchased or acquired by the reporting company from the stage of resource extraction to the stage of manufacturing for each supplier and combining these amounts; and [2] Determining data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company and multiplying those figures by emissions unit values from the stage of resource extraction to the stage of manufacturing for the respective goods and services.

These methods are described below.

[Accounting method 1]

Determining emissions for goods and services purchased or acquired by the reporting company from the stage of resource extraction to the stage of manufacturing for each supplier and combining these amounts

CO_2 emissions = Σ {Emissions* by supplier} ・・・(1-1)

* From the stage of resource extraction to the stage of manufacturing for purchased or acquired goods and services

[Accounting method 2]

Determining data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company and multiplying those figures by emissions unit values from the stage of resource extraction to the stage of manufacturing for the respective goods and services

CO_2 emissions = Σ {(Data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company) x (Emissions unit value*)} ・・・(1-2)

* Going back to the stage of resource extraction for purchased or acquired goods and services

In accounting method 1, emissions are determined for each supplier and then added up, providing high accuracy of accounting. However, this makes it necessary to obtain emissions data from suppliers, causing difficulties in cases where suppliers are unable to determine emissions data and cases where such data cannot be obtained from suppliers.

Because accounting method 2 uses data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company, there is no need to obtain further data from suppliers, so accounting is relatively easy. Since data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company is multiplied by emissions unit values from the stage of resource extraction to the stage of manufacturing in accounting method 2, the accuracy of accounting depends on the appropriateness of the categories of data on physical amounts and monetary values determined by the company, as well as the emissions unit values used.

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

In accounting method 1, the actual emissions data is collected.

In accounting method 2, amounts of activity are measured using data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company during the accounting period. For the sake of accuracy,[7] it is desirable to use data on physical amounts. However, monetary values may be used instead if it is impossible to obtain data on physical amounts.

2.1.3. Other points for consideration

In cases where the reporting company has procured recycled raw materials, it would be practically impossible for the scope of accounting to include the entire flow of activities prior to recycling. Accounting must be limited to a certain scope. There are various approaches to this kind of limitation, and it is not feasible to prescribe one specific method; but for example, if the recycling processes for such raw materials are included within the scope of accounting in this category, the recycling process is then recorded under Category 1 by the receiving side, and under Category 5 or Category 12 by the emitting side.[8] (See details under Categories 5 and 12.)

Franchisees may optionally include Scope 1 and 2 emissions of the franchisor under Category 1 (purchased goods and services).

[7] In the area of materials in particular, a company often receives many different types of raw materials, and prices of raw materials may vary widely on the global market. Therefore, the use of physical amounts of materials as the basis for determining amounts of activity is basically considered to be more appropriate.

[8] There exist a variety of approaches concerning the handling of recycled materials, including the approach of having the emitting side account for activities up to the stage of preparation for recycling while the receiving side accounts for the recycling stage, or the approach of having either one side or the other account for the recycling process. In yet another approach, the scope is not divided, and, the company that processed and manufactured virgin materials accounts for emissions up to the final disposal stage including processes after recycling. Therefore, continued study is needed concerning the handling of recycled materials.

2.2. Category 2: Capital goods

2.2.1. Scope of accounting

The scope of accounting under Category 2 consists of emissions from the construction, manufacturing, and transport of capital goods purchased or acquired during the accounting period. Emissions from the use of capital goods are accounted for under either Scope 1 or Scope 2.

Capital goods are final products having a long usable lifetime, used by a company for the manufacturing of products, provision of services, or sale, storage, and transportation of goods. They are treated as fixed assets in financial accounting. Examples include equipment, machinery, buildings, facilities, and vehicles. Procurement of other goods and services besides capital goods is included in Category 1.

This category includes emissions from raw material manufacturing and transport at all of the reporting company's facilities (factories, offices, stores, etc.), equipment, buildings, etc., as well as emissions during construction (including wastes). In cases of renovation of existing facilities leased from other entities as a tenant, accounting covers only the renovation portion (interior decoration, machinery, etc.).

2.2.2. Accounting methodology

(1) Accounting methods

There are three methods of accounting, as follows: [1] Determining emissions from raw material procurement to manufacturing for each capital good purchased or acquired by the reporting company, and combining these amounts; [2] Obtaining data from capital good suppliers on Scope 1 and 2 emissions related to capital goods, weight and transport distance of raw materials, and weight of waste, etc., and combining these for each item; and [3] Determining the weight, sale units, or amount of expenditures for purchased capital goods and estimating emissions on that basis.

These methods are described below.

[Accounting method 1]

Determining emissions from raw material procurement to manufacturing for each capital good purchased or acquired by the reporting company, and combining these amounts

CO_2 emissions = Σ {(Amount purchased x Supplier's unique emissions unit value by capital good*)} ・・・(2-1)

* These are the unit values in cases where highly reliable GHG inventories, product carbon footprints, or internal LCA reports have been prepared; they cover emissions from the stage of resource extraction to the stage of manufacturing.

[Accounting method 2]

Obtaining data from capital good suppliers on Scope 1 and 2 emissions related to capital goods, weight and transport distance of raw materials, and weight of waste, etc., and combining these for each item

CO_2 emissions = Σ (Suppliers' Scope 1 and 2 emissions related to capital goods*) ・・・(2-2)
+ Σ {(Amount or value of raw materials brought in) x (Emissions unit value)}
+ Σ {(Raw material transport amount) x (Emissions unit value)}
+ Σ {(Weight of wastes related to capital goods) x (Emissions unit value)}
* This includes energy consumption such as electricity and fuel during construction, etc.

[Accounting method 3]

Determining the weight, sale units, or amount of expenditures for purchased capital goods and estimating emissions on that basis

CO_2 emissions = Σ {(Weight of capital goods) x (Emissions unit value)} ・・・(2-3)
or Σ {(Sale units of capital goods) x (Emissions unit value)}
or Σ {(Price of capital goods (construction expenses)) x (Emissions unit value)}
* Each of the company's capital goods may be accounted for using any of the above formulas.

In accounting method 1, if the supplier has prepared a highly reliable GHG inventory, product carbon footprint, or internal LCA report for each capital good, accounting may be based on an emissions unit value from the supplier for each capital good. However, this method is not feasible if the supplier has not determined emissions unit values.

In accounting method 2, if the supplier has not determined emissions for each capital good, then accounting is performed by determining Scope 1 and Scope 2 emissions related to the capital good from the supplier, determining the raw materials brought into the capital good, raw material transport distances, wastes, etc., and using emissions unit values in calculations. For transportation, the accounting methods for specified consigners are used (see Category 4).

In accounting method 3, the capital good's weight, sale units, or price (construction expenses) is determined for use in calculations with the corresponding emissions unit values.

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

The amount of activity in accounting method 1 is an amount or quantity of purchased capital goods, namely the number of units of capital goods corresponding to emissions unit values determined by the supplier.

The amount of activity in accounting method 2 is the supplier's Scope 1 and Scope 2 emissions and other emissions including amounts of raw materials, transport distances, and amounts of waste.

The amount of activity in accounting method 3 is the capital good's weight, sale units, or price (construction expenses).

2.2.3. Other points for consideration

Concerning the time scope subject to accounting (period and timing for recording of emissions), actual emissions from construction and manufacturing are calculated for capital goods built or manufactured within the accounting period. In cases where construction or manufacturing occurred over multiple years, emissions are recorded in the final year when construction or manufacturing was completed. If large assets are purchased only once every several years, this results in fluctuations in emissions from year to year. A business should provide suitable information about this in their reports (indicating that such emissions are an exception or that it did not invest in the asset, etc.).

Further study is needed concerning the handling of emissions in cases where a company has acquired a used asset (such as an existing building).

Possible accounting methods:

1. The party acquiring the used asset is considered to have zero emissions.
2. The party acquiring the used asset is considered to have the same emissions as if it were a new asset (double counting).
3. At the time of sale, the party which acquired the asset when it was new calculates negative emissions in the year of sale by deducting an amount proportional to the period of use, and the party which acquired the used asset records that same amount in the year of acquisition (the same year as the year of sale by the party which acquired the asset when it was new).
4. At the time of sale, the party which acquired the asset when it was new corrects its emissions for the year of new acquisition by deducting an amount proportional to the period of use, and the party which acquired the used asset records that same amount in the year of acquisition.

2.3. Category 3: Fuel and energy related activities not included in Scope 1 or 2

2.3.1. Scope of accounting

The scope of accounting under Category 3 consists of upstream side emissions (resource extraction, production, and transportation) from fuel purchased by the reporting company and upstream side emissions (resource extraction, production, and transportation) from the manufacturing process of electricity and heat (steam, hot water, and cold water) purchased by the reporting company in the fiscal year subject to accounting.

Emissions from the use of electricity and heat purchased or manufactured by the reporting company correspond to Scope 2 or Scope 1 emissions, and are not included under Category 3.

Table 2-1. Scope of accounting for use of electricity

		Emissions	Scope of accounting		Ref.: GHG Protocol	
			Electric power companies	Utility customers	Electric power companies	Utility customers
Electric power production	Resource extraction, production, and transportation of fuel used to generate electricity	5 tCO_2	Scope 3, Category 3	Scope 3, Category 3	Scope 3, Category 3	Scope 3, Category 3
	Use of fuel to generate electricity	100 tCO_2	Scope 1 (before allocation under the Accounting and Reporting System)	—	Scope 1	—
Electric power consumption	Consumption within the power plant	5 tCO_2	(after allocation under the Accounting and Reporting System)	Scope 2 (Accounting and Reporting System)	—	Scope 3, Category 3
	Power transmission loss	5 tCO_2	—	Scope 2 (Accounting and Reporting System)	—	Scope 3, Category 3
	Final consumption by	90 t CO_2 *	—	Scope 2 (Accounting and Reporting System)	—	Scope 2

* Notes:

1. The numerals shown here are for illustration purposes only, and do not represent actual figures.
2. This table shows the Scope and Category under these guidelines. In addition, reporting under the Accounting and Reporting System is shown in parentheses.
3. Under the Accounting and Reporting System, while electric power plants are required to report in-house consumption, utility customers are required to use a net demand emissions coefficient, resulting in double counting.

2.3.2. Accounting methodology

(1) Accounting methods

In the case of fuel purchased by the reporting company, data on physical amounts and monetary values of fuel purchased by the reporting company are multiplied by emissions unit values from the stage of resource extraction to the transportation stage. Specifically, accounting is performed as follows.

CO_2 emissions = Σ {(Data on physical amounts and monetary values for fuel purchased by the reporting company) x (Emissions unit value*)} * From the stage of resource extraction to the transportation stage for purchased fuel	・・・(3-1)

For electricity, the emissions unit value used in accounting depends on the type of contract.

In cases where electricity is procured from a power company under an ordinary contract, if the contract does not specify the type of power source, calculations are based on the average emissions unit value for resource extraction, production, and transportation of fuel for all power sources.

CO_2 emissions = Σ {(Reporting company's received power input data) x (Average emissions unit value for all power sources)}	・・・(3-2)

In cases where electricity is procured under a contract that specifies the type of power source, the emissions unit values for resource extraction, production, and transportation of fuel are based on the type of power source. The specific formula is as follows.

CO_2 emissions = Σ {(Reporting company's received power input data by type of power source) x (Emissions unit value by type of power source)}	・・・(3-3)

Heat is calculated according to two types, industrial steam and hot/cold water, regardless of the contract suppliers.

