**Policy on Emissions Unit Values for Accounting of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain (Ver. 2.0)**

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## Introduction

This Policy presents the requirements to be met by emissions unit values for accounting of supply chain emissions, etc., as well as procedures for using the emissions unit value database when preparing the emissions unit values needed in accounting for organizations' greenhouse gas emissions, etc., throughout the supply chain (referred to below as "supply chain emissions, etc."). The purpose is to reduce the burden of accounting for supply chain emissions, etc., through the compilation of an emissions unit value database based on this Policy.

This Policy consists of the results of study by the Working Group for Study of Unit Values, a group under the Study Group on Greenhouse Gas Emissions Throughout the Supply Chain, consisting of experts and specialists (chairman: Yasunari Matsuno, Associate Professor, Graduate School of Engineering, The University of Tokyo; members listed at the end of this document).

## 1. Approach to emissions unit values for calculation of supply chain emissions, etc.

### 1.1 Basic approach

It is desirable to improve accuracy as much as possible in accounting for supply chain emissions, etc. However, due to concern that improving the accuracy of accounting may increase the cost and burden of accounting, it is important to consider the level of accounting accuracy in relation to the purpose of accounting.

This Policy shows an approach to the preparation of emissions unit values based on the assumption that the supply chain emissions calculated using emissions unit values will be used for purposes such as inclusion in CSR reports and voluntary information disclosure. Therefore, here, the emissions unit values to be prepared will not represent a new set of strictly verified values; the basic approach is to adopt or modify emissions unit values from existing LCA and the like. In addition, new emissions unit values will be established in areas where there is a lack of existing emissions unit values.

This Policy is not to be a static document, but should be continuously reviewed and improved in view of the purposes of accounting of supply chain emissions, etc., as well as the validity of emissions unit values.

## 1.2 Emissions unit values to be prepared

Accounting parties will be able to use the emissions unit values to be prepared on the basis of this Policy in accounting for supply chain emissions, etc., based on the Basic Guidelines and explanations by industry. Also, to facilitate accounting, emissions unit values will be established that can be used for each of the categories in the Basic Guidelines (See Table 1).

Table 1. Categories in the Basic Guidelines

| 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 companies |
| | 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 |

| Division | | Category | Emissions subject to accounting |
|---|---|---|---|
| | | | entities |
| | 14 | Franchises | Emissions from franchise members |
| | 15 | Investments | Emissions from operation of investments |
| | | Other | Emissions from daily lives of employees and consumers, etc. |

Source: Basic Guidelines

### 1.3 Requirements to be met by emissions unit values

As shown in the Basic Guidelines, it is considered that most supply chain emissions, etc., will be calculated by multiplying an amount of activity by an emissions unit value. However, the level of accuracy and scope of accounting (rate of coverage) vary according to the types of data used with regard to amounts of activity and emissions unit values.

Based on the recommendation in the Basic Guidelines to use the types of calculations that provide the greatest rate of coverage, it is desirable to prepare as many emissions unit values as possible, in accordance with the types of activity amount data that companies are able to obtain.

Table 2 shows the requirements to be met by emissions unit values for calculation of supply chain emissions, etc., with reference to the verification criteria for general emissions unit values. Emissions unit values for use in accounting for supply chain emissions, etc., should satisfy the requirements listed in Table 2.

Table 2. Requirements to be met by emissions unit values for calculation of supply chain emissions, etc.

| Item | Criteria and requirements |
|---|---|
| Reliability | The sources of data and origins of information can be traced. |
| Representativeness | The input and output data of the emissions unit value are suitably representative of the relevant time period, geographical area, and technologies, as indicated below. |
| Chronological conformity | The time covered does not deviate from the time of accounting, and the time covered is specified. For example, for a unit value that fluctuates from year to year, the value used should be the most appropriate at the time of accounting (closest in time).[1] Also, for a unit value that is updated once every few years, the value used should be the closest in time to the time of accounting. |
| Geographical conformity | The geographical area covered is the area where the activity in question occurred, and the area covered is specified. However, if no emissions unit value exists for the area where the activity in question occurred, a value from a different area may be substituted. |
| Technical conformity | The technology covered is technology that was present at the time of accounting. |

[1] The years of emissions unit values to be applied to accounting are as follows.

- If emissions from an activity occur in the same year as the activity, use the latest unit value that can be obtained in the fiscal year subject to accounting. (Use the unit value from that fiscal year whenever possible.)
- If emissions from an activity extend to later years than the activity, use the latest unit value that can be obtained in the fiscal year subject to accounting.
- If emissions from an activity are continuing emissions since prior years, use the latest unit value that can be obtained in each fiscal year subject to accounting when emissions occur, if it is possible to calculate emissions for each fiscal year. (If that would be difficult, use the latest emissions unit value that can be obtained in the fiscal year subject to accounting.)

## 2. Compilation and use of emissions unit value database

### 2.1 Compilation of emissions unit value database

In accordance with the basic approach to emissions unit values for accounting of supply chain emissions, etc., as indicated in section 1.1, we have prepared the emissions unit value database according to the procedural flow indicated in Fig. 1.

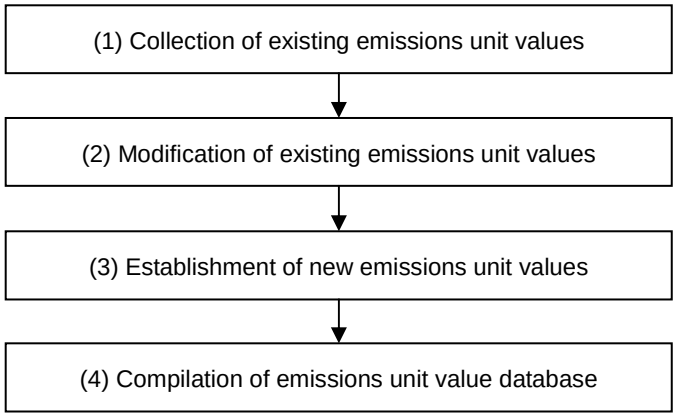



Fig. 1. Procedural flow of emissions unit value database compilation

First, based on the recommendation in the Basic Guidelines to use the types of calculations that provide the greatest rate of coverage, we decided to collect and maximize use of the emissions unit values of the existing emissions unit value databases that satisfy the requirements shown in Table 2. Next, we modified some of the emissions unit values of existing emissions unit value databases to make them easier for accounting parties to use when accounting for supply chain emissions, etc. Finally, we established new emissions unit values where the existing databases did not contain adequate emissions unit values.

We arranged the emissions unit values collected, modified, and created through the above process for each category of the Basic Guidelines and compiled them as an emissions unit value database. The results are summarized in Table 3.

In order to promote accounting for supply chain emissions, etc., companies are permitted to use emissions unit values that they have developed independently and that are not included in the emissions unit value database. However, it is desirable for companies to use emissions unit values that meet the requirements shown in Table 2. In cases where companies use emissions unit values that they have developed independently, they should clearly state the portions where such values are used, and whether these meet the requirements shown in Table 2.

# Table 3. Emissions unit value database compilation policy

| Category | | | Emissions subject to accounting | Accounting method using emissions unit values | Data type | | Applicable unit value database | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | In Japan | | | | | | In other countries | | |
| | | | | | Cradle to gate | Gate to gate | Accounting and Reporting System under the Global Warming Countermeasures Act | 3EID | CFP | IDEA | J-LCA | Other | IEA | Defra | --- |
| Reporting company | Direct emissions (Scope 1) | | Direct emissions from the use of fuel and industrial processes by the reporting company | Amount of activity x emissions unit value | | ○ | ◎ | | | * Only activities not subject to SHK | * Only activities not subject to SHK | | | | |
| | Energy-derived indirect emissions (Scope 2) | | Indirect emissions from the use of electricity and heat purchased by the reporting company | Amount of electric power and heat usage x emissions unit value | | ○ | ◎ | | | | | | | | |
| Upstream | 1 | Purchased goods and services | Emissions from activities up to manufacturing of raw materials, parts, purchased goods, sales-related materials, etc. | Data on physical amounts and monetary values of goods and services purchased or obtained by the reporting company x emissions unit value | ○ | | | ○ | ◎ | △ | △ | | | | |
| | 2 | Capital goods | Emissions from construction and manufacturing of the reporting company's capital goods | Cost of construction and manufacturing x emissions unit value | ○ | | | ○ | | △ | △ | | | | |
| | 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 companies (not including emissions from power transmission loss and in-house power consumption at power plants) | Amount of electric power and heat usage x emissions unit value | ○ | | | | ○ | △ | △ | | | | |
| | 4 | Transportation and delivery (upstream) | Emissions from distribution and storage of raw materials, parts, purchased goods, sales-related materials, etc., up to delivery to the reporting company | Amount of fuel usage, distance transported / fuel consumption, or ton-kilometers transported x emissions unit value | ○ | (○) | | | ◎ | △ | △ | ○ | | | |
| | 5 | Waste generated in operations | Emissions from transportation and processing of waste generated by the reporting company | Cost or amount of waste disposal or recycling (by type or processing method) x emissions unit value | | ○ | | | | △ | △ | ○*1 | | | |
| | 6 | Business travel | Emissions from business travel by employees | Amount of fuel usage, passenger-kilometers, or transportation costs from travel, etc., x emissions unit value | ○ | (○) | | | ◎ Only per amount of fuel usage | △ Only per amount of fuel usage | △ Only per amount of fuel usage | ○*2 | | | |

