(Provisional Translation)

Product Category Rules (PCR)
Approved PCR ID: PA-AG-01)

PCR Name: Potato chips
(The products made with domestic potatoes direct from contracted farmers)

Release Date: November 30, 2009

CFP Calculation and Labeling Pilot Program

*The approved PCR will expire at the end of the CFP Calculation and Labeling Pilot Program (scheduled until March 31, 2012). If the approved PCR is revised by the expiration date, however, the revised PCR shall be valid.

*This English translation of the original Japanese PCR is provided for information purpose. Please refer to the Japanese version for conducting the CFP calculation.

*Tentative Database of GHG Emission Factors for the CFP Pilot Project is available on the CFP web (Japanese only)

http://www.cfp-japan.jp/english/system/data.html

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Introduction

This PCR includes the rules, requirements and instructions related to "Potato chips (The products made with domestic potatoes direct from contracted farmers)" in the CFP Calculation and Labeling Pilot Program.

The contents provided in this PCR shall be subject to changes and revisions as needed for further refinement, upon continued discussions with relevant enterprises, during the period of the CFP Program Pilot Project.

1 Scope

1.1 Product system and system boundary

Scope of the quantification of CFP shall include contents, package (film) and packaging material (cardboard). Labeling shall be provided for each sales unit.

1.2 Life cycle stages to be covered

A life cycle flow chart is shown in Annex A. Each stage includes the following processes.

"Raw Material Acquisition Stage"

- Contents
  1) Potato cultivation process
  2) Potato storage process
  3) Potato transport process
  4) Disposal process of waste generated during raw material acquisition stage
  5) Process related to manufacturing and transport of various inputs
  6) Process related to manufacturing and transport of vegetable oil and flavoring materials
- Packaging materials
  1) Process related to manufacturing and transport of packaging materials

"Production Stage"

1) Production process of the product
   - Preprocessing and processing
   - Flavoring and processing
   - Manufacturing of the contents, filling and packaging
   - Disposal of packaging waste
2) Transport process between plants

"Distribution and Sales Stage"

1) Distribution process
   - Transport from production plant to distribution warehouse
   - Transport from distribution warehouse to wholesale warehouse
   - Transport from wholesale warehouse to retail store

2) Sales process

"Use and Maintenance Control Stage"

There is no life cycle GHG emission in this stage because potato chips are maintained at room temperature and consumed without processing.

"Disposal and Recycling Stage"

1) Process of recycling and disposal of packaging materials

2 Reference PCR

There is no PCR that can be referenced at the present time (October 20, 2009).

3 Terms and definitions

The following terms and definitions shall be applied in this PCR.

3.1 Raw potato chips

"Raw potato chips" covered by this PCR (hereinafter referred to as "potato chips") shall refer to potato chips that are manufactured by processing potatoes without grinding them into powder.

4 Data collection at each life cycle stage

4.1 Raw Material Acquisition Stage

4.1.1 Data collection items and classification of primary and secondary data

4.1.1.1 Data collection items

4.1.1.1.1 Contents

1) Potato cultivation process

The following data items, which are related to each process leading to the harvest of potatoes such as "seeding," "fielding" and "harvest," shall be collected. There is no need to collect the following data items related to potato cultivation when using secondary data on the amount of life cycle GHG emissions related to potato production.

<Inputs>

(a) Input of seed potatoes
(b) Input of fertilizers
(c) Input of agricultural chemicals
(d) Input of clean water
(e) Input of materials used for cultivation (take Multi-Sheet into consideration with regard to potatoes produced in prefectures other than Hokkaido)
(f) Input of fuel

<Products and emissions>

(a) Amount of potato production
(b) Amount of nitrous oxide emissions by the application of nitrogen fertilizers
(c) Amount of waste emitted

2) Potato storage process

The following data items, which are related to the process of storing and preparing the harvested potatoes for shipment, shall be collected. There is no need to collect the following data items related to potato storage when using secondary data on the amount of life cycle GHG emissions related to potato production.

<Inputs>

(a) Amount of shipment of potatoes
(b) Input of fuel, electricity, and clean water

<Products and emissions>

(a) Amount of shipment of potatoes
(b) Amount of waste emitted

3) Potato transport process

The following data items, which are related to the process of transporting potatoes, shall be collected. "Fuel consumption method," "fuel cost method" or "improved ton-kilometer method" shall be used to determine the amount of fuel used for transport.
Refer to Annex D for the details of each calculation method of fuel consumption.

(a) Weight of potatoes transported
(b) Amount of life cycle GHG emissions associated with fuel use

(When using the fuel consumption method)
- Amount of fuel used

(When using the fuel cost method)
- Transport distance
- Fuel economy of the vehicle used

Calculate the amount of fuel used from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

(When using the improved ton-kilometer method)
- Transport distance
- Loading ratio
- Maximum loading weight of the vehicle used

Calculate the transport ton-kilometer from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

4) Disposal process of waste generated during raw material acquisition stage

The following data items, which are related to each process leading to the harvest of potatoes such as "seeding," "fielding," "harvest" and "storage," shall be collected. There is no need to collect the following data items related to potato storage process when using secondary data on the amount of life cycle GHG emissions related to potato production.

(a) Amount of waste emitted
(b) Amount of life cycle GHG emissions related to waste disposal

5) Process related to manufacturing and transport of various inputs

The following data items shall be collected. There is no need to collect the following data items related to potato storage process when using secondary data on the amount of life cycle GHG emissions related to potato production.

(a) Amount of life cycle GHG emissions related to manufacturing and transport of seed potatoes
(b) Amount of life cycle GHG emissions related to manufacturing and transport of fertilizers
(c) Amount of life cycle GHG emissions related to manufacturing and transport of agricultural chemicals
(d) Amount of life cycle GHG emissions related to clean water supply
(e) Amount of life cycle GHG emissions related to manufacturing and transport of materials used for cultivation (wood, plastic materials, metallic materials, soil and stone materials, etc.)
(f) Amount of life cycle GHG emissions related to supply and use of fuel and electricity

6) Process related to manufacturing and transport of vegetable oil and flavoring materials

The following data items, which are related to the process of manufacturing and transport of vegetable oil and flavoring materials, shall be collected.

(a) Input of vegetable oil and flavoring materials
(b) Amount of life cycle GHG emissions related to manufacturing and transport of vegetable oil and flavoring materials

4.1.1.1.2 Packaging materials

The following data items, which are related to the process of manufacturing and transport of packaging materials (film and cardboard), shall be collected.

(a) Input of packaging materials
(b) Amount of life cycle GHG emissions related to manufacturing and transport of packaging materials

4.1.1.2 Primary data collection items

In the raw material acquisition stage of this PCR, primary data shall be collected for the following items.

4.1.1.2.1 Contents

1) Potato transport process

Primary data shall be collected for the following items, which are related to the potato transport process.

When using the improved ton-kilometer method to calculate the amount of life cycle GHG

emissions, collection of primary data shall not be mandatory, so as to allow setting of scenario based on transport distance, loading ratio and maximum loading weight of the vehicle used.

(a) Weight of potatoes transported

(b) Amount of life cycle GHG emissions associated with supply and use of fuel

(When using the fuel consumption method)

- Amount of fuel used

(When using the fuel cost method)

- Transport distance
- Fuel economy of the vehicle used

2) Process related to manufacturing and transport of vegetable oil and flavoring materials

Primary data shall be collected for the input of vegetable oil and flavoring materials in the process related to manufacturing and transport of the vegetable oil and flavoring materials.

4.1.1.2.2 Packaging materials

Primary data shall be collected for the input of packaging materials related to the process of manufacturing and transport of packaging materials (film and cardboard).

4.1.1.3 Items for which either primary or secondary data may be used

4.1.1.3.1 Contents

1) Potato cultivation process

Secondary data may be applied to the following data items which are related to each process leading to harvest of potatoes, such as "seeding," "fielding" and "harvest." There is no need to collect the following data items related to potato cultivation when using secondary data on the amount of life cycle GHG emissions related to potato production.