CO_2 emissions = Σ {(Reporting company's received heat input data) x (Emissions unit value)}	・・・(3-4)

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

The amount of activity consists of the amount of fuel purchased by the reporting company during the accounting period and the amount of electricity and heat purchased from other parties and brought into the reporting company during the accounting period. For electricity, the amount of activity may be the same as the amount of activity under Scope 2; and the types of power sources are also identified in cases where it is possible to determine usage by power source.

2.4. Category 4: Transportation and delivery (upstream)

2.4.1. Scope of accounting

The scope of accounting under Category 4 consists of [1] Emissions from distribution (transport, cargo handling, and storage) of goods and services purchased in the fiscal year subject to accounting (emissions from distribution on the upstream side of the reporting company) and [2] Other emissions from distribution services (transport, cargo handling, and storage) purchased in the fiscal year subject to accounting (distribution between the reporting company's facilities and distribution on the downstream side of the reporting company). This does not include distribution performed by the reporting company itself or emissions at the reporting company's facilities (determined under Scope 1 and Scope 2). Cargo handling and storage at pass-through distribution bases (transfer centers) such as distribution centers and cargo handling sites where cargo is only handled briefly, as well as distribution centers that include distribution processing, may be excluded from this category.

As shown in Fig. 2-2, as a general rule, type [1] consists of emissions from transportation between primary suppliers and the reporting company. Transportation between primary suppliers and the reporting company also includes the following.

- Emissions from transportation between direct suppliers and the reporting company beyond the scope of ownership rights
- Emissions at warehouses and terminals
- Emissions from empty haulage on return trips (See note below)

In cases where a reporting company both purchases goods and services and orders distribution services for them, the scope of this category covers one or the other, whichever is broader. Therefore, even if an intermediary agent of a trading firm, etc., brokers commercial transactions, such as of arranging for direct distribution from the manufacturer, the scope of accounting includes transportation from the manufacturer of goods and services procured by the reporting company.

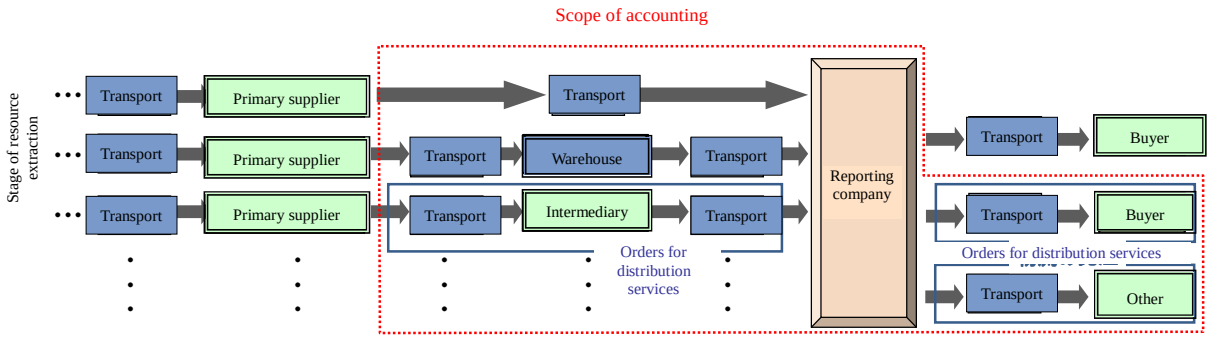


Fig. 2-2. Scope of accounting in Category 4

Type [2] consists of emissions from distribution services ordered by the reporting company for transverse transportation among the reporting company's facilities or

distribution on the downstream side. The general business practice in Japan is that the shipper is often responsible for the costs of distribution to the delivery destination of an order. Therefore, the downstream side is included in this category in many cases.

In the case of a distribution company, this category includes emissions from distribution services subcontracted to another distribution company.

Note: Handling of empty haulage on return trips (for types [1] and [2])

Empty haulage on return trips is subject to accounting if the following conditions are met, regardless of ownership.

- If the contract with the transport company is by time periods and based on vehicles (by the number of trucks, not the amount of freight)
- If the contract is by transport zones and based on the number of vehicles, but freight transport for other parties would not be realistically possible because of the contract format

The table below shows how this relates to the consigner's scope of accounting under the Global Warming Countermeasures Act (Accounting and Reporting System) and the Energy Conservation Act.

Table 2-2. Relationship to consigner's scope of accounting under the Global Warming Countermeasures Act (Accounting and Reporting System) and the Energy Conservation Act

Classification of transportation				Included under the Global Warming Countermeasures Act (Energy Conservation Law)	Supply chain emissions
Type of freight	Freight ownership	Flow of freight	Payment of transport fees?		
Transport of general freight	Yes	Upstream	Yes	○	Category 4
			No	○*	Category 4
		Downstream	Yes	○	Category 4
			No	○*	Category 9
	No	Upstream	Yes	×*	Category 4
			No	×	Category 4
		Downstream	Yes	×*	Category 4
			No	×	Category 9
Transport of wastes	—	Downstream		Emitter's scope of responsibility	Category 5

* Under the Global Warming Countermeasures Act (Accounting and Reporting System) and the Energy Conservation Act, the scope may be set from the standpoint of freight transport arrangements and fee payment, etc. if the scope of ownership does not correspond to the actual situation.

Concerning the sources of emissions that are covered under this category, emissions from the combustion of fuel and use of electricity are to be included without fail, but it is desirable to include emissions from coolant leakage as well.

2.4.2. Accounting methodology

(1) Accounting methods

[1] Transportation

For domestic transportation, accounting is based on the accounting method for specified consigners in the Accounting and Reporting System. Specifically, the following formulas are used.[9]

[Fuel method:] ···(4-1)

CO_2 emissions = Σ (Amount of fuel usage x Emissions unit value)

[Fuel consumption method:] ···(4-2)

CO_2 emissions = Σ (Transport distance / Fuel consumption x Emissions unit value)

[Ton-kilometer method:*] ···(4-3)

- For trucks: CO_2 emissions = Σ (Ton-kilometers transported x Unit value of fuel usage for the ton-kilometer method x Emissions unit value)

  In the above formula, the emissions unit value is equal to (Unit calorific value x Emission coefficient x 44/12).

- For railroads, ships, and aircraft: CO_2 emissions = Ton-kilometers transported x Emissions unit value by mode of transport with the ton-kilometer method ···(4-4)

* With the ton-kilometer method, emissions from empty haulage on return trips cannot be calculated.

Here, the emissions unit value for fuel consumption and electricity may be either a unit value based on emissions during fuel combustion or a unit value based on life cycle emissions, but this should be applied as consistently as possible throughout this category, and the approach used in the applied emissions unit value should be clearly stated.

For emissions unit values, please refer to the Report on Emissions Unit Values.

If it is not feasible to use the above calculation method because the amount of fuel usage, distance transported, etc., is unknown, calculations can be based on a raw materials transport scenario.

For example, this could be the raw materials transport scenario of the Carbon Footprint of Products Pilot System, which is as follows.

[9] From the standpoint of ensuring coverage of activity amounts, it would be possible to perform calculations for transportation overall using unit values on the basis of monetary amounts listed in 3EID, based on the correspondence table by industry, similar to Category 1. However, in terms of accounting accuracy, it is assumed that this would be inferior to the calculation method for specified consigners under the Accounting and Reporting System. This should be handled by methods such as adopting the calculation method for specified consigners with respect to the consigner's portion, based on accounting accuracy and coverage rates, etc.

- Domestic transportation: One-way transport of 500 km using a 10-ton truck with a loading ratio of 50%.
- International transportation: The domestic transportation scenario (land transportation both before and after ocean transportation) plus ocean transportation using a bulk shipping vessel (up to 80,000 DWT), with the ocean transportation distance based on a database of distances between countries and regions.

When establishing scenarios, please check to ensure that emissions are not undercounted in relation to distances to procurement sources, types of vehicles delivering goods to the reporting company's distribution bases, etc.

The relevant types of equipment concerning coolant leakage are air conditioning units in means of transportation (car air conditioners) and transportation refrigeration units that are used for refrigerated or frozen freight. In Japan, emissions from the use of car air conditioners are considered to be very small in comparison to emissions from the use of fuel, and may be omitted. It would be desirable to determine emissions for transportation refrigeration units that are used for refrigerated or frozen freight, but it is expected that data will not be easily available in most cases, so for the time being, this may be omitted.

[2] Bases (cargo handling, storage, and sales)

Emissions from the use of energy in cargo handling, storage, and sales at distribution bases and sales bases are calculated as follows.

[Fuel:] ···(4-5)

CO_2 emissions = Σ {Amount of fuel usage x Emissions unit value (= Unit calorific value x Emission coefficient x 44/12)}

[Electricity:] ···(4-6)

CO_2 emissions = Σ (Amount of electric power usage x Emissions unit value)

For cases where emissions from coolant leakage during the use of refrigeration and air conditioning equipment at such bases are included in accounting, the following calculation methods are under consideration at the present time.

- Calculating the amount of leakage during everyday use based on the amount added during maintenance and the amount recovered: ···(4-7)

  CO_2 emissions = Σ {(Amount of coolant added to equipment operated during the emissions accounting period – Amount recovered and appropriately processed) x Global warming coefficient }

- Calculating the amount of leakage during everyday use based on leakage rate: ···(4-8)

  CO_2 emissions = Σ [{(Amount of coolant contained in equipment operated during the emissions accounting period x Emissions unit value during use*) – Amount recovered and appropriately processed } x Global warming coefficient]

If calculations by the above methods are not feasible, figures may be converted from the amount of products (volume or number of pallets, etc.).

(2) Amount of activity

[1] Transportation

The amount of activity is the amount of fuel usage, transport distance, and ton-kilometers transported during the accounting period.

[2] Bases (cargo handling, storage, and sales)

The amount of activity is the amount of fuel usage and amount of electric power usage during the accounting period.

2.4.3. Other points for consideration

[1] Transportation

In cases of calculation by the fuel method or the fuel consumption method for joint transport and mixed loading, the approach to emissions accounting for consigners under the Accounting and Reporting System is applied, as indicated below.

Table 2-3. Standard method of allocating CO_2 emissions by consigner

Standard method (future goal)	Method of allocation by freight weight (tons) for each transport zone (recommended method as a goal)	Transport zones are classified according to freight combinations. For each transport zone, CO_2 emissions are allocated by freight weight (tons) for each mode of transport, and added up for the total distance traveled between points.
Standard method (at present)	Method of allocation by amounts transported (ton-kilometers)	CO_2 emissions are allocated by amounts transported (ton-kilometers).

Table 2-4. Alternative method of allocating CO_2 emissions by consigner

Alternative method A	Method of allocation by freight weight (tons)	CO_2 emissions are allocated by freight weight (tons) for amounts shipped, etc. It is anticipated that this would be used for deliveries and fixed-zone transportation.
Alternative method B	Method of allocation by transport costs (simple method when no other options exist)	CO_2 emissions are allocated by transport costs.

Notes:
1. In the case of allocation by zones, equal results are produced by ton allocation and ton-kilometer allocation.
2. If load amounts are determined in terms of capacity, capacity may be used instead of tonnage.
3. If a shipment receiver is not able to determine tonnage, allocation could also be based on the number of cases, number of items, and distance transported.

Source: Joint guidelines on methods for calculating carbon dioxide emissions in the logistics sector (Ver. 3.0) by the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism

In cases where the reporting company has participated in joint transport as a shipment receiver, if the fuel method or the fuel consumption method is used,

accounting is basically the same; however, it would be difficult to use the method of allocation based on transport fees. Therefore, in cases where allocation by freight weight or amounts transported (ton-kilometers) is not feasible, it is considered that allocation could be based on direct transport distances from the shipping center to stores.