| Category | | | Emissions subject to accounting | Accounting method using emissions unit values | Data type | | Applicable unit value database | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | In Japan | | | | | | In other countries | | |
| | | | | | Cradle to gate | Gate to gate | Accounting and Reporting System under the Global Warming Countermeasures Act | 3EID | CFP | IDEA | J-LCA | Other | IEA | Defra | --- |
| | 7 | Employee commuting | Emissions from transportation of employees when commuting to and from the place of business | Amount of fuel usage, passenger-kilometers, or transportation fares from commuting, etc., x emissions unit value | ○ | (○) | | | ◎ Only per amount of fuel usage | △ Only per amount of fuel usage | △ Only per amount of fuel usage | ○*2 | | | |
| | 8 | Leased assets (upstream) | Emissions from operation of assets leased to the reporting company (excluding emissions calculated under Scope 1 or 2) | Amount of energy consumption in leased assets x emissions unit value | | ○ | ◎ | | | * Only activities not subject to SHK | * Only activities not subject to SHK | ○*3 | | For future study | |
| Downstream | 9 | Transportation and delivery (downstream) | Emissions from transport, storage, and retail sales of products | Amount of fuel usage, distance transported / fuel consumption, or ton-kilometers transported x emissions unit value | ○ | (○) | | | ◎ | △ | △ | ○ | | | |
| | 10 | Processing of sold products | Emissions from processing of intermediate products by the reporting company | Amount of energy consumption or other amount of activity x emissions unit value | | ○ | ◎ | | | * Only activities not subject to SHK | * Only activities not subject to SHK | | | | |
| | 11 | Use of sold products | Emissions from use of products by consumers and companies | Amount of energy consumption or other amount of activity x emissions unit value | | ○ | ◎ | | | * Only activities not subject to SHK | * Only activities not subject to SHK | | | | |
| | 12 | End-of-life treatment of sold products | Emissions from transportation and processing of products upon disposal by consumers and companies | Cost or amount of waste disposal or recycling (by type or processing method) x emissions unit value | | ○ | | | | △ | △ | ○*1 | | | |
| | 13 | Leased assets (downstream) | Emissions from operation of assets leased to other entities | Amount of energy consumption in leased assets x emissions unit value | | ○ | ◎ | | | * Only activities not subject to SHK | * Only activities not subject to SHK | ○*3 | | | |
| | 14 | Franchises | Emissions from franchise members | Amount of energy consumption or other amount of activity x emissions unit value | | ○ | ◎ | | | * Only activities not subject to SHK | * Only activities not subject to SHK | | | | |
| | 15 | Investments | Emissions from operation of investments | Amount of investment x emissions unit value | | ○ | | | | | | | | | |

Database abbreviations:

3EID: Embodied Energy and Emission Intensity Data for Japan (correspondence table by industry, National Institute for Environmental Studies)

CFP: Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3)
IDEA: Inventory Database for Environmental Analysis (National Institute of Advanced Industrial Science and Technology; Japan Environmental Management Association for Industry)
J-LCA: LCA database of the LCA Japan Forum

◎: Can be used as is.
○: Modified data can be used. (Modified data provided by the Secretariat.)
} Collected in the unit value database
△: Modified data can be used. (To be modified by the companies themselves.)
＊: Can be used, but with conditions.

[*1]: Based on the Accounting and Reporting System under the Global Warming Countermeasures Act, CFP, and recent records on end-of-life treatment.
[*2]: Based on the Carbon Offset Guidelines, etc.
[*3]: Based on the 2011 EDMC Handbook of Energy and Economic Statistics in Japan (Institute of Energy Economics, Japan), etc.

## 2.2 Use of compiled emissions unit value database and important points

The following is a summary of the compiled emissions unit value database (data types,[2] etc.) with usage methods and important points for each of the categories.

(1) Scope 1: Direct emissions

Accounting for direct emissions (other than transportation) from the use of fuel and industrial processes by the reporting company

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-4, section 1.1.2, Accounting methodology |
| Activities subject to accounting | Direct emissions (other than transportation) from the use of fuel and industrial processes by the reporting company |
| Accounting method | Σ (amount of activity x emissions unit value) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1-18)<br>• For each covered emissions activity,* the corresponding emissions unit value (or emission coefficient) is used.<br>* Energy-derived $CO_2$ (use of fuel), non-energy-derived $CO_2$, $CH_4$, $N_2O$, HFC, PFC, and $SF_6$<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum<br>➢ Emission coefficients for coolant leakage in the Japan Greenhouse Gas Inventory Report |
| Applicable unit values, usage methods, and important points (overseas) | • If there are programs, etc., that specify calculation methods in the overseas location of a place of business, those methods are used.<br>• If this is not feasible, calculate using methods based on the IPCC guidelines.<br>→ More in-depth study will be needed in the future. |

Accounting for direct emissions (transportation) from the use of fuel and industrial processes by the reporting company

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-4, section 1.1.2, Accounting methodology |
| Activities subject to accounting | Direct emissions (transportation)* from the use of fuel and industrial processes by the reporting company<br>* This includes transportation by a transport operator using company-owned means of transportation, as well as transportation by a company other than a transport operator using company-owned vehicles. |

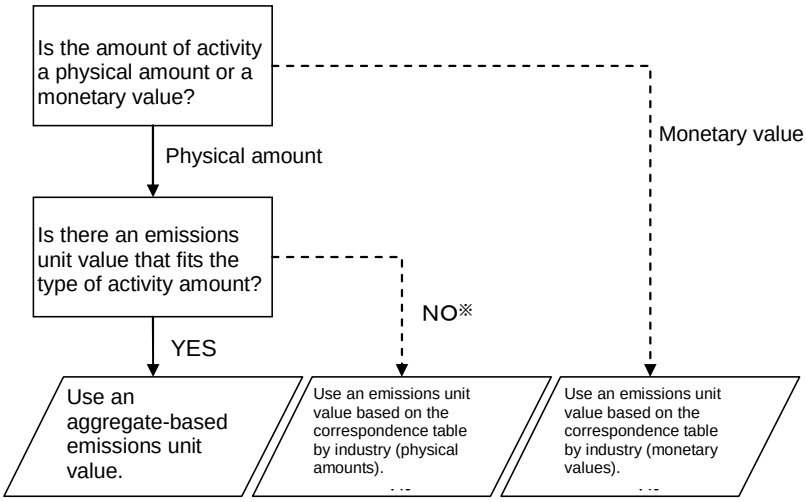
[2] For some categories, it is not necessarily clear whether the data type of emissions unit values to be used in that category is cradle-to-gate or gate-to-gate. Therefore, in this document, we have provisionally selected one or the other and established applicable unit values on that basis. In the future, as additional progress is made in the establishment of emissions unit values, further study will be needed concerning the desirable data types and applicable unit values.

| | |
|---|---|
| Accounting method | Fuel method:<br>Σ {Amount of fuel usage x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Fuel consumption method:<br>Σ {Distance transported / fuel consumption x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Ton-kilometer method:<br>• For trucks: Σ {ton-kilometers transported x fuel usage unit value for the ton-kilometer method x emissions unit value (= unit calorific value x emissions unit value x 44/12)}<br>• For railroads, ships, and aircraft: Ton-kilometers transported x emissions unit value for each mode of transport with the ton-kilometer method |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 19-24)<br>• For each accounting method, use the corresponding emissions unit value (or emission coefficient), fuel consumption, fuel usage unit value for the ton-kilometer method, etc.<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/manual/chpt2.pdf<br>See section 3.1.7, Energy usage as a consigner |
| Applicable unit values, usage methods, and important points (overseas) | • If there are programs, etc., that specify calculation methods in the overseas location of a place of business, those methods are used.<br>• If this is not feasible, calculate using methods based on the IPCC guidelines.<br>→ More in-depth study will be needed in the future. |