<Inputs>

(a) Input of seed potatoes
(b) Input of fertilizers
(c) Input of agricultural chemicals
(d) Input of clean water
(e) Input of materials used for cultivation (take Multi-Sheet into consideration with regard to potatoes produced in prefectures other than Hokkaido)
(f) Input of fuel

<Products and emissions>

(a) Amount of shipment of potatoes
(b) Amount of nitrous oxide emissions by the application of nitrogen fertilizers
(c) Amount of waste emitted

2) Potato storage process

Secondary data may be applied to the following data items, which are related to the process of storing and preparing the harvested potatoes for shipment. There is no need to collect the

following data items related to potato storage when using secondary data on the amount of life cycle GHG emissions related to potato production.

<Inputs>

(a) Input of potatoes
(b) Input of fuel, electricity and clean water

<Products and emissions>

(a) Amount of shipment of potatoes
(b) Amount of potato production for usage other than potato chips, and amount of waste generated

3) Potato transport process

Scenarios designated in this PCR may be applied to the following data items, which are related to the process of potato transport. Refer to Annex D for the details of each calculation method of fuel consumption.

(a) Amount of life cycle GHG emissions associated with fuel supply and use

(When using the improved ton-kilometer method)

- Transport distance
- Loading ratio
- Maximum loading weight of the vehicle used

4) Disposal process of waste generated during raw material acquisition stage

Secondary data may be applied to the following data items, which are related to each process leading to the harvest of potatoes such as “seeding,” “fielding,” “harvest” and “storage.” There is no need to collect the following data items related to potato cultivation when using secondary data on the amount of life cycle GHG emissions related to potato production.

(a) Amount of waste emitted
(b) Amount of life cycle GHG emissions related to waste disposal

5) Process related to manufacturing and transport of various inputs

Secondary data may be used for the following data items, which are related to the process of manufacturing and transport of various inputs.

(a) Amount of life cycle GHG emissions related to seed potato cultivation (refer to Annex B.3)
(b) Amount of life cycle GHG emissions related to manufacturing and transport of fertilizers
(c) Amount of life cycle GHG emissions related to manufacturing and transport of agricultural chemicals
(d) Amount of life cycle GHG emissions related to clean water supply
(e) Amount of life cycle GHG emissions related to manufacturing and transport of materials used for cultivation (wood, plastic materials, metallic materials, soil and stone materials, etc.)

6) Process related to manufacturing and transport of vegetable oil and flavoring materials

Secondary data may be used for the amount of life cycle GHG emissions in the process of manufacturing and transport of vegetable oil and flavoring materials.

4.1.1.3.2 Packaging materials

Secondary data may be used for the amount of life cycle GHG emissions related to manufacturing and transport of packaging materials in the process of manufacturing and transport of packaging materials (film and cardboard).

4.1.1.4 Secondary data collection items

Secondary data shall be used for the following items which are related to raw material acquisition in this PCR.

(a) Amount of life cycle GHG emissions related to supply and use of fuel and electricity, which are acquired from the outside and for which data on "GHG Emission Factors for the CFP Pilot Project" is provided.
(b) Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer

4.1.2 Primary data collection rules

4.1.2.1 Data collection method

Farming records such as farming log and farming management software may be used as information source for work unit of equipment used in the cultivation process (working hours, working area, working distance, etc.). Input of fuel and electricity associated with operation of equipment used outside the field (e.g. production of homemade compost) shall also be included in the scope of measurement as long as the input is directly related to cultivation.
Measurement method for fuel related to distribution shall be in accordance with the measurement procedures of "fuel consumption method," "fuel cost method" or "improved ton-kilometer method," as provided in the "Ordinance for the Law Concerning Rational Use of Energy." Transport distance shall be based on actual measurement in principle, but information from navigation software may also be used. In such cases, the name of the navigation software shall be provided.

4.1.2.2 Data collection period

In principle, primary data collection period shall be the most recent one year period. When not using data for the most recent one year period, a verification document stating the reasons shall be submitted to guarantee that there is no problem with data accuracy even though it is not for the most recent one year period.
However, for data items related to agricultural process such as potato cultivation process and potato seed output, data for the previous one year may be used if it is difficult to compile data for the most recent one year period before product sales. If the crop yield is extremely low in the most recent year due to weather conditions and such, the method of taking the average of multiple years before the previous year may be used.

4.1.2.3 Handling of raw material acquisition from multiple suppliers

Where raw materials are acquired from two or more suppliers, primary data should be collected from all suppliers. If the number of suppliers is very large, primary data may be used for 50 % or more of the acquired volume, and the average value of data collected from suppliers may be applied as secondary data for suppliers for which data cannot be collected. For transport of potatoes, secondary data or a designated scenario shall be used for suppliers for which data cannot be collected, even if primary data is collected for 50 % or more of the acquired volume, as there may be regional differences.

4.1.2.4 Handling of regional differences

For potato cultivation process, data for potatoes produced in Hokkaido may be used as representative values because they account for about 90 percent of total potato production volume. However, comparing potatoes from Hokkaido and potatoes produced in prefectures other than Hokkaido, Multi-Sheet is used in production of the latter. Therefore, the amount of life cycle GHG emissions related to manufacturing of Multi-Sheet shall be included in the inputs for potatoes produced in prefectures other than Hokkaido using Multi-Sheet (basis for calculation is provided in Annex B). If the use of Multi-Sheet cannot be verified in the production of potatoes produced in prefectures other than Hokkaido, calculation shall be made on the assumption that Multi-Sheet is used. There is no need to consider regional differences for other input items.

4.1.2.5 Handling of self-produced electricity

Where self-produced electricity is available on-site and the power is used for this product, the amount of fuel input for self-produced electricity shall be collected as primary data and the amount of life cycle GHG emissions related to production and combustion of the fuel shall be calculated.

4.1.2.6 Allocation method

In principle, allocation shall be based on physical quantity (mass, etc.). When using parameters other than physical quantity (economic value, etc.), the basis for using such parameters shall be provided.

4.1.3 Secondary data application rules

4.1.3.1 Secondary data to be applied

Contents and sources of secondary data that can be used in the Raw Material Acquisition Stage of this PCR are listed below. Secondary data that is not listed below may be provided by the CFP applicants (including application of other secondary data) on condition that evidence guaranteeing the validity of application of such data is prepared. Validity of the secondary data to be provided by the CFP applicants shall be verified when the CFP calculation results are verified. For data items related to cultivation, it is envisaged that average data might be disclosed for each production area and such, in technical systems and such. If such information is disclosed in the relevant area, it may be used as secondary data for data items related to cultivation. The “GHG Emission Factors for the CFP Pilot Project” listed below is intended for processes in Japan. When applying such data to overseas data, the validity of the application shall be provided, even if process names or raw

material names are the same.

■ **Amount of life cycle GHG emissions related to potato production**

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item. When applying secondary data on the amount of life cycle GHG emissions related to potato production, primary data related to potato cultivation and storage and secondary data related to potato cultivation and storage indicated below shall not be used, since the amount of life cycle GHG emissions related to potato cultivation and storage is included in the said secondary data.

■ **Amount of GHG emissions related to potato cultivation process**

For "nitrous oxide emissions by the application of synthetic fertilizers," the reference data listed below is designated as applicable secondary data in this PCR, since there is no relevant data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project."

	Process name	Value		Source
1	Nitrous oxide emissions by the application of synthetic fertilizers	3.02E+00	kg-CO_2e/kg-N	"Nitrous oxide emissions associated with the application of synthetic fertilizer to farmland soil," as described in the "*National Greenhouse Gas Inventory Report of JAPAN*" (2009)

■ **Amount of life cycle GHG emissions related to seed potato cultivation**

Amount of life cycle GHG emissions related to potato cultivation shall be used for the seed potato cultivation process, since seed potato cultivation process is similar to potato cultivation process (Annex B, B.3). The amount of potatoes produced from 1 kg of seed potatoes is normally greater than 10 kg; in this PCR, it is assumed that 10 kg of potatoes is produced from 1 kg of seed potatoes and the amount of life cycle GHG emissions related to seed potato cultivation is 0.1 times the amount of life cycle GHG emissions related to the potato cultivation process.