[2] Bases (cargo handling, storage, and sales)

If base emissions are calculated directly for a distribution base that is used by multiple consigners, it is necessary to allocate emissions by consigner. The following method of allocation is used in such a case.

Method of allocation	Source of emissions	Potential applications
Allocation by area	Lighting and air conditioning	Warehouses under contract by area or when using an entire warehouse building
Allocation by amount of distribution	Motive power (conveyors, forklifts, etc.)	Warehouses other than the above; Pass-through distribution bases (transfer centers); Distribution centers that include distribution processing
Allocation by capacity	Refrigerated storage	(In most cases, this will produce about the same results as the method of allocation by area, since a building's ceiling height does not vary greatly from floor to floor in most cases.)
Allocation by fees	None (simplified method)	In cases where the above methods of allocation are not feasible

Notes:
1. Area: Area of the cargo handling sites and warehouses used by the consigner for cargo handling and storage.
   Amount of distribution: Amount distributed by the consigner (tons or cubic meters).
   Capacity: Capacity of warehouses used by the consigner for cargo storage.
2. The shaded area indicates the method which is expected to be generally used.

Source: Joint guidelines on methods for calculating carbon dioxide emissions in the logistics sector (Ver. 3.0) by the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism

[3] Life cycle emissions from manufacturing of vehicles and facilities

Life cycle emissions from the manufacturing of vehicles and facilities may be included in this category.

2.5. Category 5: Waste generated in operations

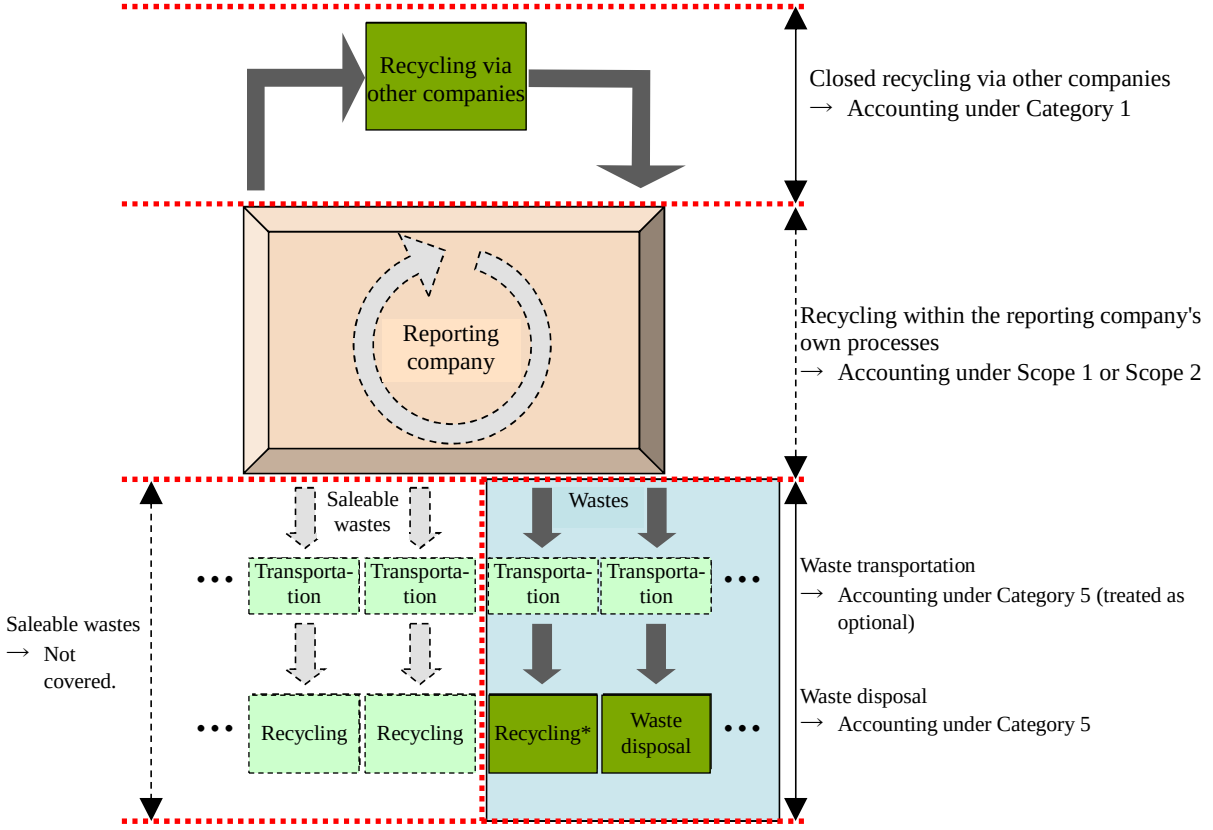
2.5.1. Scope of accounting

The scope of accounting under Category 5 consists of emissions from disposal and processing by parties other than the reporting company of wastes generated from the reporting company's business activities (excluding wastes sold for compensation). It includes emissions from the transportation of wastes.

Specifically, the scope of accounting in Category 5 is the flow of disposal of wastes emitted from the reporting company (boxed area in the lower right of Fig. 2-3).

In-house disposal, such as recycling within the company's own processes, is recorded under Scope 1.

In the case of recycling of wastes, it would be practically impossible for the scope of accounting to include the entire flow of activities after recycling. Accounting must be limited to a certain scope. As in the case of Category 12, there are various approaches to this kind of limitation, and it is not feasible to prescribe one specific method. One possibility would be to limit the scope of accounting to emissions up to preparations for recycling (transport, disassembly, crushing, and sorting), as shown in Fig. 2-4. (For example, in the case of plastic containers and packaging, the scope of accounting for the waste emitting side ends at the stage of baling, while the scope of accounting for the receiving side begins with the stage of pelletization.) Another possibility would be to include the entire recycling process in the scope of accounting.[10]

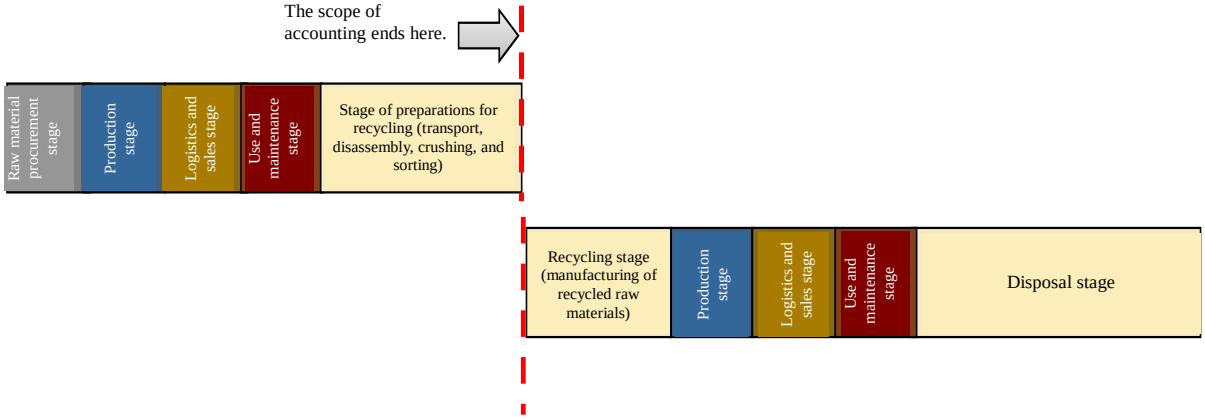


* In the case of recycling of wastes, the scope of accounting on the side of the waste emitting company is as shown below. (See Category 12 for details).

Fig. 2-3. Scope of accounting in Category 5

[10] Continued study is needed concerning the handling of recycled materials because there exist a variety of approaches, including an approach in which the scope is not divided, and the company that processed and manufactured virgin materials accounts for emissions up to the final disposal stage including processes after recycling.

If the scope of accounting ends at the stage of transport, disassembly, crushing, and sorting:



If the scope of accounting is the entire recycling process:

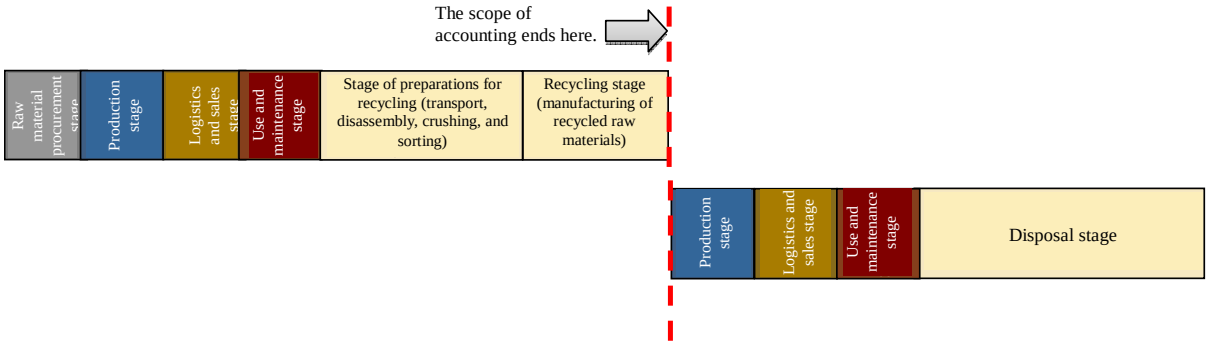


Fig. 2-4. Approach to limiting scope of accounting if wastes are recycled (example)

2.5.2. Accounting methodology

(1) Accounting methods

In cases where actual figures on disposal/recycling can be determined (processing methods by type of waste, etc.), the following method is used to calculate emissions.

CO_2 emissions = Σ {(Amounts of processed/recycled waste, by type of waste and processing method) x (Emissions unit value for the type of waste and processing method)*} ···(5-1)

* Emissions unit values are determined for each type of waste and each processing method.

In cases where actual figures on disposal/recycling cannot be determined, emissions are estimated by multiplying the fees charged by or amounts consigned to waste disposal/recycling companies by emissions unit values based on standard scenarios for each type of waste.

Standard scenarios could be established with reference to processing rates throughout Japan for each type of waste and each processing method.

CO_2 emissions = Σ {(Acceptance fees (or amount) of processed/recycled waste) x (Emissions unit value)} ···(5-2)

For emissions unit values, please refer to the Report on Emissions Unit Values. For waste transportation accounting methods, please refer to Category 4.

(2) Amount of activity

In cases where actual figures on disposal/recycling can be determined (processing methods by type of waste, etc.), the amount of activity is the amount of waste processed or recycled for each type of waste and each processing method. In cases where such data cannot be determined, the costs of waste processing (or amounts) and costs of consignment for recycling (or amounts) should be determined as amounts of activity.

2.6. Category 6: Business travel

2.6.1. Scope of accounting

The scope of accounting under Category 6 consists of emissions from fuel and electric power consumption in means of transportation used in the movement of regularly hired workers of the reporting company in operations such as business travel. However, this does not include movement using vehicles, etc., owned by the reporting company (determined under Scope 1 or Scope 2).

Here, "regularly hired workers" refers to regularly employed persons as specified in the Accounting and Reporting System, and also includes workers of consolidated companies that are included in the reporting company's scope of accounting. Workers of franchise chains and tenants' employees are not subject to accounting, but may be optionally included.