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

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-7, section 1.2.2, Accounting methodology |
| Activities subject to accounting | Indirect emissions from the use of electricity and heat by the reporting company |
| Accounting method | Σ (amount of electricity and heat usage x emissions unit value) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1, 18)<br>• Use the emissions unit values (or emission coefficients) for use of electric power supplied by others and use of heat supplied by others.<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br>→ Establishment of emissions unit values that conform to the scope of accounting under the GHG Protocol is an issue for further work. |
| Applicable unit values, usage methods, and important points (overseas) | • If there are programs, etc., that specify calculation methods in the overseas location of a place of business, those methods are used.<br>• If this is not feasible, then when calculating emissions from the use of electricity overseas, use emissions unit values based on the IEA's energy balance data by country.<br>→ More in-depth study will be needed in the future. |

## (3) Scope 3, Category 1: Purchased goods and services

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-9, section 2.1.2, Accounting methodology, formula 1-2 |
| Activities subject to accounting | Emissions from activities up to manufacturing of raw materials, parts, purchased goods, sales-related materials, etc. |
| Accounting method | Σ {(Data on physical amounts and monetary values for goods and services purchased or acquired by the reporting company x emissions unit value) |
| Data type | Cradle to gate |
| Applicable unit values, usage methods, and important points (within Japan) | The emissions unit value to be used is selected according to the amount of activity that is determined, based on the following decision tree.<br>  <br><br>[1] Aggregate-based emissions unit values (Appendix, pp. 25-26, extract)<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum<br><br>[2] Emissions unit values based on the correspondence table by industry (physical amounts) – Secretariat (Appendix, pp. 27-31)<br>• The purchaser price based unit values (overall values from the intermediate demand sector are used for the purchasing sector; transport related data is excluded in the breakdown) of the GLIO environmental impact factors (global link input-output model) based on the correspondence table by industry that take the global supply chain into consideration (National Institute for Environmental Studies) can be used by converting these values into physical amounts.<br>• For conversion into physical amounts, use the unit price data in the table of domestic production amounts by sector and by item, which is an appended table of the correspondence table by industry. For sectors where there is no unit price data, use the unit values of [3], because there are no unit values converted into physical amounts.<br><br>[3] Emissions unit values based on the correspondence table by industry (monetary values) – Secretariat (Appendix, pp. 27-31)<br>• The purchaser price based unit values (overall values from the intermediate |

| | |
|---|---|
| | demand sector are used for the purchasing sector; transport related data is excluded in the breakdown) of the GLIO environmental impact factors (global link input-output model) based on the correspondence table by industry that take the global supply chain into consideration (National Institute for Environmental Studies) can be used by converting values into physical amounts.<br>• From the standpoint of chronological conformity, it is considered effective to reduce the impact of price fluctuations based on a deflator, etc. |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used. |

Additional note 1: Cases where the type of activity measure already determined by the accounting party does not match the type of unit value used

In cases where the type of activity measure already determined by the accounting party does not match the type of unit value used (cases indicated by * in the logic tree above), with reference to the Japan Standard Commodity Classification, etc., accounting parties should identify a higher category that includes the activity and also has emissions unit values, and use the emissions unit values of that higher category.

Example: In the case of calculating emissions from purchases of LCD televisions under Category 1 (purchased goods and services), there are no emissions unit values in the emissions unit value database that completely match LCD televisions, but because LCD televisions are television receivers, accounting parties should use the emissions unit values for "radio and television receivers" from the GLIO environmental impact factors that take the global supply chain into consideration (National Institute for Environmental Studies).

Additional note 2: Cases of using both aggregate-based emissions unit values and emissions unit values based on the correspondence table by industry

When calculating emissions in Category 1, it is acceptable to use both aggregate-based emissions unit values and emissions unit values based on the correspondence table by industry, but as indicated in Table 4, both of them involve advantages and disadvantages. Therefore, they should be used in combination in accordance with the above decision tree, based on a thorough understanding of the characteristics of each.

Table 4. Advantages and disadvantages of aggregate-based emissions unit values and emissions unit values based on the correspondence table by industry

| | Advantages | Disadvantages |
|---|---|---|
| [1] Aggregate-based emissions unit values | ◎ A high level of accuracy is achieved through detailed collection and aggregation of data concerning the resources and energy added (input) and discharged (output) at each stage of the life cycle.<br>◎ A high level of representativeness is achieved because the data corresponds to actual processes. | ● The development of emissions unit values using the aggregation method is very time-consuming because the processes included in the life cycle are highly complex.<br>○ Because of the difficulty of achieving comprehensive coverage, the necessary unit values may not exist. |

| | Advantages | Disadvantages |
|---|---|---|
| [2] Emissions unit values based on the correspondence table by industry | ◎ It is possible to determine direct and indirect emissions from the production of all goods and services that exist in society.<br>○ The necessary unit values can be obtained, since emissions are determined for all goods and services that exist in society. | ◎ All goods and services that exist in society are classified into 400 categories under the correspondence table by industry, and a single category generally includes multiple types of goods and services; so the unit values indicate average emissions per unit of production value for multiple types of goods and services, and this makes it difficult to perform detailed analyses. |

※ ●: For persons developing unit values
○: For persons using unit values
◎: For persons developing and/or using unit values

### (4) Scope 3, Category 2: Capital goods

#### Accounting based on the weight or sale units of capital goods

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-12, section 2.2.2, Accounting methodology, formula 2-3 |
| Activities subject to accounting | Emissions from construction and manufacturing of the reporting company's capital goods |
| Accounting method | Σ {(Weight of capital goods) x (emissions unit value)}<br>or Σ {(Sale units of capital goods) x (emissions unit value)} |
| Data type | Cradle to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used. |

#### Accounting based on the price of capital goods

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-12, section 2.2.2, Accounting methodology, formula 2-3 |
| Activities subject to accounting | Emissions from construction and manufacturing of the reporting company's capital goods |
| Accounting method | Σ {(Price of capital goods [construction cost]) x (emissions unit value)} |
| Data type | Cradle to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions units by price of capital goods – Secretariat (Appendix, pp. 32-33)<br>• The emissions unit values for each capital formation sector, obtained by multiplying the purchase amounts by capital goods sector for each of the capital formation sectors (114 sectors) based on the fixed asset matrix (public + private) of the correspondence table by industry (2005 annual records) by the producer price based unit value of 3EID* in the capital goods sector, may be used. |

| | |
|---|---|
| | * Environmental impact factors with consideration for the global supply chain (National Institute for Environmental Studies) 2005 annual emissions unit values including greenhouse gases other than carbon dioxide |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used. |

### (5) Scope 3, Category 3: Fuel and energy related activities not included in Scope 1 or 2

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-14, section 2.3.2, Accounting methodology, formulas 3-2 and 3-4 |
| Activities subject to accounting | Emissions from procurement of fuel used in power generation, etc., for electricity and heat procured from other companies (not including emissions from power transmission loss and in-house power consumption at power plants) |
| Accounting method | Σ {(Reporting company's received power input data) x (Average emissions unit value for all power sources)}<br>{(Reporting company's received heat input data) x (emissions unit value)} |
| Data type | Cradle to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Unit values per amount of electricity or heat usage -- Secretariat (Appendix, p. 34)<br>• Accounting parties can use an emissions unit value based on subtracting an amount corresponding to direct emissions at power plants, etc., from the emissions unit values of the cradle-to-gate type domestic emissions unit value database.* (For heat, these are established for steam only.)<br>* Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3)<br><br>[2] Domestic emissions unit value databases<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for processes under the relevant category can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum<br><br>→ Further study is needed concerning the establishment of emissions unit values that conform to the scope of accounting under the GHG Protocol. |
| Applicable unit values, usage methods, and important points (overseas) | • In cases where it is difficult to determine an emissions unit value for use at an overseas place of business, an accounting party may provisionally apply an emissions unit value for domestic use to activities at the overseas place of business.<br>→ More in-depth study will be needed in the future. |