■ **Amount of life cycle GHG emissions related to manufacturing of inputs (fertilizers, agricultural chemicals) to potato cultivation process**

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

■ **Amount of life cycle GHG emissions related to manufacturing of inputs (materials used for cultivation, plastics) to potato cultivation process**

This item is described in Annex F, "F.3 Life cycle GHG emissions related to manufacturing of containers, packaging materials, materials used for transport and other materials."

■ **Amount of life cycle GHG emissions related to manufacturing of vegetable oil and flavoring materials**

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

Flavoring materials are described in Annex C, "C. Calculation basis for the amount of life cycle GHG emissions related to manufacturing of flavoring materials."

■ **Amount of life cycle GHG emissions related to manufacturing of packaging materials**
This item is described in Annex F, "F.3 Life cycle GHG emissions related to manufacturing of containers, packaging materials, materials used for transport and other materials."

■ **Amount of life cycle GHG emissions related to waste and wastewater**
This item is described in Annex F, "F.4 Life cycle GHG emissions related to treatment of waste and wastewater."

■ **Amount of life cycle GHG emissions related to supply and use of fuel and electricity**
This item is described in Annex F, "F.1 Life cycle GHG emissions related to supply and use of fuel and electricity."

■ **Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer**
This item is described in Annex F, "F.5 GHG emissions by fuel consumption per transport ton-kilometer."

4.1.3.2 Scenarios to be applied

In principle, it is desirable to collect primary data for transport distance, means of transport and loading ratio, and maximum loading weight of the vehicle used, which are related to transport from suppliers. However, the following scenarios may be used if primary data cannot be collected. Refer to Annex E for the methodology for setting the transport scenario.
The following scenarios may be used for calculation of the amount of life cycle GHG emissions related to Multi-Sheet used for potato cultivation in prefectures other than Hokkaido. Refer to Annex B "Multi-Sheet used for potato cultivation in prefectures other than Hokkaido" for the methodology for setting the scenario.

1) **Manufacturer of inputs to potato cultivation process ⇒ Potato grower**
<Transport distance> 500 km
<Loading ratio> 62 %
<Maximum loading weight of the vehicle used> 10-ton truck (light oil)

2) **Potato grower ⇒ Potato chip production plant**
<Transport distance> 2,000 km
<Loading ratio> 62 %
<Maximum loading weight of the vehicle used> 20-ton truck (light oil)

3) **Manufacturer of inputs to production process (other than potatoes) ⇒ Potato chip production plant**
(Example: Materials manufacturer ⇒ Potato chip production plant)
<Transport distance> 500 km
<Loading ratio> 62 %

<Maximum loading weight of the vehicle used> 10-ton truck (light oil)

4) Amount of Multi-Sheet used for potatoes produced in prefectures other than Hokkaido.
Amount of Multi-Sheet used per 1 kg of potatoes produced
Amount of life cycle GHG emissions related to Multi-Sheet used per 1 kg of potatoes produced

4.1.4 Cut-off criteria

Of the amount of life cycle GHG emissions related to manufacturing and transport of materials that are input in the Raw Material Acquisition Stage, raw materials and inputs may be cut-off if it can be proved that they collectively account for 5 % or less of the total life cycle GHG emissions in the Raw Material Acquisition Stage. When such cut-off is conducted, however, the amount of GHG emissions related to the rest of inputs shall be prorated based on the respective composition ratio in the total input mass, so that the total input mass is adjusted to 100 %.

4.1.5 Evaluation of recycled materials and reused products

When using recycled materials and reused products as inputs, the amount of life cycle GHG emissions related to manufacturing and transport of the recycled materials and reused products shall include the amount of life cycle GHG emissions associated with the recycling process (example: collection, preprocessing, regeneration processing, etc.) and the reuse process (example: collection, cleaning, etc.).

4.2 Production Stage

4.2.1 Data collection items and classification of primary and secondary data

4.2.1.1 Data collection items

1) Product production process
Data shall be collected for the following items in the Production Stage of this PCR.

<Inputs>

(a) Input of various inputs (vegetable oil, flavoring materials, etc.)
(b) Input of potatoes
(c) Input of packaging materials
(d) Input of fuel and electricity
(e) Input of water (clean water and industrial water)
Input of "clean water and industrial water" shall be data collection items, but "well water" which is pumped up on the site of the enterprise shall be excluded from the data collection items. This is because it is not necessary to grasp the amount of input, since the amount of life cycle GHG emissions related to supply of "well water" is included in the amount of life cycle GHG emissions associated with supply of fuel and electricity used for pumping.

<Products and emissions> (which are emitted to the outside)

(f) Amount of potato production
(g) Amount of waste emitted

<Other>

(g) Amount of life cycle GHG emissions related to clean water supply
(h) Amount of life cycle GHG emissions related to industrial water supply
(i) Amount of life cycle GHG emissions related to waste disposal
This item shall be excluded if the waste is collected for value or recycled.
(j) Amount of life cycle GHG emissions related to supply and use of fuel and electricity

2) Transport process between plants

The following data items shall be collected for the transport process between plants.
"Fuel consumption method," "fuel cost method" or "improved ton-kilometer method" shall be used to determine the amount of fuel used for transport. Refer to Annex D for the details of each calculation method of fuel consumption.

(a) Weight of items transported
(b) Amount of life cycle GHG emissions associated with supply and use of fuel

(When using the fuel consumption method)
- Amount of fuel used

(When using the fuel cost method)
- Transport distance
- Fuel economy of the vehicle used

Calculate the amount of fuel used from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

(When using the improved ton-kilometer method)
- Transport distance
- Loading ratio
- Maximum loading weight of the vehicle used

Calculate the transport ton-kilometer from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

4.2.1.2 Primary data collection items

In the production stage of this PCR, primary data shall be collected for the following items.

1) Production process of the product

<Inputs>

(a) Input of various inputs (vegetable oil, flavoring materials, etc.)
(b) Input of potatoes
(c) Input of packaging materials
(d) Input of fuel and electricity
(e) Input of water (clean water and industrial water)

<Products and emissions> (which are emitted to the outside)

(f) Amount of production of the product
(g) Amount of waste emitted

2) Transport process between plants

Primary data shall be collected for the following data items, which are related to the transport process between plants. When using the improved ton-kilometer method to calculate the amount of life cycle GHG emissions, collection of primary data shall not be mandatory, so as to allow setting of scenario based on transport distance, loading ratio and maximum loading weight of the vehicle used.

(a) Weight of items transported

(b) Amount of life cycle GHG emissions associated with supply and use of fuel
(When using the fuel consumption method)
- Calculate the amount of life cycle GHG emissions using the amount of fuel used

(When using the fuel cost method)
- Transport distance
- Fuel economy of the vehicle used

Calculate the transport ton-kilometer from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

4.2.1.3 Items for which either primary or secondary data may be used

1) Product production process

For the following items which are related to the Production Stage of this PCR, it is desirable to collect primary data but secondary data may also be applied.

(a) Amount of life cycle GHG emissions related to clean water supply
(b) Amount of life cycle GHG emissions related to industrial water supply
(c) Amount of life cycle GHG emissions related to waste disposal

2) Transport process between plants

It is desirable to collect primary data for the following items, which are related to the transport process between plants, but a scenario may also be set. When using a scenario, the basis for it shall be clearly provided since scenarios will be subject to verification. Refer to Annex D for the details of each calculation method of fuel consumption.

(a) Amount of life cycle GHG emissions associated with fuel supply and use
(When using the improved ton-kilometer method)
- Transport distance
- Loading ratio
- Maximum loading weight of the vehicle used

Calculate the transport ton-kilometer from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

4.2.1.4 Secondary data collection items

Secondary data shall be used for the following items which are related to the Production Stage in this PCR.

(a) Amount of life cycle GHG emissions related to supply and use of fuel and electricity, which are acquired from the outside and for which data on “GHG Emission Factors for the

CFP Pilot Project" is provided.

(b) Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer

4.2.2 Primary data collection rules

4.2.2.1 Data collection period

In principle, primary data collection period shall be the most recent one year period. When not using data for the most recent one year period, a verification document stating the reasons shall be submitted to guarantee that there is no problem with data accuracy even though it is not for the most recent one year period.