Emissions from lodging facilities where workers stay during business travel may also be included in this category.

[Definition of "regularly hired workers"]

Persons who, as of April 1* of the year preceding the year of emissions reporting, are employed for an indefinite period of time or for a fixed period of more than one month (persons who are "regular employees" for a continuous period of more than one month) or have been employed for at least 18 days in each of the months of February and March of that year (including part-time workers or casual staff in some cases).

* A different date may be specified if the company uses a different period for its accounting year.

The table below provides examples of persons counted as regularly hired workers (indicated with a check mark).

Executives	Regular employees	Temporary workers	Persons dispatched to other firms (secondees)	Labor subcontracted to other companies	Persons dispatched from other firms (secondees)	Subcontracted labor from other companies
×	○	×	×	×	○	○

* An executive who is engaged in certain duties as a member of the clerical or labor staff, and is salaried according to the same salary rules as regular employees, is counted as a regularly hired worker.

2.6.2. Accounting methodology

(1) Accounting methods

The following method is used if it is possible to determine the distances traveled by each mode of transportation (passenger aircraft, passenger railways, passenger ships, and automobiles) or amounts of fuel consumed in worker movement.

[Passenger aircraft, passenger railways, passenger ships, and automobiles, etc.:] ···(6-1)

CO_2 emissions = (For each mode of transport) Σ (Passenger-kilometers x Emissions unit value)

Here, "passenger-kilometers" indicates (for each route) Σ (Number of passengers x Passenger transport distance).

[Automobiles] ···(6-2)

(Fuel method:)

CO_2 emissions = Σ {Amount of fuel usage x Emissions unit value (= Unit calorific value x Emission coefficient x 44/12)}

(Fuel consumption method:) ···(6-3)

CO_2 emissions = Σ {Transport distance / Fuel consumption x Emissions unit value (= Unit calorific value x Emission coefficient x 44/12)}

Here, the emissions unit values for fuel, electricity, and modes of transportation may be either a unit value based on emissions during fuel combustion or a unit value based on life cycle emissions, but this should be applied as consistently as possible throughout this category, and the approach used in the applied emissions unit value should be clearly stated.

If determination and calculation using the above methods is not feasible, in cases where public transportation is used, accounting is based on amounts paid for transportation fares (for each mode of transportation).

CO_2 emissions = (for each mode of transport) Σ (Expenditures for transportation fares x Emissions unit value) ···(6-4)

If transportation costs by mode of transportation are unknown, accounting may be based on the ratios of use of each mode of transportation from sampling surveys, etc.

If emissions from lodging during business travel are included, the following formula could be used.

CO_2 emissions = Σ (Number of overnight stays x Emissions unit value for lodging facilities) ···(6-5)

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

In accounting for emissions from worker movement, the amount of activity consists of passenger-kilometers by each mode of transportation (passenger aircraft, passenger railways, passenger ships, and automobiles), amounts of fuel consumed in worker movement, or expenditures for transportation costs. If emissions from lodging are included, the amount of activity is the number of overnight stays.

2.6.3. Other points for consideration

When employees use their own private vehicles for business related movement such as sales activities, the operation of such vehicles is also included in this category. Life cycle emissions from manufacturing of vehicles and facilities may also be included in this category.

2.7. Category 7: Employee commuting

2.7.1. Scope of accounting

The scope of accounting under Category 7 consists of emissions from fuel and electric power consumption in means of transportation used for commuting to factories or places of business by regularly hired workers of the reporting company.

However, movement by company owned vehicles are excluded. (Calculated in Scope 1 or Scope 2)

Here, "regularly hired workers" refers to regularly employed persons as specified in the Accounting and Reporting System, and also includes workers of consolidated companies that are included in the reporting company's scope of accounting. Workers of franchise chains and tenants' employees are not subject to accounting, but may be optionally included.

Emissions from telework may also be included in this category.

2.7.2. Accounting methodology

(1) Accounting methods

The following method is used if it is possible to determine the distances traveled by each mode of transportation (passenger aircraft, passenger railways, passenger ships, and automobiles) or amounts of fuel consumed in worker movement.

[Passenger aircraft, passenger railways, passenger ships, and automobiles, etc.:] ···(7-1)

CO_2 emissions = (For each mode of transport) Σ (Passenger-kilometers x Emissions unit value)

Here, "passenger-kilometers" indicates = (For each route) Σ (Number of passengers x Passenger transport distance).

[Automobiles] ···(7-2)

(Fuel method:)

CO_2 emissions = Σ {Amount of fuel usage x Emissions unit value (= Unit calorific value x Emission coefficient x 44/12)}

(Fuel consumption method:) ···(7-3)

CO_2 emissions = Σ {Transport distance / Fuel consumption x Emissions unit value (= Unit calorific value x Emission coefficient x 44/12)}

Here, the emissions unit values for fuel, electricity, and modes of transportation may be either a unit value based on emissions during fuel combustion or a unit value based on life cycle emissions, but this should be applied as consistently as possible throughout this category, and the approach used in the applied emissions unit value should be clearly stated.

If determination and calculation using the above methods is not feasible, in cases where public transportation is used, accounting is based on amounts paid for transportation fares (for each mode of transportation).

CO_2 emissions = (for each mode of transport) Σ (Expenditures for transportation fares x Emissions unit value) ···(7-4)

If transportation costs by mode of transportation are unknown, accounting may be based on the ratios of use of each mode of transportation from sampling surveys, etc.

If emissions from telework are included, the following formula may be used.

CO_2 emissions = (For each type of energy) Σ (Amount of fuel usage x Emissions unit value) + (Amount of electricity usage x Emissions unit value) ···(7-5)

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

In accounting for emissions from worker commuting, the amount of activity consists of distances traveled by each mode of transportation (passenger aircraft, passenger railways, passenger ships, and automobiles), amounts of fuel consumed in worker movement, or expenditures for transportation costs. If telework is included, the amount of activity is the amount of energy usage.

2.8. Category 8: Leased assets (upstream)

2.8.1. Scope of accounting

Accounting covers emissions from the operation of assets leased to the reporting company. However, because all emissions from the operation of leased assets used by the reporting company are subject to accounting under the Accounting and Reporting System, leased assets that are already accounted for under the Accounting and Reporting System should be calculated under Scope 1 and 2. Meanwhile, the reporting company should decide whether to handle leased assets that are not subject to the Accounting and Reporting System, such as vehicles rented under short-term leases, as emissions under Scope 1 and 2 or as emissions under Scope 3, based on the following.

In accounting for emissions from the use of leased assets, it is important to avoid double counting among the respective scopes by the lessor company and the renter company. Specifically, the reporting company should decide which portions of Scopes 1, 2, and 3 are subject to accounting, based on Table 2-5 and Table 2-6. Also, in cases where the company owns leased assets and leases them to others, such emissions are accounted for under Category 13.

Here, financial/capital leases and operating leases are defined as follows. This approach is based on the Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

Finance/capital lease: The renter company may operate the asset, and is liable for all risks and entitled to all benefits associated with ownership of the asset. Assets leased under a capital lease or a finance lease are considered to be wholly owned assets of the renter company in financial accounting, and are recorded on the balance sheet.

Operating lease: The renter company may operate the asset (building or vehicle, etc.) but is not liable for risks or entitled to benefits of asset ownership. A lease other than a capital lease or a finance lease is classified as an operating lease.

Table 2-5. Types of lease agreements and scope of accounting, from renter company's standpoint

Organizational boundary standard selected	Type of lease agreement	
	Finance/capital lease	Operating lease
Investment ratio standard or financial control standard	The renter company has ownership and financial control of the leased assets. Therefore, emissions from fuel combustion are in Scope 1, and emissions from use of purchased electric power are in Scope 2.	The renter company does not have ownership or financial control of the leased assets. Therefore, emissions from fuel combustion and emissions from use of purchased electric power are in Scope 3 (leased assets, upstream).
Management control standard	The renter company has management control of the leased assets. Therefore, emissions from fuel combustion are in Scope 1, and emissions from use of purchased electric power are in Scope 2.	The renter company has management control of the leased assets. Therefore, emissions from fuel combustion are in Scope 1, and emissions from use of purchased electric power are in Scope 2.

Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, WRI & WBCSD

Table 2-6. Types of lease agreements and scope of accounting, from lessor company's standpoint (covered by Category 13)

Organizational boundary standard selected	Type of lease agreement	
	Finance/capital lease	Operating lease
Investment ratio standard or financial control standard	The lessor company does not have ownership or control of the leased assets. Therefore, emissions from fuel combustion and emissions from use of purchased electric power are in Scope 3 (leased assets, downstream).	The lessor company has ownership and financial control of the leased assets. Therefore, emissions from fuel combustion are in Scope 1, and emissions from use of purchased electric power are in Scope 2.
Management control standard	The lessor company does not have ownership or control of the leased assets. Therefore, emissions from fuel combustion and emissions from use of purchased electric power are in Scope 3 (leased assets, downstream).	The lessor company does not have ownership or control of the leased assets. Therefore, emissions from fuel combustion and emissions from use of purchased electric power are in Scope 3 (leased assets, downstream).

Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, WRI & WBCSD

2.8.2. Accounting methodology

(1) Accounting methods

The following method is used to calculate emissions from the operation of assets leased to the reporting company if it is possible to determine energy consumption by type of energy for each leased asset.

CO_2 emissions = Σ (Consumption by energy type in leased assets x Emissions unit value by energy type) ・・・(8-1)

* In cases where it is necessary to allocate energy consumption in an asset because the asset leased to the reporting company is a portion of an entire asset, such as cases where the reporting company is a tenant of an office building, energy consumption should be allocated by means such as the area ratio.

If it is possible to determine energy consumption for each leased asset, but the proportions of consumption by type of energy are unknown, the following method is used to calculate emissions from the operation of assets leased to the reporting company.

CO_2 emissions = Σ (Energy consumption in leased assets x Emissions unit value as a weighted average by energy type) ・・・(8-2)

* In cases where it is necessary to allocate energy consumption in an asset because the asset leased to the reporting company is a portion of an entire asset, such as cases where the reporting company is a tenant of an office building, energy consumption should be allocated by means such as the area ratio.

If calculations using the above methods are not feasible, then calculations are performed using average emissions unit values based on indices indicating the scale, etc., of each leased asset (such as total floor area, etc., in the case of a building).

[For buildings:] ・・・(8-3)

CO_2 emissions = Σ (Floor area of leased building x Emissions unit value per unit area)

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

The amount of activity is the amount of energy consumption in assets leased to the reporting company, including amounts of electricity consumption in office buildings and fuel consumption by trucks.

2.8.3. Other points for consideration

If a leased asset is leased for only a portion of the reporting year, the reporting company should account for only those emissions from that lease period.

Also, if a renter company reports on upstream emissions such as the manufacturing of leased assets, such emissions should be included in this category.