### (6) Scope 3, Category 4: Transportation and delivery (upstream)

### Accounting of emissions from transportation

| | |
|---|---|
| Corresponding section of the Basic Guidelines | pp. II-17-18, section 2.4.2, Accounting methodology, formulas 4-1, 4-2, 4-3, and 4-4 |
| Activities subject to accounting | Emissions from distribution and storage of raw materials, parts, purchased goods, sales-related materials, etc., up to delivery to the reporting company (emissions from transportation) |
| Accounting method | Fuel method: |

| | |
|---|---|
| | Σ {Amount of fuel usage x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Fuel consumption method:<br>Σ {Transport distance / fuel consumption x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Ton-kilometer method:<br>• For trucks: Σ {Ton-kilometers transported x unit value of fuel usage for the ton-kilometer method x emissions unit value (= unit calorific value x emissions unit value x 44/12)}<br>• For railroads, ships, and aircraft: Ton-kilometers transported x emissions unit value for each mode of transport with the ton-kilometer method |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [(tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used.<br>• The Code of Best Practice for Carbon Offset Providers: Methodology Paper for New Transport Emission Factors (Defra, UK, 2008) indicates emissions unit values for freight transport in Great Britain by mode of transport (including vehicles by type, size, and loading ratio, and aircraft by domestic or international flights and transport distance zones), and these emissions unit values could be used in accounting. |

Accounting of emissions from energy consumption at bases of cargo handling, storage, and sales

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-18-19, section 2.4.2, Accounting methodology, formulas 4-5 and 4-6 |
| Activities subject to accounting | Emissions from distribution and storage of raw materials, parts, purchased goods, sales-related materials, etc., up to delivery to the reporting company (emissions from energy consumption at bases of cargo handling, storage, and sales) |
| Accounting method | Σ (Amount of fuel usage x emissions unit value)<br>Σ (Amount of electric power usage x emissions unit value) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

Accounting of emissions from coolant leakage at bases of cargo handling, storage, and sales

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-19, section 2.4.2, Accounting methodology, formula 4-8 |
| Activities subject to accounting | Emissions from distribution and storage of raw materials, parts, purchased goods, sales-related materials, etc., up to delivery to the reporting company (emissions from coolant leakage at bases of cargo handling, storage, and sales) |
| Accounting method | If emissions are calculated by determining the amount of leakage during everyday use based on the leakage rate:<br>Σ {(Amount of coolant contained in equipment operated during the emissions accounting period x emissions unit value during use) - amount recovered and appropriately processed} |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the National Greenhouse Gas Inventory Report of Japan (Appendix, p. 35)<br>• For each item of relevant equipment, the corresponding emissions unit value (or emission coefficient) is used.<br><br>Source of unit values:<br>National Greenhouse Gas Inventory Report of Japan, April 2011 greenhouse gas inventory, office edition<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

(7) Scope 3, Category 5: Waste generated in operations

Accounting based on amounts of processed/recycled waste, by type of waste and processing method

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-22, section 2.5.2, Accounting methodology, formula 5-1 |
| Activities subject to accounting | Emissions from transportation and processing of waste generated by the reporting company |
| Accounting method | 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)} |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values by type of waste and processing method – Secretariat (Appendix, pp. 36-37)<br>• For recycling, emissions unit values are established with consideration for emissions from transport to the recycling facility as well as disassembly and sorting.<br>→ At the present time, only provisional values have been established, based on the transport portion alone. Specific unit values will be studied in the |

<table>
<tr><td></td><td>future.<br>• For incineration, emissions unit values are established with consideration for emissions from transport to the incineration facility as well as energy-derived $CO_2$ for incineration, non-energy-derived $CO_2$, $CH_4$, and $N_2O$.<br>• For landfilling, emissions unit values are established with consideration for emissions from transport to the landfill site as well as energy-derived $CO_2$ for landfilling and $CH_4$ emissions.<br><br>Setting values for each process:<br><table><tr><td>Transport</td><td>One-way transport of 100 km using a 2-ton truck with a loading ratio of 50%.</td></tr><tr><td>Incineration</td><td>• Energy-derived $CO_2$<br>The unit values given for incineration (general waste) in the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3).<br>• Non-energy-derived $CO_2$, $CH_4$, and $N_2O$<br>The emission coefficients given in the Accounting and Reporting System under the Global Warming Countermeasures Act.</td></tr><tr><td>Landfilling</td><td>• Energy-derived $CO_2$<br>The unit values given for landfilling (general waste) in the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3).<br>• $CH_4$<br>The emission coefficients given in the Accounting and Reporting System under the Global Warming Countermeasures Act.</td></tr></table><br>[2] Domestic emissions unit value databases<br>Unit values for the relevant processes, prepared on the basis of gate-to-gate type domestic emissions unit value databases such as the following, can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (overseas)</td><td>[1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used.</td></tr>
</table>

## Accounting based on fees charged for (or amounts of) wastes consigned for disposal/recycling, by type of waste

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-22, section 2.5.2, Accounting methodology, formula 5-2 |
| Activities subject to accounting | Emissions from transportation and processing of waste generated by the reporting company |
| Accounting method | Σ {(Fees (or amounts) for processing/recycling of wastes) x (emissions unit value)} |
| Data type | Gate to gate |

| | |
|---|---|
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values by type of waste – Secretariat (Appendix, pp. 36-37)<br>Weighted emissions unit values are established using the ratios of industrial waste recycling, incineration, and landfilling by type of waste based on actual records* with regard to the above [1] (Emissions unit values by type of waste and processing method – Secretariat).<br>* Survey on industrial waste generation and disposal, Ministry of the Environment (FY 2008 records)<br>→ At the present time, only provisional values have been established for recycling, based on the transport portion alone. Specific unit values will be studied in the future. |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used. |

(8) Scope 3, Category 6: Business travel

Accounting based on distances traveled and amounts of fuel consumed for transportation, etc.

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-23 to 24, section 2.6.2, Accounting methodology, formulas 6-1, 6-2, and 6-3 |
| Activities subject to accounting | Emissions from fuel and electric power consumption in means of transportation used by regularly hired workers of the reporting company in operations such as business travel (transportation portion) |
| Accounting method | • For passenger aircraft, passenger railways, passenger ships, and automobiles:<br>(For each mode of transport) Σ (Passenger-kilometers x emissions unit value)<br>Here, "passenger-kilometers" indicates (for each route) Σ (number of passengers x passenger transport distance).<br>• For automobiles:<br>Fuel method: Σ {Amount of fuel usage x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Fuel consumption method: Σ {Distance transported / fuel consumption x emissions unit value (= unit calorific value x emission coefficient x 44/12)} |
| Data type | Cradle to gate (Gate to gate may also be used.) |

<table>
<tr><td>Applicable unit values, usage methods, and important points (within Japan)</td><td>
• For passenger aircraft, passenger railways, passenger ships, and automobiles<br>
[1] Emissions unit values per passenger-kilometer – Secretariat (Appendix, p. 38)<br>
• A unit value calculated by multiplying the rate of fuel consumption per passenger-kilometer (liters per person-kilometer) by the fuel emissions unit value can be used.<br>
* Basic data used in emissions unit value calculation<br>
Rates of fuel consumption:
<table>
<tr><td>Passenger aircraft</td><td>Based on the figures given in the Statistical Yearbook of Air Transport for FY 2010 (Ministry of Land, Infrastructure and Transport) for annual person-kilometers, amount of jet fuel consumption, and amount of aviation gasoline consumption.</td></tr>
<tr><td>Passenger railways</td><td>Based on the figures given in the Statistical Yearbook of Rail Transport (Ministry of Land, Infrastructure and Transport) and the sourcebook of transportation-related statistical materials (Ministry of Land, Infrastructure and Transport) for annual electric power used for operation, fuel (diesel), and passenger-kilometers (for FY 2008).</td></tr>
<tr><td>Automobiles</td><td>Based on the figures given in the Statistical Yearbook of Automotive Transport (Ministry of Land, Infrastructure and Transport) for annual transport volume (person-kilometers) and amount of fuel consumption.</td></tr>
</table>
Fuel emissions unit values:<br>
Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3)<br><br>
→ Further study is needed to establish emissions unit values for ships.<br><br>
• Automobiles<br>
[1] Domestic emissions unit value databases<br>
• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>
• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>
➢ IDEA (Inventory Database for Environmental Analysis)<br>
➢ LCA database of the LCA Japan Forum
</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (overseas)</td><td>→ More in-depth study will be needed in the future.</td></tr>
</table>

## Accounting based on expenditures for transportation fares

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-24, section 2.6.2, Accounting methodology, formula 6-4 |
| Activities subject to accounting | Emissions from fuel and electric power consumption in means of transportation used by regularly hired workers of the reporting company in operations such as business travel (transportation portion) |
| Accounting method | (For each mode of transport) Σ (Expenditures for transportation fares x emissions unit value) |