4.2.2.2 Handling of production on multiple sites

Where the product is produced at multiple production sites, primary data shall be collected for all production sites. If the number of production sites is very large, primary data for major production sites may be applied as secondary data for all other production sites, provided that combined production at major production sites covers 95 % or more of the total amount of production.

4.2.2.3 Allocation method

In principle, allocation shall be based on physical quantity (mass, etc.) and time. When using parameters other than physical quantity and time amount, the basis for using such parameters must be provided. In the production process covered by this CFP quantification, allocation based on economic values is allowed only when co-products are generated (which are sold although the production process is not intended for producing such secondary products).

4.2.2.4 Handling of regional differences and seasonal variations

For data related to production plant, there is no need to consider regional differences in the primary data.

4.2.2.5 Handling of self-produced electricity

Where self-produced electricity is available on-site and the power is used for the product, the amount of fuel input for self-produced electricity shall be collected as primary data and the amount of life cycle GHG emissions related to production and combustion of fuel shall be calculated. Where waste generated in the production plant is used to generate power and heat, the amount of life cycle GHG emissions associated with captive consumption (electricity and heat generated, less electricity being sold) shall be included (but GHG emissions associated with combustion of biomass shall be excluded).

4.2.3 Secondary data application rules

4.2.3.1 Secondary data to be applied

Contents and sources of secondary data that can be used in the Production Stage of this PCR are listed below. Secondary data that is not listed below may be provided by the CFP applicants (including application of other secondary data) on condition that evidence guaranteeing the validity

of application of such data is prepared. Validity of the secondary data to be provided by the CFP applicants shall be verified when the CFP calculation results are verified. The "GHG Emission Factors for the CFP Pilot Project" listed below is intended for processes in Japan. When applying such data to overseas data, the validity of the application must be provided, even if process names or raw material names are the same.

■ **Amount of life cycle GHG emissions related to supply and use of fuel and electricity**
This item is described in Annex F, "F.1 "Life cycle GHG emissions related to supply and use of fuel and electricity."

■ **Amount of life cycle GHG emissions related to water supply**
This item is described in Annex F, "F.2 "Life cycle GHG emissions related to water supply."

■ **Amount of life cycle GHG emissions related to waste and sewage disposal**
This item is described in Annex F, "F.4 "Life cycle GHG emissions related to treatment of waste and wastewater."

4.2.4 Cut-off criteria

Of the amount of life cycle GHG emissions related to manufacturing and transport of materials that are input in the Production Stage (other than raw materials and packaging materials), raw materials and inputs may be cut-off if it can be proved that they collectively account for 5 % or less of the total life cycle GHG emissions in the Production Stage. When such cutoff is conducted, however, the amount of GHG emissions related to the rest of inputs shall be prorated based on the respective composition ratio in the total input mass, so that the total input weight is adjusted to 100 %.

4.3 Distribution and Sales Stage

4.3.1 Scope of data collection

Data is collected by dividing distribution and sales as defined below.
Distribution process is defined as process related to transport from production plants to retail stores.
Sales process is defined as process related to sales at retail stores.
Typical flow of the distribution process is shown in Annex G.

4.3.2 Data collection items and classification of primary and secondary data

4.3.2.1 Data collection items and collection method

1) Distribution process

(a) Weight of items transported

(b) Amount of life cycle GHG emissions associated with fuel use
(When using the fuel consumption method)
- Amount of fuel used

(When using the fuel cost method)
- Transport distance
- Fuel economy of the vehicle used

Calculate the amount of fuel used from the above-listed parameters,

and then calculate the amount of life cycle GHG emissions.

(When using the improved ton-kilometer method)

- Transport distance
- Loading ratio
- Maximum loading weight of the vehicle used

Calculate the transport ton-kilometer from the above-listed parameters, and then calculate the amount of life cycle GHG emissions.

(c) Amount of life cycle GHG emissions associated with operation, maintenance and management of wholesale warehouse

- Input of electricity

2) Sales process

(a) Amount of life cycle GHG emissions related to supply and use of fuel and electricity required for store sales

(b) Amount of life cycle GHG emissions related to disposal of packaging waste generated in stores. This item shall be excluded if the packaging waste is collected for value.

(c) When using the amount of life cycle GHG emissions related to store sales, which is described later, manufacturer asking price shall be collected as data on the amount of activity.

4.3.2.2 Primary data collection items

1) Distribution process

(a) Weight of items transported

(b) Amount of life cycle GHG emissions associated with fuel use

(When using the fuel consumption method)

- Amount of fuel used

(When using the fuel cost method)

- Transport distance
- Fuel economy of the vehicle used

2) Sales process

When using the amount of life cycle GHG emissions related to store sales, manufacturer asking price shall be collected as data on the amount of activity.

4.3.2.3 Items for which either primary or secondary data may be used

1) Distribution process

(a) Amount of life cycle GHG emissions associated with the use of transport fuel

(When using the improved ton-kilometer method)

- Transport distance
- Loading ratio
- Maximum loading weight of the vehicle used

(b) Amount of life cycle GHG emissions associated with operation, maintenance and management of wholesale warehouse

- Input of electricity

2) Sales process

Amount of life cycle GHG emissions related to supply and use of fuel and electricity required for the store sales process

4.3.2.4 Secondary data collection items

Secondary data shall be used for the following items which are related to the Distribution and Sales Stage in this PCR.

(a) Amount of life cycle GHG emissions related to supply and use of fuel and electricity, which are acquired from the outside and for which data on "GHG Emission Factors for the CFP Pilot Project" is provided.

(b) Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer

4.3.3 Primary data collection rules

4.3.3.1 Data collection method and conditions

Measurement method for fuel related to distribution shall be in accordance with the measurement procedures of "fuel consumption method," "fuel cost method" or "improved ton-kilometer method," as provided in the "Ordinance for the Law Concerning Rational Use of Energy." Transport distance shall be based on actual measurement in principle, but information from navigation software may also be used. In such cases, the name of the navigation software shall be provided.

4.3.3.2 Data collection period

In principle, primary data collection period shall be the most recent one year period. When not using data for the most recent one year period, a verification document stating the reasons shall be submitted to guarantee that there is no problem with data accuracy even though it is not for the most recent one year period.

4.3.3.3 Handling of products on multiple distribution routes and sales sites

4.3.3.3.1 Multiple transport routes

When there are multiple transport routes for product transport, primary data shall be collected for all routes and the weighted average of the data shall be calculated. If the number of suppliers is very large, the "product transport scenario" described below (section 4.3.4.2) shall be applied. If primary data is collected for 50 % or more of the transported volume, the average value of data collected from transport routes may be applied as secondary data for transport routes for which data cannot be collected.

4.3.3.3.2 Multiple sales sites

When there are multiple sales sites for product sales, primary data shall be collected for all sites and the weighted average of the data shall be calculated based on sales volume. If the number of

sales sites is very large, the secondary data “store sales” described below (section 4.3.4.1) shall be applied. If primary data is collected for 50 % or more of the sales volume, the average value of data collected from sites may be applied as secondary data for sites for which data cannot be collected.

4.3.3.4 Allocation method

4.3.3.4.1 Transport process allocation method

In principle, allocation of energy consumption in the transport process shall be based on physical quantity (mass, etc.). However, when it is difficult to measure only the portion related to the product and if data related to multiple products is available, such data may be used as substitute data by allocating it based on sales value.

4.3.3.4.2 Sales process allocation method

In principle, allocation of energy consumption in the sales process shall be based on physical quantity (mass, etc.). However, when it is difficult to measure only the portion related to the product and if data related to multiple products is available, such data may be used as substitute data by allocating it based on sales value.

4.3.3.5 Handling of regional differences and seasonal variations

For primary data in the transport process and the sales process, data collection area shall be all transport routes and all sales sites in principle, since there are regional differences.
Refer to sections 4.3.4.1 and 4.3.4.2 for primary data collection in the transport process and the sales process, representation by partial data where primary data collection is difficult, or application of scenarios or secondary data.