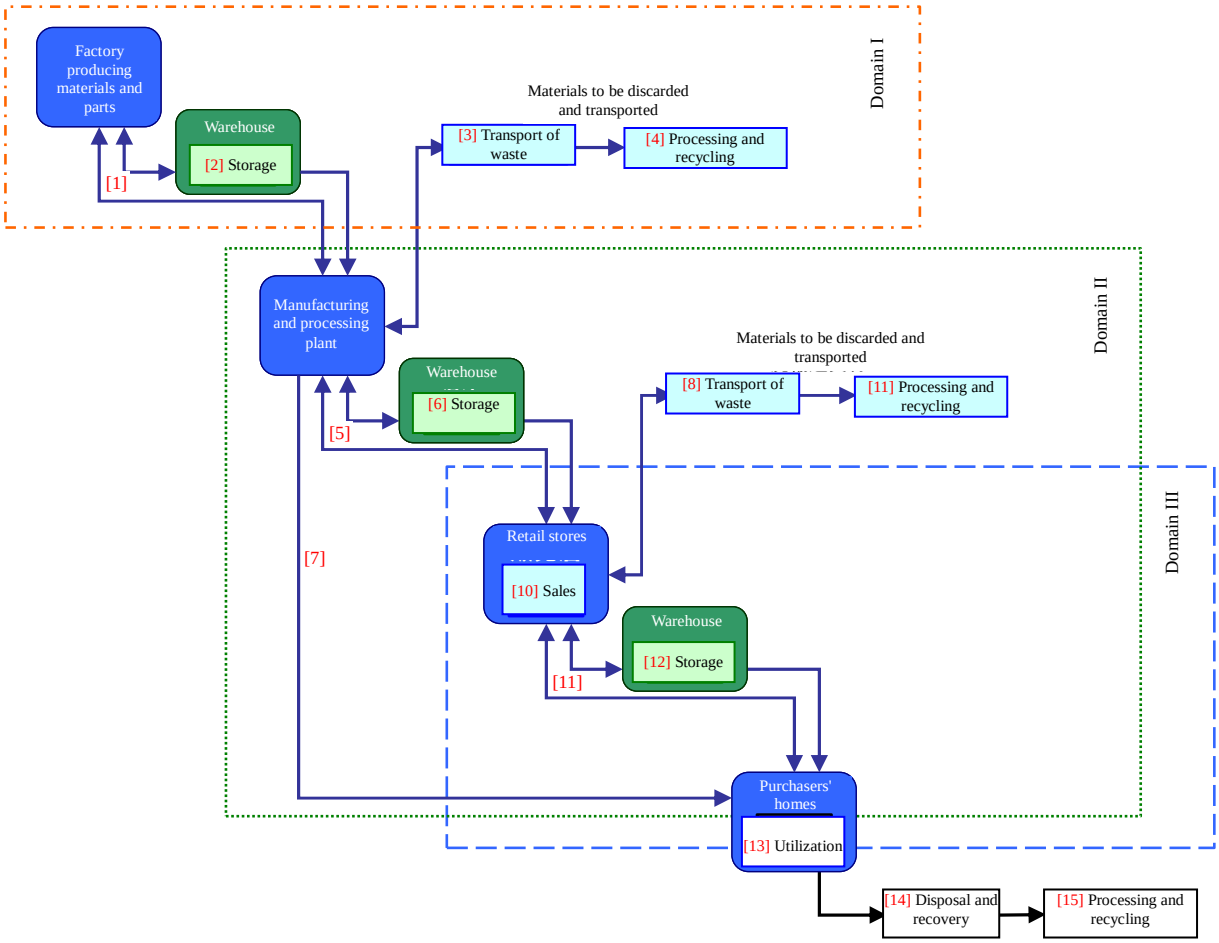
2.9. Category 9: Transportation and delivery (downstream)

2.9.1. Scope of accounting

The scope of accounting consists of emissions from downstream distribution of products (transport, cargo handling, storage, and sales). This does not include distribution performed by the reporting company itself or emissions at the reporting company's facilities (determined under Scope 1 or Scope 2). It also excludes cases where the reporting company orders and pays for transportation services (calculated under Category 4). Cargo handling and storage at pass-through distribution bases (transfer centers) such as distribution centers and cargo handling sites where cargo is only handled briefly, as well as distribution centers that include distribution processing, may be excluded from accounting. Transportation and processing of

waste materials for transport that have been delivered to the downstream side may be included in the scope of accounting.

The basic approach is to determine data on distribution to consumers from all industries and all companies. However, in cases where such data cannot be determined, accounting is performed for processes A–C below from among the respective matters illustrated in Fig. 2-5. (However, even emissions corresponding to processes A–C are handled under Scope 1 or Scope 2 in the case of emissions from distribution performed by the reporting company itself or emissions at the reporting company's facilities, or under Category 4 in cases where the reporting company orders and pays for transportation services.)



Note: Not including emissions covered under Scope 1, Scope 2, or Category 4.

Fig. 2-5. Scope of accounting in Category 9

A. If the reporting company has its own factories producing materials and parts

As a general rule, accounting covers the process of transporting produced materials from the reporting company's production plant to the materials processing plant, or Domain I within Fig. 2-5. The specific activities subject to accounting are as follows.

- Transportation from factories producing materials and parts to warehouses and to manufacturing and processing plants ([1])
- Storage and cargo handling at warehouses ([2])
- Transportation and processing of materials to be discarded and transported ([3], [4]) (optional)

B. If the reporting company has manufacturing and processing plants for final products

As a general rule, accounting covers the process of transporting produced products from the plant to a retail store or purchaser, or Domain II as shown in Fig. 2-5. The specific activities subject to accounting are as follows.

- Transportation from manufacturing and processing plants to warehouses and to retail stores ([5])
- Storage and cargo handling at warehouses ([6])
- Direct transport between manufacturing and processing plants and purchasers ([7])
- Transportation and processing of materials to be discarded and transported ([8], [9]) (optional)
- Sales at retail stores ([10]) (based on obtaining data from retail stores)
  In addition to the above, accounting also covers the following with regard to the kinds of products (large household products, etc.) that are generally delivered from retail stores.
- Transportation from retail stores to warehouses and to purchasers ([11])
- Storage and cargo handling at warehouses ([12])

C. If the reporting company has retail stores (including companies that conduct sales without retail premises)

As a general rule, accounting covers the process of transporting the goods purchased and sold by the reporting company to the purchaser, or Domain III as shown in Fig. 2-5. The specific activities subject to accounting include the following scope of distribution, and are not based on the scope of accounting for consigners under the Energy Conservation Act.

- Transportation from retail stores to warehouses and distribution bases and to purchasers ([11])
- Storage and cargo handling at warehouses ([12])
- Sales at retail stores ([10])

If a company conducts sales without retail premises, accounting covers distribution from the time the reporting company acquires ownership of the goods until delivery to the customer. For example, in cases where ownership is transferred from the supplier at the reporting company's distribution center, distribution from the reporting company's distribution center to the purchaser ([7], part of [11], and [12]) is subject to accounting.

Note: Handling of empty haulage on return trips (applies to A, B, and C

Empty haulage on return trips is subject to accounting if the following conditions are met, regardless of ownership.

- If the contract with the transport company is by time periods and based on vehicles (by the number of trucks, not the amount of freight)
- If the contract is by transport zones and based on the number of vehicles, but freight transport for other parties would not be realistically possible because of the contract format

The table below shows how this relates to the consigner's scope of accounting under the Global Warming Countermeasures Act (Accounting and Reporting System) and the Energy Conservation Act.

Table 2-7. Relationship to consigner's scope of accounting under the Global Warming Countermeasures Act (Accounting and Reporting System) and the Energy Conservation Act

Classification of transportation				Included under the Global Warming Countermeasures Act (Energy Conservation Law)	Supply chain emissions
Type of freight	Freight ownership	Flow of freight	Payment of transport fees?		
Transport of general freight	Yes	Upstream	Yes	○	Category 4
			No	○*	Category 4
		Downstream	Yes	○	Category 4
			No	○*	Category 9
	No	Upstream	Yes	×*	Category 4
			No	×	Category 4
		Downstream	Yes	×*	Category 4
			No	×	Category 9
Transport of wastes	-	Downstream		Emitter's scope of responsibility	Category 5

* Under the Global Warming Countermeasures Act (Accounting and Reporting System) and the Energy Conservation Act, the scope may be set from the standpoint of freight transport arrangements and fee payment, etc. if the scope of ownership does not correspond to the actual situation.

In cases where products are sold at retail premises and purchasers of final products are the direct transaction partners, emissions from the movement of customers for purchasing purposes may be included in accounting. For suburban retail premises and other stores that attract customers, in which customer movement functions as a substitute for product distribution, it is desirable to account for customer movement in order to help determine the overall situation of the supply chain.

Concerning the sources of emissions that are covered under this category, emissions from the combustion of fuel and use of electricity are to be included without fail, but it is desirable to include emissions from coolant leakage as well.

2.9.2. Accounting methodology

(1) Accounting methods

[1] Transportation

For emissions from the use of energy in transportation, accounting is based on the accounting method for specified consigners in the Accounting and Reporting System. Specifically, the following formulas are used.

[Fuel method:] ···(9-1)

CO_2 emissions = Σ (Amount of fuel usage x Emissions unit value)

[Fuel consumption method:] ···(9-2)

CO_2 emissions = Σ (Transport distance / Fuel consumption x Emissions unit value)

[Ton-kilometer method:*] ···(9-3)

- For trucks: CO_2 emissions = Σ (Ton-kilometers transported x Unit value of fuel usage for the ton-kilometer method x Emissions unit value)

  In the above formula, the emissions unit value is equal to (Unit calorific value x Emission coefficient x 44/12).

- For railroads, ships, and aircraft: CO_2 emissions = Ton-kilometers transported x Emissions unit value by mode of transport with the ton-kilometer method ···(9-4)

* With the ton-kilometer method, emissions from empty haulage on return trips cannot be calculated.

Here, the emissions unit value for fuel consumption and electricity may be either a unit value based on emissions during fuel combustion or a unit value based on life cycle emissions, but this should be applied as consistently as possible throughout this category, and the approach used in the applied emissions unit value should be clearly stated.

For emissions unit values, please refer to the Report on Emissions Unit Values.

If data cannot be obtained from downstream companies, the fuel method or the fuel consumption method may be used. If that is not feasible, the ton-kilometer method is used instead.

When using the ton-kilometer method, calculations can be based on standard scenarios concerning distances transported, loading ratios, truck types, etc., for each type of product. If accounting by type of product is not feasible, then calculations are based on a uniform scenario. For example, this could be the distribution (transport and sales) scenario for products, etc., in the Carbon Footprint of Products Pilot System, which is as follows.

- Domestic transportation: One-way transport of 500 km using a 10-ton truck with a loading ratio of 50%.
- International transportation: The domestic transportation scenario (land transportation both before and after ocean transportation) plus ocean transportation using a bulk shipping vessel (up to 80,000 DWT), with the ocean

transportation distance based on a database of distances between countries and regions.

When establishing scenarios, please check to ensure that emissions are not undercounted in relation to distances to transaction partners, types of vehicles used to ship goods from the reporting company's distribution bases, etc.

The relevant types of equipment concerning coolant leakage are air conditioning units in means of transportation (car air conditioners) and transportation refrigeration units that are used for refrigerated or frozen freight. In Japan, emissions from the use of car air conditioners are considered to be very small in comparison to emissions from the use of fuel, and may be omitted. It would be desirable to determine emissions for transportation refrigeration units that are used for refrigerated or frozen freight, but it is expected that data will not be easily available in most cases, so for the time being, this may be omitted.

[2] Bases (cargo handling, storage, and sales)

Emissions from the use of energy in cargo handling, storage, and sales at distribution bases and sales bases are calculated as follows.

[Fuel:] ···(9-5)

CO_2 emissions = Σ {Amount of fuel usage x Emissions unit value (= Unit calorific value x Emission coefficient x 44/12)}

[Electricity:] ···(9-6)

CO_2 emissions = Σ (Amount of electric power usage x Emissions unit value)

For cases where emissions from coolant leakage during the use of refrigeration and air conditioning equipment at such bases are included in accounting, the following calculation methods are under consideration at the present time.