<table>
<tr><td>Data type</td><td>Cradle to gate (Gate to gate may also be used.)</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (within Japan)</td><td>[1] Emissions unit values by amount of expenditure for transportation fares – Secretariat (Appendix, p. 39)<br>• Emissions unit values calculated on the basis of fares per passenger operating distance, operating distances, and emissions unit values by passenger-kilometers can be used.<br>* Basic data used in emissions unit value calculation<br>Fares per passenger operating distance and operating distances:
<table>
<tr><td>Passenger aircraft (domestic flights)</td><td>Based on distances and ticket prices (standard fare, one-way) between airports on major domestic routes.</td></tr>
<tr><td>Passenger aircraft (international flights)</td><td>Based on distances and ticket prices (standard economy fare, one-way) between airports on major international routes.</td></tr>
<tr><td>Passenger railways</td><td>Based on distances and fares between major domestic railway stations (ten rail lines).</td></tr>
<tr><td>Automotive transport (bus, taxi, charter vehicle)</td><td>Based on person-kilometers per amount of fares, calculated using the automotive transport operating revenue figures indicated in the Statistical Handbook of Transport Economics and the person-kilometer figures indicated in the Statistical Yearbook of Motor Vehicle Transport.</td></tr>
</table>
Emissions unit value per passenger-kilometer:<br>Use the above "Emissions unit values per passenger-kilometer – Secretariat."<br><br>→ Further study is needed to establish emissions unit values for ships.</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (overseas)</td><td>→ More in-depth study will be needed in the future.</td></tr>
</table>

## Accounting based on number of overnight stays

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-24, section 2.6.2, Accounting methodology, formula 6-5 |
| Activities subject to accounting | Emissions from fuel and electric power consumption in means of transportation used by regularly hired workers of the reporting company in operations such as business travel (lodging portion) |
| Accounting method | Σ (Number of overnight stays x emissions unit value for lodging facilities) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values for number of overnight stays – Secretariat (Appendix, p. 39)<br>• Based on the GLIO figure of 2.78 t-$CO_2$ per million yen for the lodging industry (producer price base) and the cost per overnight stay (9,730 yen, the national average for ordinary weekday hotel reservations according to the 2007 statistical survey of nationwide prices.<br>➢ 31.5 kg-$CO_2$ per overnight stay |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting based on number of days of business travel per employee

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-24, section 2.6.2, Accounting methodology, formula 6-6 |
| Activities subject to accounting | Emissions from transportation and lodging in business travel by employees |
| Accounting method | (For each type of business travel (domestic day trips, domestic overnight trips, and overseas trips)) Σ (Number of days of business travel x emissions unit value) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values based on number of days of business travel – Secretariat<br>○ Approach of calculation based on data concerning transportation costs and lodging costs related to annual business travel nationwide (2010 survey of travel and tourism consumption trends by the Japan Tourism Agency)<br>• Based on data on the annual costs of transportation and lodging consumption for each type of business travel, applicable emissions unit values are calculated on the basis of emissions unit values by means of transportation per unit cost and emissions unit values for lodging. |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting based on number of employees

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-24, section 2.6.2, Accounting methodology, formula 6-7 |
| Activities subject to accounting | Emissions from transportation and lodging in business travel by employees |
| Accounting method | (For each industry) Σ (Number of employees x emissions unit value) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values based on number of employees – Secretariat<br>○ Approach of calculation based on data concerning transportation costs and lodging costs related to annual business travel nationwide (2010 survey of travel and tourism consumption trends by the Japan Tourism Agency) (only average values for all industries)<br>• Based on data on the annual costs of transportation and lodging consumption for each type of business travel, applicable emissions unit values are calculated on the basis of emissions unit values by means of transportation per unit cost and emissions unit values for lodging.<br>○ Approach of calculation based on the correspondence table by industry (2005)<br>• Based on the amounts of input into each industry of the passenger transport sector and the lodging and per diem sector, applicable emissions unit values are calculated on the basis of emissions unit values by means of transportation per unit cost and emissions unit values for lodging. |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## (9) Scope 3, Category 7: Employee commuting

Accounting based on distances traveled and amounts of fuel consumed for transportation, etc.

<table>
<tr><td>Corresponding section of the Basic Guidelines</td><td>p. II-25, section 2.7.2, Accounting methodology, formulas 7-1, 7-2, and 7-3</td></tr>
<tr><td>Activities subject to accounting</td><td>Emissions from transportation used by employees when commuting to places of business</td></tr>
<tr><td>Accounting method</td><td>• For passenger aircraft, passenger railways, passenger ships, and automobiles:<br>(For each mode of transport) Σ (Passenger-kilometers x emissions unit value)<br>Here, "passenger-kilometers" indicates (for each route) Σ (number of passengers x passenger transport distance).<br><br>• For automobiles:<br>Fuel method: Σ {Amount of fuel usage x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Fuel consumption method: Σ {Distance transported / fuel consumption x emissions unit value (= unit calorific value x emission coefficient x 44/12)}</td></tr>
<tr><td>Data type</td><td>Cradle to gate (Gate to gate may also be used.)</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (within Japan)</td><td>For passenger aircraft, passenger railways, passenger ships, and automobiles<br>[1] Emissions unit values per passenger-kilometer – Secretariat (Appendix, p. 38)<br>• A unit value calculated by multiplying the rate of fuel consumption per passenger-kilometer (liters per person-kilometer) by the fuel emissions unit value can be used.<br>* Basic data used in emissions unit value calculation<br>Rates of fuel consumption:<br><table><tr><td>Passenger aircraft</td><td>Based on the figures given in the Statistical Yearbook of Air Transport for FY 2009 (Ministry of Land, Infrastructure and Transport) for annual person-kilometers and amount of jet fuel consumption.</td></tr><tr><td>Passenger railways</td><td>Based on the figures given in the Statistical Yearbook of Rail Transport (Ministry of Land, Infrastructure and Transport) and the sourcebook of transportation-related statistical materials (Ministry of Land, Infrastructure and Transport) for annual electric power used for operation, fuel (diesel), and passenger-kilometers (for FY 2008).</td></tr><tr><td>Automobiles (buses [commercial share-ride service], taxis, limousines, and private passenger cars)</td><td>Based on the figures given in the Statistical Yearbook of Automotive Transport (Ministry of Land, Infrastructure and Transport) for annual passenger transport volume (person-kilometers) and amount of fuel consumption (in passenger vehicles).</td></tr></table><br>Fuel emissions unit values:<br>Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3)<br><br>→ Further study is needed to establish emissions unit values for ships.</td></tr>
</table>

| | |
|---|---|
| | • Automobiles<br>[1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting based on expenditures for transportation fares

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-25, section 2.7.2, Accounting methodology, formula 7-4 |
| Activities subject to accounting | Emissions from transportation used by employees when commuting to places of business |
| Accounting method | (For each mode of transport) Σ (Expenditures for transportation fares x emissions unit value) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values by amount of expenditure for transportation fares – Secretariat (Appendix, p. 39)<br>• Emissions unit values calculated on the basis of fares per passenger operating distance, operating distances, and emissions unit values by passenger-kilometers can be used.<br>* Basic data used in emissions unit value calculation<br>Fares per passenger operating distance and operating distances: |

| | |
|---|---|
| Passenger aircraft (domestic flights) | Based on distances and ticket prices (standard fare) between airports on major domestic routes. |
| Passenger aircraft (international flights) | Based on distances and ticket prices (standard economy fare) between airports on major international routes. |
| Passenger railways | Based on distances and fares between major domestic railway stations (ten rail lines). |
| Automotive transport (bus, taxi, charter vehicle) | Based on person-kilometers per amount of fares, calculated using the automotive transport operating revenue figures indicated in the Statistical Handbook of Transport Economics and the person-kilometer figures indicated in the Statistical Yearbook of Motor Vehicle Transport. |

| | |
|---|---|
| | Emissions unit value per passenger-kilometer:<br>Use the above "Emissions unit values per passenger-kilometer – Secretariat."<br><br>→ Further study is needed to establish emissions unit values for ships. |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting based on telework

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-25, section 2.7.2, Accounting methodology, formula 7-5 |
| Activities subject to accounting | Emissions from telework by employees |
| Accounting method | (For each type of energy) Σ (Amount of fuel usage x emissions unit value) + amount of electricity usage x emissions unit value |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting based on number of employees and number of business days