4.3.3.6 Handling of self-produced electricity

Where self-produced electricity is available in the store and the power is used for sales of this product, the amount of fuel input for self-produced electricity shall be collected as primary data and the amount of life cycle GHG emissions related to supply and use of the fuel shall be calculated.

4.3.4 Secondary data application rules

4.3.4.1 Contents and sources of secondary data

Contents and sources of secondary data that can be used in the Distribution and Sales Stage of this PCR are listed below. Secondary data that is not listed below may be provided by the CFP applicants (including application of other secondary data), on condition that evidence guaranteeing the validity of application of such data is prepared. Validity of the secondary data to be provided by the CFP applicants shall be verified when CFP calculation results are verified.
The “GHG Emission Factors for the CFP Pilot Project” listed below is intended for processes in Japan. When applying such data to overseas data, the validity of the application shall be provided, even if process names or raw material names are the same.

■ **Amount of life cycle GHG emissions related to supply and use of fuel and electricity**

This item is described in Annex F, "F.1 Life cycle GHG emissions related to supply and use of fuel and electricity."

■ **Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer, when the transport ton-kilometer method is used**

This item is described in Annex F, "F.5 GHG emissions by fuel consumption per transport ton-kilometer."

■ **Amount of life cycle GHG emissions related to store sales**

For the amount of life cycle GHG emissions related to store sales, the reference data listed below is designated as applicable secondary data in this PCR, since there is no relevant data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project." When using this data, manufacturer asking price shall be collected as data on the amount of activity.

	Input	Value		Source
1	Store sales (room temperature sales)	0.556	g-CO_2e/yen	Ohno, Ikuhiro (2008): "Carbon Footprint in the Distribution Industry," Proceedings of the Lecture Meeting of the Food Study Group on Carbon Footprint, the Institute of Life Cycle Assessment, Japan. August 1, 2008, p.74.

4.3.4.2 Scenarios to be applied

1) When using the fuel consumption method

No scenario is set.

2) When using the fuel cost method

No scenario is set.

3) When using the improved ton-kilometer method (a) (when using non-regular routes)

[Production plant to distribution warehouse]

If actual measurement of the three items listed below is difficult in the transport process from production plant to distribution warehouse, make the calculation based on the following values.

<Transport distance> 1,000 km

<Loading ratio> 25 %

<Maximum loading weight of the vehicle used> 10 tons

The basis is provided in Annex E.

[Distribution warehouse to wholesale warehouse]

If actual measurement of the three items listed below is difficult in the transport process from distribution warehouse to wholesale warehouse, make the calculation on the assumption that the transported weight in the transport process from production plant to distribution warehouse is divided into the following values and transported.

<Transport distance> 500 km
<Loading ratio> 62 %
<Maximum loading weight of the vehicle used> 10 tons

4) Improved ton-kilometer method (b) (when using regular routes)

[Distribution warehouse to wholesale warehouse]

If actual measurement of the three items listed below is difficult in the transport process from distribution warehouse to wholesale warehouse, make the calculation on the assumption that the transported weight in the transport process from production plant to distribution warehouse is divided into the following values and transported.

<Transport distance> 1,000 km
<Loading ratio> 62 %
<Maximum loading weight of the vehicle used> 10 tons

[Wholesale warehouse to store]

If actual measurement of the three items listed below is difficult in the transport process from wholesale warehouse to store, make the calculation on the assumption that the transported weight in the transport process from production plant to distribution warehouse is divided into the following values and transported.

<Transport distance> 500 km
<Loading ratio> 62 %
<Maximum loading weight of the vehicle used> 10 tons

5) The following values shall be used in the transport process from wholesale warehouse to store.

<Transport distance> 500 km
<Loading ratio> 58 %
<Maximum loading weight of the vehicle used> 2 tons

6) Inputs related to operation, maintenance and management of wholesale warehouse

If actual measurement of all covered warehouses is difficult, make the calculation based on manufacturer asking price ratio and using the following values.

Amount of activity per one yen of manufacturer asking price

(a) Input of electricity 0.0000430 kwh
The basis is provided in Annex E.

4.4 Use and Maintenance Control Stage

In the Use and Maintenance Control Stage, life cycle GHG emissions is not generated since potato chips remain at room temperature and are eaten without processing.

4.5 Disposal and Recycling Stage

4.5.1 Data collection items and classification of primary and secondary data

4.5.1.1 Data collection items

The following data items, which are related to the Disposal and Recycling Stage in this PCR, shall be collected.

(a) Amount of packaging waste disposed at home

(b) Amount of life cycle GHG emissions related to transport of packaging waste to disposal facility

(c) Amount of packaging waste incinerated at disposal facility

(d) Amount of packaging waste landfilled at disposal facility

(e) Amount of life cycle GHG emissions related to incineration disposal at disposal facility (other than CO_2 emission derived from packaging waste)

(f) Amount of life cycle GHG emissions derived from incineration disposal of packaging waste

(g) Amount of life cycle GHG emissions related to landfill disposal at disposal facility
Note: In the "(f) Amount of life cycle GHG emissions derived from incineration disposal of packaging waste," CO_2 emissions derived from biomass may be excluded, as it is considered to be carbon neutral.

4.5.1.2 Primary data collection items

In the Disposal and Recycling Stage of this PCR, primary data shall be collected for the following items.

(a) Amount of packaging waste disposed at home

4.5.1.3 Items for which either primary or secondary data may be used

For the following items which are related to the Disposal and Recycling Stage of this PCR, secondary data (including scenarios) may also be applied.

(a) Amount of life cycle GHG emissions related to transport of packaging waste to disposal facility

(b) Amount of packaging waste incinerated at disposal facility

(c) Amount of packaging waste landfilled at disposal facility

(d) Amount of life cycle GHG emissions derived from incineration disposal of packaging waste

4.5.1.4 Secondary data collection items

For the following items which are related to the Disposal and Recycling Stage of this PCR, secondary data shall be applied.

(a) Amount of life cycle GHG emissions related to incineration disposal of packaging waste at disposal facility

(b) Amount of life cycle GHG emissions related to landfill disposal of packaging waste at disposal facility

4.5.2 Primary data collection rules

4.5.2.1 Data collection method and conditions

For the amount of packaging waste disposed at home, the weight of packaging materials as provided in the product specifications may be used, since it is assumed that all of the packaging materials used in the product will be disposed. As for the life cycle GHG emissions derived from incineration disposal of packaging waste, it may be assumed that all of the carbon content contained in packaging waste will be emitted as CO_2 through incineration.

The carbon content in the packaging waste may be calculated by multiplying the weight composition ratio of each raw material based on product specifications, by the carbon content per unit quantity of each raw material based on chemical composition. Secondary data provided in section 4.5.3.1 may also be used.

4.5.2.2 Data collection period

For the amount of packaging waste disposed at home, data collection period shall not be specified, since the weight of packaging materials provided in the product specifications may be used.

4.5.2.3 Handling of products at multiple disposal and recycling facilities

In this PCR, secondary data shall be applied to the amount of life cycle GHG emissions related to incineration disposal at disposal facility and the amount of life cycle GHG emissions related to landfill disposal at disposal facility. These secondary data may also be applied when waste is handled at multiple disposal and recycling facilities.

4.5.2.4 Allocation method

The weight allocation method shall be used.

When collecting primary data on the "amount of life cycle GHG emissions related to transport of packaging waste to disposal facility," life cycle GHG emissions for multiple routes is obtained as data for the total combined weight with other waste.

For the amount of life cycle GHG emissions for multiple routes, the total amount of life cycle GHG emissions shall be allocated based on the transported weight for each route and included in the amount of life cycle GHG emissions related to transport per unit weight. The amount of life cycle GHG emissions related to transport per unit weight, which is data for the total combined weight with other types of waste, shall also be allocated to different types of waste based on allocation by weight and included in the amount of life cycle GHG emissions related to transport per unit weight covered by this PCR.

When collecting primary data for the "amount of packaging waste incinerated at disposal facility" and the "amount of packaging waste landfilled at disposal facility," the ratio between the incinerated amount and the landfilled amount is obtained as data for total weight including other types of waste. The incinerated amount and the landfilled amount of the packaging waste shall be calculated based on allocation by weight, using the total incinerated amount and the total landfilled amount at multiple disposal sites.