- Calculating the amount of leakage during everyday use based on the amount added during maintenance and the amount recovered: ···(9-7)

  CO_2 emissions = Σ {(Amount of coolant added to equipment operated during the emissions accounting period – Amount recovered and appropriately processed) x Global warming coefficient }

- Calculating the amount of leakage during everyday use based on leakage rate: ···(9-8)

  CO_2 emissions = Σ [{(Amount of coolant contained in equipment operated during the emissions accounting period x Emissions unit value during use*) – Amount recovered and appropriately processed } x Global warming coefficient]

If calculations by the above methods are not feasible, figures may be converted from the amount of products (volume or number of pallets, etc.).

(2) Amount of activity

[1] Transportation

The amount of activity is the amount of fuel usage, transport distance, and ton-kilometers transported during the accounting period.

[2] Bases (cargo handling, storage, and sales)

The amount of activity is the amount of fuel usage and amount of electric power usage during the accounting period.

2.9.3. Other points for consideration

[1] Transportation

In cases of calculation by the fuel method or the fuel consumption method for joint transport and mixed loading, the approach to emissions accounting for consigners under the Accounting and Reporting System is applied, as indicated below.

Table 2-8. Standard method of allocating CO_2 emissions by consigner

Standard method (future goal)	Method of allocation by freight weight (tons) for each transport zone (recommended method as a goal)	Transport zones are classified according to freight combinations. For each transport zone, CO_2 emissions are allocated by freight weight (tons) for each mode of transport, and added up for the total distance traveled between points.
Standard method (at present)	Method of allocation by amounts transported (ton-kilometers)	CO_2 emissions are allocated by amounts transported (ton-kilometers).

Table 2-9. Alternative method of allocating CO_2 emissions by consigner

Alternative method A	Method of allocation by freight weight (tons)	CO_2 emissions are allocated by freight weight (tons) for amounts shipped, etc. It is anticipated that this would be used for deliveries and fixed-zone transportation.
Alternative method B	Method of allocation by transport costs (simple method when no other options exist)	CO_2 emissions are allocated by transport costs.

Notes:
1. In the case of allocation by zones, equal results are produced by ton allocation and ton-kilometer allocation.
2. If load amounts are determined in terms of capacity, capacity may be used instead of tonnage.
3. If a shipment receiver is not able to determine tonnage, allocation could also be based on the number of cases, number of items, and distance transported.

Source: Joint guidelines on methods for calculating carbon dioxide emissions in the logistics sector (Ver. 3.0) by the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism

[2] Bases (cargo handling, storage, and sales)

If base emissions are calculated directly for a distribution base that is used by multiple consigners, it is necessary to allocate emissions by consigner. The following method of allocation is used in such a case.

Method of allocation	Source of emissions	Potential applications
Allocation by area	Lighting and air conditioning	Warehouses under contract by area or when using an entire warehouse building
Allocation by amount of distribution	Motive power (conveyors, forklifts, etc.)	Warehouses other than the above; Pass-through distribution bases (transfer centers); Distribution centers that include distribution processing
Allocation by capacity	Refrigerated storage	(In most cases, this will produce about the same results as the method of allocation by area, since a building's ceiling height does not vary greatly from floor to floor in most cases.)
Allocation by fees	None (simplified method)	In cases where the above methods of allocation are not feasible

Notes:
1. Area: Area of the cargo handling sites and warehouses used by the consigner for cargo handling and storage.
   Amount of distribution: Amount distributed by the consigner (tons or cubic meters).
   Capacity: Capacity of warehouses used by the consigner for cargo storage.
2. The shaded area indicates the method which is expected to be generally used.

Source: Joint guidelines on methods for calculating carbon dioxide emissions in the logistics sector (Ver. 3.0) by the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism

Allocation method for sales store is calculated by capacity of products (m^3), in principle.

[3] Life cycle emissions from manufacturing of vehicles and facilities

Life cycle emissions from the manufacturing of vehicles and facilities may be included in this category.

2.10. Category 10: Processing of sold products

2.10.1. Scope of accounting

The scope of accounting consists of emissions generated when intermediate products manufactured by the reporting company are processed by companies on the downstream side of the reporting company (such as third-party intermediate processors and final product manufacturers). In other words, Scope 1 and 2 emissions of companies that process intermediate products are Scope 3, Category 10 emissions of companies that sell intermediate products. Here, "intermediate products" means products that require further processing or assembly, etc. before use by final consumers. However, if the selling company is unable to identify the final products made by processing the intermediate products that it has sold, it may be permissible to exclude the processing of such intermediate products from its scope of

accounting if adequate grounds are indicated. Decisions as to the appropriateness of this kind of exclusion should be based on the criteria indicated in Table 2-10.

Table 2-10. Criteria for excluding emissions from scope of accounting

Criterion	Summary
Scale	Such emissions may not be excluded if they account for a large proportion of Scope 3 emissions overall.
Impact	For products where there is a high potential to contribute to reducing emissions at multiple companies in the supply chain, such emissions must be calculated as a priority.
Risk	Such emissions may not be excluded if they impact the company's risk disclosure.
Stakeholders	Such emissions may not be excluded if accounting is demanded by major stakeholders.
Outsourcing	Such emissions may not be excluded if they are from activities which the reporting company previously performed in-house but now outsources to others, or from activities which are performed in-house by other companies in the same industry but outsourced by the reporting company.
Explanations by industry	Such emissions may not be excluded if they are from activities specified as important in the explanations by industry.
Other	Such emissions may not be excluded if they are from activities judged to be important in the company or sector.

2.10.2. Accounting methodology

(1) Accounting methods

If emissions data or energy consumption data can be obtained from the buyer company, the following method is used. Emissions of other gases besides energy-derived carbon dioxide should also be included if they are important from the standpoint of scale of emissions or potential for reduction, etc.

CO_2 emissions = Σ (Emissions from processing of intermediate products (including gases other than CO_2) ･･･(10-1)

CO_2 emissions = Σ (Amount of energy consumption in processing of intermediate products x Emissions unit value) ･･･(10-2)

If the above data cannot be obtained from the buyer company, the following method is used.

CO_2 emissions = Σ (Amount of intermediate products sold x Emissions unit value per amount processed) ･･･(10-3)

For emissions unit values, please refer to the Report on Emissions Unit Values.

In cases where multiple intermediate products are processed by a downstream processing company, a decision is needed as to whether to allocate emissions between the intermediate products subject to accounting and other intermediate products, based on the approach shown in Fig. 2-7. The indicators that may be used in allocation include monetary value data in addition to data on physical amounts such as weight and volume.

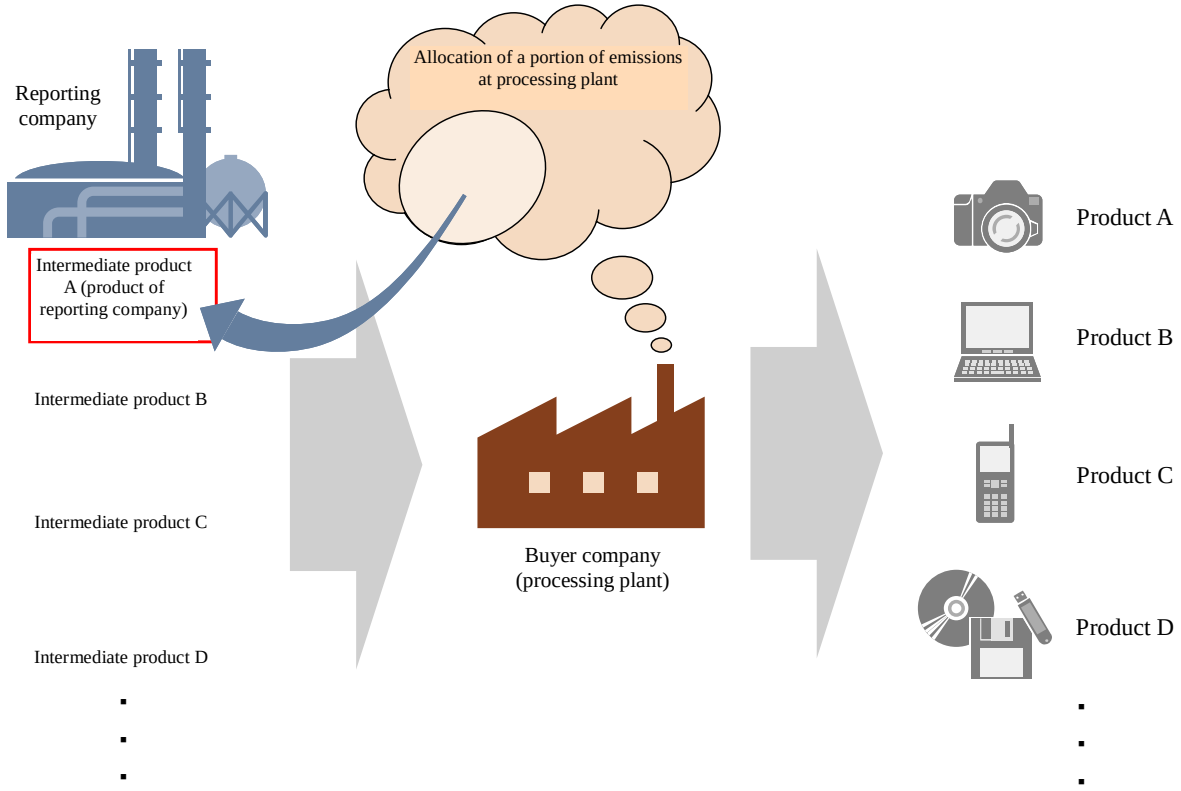


Fig. 2-6. How allocation works

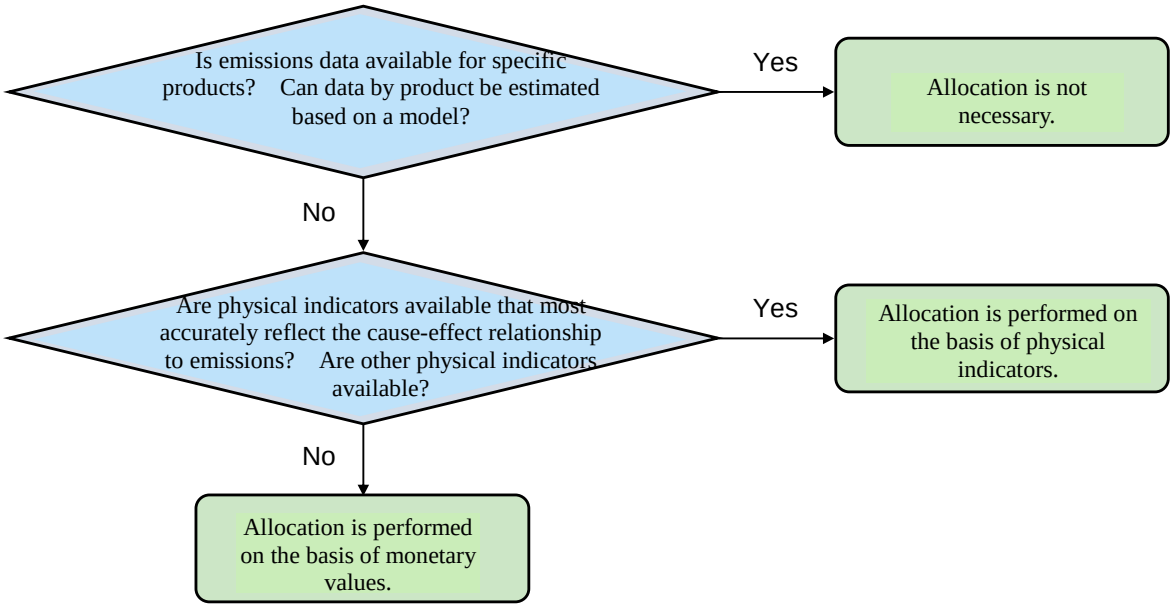


Fig. 2-7. Approach to allocation

(2) Amount of activity

If energy data can be obtained from the downstream processing company, that data on the amount of energy consumption is the amount of activity. If accounting is performed using unit values per amount sold, the amount sold in the reporting year is the amount of activity.