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-25, section 2.7.2, Accounting methodology, formula 7-6 |
| Activities subject to accounting | Emissions from transportation used by employees when commuting to places of business |
| Accounting method | (For each work format and class of city) Σ (Number of employees/number of business days x emissions unit value) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values per number of employees/number of business days – Secretariat<br>• Applicable emissions unit values are calculated in accordance with the commuting time and proportions by means of transportation for each type based on questionnaire surveys, passenger-kilometers by means of transportation, average speed, and emissions unit values by passenger-kilometer.<br>Commuting time and proportions by means of transportation |

| | |
|---|---|
| Commuting time | Determined on the basis of questionnaire surveys |
| Proportion by means of transportation | Determined on the basis of questionnaire surveys |
| Passenger-kilometers by means of transportation | Calculated with average speed based on commuting time by means of transportation as determined on the basis of questionnaire surveys |
| Average speed | Determined on the basis of a survey report on building an environment to promote bicycle use by the survey committee on bicycle traffic network development |

Emissions unit value per passenger-kilometer:

Use the above "Emissions unit values per passenger-kilometer – Secretariat."

| | |
|---|---|
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

(10) Scope 3, Category 8: Leased assets (upstream)

Accounting in cases where the amounts of energy consumption can be determined for each leased asset and each type of energy

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-28, section 2.8.2, Accounting methodology, formula 8-1 |
| Activities subject to accounting | Emissions from operation of assets leased to the reporting company (excluding emissions calculated under Scope 1 or 2) |
| Accounting method | Σ (Consumption by energy type in leased assets x emissions unit value by energy type) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1-18)<br>• For each covered emissions activity,* the corresponding emissions unit value (or emission coefficient) is used.<br>* Energy-derived $CO_2$, non-energy-derived $CO_2$, $CH_4$, $N_2O$, HFC, PFC, and $SF_6$<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting in cases where energy consumption can be determined for each leased asset, but the proportions of consumption by type of energy are unknown

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-28, section 2.8.2, Accounting methodology, formula 8-2 |
| Activities subject to accounting | Emissions from operation of assets leased to the reporting company (excluding emissions calculated under Scope 1 or 2) |
| Accounting method | Σ (Energy consumption in leased assets x emissions unit value as a weighted average by energy type) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit value as a weighted average by energy type – Secretariat (Appendix, p. 40)<br>• The applicable emissions unit value is a weighted average using the proportions of consumption by type of energy and by type of building use.<br>* Basic data used in emissions unit value calculation |

| | Office buildings | Wholesale and retail | Restaurants | Schools | Hotels and inns | Hospitals | Other service industries |
|---|---|---|---|---|---|---|---|
| Electric power | 78.7% | 81.2% | 46.9% | 42.7% | 33.6% | 37.9% | 39.6% |
| City gas | 12.9% | 14.4% | 38.9% | 30.7% | 17.1% | 25.7% | 49.1% |
| LPG | 0.0% | 1.2% | 7.6% | 2.7% | 3.7% | 1.0% | 1.5% |
| Type A heavy oil | 3.9% | 1.2% | 0.0% | 14.7% | 37.7% | 25.4% | 7.5% |
| Kerosene | 1.1% | 0.9% | 6.6% | 8.0% | 2.3% | 10.0% | 1.5% |
| Local heat supply | 3.4% | 1.2% | 0.0% | 1.3% | 5.8% | 0.2% | 0.8% |

Source: Survey of energy use in the consumer sector, Institute of Energy Economics, Japan (FY 2002 survey commissioned by the Ministry of Economy, Trade and Industry)

The emission coefficients for each type of energy were determined with reference to the values of the Accounting and Reporting System.

http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf

| | |
|---|---|
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## Accounting in cases where it is not possible to determine energy consumption for each leased asset

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-29, section 2.8.2, Accounting methodology, formula 8-3 |
| Activities subject to accounting | Emissions from operation of assets leased to the reporting company (excluding emissions calculated under Scope 1 or 2) |
| Accounting method | Σ (Floor area of leased building x emissions unit value per unit area) |
| Data type | Gate to gate |

<table>
<tr><td>Applicable unit values, usage methods, and important points (within Japan)</td><td>[1] Emissions unit value per unit area – Secretariat (Appendix, p. 41)<br>• An emissions unit value per unit area is used.<br>* Basic data used in emissions unit value calculation<br>(Unit: MJ/m$^2$)
<table>
<tr><td>Office building</td><td>Department store or supermarket</td><td>Wholesale and retail</td><td>Restaurants</td><td>Schools</td></tr>
<tr><td>739</td><td>1,320</td><td>742</td><td>2,225</td><td>354</td></tr>
<tr><td>Hotels and inns</td><td>Hospitals</td><td>Places of entertainment</td><td>Other</td><td></td></tr>
<tr><td>1,936</td><td>1,719</td><td>1,527</td><td>1,258</td><td></td></tr>
</table>
Source: 2011 EDMC Handbook of Energy and Economic Statistics in Japan (Institute of Energy Economics, Japan)
<table>
<tr><td></td><td>Office buildings</td><td>Wholesale and retail</td><td>Restaurants</td><td>Schools</td><td>Hotels and inns</td><td>Hospitals</td><td>Other service industries</td></tr>
<tr><td>Electric power</td><td>78.7%</td><td>81.2%</td><td>46.9%</td><td>42.7%</td><td>33.6%</td><td>37.9%</td><td>39.6%</td></tr>
<tr><td>City gas</td><td>12.9%</td><td>14.4%</td><td>38.9%</td><td>30.7%</td><td>17.1%</td><td>25.7%</td><td>49.1%</td></tr>
<tr><td>LPG</td><td>0.0%</td><td>1.2%</td><td>7.6%</td><td>2.7%</td><td>3.7%^</td><td>1.0%</td><td>1.5%</td></tr>
<tr><td>Type A heavy oil</td><td>3.9%</td><td>1.2%</td><td>0.0%</td><td>14.7%</td><td>37.7%</td><td>25.4%</td><td>7.5%</td></tr>
<tr><td>Kerosene</td><td>1.1%</td><td>0.9%</td><td>6.6%</td><td>8.0%</td><td>2.3%</td><td>10.0%</td><td>1.5%</td></tr>
<tr><td>Local heat supply</td><td>3.4%</td><td>1.2%</td><td>0.0%</td><td>1.3%</td><td>5.8%</td><td>0.2%</td><td>0.8%</td></tr>
</table>
Source: Survey of energy use in the consumer sector, Institute of Energy Economics, Japan (FY 2002 survey commissioned by the Ministry of Economy, Trade and Industry)<br><br>The emission coefficients for each type of energy were determined with reference to the values of the Accounting and Reporting System.<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (overseas)</td><td>→ More in-depth study will be needed in the future.</td></tr>
</table>

## (11) Scope 3, Category 9: Transportation and delivery (downstream)

### Accounting of emissions from transportation

| | |
|---|---|
| Corresponding section of the Basic Guidelines | pp. II-32-33, section 2.9.2, Accounting methodology, formulas 9-1, 9-2, 9-3, and 9-4 |
| Activities subject to accounting | Emissions from transport, storage, and retail sales of products (emissions from transportation) |
| Accounting method | Fuel method:<br>Σ {Amount of fuel usage x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Fuel consumption method:<br>Σ {Transport distance / fuel consumption x emissions unit value (= unit calorific value x emission coefficient x 44/12)}<br>Ton-kilometer method:<br>• For trucks: Σ {Ton-kilometers transported x unit value of fuel usage for the ton-kilometer method x emissions unit value (= unit calorific value x emissions unit value x 44/12)<br>• For railroads, ships, and aircraft: Ton-kilometers transported x emissions unit value for each mode of transport with the ton-kilometer method |
| Data type | Cradle to gate (Gate to gate may also be used.) |

| | |
|---|---|
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used.<br>• The Code of Best Practice for Carbon Offset Providers: Methodology Paper for New Transport Emission Factors (Defra, UK, 2008) indicates emissions unit values for freight transport in Great Britain by mode of transportation (including vehicles by type, size, and loading ratio, and aircraft by domestic or international flights and transport distance zones), and these emissions unit values could be used in accounting. |

Accounting of emissions from energy consumption at bases of cargo handling, storage, and sales

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-33-34, section 2.9.2, Accounting methodology, formulas 9-5 and 9-6 |
| Activities subject to accounting | Emissions from transport, storage, and retail sales of products (emissions from energy consumption at bases of cargo handling, storage, and sales) |
| Accounting method | Σ (Amount of fuel usage x emissions unit value)<br>Σ (Amount of electric power usage x emissions unit value) |
| Data type | Cradle to gate (Gate to gate may also be used.) |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Applicable unit values are listed in cradle-to-gate type domestic emissions unit value databases (such as the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors [tentative, Ver. 3]).<br>• For gate-to-gate type domestic emissions unit value databases such as the following, the unit values for such processes can be used through expansion to cradle-to-gate coverage.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