4.5.3 Secondary data application rules

4.5.3.1 Contents and sources of secondary data

Contents and sources of secondary data that can be used in the Disposal and Recycling Stage of this PCR are listed below. Secondary data that is not listed below may be provided by the CFP applicants (including application of other secondary data), on condition that evidence guaranteeing the validity of application of such data is prepared. Validity of the secondary data to be provided by the CFP applicants shall be verified when the CFP calculation results are verified.

■ **Amount of life cycle GHG emissions related to waste disposal**

This item is described in Annex F, "F.4 Life cycle GHG emissions related to treatment of wastes and wastewater."

■ **Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer when improved ton-kilometer method is used**

This item is described in Annex F, "F.5 Life cycle GHG emissions by fuel consumption per transport ton-kilometer."

■ **Amount of life cycle GHG emissions derived from incineration disposal of packaging waste**

This item is described in Annex F, "F.4 Life cycle GHG emissions related to treatment of wastes and wastewater."

4.5.3.2 Scenarios to be applied

4.5.3.2.1 Waste transport scenario

For the calculation of life cycle GHG emissions related to transport of packaging waste from home to disposal facility, it is desirable to collect primary data but the following scenario may also be applied.

<Transport distance> 50 km
<Loading ratio> 62 %
<Maximum loading weight of the vehicle used> 10-ton truck (light oil)

4.5.3.2.2 Treatment scenario

For the disposal method for the packaging waste transported to disposal facility, it is desirable to collect primary data but the following scenario may also be applied. The following assumptions are applied from the current status of disposal of general waste described in "The current status of emission, disposal, etc. of general waste (actual data for fiscal year 2006)," published by the Ministry of the Environment.

- 92 % of the packaging waste is incinerated.
- 3 % is directly landfilled, and 14 % is landfilled including incinerated ash.
- 5 % is recycled. Environmental load related to recycling shall not be included.

5 Communication method

5.1 Label format, position, and size

The labeling format and size of the CFP label shall be in accordance with Japanese Technical Specification "General principles for the assessment and labeling of Carbon Footprint of Products" (TS Q0010).

CFP label shall be labeled on the package. In addition, POP labeling, pamphlet labeling and Internet labeling shall be permitted.

5.2 Calculation of the amount of life cycle GHG emissions where incremental volume or quantity of the product is sold for a short period of time

Assuming that the product will be sold for a short period of time, the amount of life cycle GHG emissions related to incremental volume or quantity of the product can be calculated and labeled by converting the life cycle GHG emissions of the product before the increment in volume or quantity by comparing the weight of the product before and after the increment. However, validity of such conversion must be verified when the product before the increment in volume or quantity is verified. When the weight of the content is increased without changing the product name, the size of the packaging materials corresponding to the increment can be uniquely determined, and the amount of life cycle GHG emissions corresponding to the increment shall be calculated by prorating the representative data of the product.

<Example of calculation>

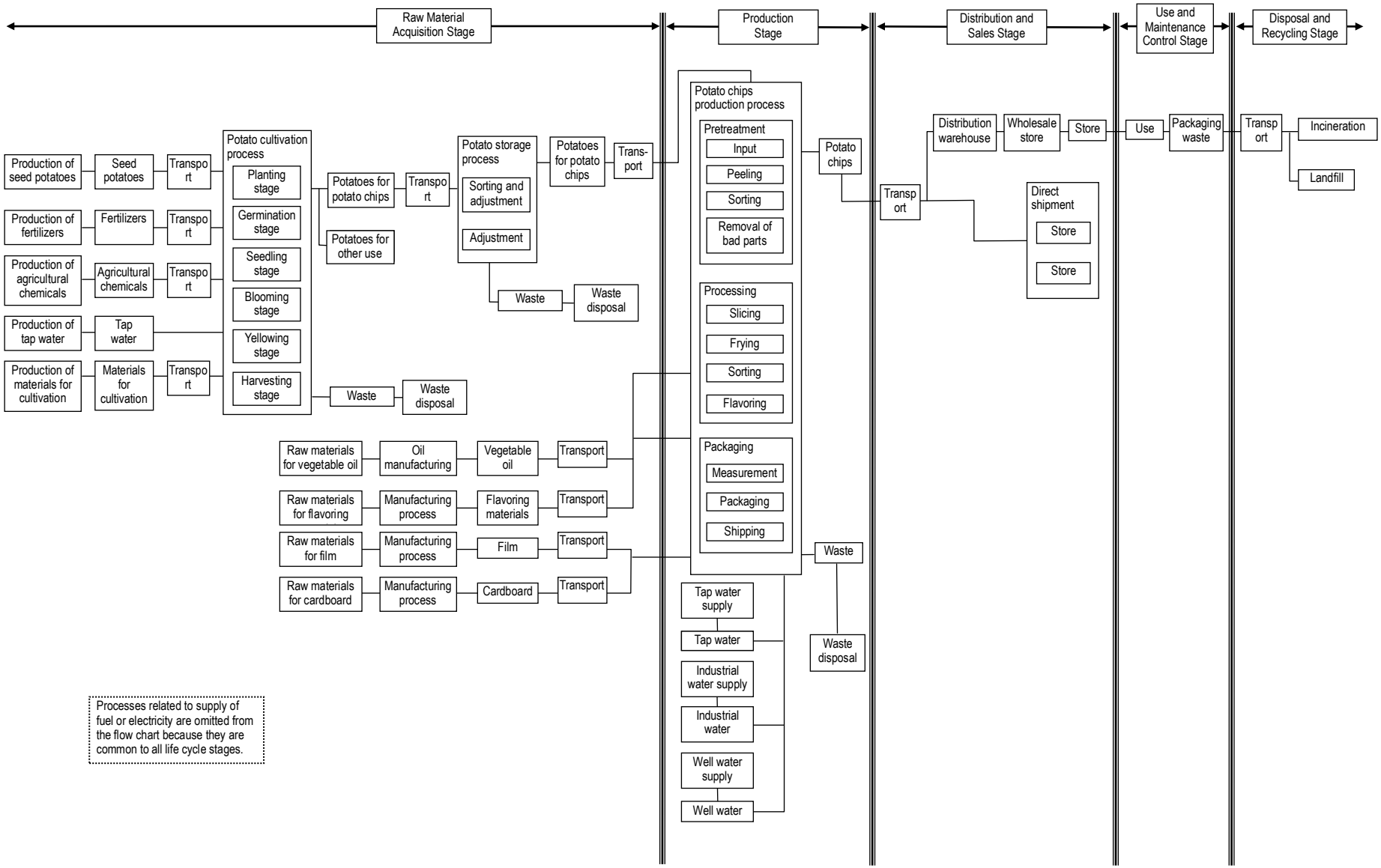
When the weight of the initial product (which has been verified) is 100 g, the CFP calculation result is 50 g-CO_2e, and the weight of the product after increment in volume or quantity is 150g. The CFP result for the product after increment in volume or quantity can be calculated as follows:

50 g-CO_2e × (150 g / 100 g) = <u>75 g-CO_2e</u>

5.3 Contents of additional information

Labeling by process and labeling by component shall be permitted as additional labeling, in expectation of encouraging the GHG reduction efforts of the enterprises responsible for each process. In addition to sales units, labeling of the amount of life cycle GHG emission per individual package and unit weight shall be permitted as additional labeling. The contents of additional information to be labeled (for example, inclusive of the amount of life cycle GHG emissions before the reduction in the labeling of reduced amount) shall be permitted only to the extent approved as appropriate by the PCR Committee.