2.11. Category 11: Use of sold products

2.11.1. Scope of accounting

The scope of accounting consists of emissions from the use of products. The products covered are products sold in the fiscal year subject to accounting (including systems and services).

Specifically, emissions included in this category are classified under the following two stages.

Direct use stage emissions:

- Energy-derived carbon dioxide emissions from the use of electricity, fuel, and heat in products such as household appliances
- Emissions of 5.5 gases in products that directly emit 5.5 gases during use, such as air conditioners

Indirect use stage emissions:

- Energy-derived carbon dioxide emissions from the use of products that indirectly involve the use of electricity, fuel, and heat, such as clothing (requires washing and drying) and food (requires cooking, refrigeration, and freezing).

Of the above, direct use stage emissions from sold products are subject to accounting without fail. Indirect use stage emissions from sold products may also be included in accounting, and should be included if they are important in terms of the scale of indirect use stage emissions or potential for reduction of emissions, etc. It is desirable to omit such emissions if this would clearly cause double counting among sold products for the same source of emissions.

Concerning the period subject to accounting, all emissions that a product is expected to emit in the future during the stage of use are calculated in the year when the product was sold.

Emissions related to the maintenance of sold products during use may also be included in accounting.

2.11.2. Accounting methodology

(1) Accounting methods

When calculating emissions during use, the amount of energy consumption during use, based on quantities sold, etc., and standard usage scenarios (a product's design specifications and assumptions concerning the conditions of product use by consumers), is multiplied by an emissions unit value.

For cases where products that emit 5.5 gases are included in accounting, if the Accounting and Reporting System specifies an accounting method (e.g., HFC emissions during maintenance of commercial air conditioners), that method is used. If it does not, accounting is based on usage scenarios for each carbon footprint product if such scenarios exist; and if not, accounting is based on standard scenarios established by the reporting company.

It must be noted that the amount of emissions during usage can fluctuate widely depending on the content of the usage scenarios that are established.

For the approach to allocation, please refer to Category 10.

For emissions unit values, please refer to the Report on Emissions Unit Values.

[Direct use stage emissions:]

[1] Products that use energy ···(11-1)

CO_2 emissions = (CO_2 emissions from the use of fuel consumed during product use) + (CO_2 emissions from the use of electricity consumed during product use) + (Emissions of 5.5 gases during product use, converted into CO_2)

= Σ (Anticipated number of lifetime uses of the product x Number sold during the reporting period x Amount of fuel consumption per use x Emissions unit value) + Σ (Anticipated number of lifetime uses of the product x Number sold during the reporting period x Amount of electricity consumption per use x Emissions unit value) + Σ (Emissions of 5.5 gases during product use x Global warming coefficient)

[2] Fuel and feedstock (coal, petroleum, city gas, etc.) ···(11-2)

CO_2 emissions = Σ (Total amount of fuel and feedstock sold x Emissions unit value)

[3] GHG-containing products that emit GHGs during use ···(11-3)

CO_2 emissions = Σ (Amount of GHG content per product x Total number of products sold x GHG emission rate during lifetime usage period x Global warming coefficient)

CO_2 emissions = Σ (Emissions during usage stage of product or product group) ···(11-4)

* If the CO_2 emissions rate is unknown, please assume a value of 100% in calculations.

[Indirect use stage emissions (Using a general usage scenario):]

[1] Method for general usage scenario ···(11-5)

CO_2 emissions = (CO_2 emissions from use of fuel under the usage scenario) + (CO_2 emissions from use of electricity under the usage scenario) + (Emissions of 5.5 gases under the usage scenario, converted into CO_2)

= Σ (Anticipated number of lifetime uses of the product x Proportion of number of anticipated uses under the scenario x Number sold during the reporting period x Amount of fuel consumption per use under the scenario x Emissions unit value) + Σ (Anticipated number of lifetime uses of the product x Number sold during the reporting period x

Amount of electricity consumption per use x Emissions unit value) + Σ (Emissions of 5.5 gases during product use x Global warming coefficient)

(2) Amount of activity

For either direct use stage emissions or indirect use stage emissions, the amount of activity is based on the actual number of units sold and establishment of a standard usage scenario (usage time, conditions of use, number of years of use, etc.). As stated above, it must be noted that the amount of emissions during usage can fluctuate widely depending on the content of the usage scenarios that are established. Also, for exported goods, usage conditions may vary between Japan and other countries, and the conditions set could cause emissions to be too low or too high.

Here, it is acceptable for individual companies to independently establish standard use scenarios; however, if conditions have been specified by industry organizations and the like, it is desirable to set the amounts of activity in accordance with those conditions. Also, when disclosing the results of accounting, the methods used in calculating emissions (usage scenarios) should also be reported.

2.11.3. Other points for consideration

For products that directly use electricity, fuel, or heat (products that emit energy-derived carbon dioxide), records from monitoring actual usage may be used as the amount of activity. (This results in a more accurate determination of the amount of activity.)

In cases where companies that manufacture intermediate products and materials calculate emissions during use of the final products after processing, only the portions corresponding to such intermediate products are considered to be subject to accounting. (A tire manufacturer would only account for the portion of emissions during use of a motor vehicle that are due to the tires.) In such a case, the proportion of emissions from the final products corresponding to the intermediate products must be allocated by methods such as weight ratio or manufacturing cost ratio.

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

2.12.1. Scope of accounting

The scope of accounting under Category 12 consists of emissions from the disposal and processing of products manufactured or sold by the reporting company, as well as those products' containers and packaging.

In cases where products are discarded without recycling, the scope of accounting for companies involved in product manufacturing, etc., consists of emissions at the stage of disposal.

In cases where products are recycled, it would be practically impossible for the scope of accounting to include the entire flow of activities after recycling. Accounting

must be limited to a certain scope. There are various approaches to this kind of limitation, and it is not feasible to prescribe one specific method. One possibility would be to limit the scope of accounting to emissions up to preparations for recycling (transport, disassembly, crushing, and sorting), as shown in Fig. 2-8. (For example, in the case of plastic containers and packaging, the scope of accounting for the manufacturer of discarded products ends at the stage of baling under this category, while the scope of accounting for the receiving side begins with the stage of pelletization under Category 1.) Another possibility would be to include the entire recycling process in the scope of accounting.[11]

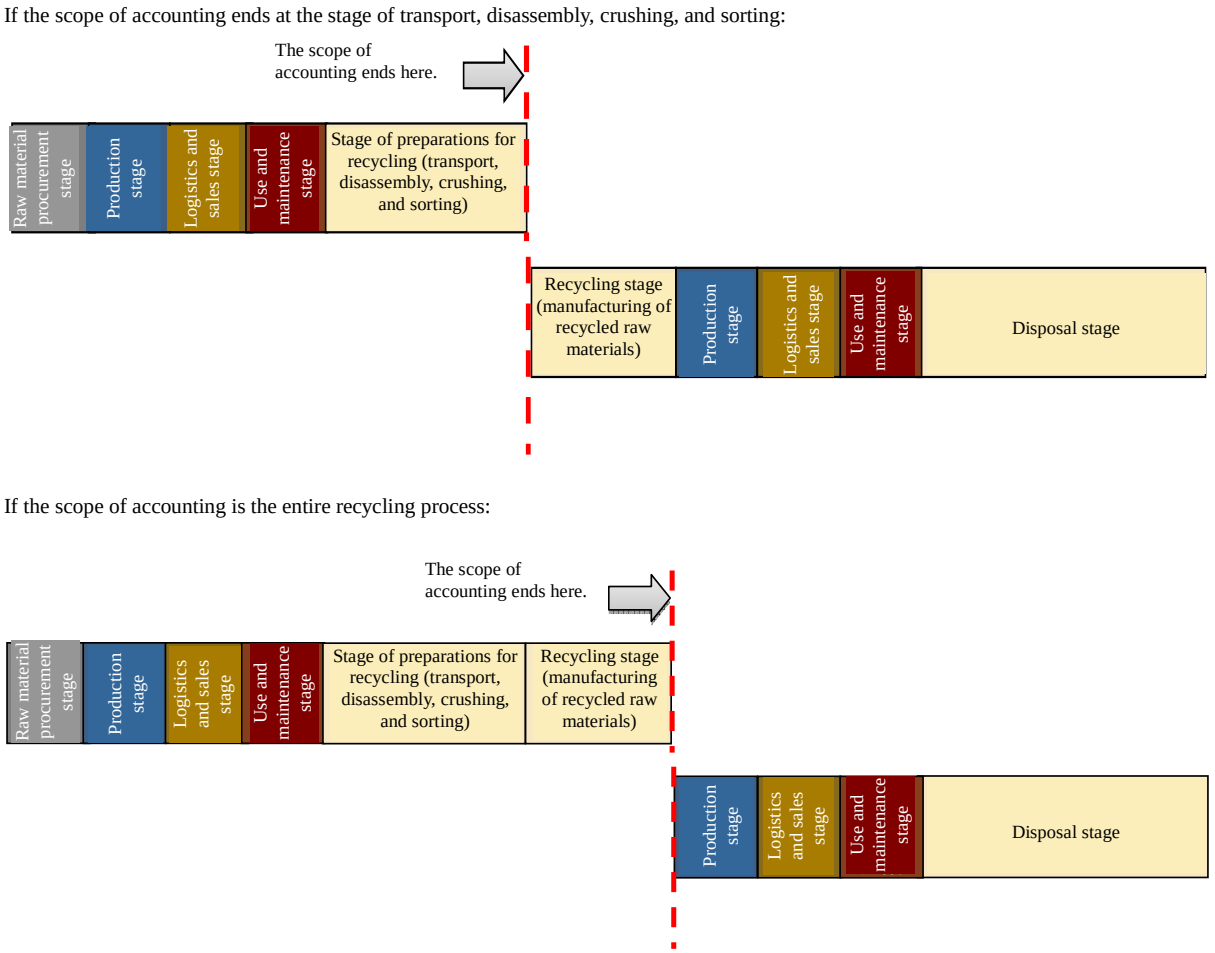


Fig. 2-8. Approach to limiting scope of accounting if sold products are recycled (example)

As stated above, as a general rule, the scope of accounting includes products manufactured or sold by the reporting company as well as all containers and packaging of such products. However, this may be limited depending on the actual situation of operations by industry.

[11] Continued study is needed concerning the handling of recycled materials because there exist a variety of approaches, including an approach in which the scope is not divided, and the company that processed and manufactured virgin materials accounts for emissions up to the final disposal stage including processes after recycling.

2.12.2. Accounting methodology

(1) Accounting methods

As in Category 5, in cases where actual figures on disposal/recycling can be determined (processing methods by type of waste, etc.), the following method is used to calculate emissions.