Accounting of emissions from coolant leakage at bases of cargo handling, storage, and sales

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-34, section 2.9.2, Accounting methodology, formula 9-8 |
| Activities subject to accounting | Emissions from transport, storage, and retail sales of products (emissions from coolant leakage at bases of cargo handling, storage, and sales) |
| Accounting method | • If emissions are calculated by determining the amount of leakage during everyday use based on the leakage rate:<br>Σ {(Amount of coolant contained in equipment operated during the emissions accounting period x emissions unit value during use) - amount recovered and appropriately processed} |

| | |
|---|---|
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the National Greenhouse Gas Inventory Report of Japan (Appendix, p. 35)<br>• For each item of relevant equipment, the corresponding emissions unit value (or emission coefficient) is used.<br><br>Source of unit values:<br>National Greenhouse Gas Inventory Report of Japan, April 2011 greenhouse gas inventory, office edition<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

(12) Scope 3, Category 10: Processing of sold products

In cases where data on energy consumption for processing can be obtained from the buyer company

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-36, section 2.10.2, Accounting methodology, formula 10-2 |
| Activities subject to accounting | Emissions from processing of intermediate products by companies |
| Accounting method | Σ (Energy consumption in the processing of intermediate products x emissions unit value) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1-18)<br>• For each covered emissions activity,* the corresponding emissions unit value (or emission coefficient) is used.<br>* Energy-derived $CO_2$, non-energy-derived $CO_2$, $CH_4$, $N_2O$, HFC, PFC, and $SF_6$<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

In cases where data on energy consumption for processing cannot be obtained from the buyer company

| | |
|---|---|
| Corresponding section of the | p. II-36-37, section 2.10.2, Accounting methodology, formula 10-3 |

| | |
|---|---|
| Basic Guidelines | |
| Activities subject to accounting | Emissions from processing of intermediate products by companies |
| Accounting method | Σ (Amount of intermediate products sold x emissions unit value per amount processed) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• The unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

### (13) Scope 3, Category 11: Use of sold products

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-40, section 2.11.2, Accounting methodology, formulas 11-1 and 11-5 |
| Activities subject to accounting | Emissions from use of products by consumers and companies |
| Accounting method | • Direct use stage emissions:<br>Σ (Anticipated number of lifetime uses of the product x proportion of anticipated uses under the scenario 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)<br>• Indirect use stage emissions:<br>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) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1-18)<br>• For each covered emissions activity,* the corresponding emissions unit value (or emission coefficient) is used.<br>* Energy-derived $CO_2$, non-energy-derived $CO_2$, $CH_4$, $N_2O$, HFC, PFC, and $SF_6$<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

## (14) Scope 3, Category 12: End-of-life treatment of sold products

### Accounting based on amounts of processed/recycled waste, by type of waste and processing method

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-42, section 2.12.2, Accounting methodology, formula 11-1 |
| Activities subject to accounting | Emissions from transportation and processing of products upon disposal by consumers and companies |
| Accounting method | 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)} |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Domestic emissions unit value databases<br>• Unit values for the relevant processes, prepared on the basis of gate-to-gate type domestic emissions unit value databases such as the following, can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | [1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used. |

### Accounting based on fees charged for (or amounts of) wastes consigned for disposal/recycling, by type of waste

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-43, section 2.12.2, Accounting methodology, formula 11-2 |
| Activities subject to accounting | Emissions from transportation and processing of products upon disposal by consumers and companies |
| Accounting method | Σ {(Fees (or amounts) for processing/recycling of wastes) x (emissions unit value)} |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit values by type of waste – Secretariat (Appendix, pp. 36-37)<br>• Using the ratios of industrial waste recycling, incineration, and landfilling based on actual records[*1] of waste processing for each type of waste, a weighted emissions unit value is established for that type of waste from the emissions unit values[*2] for recycling, incineration, and landfilling.<br>[*1]: If there are records of processing and recycling based on programs under the Containers and Packaging Recycling Law or the Home Appliance Recycling Law, etc., those records may be used.<br>[*2]: For recycling, emissions unit values are established with consideration for emissions from transport to the recycling facility as well as disassembly and sorting.<br>For incineration, emissions unit values are established with consideration for emissions from transport to the incineration facility as well as energy-derived $CO_2$ for incineration, non-energy-derived $CO_2$, $CH_4$, and $N_2O$.<br>For landfilling, emissions unit values are established with consideration for emissions from transport to the landfill site as well as energy-derived $CO_2$ for landfilling and $CH_4$ emissions.<br><br>Setting values for each process:<br>Transport: One-way transport of 100 km using a 2-ton truck with a loading ratio of 50%. |

<table>
<tr><td></td><td>
<table>
<tr><td>Incineration</td><td>• Energy-derived $CO_2$<br>The unit values given for incineration (general waste) in the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3).<br>• Non-energy-derived $CO_2$, $CH_4$, and $N_2O$<br>The emission coefficients given in the Accounting and Reporting System under the Global Warming Countermeasures Act.</td></tr>
<tr><td>Landfilling</td><td>• Energy-derived $CO_2$<br>The unit values given for landfilling (general waste) in the Carbon Footprint of Products Pilot Project Database of GHG Emission Factors (tentative, Ver. 3).<br>• $CH_4$<br>The emission coefficients given in the Accounting and Reporting System under the Global Warming Countermeasures Act.</td></tr>
</table>
<br>→ At the present time, only provisional values have been established for the recycling of LCD televisions, refrigerators, washing machines, air conditioners, and computer monitors, based on the transport portion alone. Specific unit values will be studied in the future.
</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (overseas)</td><td>[1] Overseas emissions unit value database<br>• The emissions unit values provided in the list of databases that can be used overseas (appendix) may be used.</td></tr>
</table>

(15) Scope 3, Category 13: Leased assets (downstream)

Accounting in cases where the amounts of energy consumption can be determined for each leased asset and each type of energy

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-44, section 2.13.2, Accounting methodology, formula 13-1 |
| Activities subject to accounting | Emissions from operation of assets leased to other companies |
| Accounting method | Σ (Consumption by energy type in leased assets x emissions unit value by energy type) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1-18)<br>• For each covered emissions activity,* the corresponding emissions unit value (or emission coefficient) is used.<br>* Energy-derived $CO_2$, non-energy-derived $CO_2$, $CH_4$, $N_2O$, HFC, PFC, and $SF_6$<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used.<br>➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points | → More in-depth study will be needed in the future. |

| | |
|---|---|
| (overseas) | |

### Accounting in cases where energy consumption can be determined for each leased asset, but the proportions of consumption by type of energy are unknown

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-44, section 2.13.2, Accounting methodology, formula 13-2 |
| Activities subject to accounting | Emissions from operation of assets leased to other companies |
| Accounting method | Σ (Energy consumption in leased assets x emissions unit value as a weighted average by energy type) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emissions unit value as a weighted average by energy type – Secretariat (Appendix, p. 40)<br>• The applicable emissions unit value is a weighted average using the proportions of consumption by type of energy and by type of building use.<br>* Basic data used in emissions unit value calculation |

| | Office buildings | Wholesale and retail | Restaurants | Schools | Hotels and inns | Hospitals | Other service industries |
|---|---|---|---|---|---|---|---|
| Electric power | 78.7% | 81.2% | 46.9% | 42.7% | 33.6% | 37.9% | 39.6% |
| City gas | 12.9% | 14.4% | 38.9% | 30.7% | 17.1% | 25.7% | 49.1% |
| LPG | 0.0% | 1.2% | 7.6% | 2.7% | 3.7% | 1.0% | 1.5% |
| Type A heavy oil | 3.9% | 1.2% | 0.0% | 14.7% | 37.7% | 25.4% | 7.5% |
| Kerosene | 1.1% | 0.9% | 6.6% | 8.0% | 2.3% | 10.0% | 1.5% |
| Local heat supply | 3.4% | 1.2% | 0.0% | 1.3% | 5.8% | 0.2% | 0.8% |

Source: Survey of energy use in the consumer sector, Institute of Energy Economics, Japan (FY 2002 survey commissioned by the Ministry of Economy, Trade and Industry)

The emission coefficients for each type of energy were determined with reference to the values of the Accounting and Reporting System.

http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf

| | |
|---|---|
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

### Accounting in cases where it is not possible to determine energy consumption for each leased asset

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-44-45, section 2.13.2, Accounting methodology, formula 13-3 |
| Activities subject to accounting | Emissions from operation of assets leased to other companies |
| Accounting method | Σ (Floor area of leased building x emissions unit value per unit area) |
| Data type | Gate to gate |