Annex A: Life cycle flow chart



Annex B Data on potatoes

B.1 Amount of potato consumption in Japan

Data was taken from "Data on Potatoes and Starch," B. Consumption by Prefecture for Potatoes Produced in FY2007, (a) Total for Spring and Fall (approximate values), published by the Marketing Development Division, Agricultural Production Bureau, the Ministry of Agriculture, Forestry and Fisheries of Japan, February 2009.

unit : ton

		Amount of production	Raw food(Omophagia)		Total	Processed food	Feed	Seed	Starch	Others	Depletion
			Farmer private consumption	Retail							
Hokkaido		2,242,000	17,395	320,348	337,743	460,090	572	133,745	1,102,356	20,804	186,690
Tohoku	Aomori	30,200	6,959	20,512	27,471	1,827	20	880		1	1
	Iwate	10,100	6,979	904	7,883			492			1,725
	Miyagi	12,200	10,645	963	11,608			568			24
	Akita	13,600	10,186	2,060	12,246			1,354			
	Yamagata	5,780	3,585	587	4,172	132	15	410			1,051
	Fukushima	28,800	4,700	4,590	9,290	770		1,800		14,060	2,880
Kanto	Ibaraki	45,300	9,861	11,554	21,415	22,434		296			1,155
	Tochigi	11,100	6,308	3,030	9,338	319	1,110				333
	Gunma	10,700	8,200	1,950	10,150	60		410			80
	Saitama	16,420	11,352	4,865	16,217	203					
	Chiba	36,000	1,608	20,950	22,558	8,550	360	2,078			2,454
	Tokyo	6,520	2,399	3,561	5,960		364	196			
	Kanagawa	11,800	4,651	5,784	10,435	258		496			611
	Yamanashi	5,300	4,696	574	5,270	30					
	Nagano	26,700	21,550	2,960	24,510		45	1,730			415
	Shizuoka	19,550	365	17,230	17,595						1,955
Hokuriku	Niigata	17,000	11,148	3,330	14,478			1,332			1,190
	Toyama	2,540	1,703	837	2,540						
	Ishikawa	4,200	3,000	488	3,488			331			381
	Fukui	5,010	3,272	614	3,886	135		730			259
Tokai	Gifu	5,850	4,247	1,101	5,348			268			234
	Aichi	6,920	4,072	2,463	6,535	255		114			16
	Mie	3,620	927	1,865	2,792	224		242			362
Kansai	Shiga	2,020	1,898	102	2,000	20					
	Kyoto	2,740	1,610	1,130	2,740						
	Osaka	1,220	243	916	1,159						61
	Hyogo	4,800	2,594	972	3,566	2		14			643
	Nara	2,230	1,073	824	1,897						226
	Wakayama	1,100	748	352	1,100						
Chugoku Shikoku	Tottori	2,610	2,241	369	2,610						
	Shimane	2,970	2,413	468	2,881						89
	Okayama	5,550	2,842	1,728	4,570			329			378
	Hiroshima	8,840	2,940	1,700	4,640		695	431			1,781
	Yamaguchi	3,630	1,669	1,076	2,745	14		51			701
	Tokushima	2,510	1,641	257	1,898						612
	Kagawa	1,600	1,014	400	1,414			3			155
	Ehime	5,470	2,740	1,900	4,640		605	200			
	Kochi	2,080	646	1,330	1,976			58			
Kyushu	Fukuoka	5,620	4,452	382	4,834		281	14			281
	Saga	3,520	586	1,932	2,518	284	241	103			211
	Nagasaki	113,280	6,680	97,243	103,923		992	1,109			1,133
	Kumamoto	11,910	3,801	5,954	9,755	1,649	4	14			18
	Oita	2,840	1,765	1,000	2,765	75					
	Miyazaki	15,860	204	4,033	4,237	11,300		137			
	Kagoshima	93,250	3,154	81,672	84,826	4,188	351	649			472
Okinawa		3,660	1,294	2,336	3,630	10	15				5
Prefectures total		634,520	190,661	320,848	511,509	52,739	5,098	16,839		14,061	21,892
Total		2,876,540	208,056	641,196	849,252	512,829	5,670	150,584	1,102,356	34,865	208,582

From the above-listed data, the amount of potatoes produced in Hokkaido, 460,090 tons, accounted for 89.7 % of the total national potato production for processed food, 512,829 tons. Since this trend was also confirmed in data for multiple years, it was used as the basis for using Hokkaido-produced potatoes as representative data in terms of volume.

B.2 Multi-Sheet used for potato cultivation in prefectures other than Hokkaido

The so-called "Multi-Sheet" is defined according to MSDS as follows:

Product name: Polyethylene film for agricultural use

Material identification: Linear low density polyethylene

In potato cultivation, Multi-Sheet is used for covering the field to maintain ground temperature during cultivation.

Specifications of the Multi-Sheet are as follows:

Dimensions: 0.03 mm thick × 110 cm wide × 400 m long

Weight per roll: 12.14 kg

Since 1,200 meters of Multi-Sheet is required per 10 a, three roles of Multi-Sheet with above specifications will be required, weighing 36.42 kg in total. The amount of potatoes harvested per 10 a (kg/10 a) in prefectures other than Hokkaido shall be collected as primary data, a value of 3,000 (kg/10 a) for the amount of potatoes harvested per 10 a may also be used as secondary data.

B.3 Calculation basis for the amount of life cycle GHG emissions related to seed potato cultivation

The following tables, from "Agricultural Production Technology System in Hokkaido," compiled by the Hokkaido Agricultural Policy Planning Department and published by the Hokkaido Agricultural Improvement and Dissemination Society, show that the process related to seed potato cultivation is the same as the process related to potato cultivation.

"Agricultural Production Technology System in Hokkaido," compiled by the Hokkaido Agricultural Policy Planning Department and published by the Hokkaido Agricultural Improvement and Dissemination Society (an incorporated association).

Potatoes for eating raw and processed food

Work name	Work time	Machine	Machine name
Transport of seeds	10		
Seed drying	23.8	4.6	Potato cutter
Plowing	1.7	1.7	Reversible plow
Clod crushing / Soil preparation	2.2	2.2	Rotary harrow
Fertilizing / Seed planting	9.7	3.3	Potato planter / Truck
Herbicide spraying	0.4	0.4	Sprayer truck
Weeding	10		
Intertillage	1.4	1.4	Cultivator
Soil cultivation	0.7	0.7	Cultivator
Insect pest control	2.4	2.4	Sprayer truck
Harvest	51.5	10.3	Potato harvester
Transport	3.5	3.5	Truck / Front loader
Total	117.3	30.5	

Potatoes for seeds **(per ha)**

Work name	Work time	Machine	Machine name
Transport of seeds	10		
Seed drying	60		
Plowing	1.7	1.7	Reversible plow
Clod crushing / Soil preparation	2.2	2.2	Rotary harrow
Fertilizing / Seed planting	9.7	3.3	Potato planter / Truck
Herbicide spraying	0.4	0.4	Sprayer truck
Weeding	10		
Intertillage	1.4	1.4	Cultivator
Soil cultivation	0.7	0.7	Cultivator
Removal of sick plant	20.4	0.4	
Insect pest control	2.4	2.4	Sprayer truck
Harvest	51.5	10.3	Potato harvester
Transport	0.5	0.5	Truck / Front loader
Total	170.9	23.3	

Annex C Calculation basis for the amount of life cycle GHG emissions related to manufacturing of flavoring materials

For flavoring materials, scenarios for calculating the amount of life cycle GHG emissions related to "salty flavor" and "powdery flavor" of the products are shown below.
This calculation is normally done by tracing back to source materials of each flavoring material, but compositions are company-unique. So the calculation may also be based on the following representative scenario for flavoring materials.

C.1 Salty flavor

Ingredients of the primary raw material shall be as follows:

Sodium chloride
Flavored powder (primary ingredient: dextrin)

The amount of life cycle GHG emissions related to salty flavor shall be calculated based on the above composition.

C.2 Powdery flavor

Ingredients of the primary raw material shall be as follows:

Chicken powder (primary ingredient: dextrin)
Monosodium glutamate
Sugar
Sodium chloride
Corn starch

The amount of life cycle GHG emissions related to powdery flavor shall be calculated based on the above composition.
For both powders, either primary or secondary data may be used for the amount of life cycle GHG emissions related to the manufacturing process of powder production plants.

Annex D Assessment method for GHG emissions accompanying fuel consumption during transport

D.1 Fuel consumption method

1) Collect data on fuel consumption for each means of transport.
2) Calculate the amount of life cycle GHG emissions [kg-CO_2e] by multiplying the amount of fuel consumption [kg (or L)] and the "amount of life cycle GHG emissions related to supply and use of fuel" [kg-CO_2e/kg (or L)] (secondary data) for each type of fuel.