CO_2 emissions = Σ {(Amounts of processed/recycled waste, by type of waste and processing method) x (Emissions unit value for the type of waste and processing method)*} ・・・(12-1)

* Emissions unit values are determined for each type of waste and each processing method.

In cases where actual figures on disposal/recycling cannot be determined, emissions are estimated by multiplying the fees charged by or amounts consigned to waste disposal/recycling companies by emissions unit values based on standard scenarios for each type of waste.

Standard scenarios could be established with reference to processing rates throughout Japan for each type of waste and each processing method.

CO_2 emissions = Σ {(Waste processing/recycling fees (or amounts)) x (Emissions unit value)} ・・・(12-2)

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

In cases where actual figures on disposal/recycling can be determined (processing methods by type of waste, etc.), the amount of activity is the amount of waste processed or recycled for each type of waste and each processing method. In cases where such data cannot be determined, the costs of waste processing (or amounts) and costs of recycling (or amounts) should be determined as amounts of activity.

2.13. Category 13: Leased assets (downstream)

2.13.1. Scope of accounting

The scope of accounting consists of emissions from the operation of assets held by the reporting company as lessor and leased to other parties. However, this does not include cases where such emissions are subject to accounting under Scope 1 or 2 by the reporting company. Also, in cases where the company leases assets from others, accounting is covered by Category 8.

In accounting for emissions from the use of leased assets, it is important to avoid double counting among the respective scopes by the lessor company and the renter company. Specific decisions should be made with reference to Category 8.

In some cases, it may not be possible to distinguish between products sold to customers (accounted for under Category 11) and products leased to customers (accounted for under Category 13). Therefore, the same method may be used for

products leased to customers as for products sold to customers. In such a case, emissions from products leased to customers are recorded under Category 11 (use of sold products) instead of Category 13 (downstream leased assets) to avoid double counting between categories.

2.13.2. Accounting methodology

(1) Accounting methods

The following method is used to calculate emissions from the operation of assets leased to others if it is possible to determine energy consumption by type of energy for each leased asset.

CO_2 emissions = Σ (Consumption by energy type in leased assets x Emissions unit value by energy type) ···(13-1)

* In cases where it is necessary to allocate energy consumption in an asset because the asset held by the reporting company is a portion of an entire asset, such as cases where the reporting company is a tenant of an office building, energy consumption should be allocated by means such as the area ratio.

If it is possible to determine energy consumption for each leased asset, but the proportions of consumption by type of energy are unknown, the following method is used to calculate emissions from the operation of assets leased to others.

CO_2 emissions = Σ (Energy consumption in leased assets x Emissions unit value as a weighted average by energy type) ···(13-2)

* In cases where it is necessary to allocate energy consumption in an asset because the asset leased by the reporting company is a portion of an entire asset, such as cases where the reporting company is a tenant of an office building, energy consumption should be allocated by means such as the area ratio.

If calculations using the above methods are not feasible, then calculations are performed using average emissions unit values based on indices indicating the scale, etc., of each leased asset (such as total floor area, etc., in the case of a building).

[For buildings:] ···(13-3)

CO_2 emissions = Σ (Floor area of leased building x Emissions unit value per unit area)

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

The amount of activity is the amount of energy consumption in assets leased by the reporting company, including amounts of electricity consumption in office buildings and fuel consumption by trucks.

2.13.3. Other points for consideration

If a lessor company reports on upstream emissions such as the manufacturing of leased assets, such emissions should be included in this category.

2.14. Category 14: Franchises

2.14.1. Scope of accounting

In cases where the reporting company is a franchisor, the scope of accounting consists of Scope 1 and 2 emissions at franchisees (companies having entered into a franchise agreement). However, this does not include franchisees which are included in Scope 1 or 2.

As a general rule, the scope of this category excludes emissions included in Scope 1 and 2 (reporting company's places of business, etc.) for specified chain businesses subject to accounting under the Accounting and Reporting System. However, it is desirable to include other Scope 1 and 2 emissions of franchisees, such as fuel in vehicles used by franchisees.

2.14.2. Accounting methodology

(1) Accounting methods

Accounting is performed by calculation methods equivalent to those of the Accounting and Reporting System, as indicated below.

When accounting for emissions activities not covered by that system, please refer to the approach indicated in section 1.1 (Direct emissions, Scope 1).

For emissions unit values, please refer to the Report on Emissions Unit Values.

See the greenhouse gas emissions accounting and reporting manual of the Accounting and Reporting System.
http://www.env.go.jp/earth/ghg-santeikohyo/manual/index.html

(2) Amount of activity

See the greenhouse gas emissions accounting and reporting manual of the Accounting and Reporting System.
http://www.env.go.jp/earth/ghg-santeikohyo/manual/index.html

2.14.3. Other points for consideration

Franchisees may optionally include Scope 1 and 2 emissions of the franchisor under Category 1 (purchased goods and services).

2.15. Category 15: Investments

2.15.1. Scope of accounting

The scope of accounting under Category 15 consists of emissions (not including emissions accounted for under Scope 1 or 2) related to the operation of investments (including stock investment, bond investment, and project finance) during the accounting period. This category applies to investor companies (companies that perform investment to earn profits) and companies that provide financial services, and is generally aimed at private financial institutions (commercial banks, etc).

Financial investments are classified in the following four types.

- Stock investment
- Bond investment
- Project finance
- Managed investment and client service

Depending on how a company's organizational boundaries are defined, investment can be included in Scope 1 or Scope 2. For example, a company using the investment ratio standard would record emissions from stock investments in Scope 1 and Scope 2. A company using the controlling interest standard would only record stock investments that are under the company's control in Scope 1 and Scope 2.

Investments that are not included in the company's Scope 1 or Scope 2 emissions are accounted for under Scope 3, Category 15. Scope 3 emissions from investments are Scope 1 and 2 emissions of the investee company, and these are allocated to the reporting company in accordance with the reporting company's investment equity ratio in the investee company. Because the investment portfolio may change during an accounting period, when defining its investment situation, the company either selects a fixed date during the accounting period or uses a representative average value throughout the accounting period.

The specific scope of accounting is as follows. This approach is based on the Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

Table 2-11. Accounting for emissions from investments (mandatory)

Financial investment or service	Summary
Stock investment	Stock investment performed by the reporting company using its own capital and balance sheet; this includes the following. • Stock investment in a subsidiary (or group company) in cases where the reporting company has financial control (normally, more than 50% ownership) • Cases where the reporting company has significant influence but does not have financial control (normally, 20-50% ownership) and associated companies (or stock investment in affiliated companies) • Stock investment in joint venture companies, etc., in cases where partners have joint financial control • Stock investment using the reporting company's own capital and balance sheet in cases where it has neither financial control nor significant influence

Financial investment or service	Summary
Bond investment	Corporate debt held in the company's portfolio based on a known use of revenues, including corporate debenture financial products (such as convertible bonds prior to reorganization or conversion)
Project finance	Long-term financing by the reporting company as a stock investor (equity participant) or bond investor (financier) in a project (All emissions of the project period are recorded during the year of investment.)

Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, WRI & WBCSD

Table 2-12. Accounting for emissions from investments (optional)

Financial investment or service	Summary
Bond investment	Debt holdings (credits, loans, etc.) that are held in the company's portfolio for general company purposes, in cases where the use of revenues is not specified
Managed investment and client service	Investments managed by the company for clients (using clients' assets) or services that the company provides to clients, including the following. • Investments and asset management (stocks or fixed-income funds managed for clients using clients' assets) • Company underwriting and issuance for clients requesting stock investment or loan capital • Financial consulting services for clients who request support for M&A or need other consulting services
Other investments and financial services	Other investments, financial contracts, or financial services not included above

Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, WRI & WBCSD

2.15.2. Accounting methodology

(1) Accounting methods

There are two accounting methods: [1] Combining data from investees on Scope 1 and 2 emissions by investment according to investment equity ratios, or [2] Using economic data to estimate emissions from investments.

[Accounting method 1]

Combining data from investees on Scope 1 and 2 emissions by investment according to investment equity ratios

CO_2 emissions = Σ {(Emissions* of each stock investment x Equity holding ratio)} + Σ {(Emissions* of each bond investment x Ratio of investment destination's total capital)} + Σ {(Emissions* of each project x Ratio of project equity participation)} ···(15-1)

Anticipated emissions* during project investments are reported separately.

In addition to the above, the following items may be added optionally.

CO_2 emissions = Mandatory accounting emissions indicated above + Σ {(Emissions* ···(15-2)

from loan credit investments without known use of revenues x Ratio of investment destination's total capital)} + Σ {(Emissions* from managed investments and client services x Clients' ratio of overall operations)} + Σ {(Emissions* from other investment areas x Ratio of total investment)}

* Scope 1 and Scope 2 emissions

[Accounting method 2]

Using economic data to estimate emissions from investments

CO_2 emissions = Σ {(Amount of stock investment x Emissions unit value by investment sector)} + Σ {(Amount of bond investment x Emissions unit value by investment sector)} + Σ {(Total amount of project investment x Emissions unit value by investment sector)} ···(15-3)

In addition to the above, the following items may be added optionally.

CO_2 emissions = Mandatory accounting emissions indicated above + Σ {(Amount of loan credit investments without known use of revenues x Emissions unit value by investment sector)} + Σ {(Amount of managed investments and client services x Emissions unit value by investment sector)} + Σ {(Amount invested in other areas x Emissions unit value by investment sector)} ···(15-4)

If possible, the reporting company should use accounting method 1. Accounting method 2 is used in cases where it is not possible to obtain emissions data by investment.

For emissions unit values, please refer to the Report on Emissions Unit Values.

(2) Amount of activity

In accounting method 1, the actual data on Scope 1 and 2 emissions from the accounting period's investments, loan credit investments, project finance, managed investments, and customer service is gathered from investees. This collected emissions data is combined with investment ratios in accounting.

In accounting method 2, the amount of activity is the amount invested in investments, loan credit investments, project finance, managed investments, and customer service during the accounting period.

2.16. Other

Reporting companies may opt to use this category to account for emissions that have some relationship to their business activities but are not covered in Categories 1 to 15. For example, this could include emissions in the daily lives of employees and consumers at their homes, emissions from the use of assets not included under organizational boundaries, emissions from means of transportation used by meeting and event participants, etc.

Emissions from the everyday home lives of employees and consumers are presented as one example below.

Example: Emissions from everyday home lives of employees and consumers

2.16.1. Scope of accounting

Accounting covers emissions from the everyday home lives of the reporting company's employees and its customers (consumers). This is an optional category.

2.16.2. Accounting methodology

(1) Accounting methods

Household environmental accounting booklets* with uniform specifications are used to develop estimates based on sampling surveys.

* For example, the household environmental accounting booklet developed by the Ministry of the Environment (http://www.eco-family.go.jp/practice/index.html) could be used.

(2) Amount of activity

In practice, it is expected to be difficult to determine the amount of activity. Therefore, broad estimates are developed by determining emissions amounts based on household environmental accounting booklets from sample households and multiplying that figure by the number of employees and the number of customers (consumers), etc.

2.16.3. Other points for consideration

Emissions in the homes of the reporting party's employees and customers (consumers) include emissions from consumers' use and disposal of products. Therefore, it must be noted that some of the emissions in the homes of employees and customers (consumers) will overlap with Category 11 (Use of sold products) and Category 12 (Disposal of sold products) in the reporting party's supply chain emissions.