<table>
<tr><td>Applicable unit values, usage methods, and important points (within Japan)</td><td>[1] Emissions unit value per unit area – Secretariat (Appendix, p. 41)<br>• An emissions unit value per unit area is used.<br>* Basic data used in emissions unit value calculation<br>(Unit: MJ/m$^2$)<br><table><tr><td>Office building</td><td>Department store or supermarket</td><td>Wholesale and retail</td><td>Restaurants</td><td>Schools</td></tr><tr><td>739</td><td>1,320</td><td>742</td><td>2,225</td><td>354</td></tr><tr><td>Hotels and inns</td><td>Hospitals</td><td>Places of entertainment</td><td>Other</td><td></td></tr><tr><td>1,936</td><td>1,719</td><td>1,527</td><td>1,258</td><td></td></tr></table><br>Source: 2011 EDMC Handbook of Energy and Economic Statistics in Japan (Institute of Energy Economics, Japan)<br><table><tr><td></td><td>Office buildings</td><td>Wholesale and retail</td><td>Restaurants</td><td>Schools</td><td>Hotels and inns</td><td>Hospitals</td><td>Other service industries</td></tr><tr><td>Electric power</td><td>78.7%</td><td>81.2%</td><td>46.9%</td><td>42.7%</td><td>33.6%</td><td>37.9%</td><td>39.6%</td></tr><tr><td>City gas</td><td>12.9%</td><td>14.4%</td><td>38.9%</td><td>30.7%</td><td>17.1%</td><td>25.7%</td><td>49.1%</td></tr><tr><td>LPG</td><td>0.0%</td><td>1.2%</td><td>7.6%</td><td>2.7%</td><td>3.7%</td><td>1.0%</td><td>1.5%</td></tr><tr><td>Type A heavy oil</td><td>3.9%</td><td>1.2%</td><td>0.0%</td><td>14.7%</td><td>37.7%</td><td>25.4%</td><td>7.5%</td></tr><tr><td>Kerosene</td><td>1.1%</td><td>0.9%</td><td>6.6%</td><td>8.0%</td><td>2.3%</td><td>10.0%</td><td>1.5%</td></tr><tr><td>Local heat supply</td><td>3.4%</td><td>1.2%</td><td>0.0%</td><td>1.3%</td><td>5.8%</td><td>0.2%</td><td>0.8%</td></tr></table><br>Source: Survey of energy use in the consumer sector, Institute of Energy Economics, Japan (FY 2002 survey commissioned by the Ministry of Economy, Trade and Industry)<br><br>The emission coefficients for each type of energy were determined with reference to the values of the Accounting and Reporting System.<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf</td></tr>
<tr><td>Applicable unit values, usage methods, and important points (overseas)</td><td>→ More in-depth study will be needed in the future.</td></tr>
</table>

## (16) Scope 3, Category 14: Franchises

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-46, section 2.14.2, Accounting methodology |
| Activities subject to accounting | Emissions from franchise members |
| Accounting method | Σ (Amount of activity x emissions unit value) |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | [1] Emission coefficients in the Accounting and Reporting System under the Global Warming Countermeasures Act (Appendix, pp. 1-18)<br>• For each covered emissions activity,* the corresponding emissions unit value (or emission coefficient) is used.<br>* Energy-derived $CO_2$, non-energy-derived $CO_2$, $CH_4$, $N_2O$, HFC, PFC, and $SF_6$<br>Source of unit values:<br>http://www.env.go.jp/earth/ghg-santeikohyo/material/itiran.pdf<br><br>[2] Other domestic emissions unit value databases<br>• For emissions activities not covered under [1], the unit values given in domestic emissions unit value databases such as the following can be used. |

| | |
|---|---|
| | ➢ IDEA (Inventory Database for Environmental Analysis)<br>➢ LCA database of the LCA Japan Forum |
| Applicable unit values, usage methods, and important points (overseas) | → More in-depth study will be needed in the future. |

### (17) Scope 3, Category 15: Investments

| | |
|---|---|
| Corresponding section of the Basic Guidelines | p. II-49, section 2.15.2, Accounting methodology, formula 15-3 |
| Activities subject to accounting | Emissions from operation of investments |
| Accounting method | Σ {(Amount of stock investment x emissions unit value by investment sector)}<br>+ Σ {(Amount of bond investment x emissions unit value by investment sector)}<br>+ Σ {(Total amount of project investment x emissions unit value by investment sector)} |
| Data type | Gate to gate |
| Applicable unit values, usage methods, and important points (within Japan) | Emissions unit values in investment sectors are to be obtained by means such as direct queries by investors to investment destinations. (Emissions unit values for investments will not be established in this database.) |
| Applicable unit values, usage methods, and important points (overseas) | |

### (18) Scope 3: Other

## 2.3 Issues for future study

The following is a list of issues requiring further study in the compilation of the emissions unit value database.

Table 4. Issues for future study

| Division | Category | | Issues for future study |
|---|---|---|---|
| Issues common to all categories | | | • Establishment and completeness of emissions unit values that are applicable in overseas activities<br>• Emissions unit value data type that is applicable in all categories (cradle-to-gate or gate-to-gate) |
| Reporting company's emissions | | | |
| | Direct emissions (Scope 1) | | |
| | Energy-derived indirect emissions (Scope 2) | | • Establishment of emissions unit values that conform to the scope of accounting under the GHG Protocol |
| Other indirect emissions (Scope 3) | | | |
| Upstream | 1 | Purchased goods and services | • Studying the potential for establishment of emissions unit values for the purchasing of resources, materials, etc., obtained by means of recycling |
| | 2 | Capital goods | |
| | 3 | Fuel and energy related activities not included in Scope 1 or 2 | • Establishment of emissions unit values that conform to the scope of accounting under the GHG Protocol |
| | 4 | Transportation and delivery (upstream) | |
| | 5 | Waste generated in operations | • Establishment of emissions unit values for cases where wastes are recycled |
| | 6 | Business travel | • Privately owned motorcycles<br>• Establishment of unit values per ship passenger-kilometer and unit values per amount of transportation fare expenditure |
| | 7 | Employee commuting | • Privately owned motorcycles<br>• Establishment of unit values per ship passenger-kilometer and unit values per amount of transportation fare expenditure |
| | 8 | Leased assets (upstream) | |
| Downstream | 9 | Transportation and delivery (downstream) | |
| | 10 | Processing of sold products | |
| | 11 | Use of sold products | |
| | 12 | End-of-life treatment of sold products | • Establishment of emissions unit values for cases where wastes are recycled |
| | 13 | Leased assets (downstream) | |
| | 14 | Franchises | |
| | 15 | Investments | |
| | | Other | |

Based on the recommendation in the Basic Guidelines to use the types of calculations that provide the greatest rate of coverage, we have tried to make maximal use of existing databases with regard to the emissions unit values established through the present study. However, because the existing databases that we have used as a reference or source of emissions unit values in this document were not developed for the purpose of calculating supply chain emissions, etc., there is a possibility that the level of accuracy may not necessarily be adequate when looking at individual emissions unit values. (In the present study, we have taken the reliability of overall databases into consideration to some extent, but we have not compared and verified the individual emissions unit values.)

Therefore, for the sake of further improvements in the accuracy of accounting, it is important to compare and study the emissions unit values to determine the extent of potential error that may arise in the results of accounting depending on the emissions unit values that are used. In addition, uncertainty in the results of accounting should also be a topic for future study.

End

**Roster of Members**
**Working Group for Study of Unit Values**
**Study Group on Greenhouse Gas Emissions Throughout the Supply Chain**

Tahara, Kiyotaka Director, Society and LCA Study Group, Research Institute of Science for Safety and Sustainability, National Institute of Advanced Industrial Science and Technology

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|---|---|
| Nakatani, Jun | Assistant Professor, Graduate School of Engineering, The University of Tokyo |
| Nakano, Katsuyuki | Manager, LCA Development Office, Department of Product and Environmental Aspects, Japan Environmental Management Association for Industry |
| Matsuno, Yasunari* | Associate Professor, Graduate School of Engineering, The University of Tokyo |
| Hayami, Hitoshi | Professor, Faculty of Business and Commerce, Keio University (through FY 2011) |
| Nansai, Keisuke | Senior researcher, International Material Cycles Research Section, Center for Material Cycles and Waste Management, National Institute for Environmental Studies (from FY 2012) |

*Chairman