D.2 Fuel cost method

1) Collect data on fuel cost [km/L] and transport distance [km] for each means of transport, and calculate the amount of fuel consumption [kg] by multiplying the two parameters.
2) Calculate the amount of life cycle GHG emissions [kg-CO_2e] by multiplying the amount of fuel consumption [kg (or L)] and the "amount of life cycle GHG emissions related to supply and use of fuel" [kg-CO_2e/kg (or L)] (secondary data) for each type of fuel.

D.3 Improved ton-kilometer method

1) Collect data on loading ratio [%] and transport load (transport ton-kilometer) [t-km] for each means of transport.
2) If the loading ratio is unknown, assume it to be 62 %.
3) Calculate the amount of life cycle GHG emissions [kg-CO_2e] by multiplying the transport load (transport ton-kilometer) [t-km] by the "amount of life cycle GHG emissions related to fuel consumption per transport ton-kilometer" [kg-CO_2e/t/km] (secondary data) for different transport loads for each means of transport.

Annex E Transport scenario setting

In this PCR, transport scenarios are set for cases where primary data is not available in the Raw Material Acquisition Stage, the Production Stage, the Distribution and Sales Stage and the Disposal and Recycling Stage. Assumptions for each scenario are as follows:

E.1 Transport distance

<Domestic transport>

To provide an incentive for primary data collection, transport distances are set at longer possible distances rather than at an average distance.

(A) For transport that is certain to be closed within the city or between neighboring cities: 50 km
[Assumptions] Distance from the middle of the prefecture to the prefectural boundary is assumed.

(B) For transport that is certain to be closed within the prefecture: 100 km
[Assumptions] Distance between prefectural boundaries is assumed.

(C) For transport that may possibly span between prefectures: 500 km
[Assumptions] Distance in the range of Tokyo-Osaka route is assumed.

(D) For transport from producer to consumers that are not limited to those in specific areas: 1,000 km.
[Assumptions] Distance slightly longer than half the length of Honshu Island (1,600 km) is assumed.

<Domestic transport in foreign countries>

(A) For transport from the cultivation area to the processing plant of the main raw material: 500 km
[Assumptions] Distance from the state boundary to the middle of the state is assumed.

(B) For transport from the processing plant to the port: 2,000 km
[Assumptions] Twice the distance between state boundaries is assumed.

<International transport>

Navigation distance from the departing port to the arriving port is used.

For international transport distance, the following distance data may be used. (Representative ports were designated for each country and distance data between them were extracted from "Ports & Terminals Guide 2003-2004," Lloyd's Register - Fairplay Ltd.)

- Japan－Australia: 8,938 km
- Japan－Canada: 7,697 km
- Japan－United States: 8,959 km
- Japan－South Korea: 1,156 km
- Japan－China: 1,928 km
- Japan－India: 5,834 km

E.2 Means of transport

<Transport in Japan>

(A) Means of transport is basically assumed to be "10-ton truck (light oil)," to provide an incentive for reducing CO_2 emissions from physical distribution by modal shift, etc.

(B) In the scenario for raw material transport, however, the mode of domestic transport of foreign-produced main raw material is basically assumed to be "bulk transport ship (80,000 DWT or less)," based on the fact that material is typically transported by domestic vessel to the nearest port to the destination production plant.

<Domestic transport in foreign production areas>

(A) "20-ton truck (light oil)" where transport distance is less than 2,000 km.

(B) "Railway" where transport distance is 2,000 km or more.

<International transport>

Means of transport is assumed to be ocean transport and the vessel is assumed to be "bulk transport ship (80,000 DWT or less)."

E.3 Loading ratio

<Truck>

Values to be applied when loading ratio is unknown were taken from the following table in the "Methods for calculating the energy consumption related to cargo transport by cargo transport carriers," a notification by the Ministry of Economy, Trade and Industry.

Vehicle type	Fuel	Maximum loading weight (kg)		When loading ratio is unknown			
				Average loading ratio		Basic unit (l/t・km)	
			Median value	Private use	Business use	Private use	Business use
Light, compact and ordinary trucks	Gasoline	Light trucks	350	10 %	41 %	2.74	0.741
		Less than 2,000	1000	10 %	32 %	1.39	0.472
		2,000 or more	2000	24 %	52 %	0.394	0.192
Compact and ordinary trucks	Light oil	Less than 1,000	500	10 %	36 %	1.67	0.592
		1,000~1,999	1500	17 %	42 %	0.530	0.255
		2,000~3,999	3000	39 %	58 %	0.172	0.124
		4,000~5,999	5000	49 %	62 %	0.102	0.0844
		6,000~7,999	7000			0.0820	0.0677
		8,000~9,999	9000			0.0696	0.0575
		10,000~11,999	11000			0.0610	0.0504
		12,000~16,999	14500			0.0509	0.0421

It was considered that the above-listed set values, which are average loading ratios for truck transport, would yield relatively higher calculated values and therefore provide enough incentive for primary data collection, since the loading ratios for the main raw material generally tends to be higher than other cargo.

The above-listed set values were also applied to overseas land transport trucks in this PCR.

- The basis for the scenario setting of the 25 % loading rate in the transport process from the plant warehouse to the shipping storage
  The average actual loading ratio for 10-ton vehicles, 25 %, was taken from the Specific Shippers Periodic Report by Snack Food Manufacturers for FY2008.
- The basis for the scenario setting of the 2-ton maximum loading weight of the vehicle used in the transport process from the wholesale warehouse to the store
  The 2-ton maximum loading weight was applied because the operating share of 2-ton vehicles was 57% in the operation data of the general snack food wholesale industry for April, 2009.

E.4 Amount of activity related to operation, maintenance and management of wholesale warehouse

The basis for the scenario setting for the amount of activity related to operation, maintenance and management of wholesale warehouse

Electricity consumption per one yen of manufacturer asking price was calculated from power consumption at warehouses operated by the general snack food wholesale industry for April 2009 (7,747 kwh), and the estimated sales amount based on manufacturer asking price for April 2009 (270,545,220 yen, estimated by multiplying the amount of transaction by 10/7). Then the calculated value was increased by roughly 50 %, in consideration of providing incentive for making actual measurement, and used as the set value for the scenario.

Annex F Secondary data common to all life cycle stages

When applying the "GHG Emission Factors for the CFP Pilot Project" and reference data shown in this PCR to overseas cases, the validity of application of such data must be provided, since such data is intended for fuels and electricity used in Japan, raw materials manufactured in Japan, and processes implemented in Japan.
Secondary data that is not listed below (i.e. data to which the "GHG Emission Factors for the CFP Pilot Project" is not applied) may be provided by the CFP applicants, on condition that evidence guaranteeing the validity of application of such data is prepared.

F.1 Life cycle GHG emissions related to supply and use of fuel and electricity

F.1.1 Application of GHG Emission Factors

For the items listed below, data on "manufacturing" and "combustion" for the relevant fuels in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" shall be used. Correlation with the GHG emission factors is as follows.

■ **Amount of life cycle GHG emissions related to the supply of fuel and electricity**

	Fuel type		Correlation with "GHG Emission Factors for the CFP Pilot Project"
1	Fuel	Light oil	"Light oil"
2		Kerosene	"Kerosene"
3		Gasoline	"Gasoline"
4		Heavy oil A	"Heavy oil A"
5		Heavy oil B	"Heavy oil B"
6		Heavy oil C	"Heavy oil C"
7		LPG	"Liquefied Petroleum Gas (LPG)"
8		Utility gas 13A	"Utility gas 13A"
9	Power usage	Steam	"Steam"
10	Purchased electricity		"Electricity (Average for Japan)"

■ **Amount of life cycle GHG emissions related to the use of fuel and electricity**

	Fuel type		Correlation with "GHG Emission Factors for the CFP Pilot Project"
1	Fuel	Light oil	"Combustion/Light oil"
2		Kerosene	"Combustion/Kerosene"
3		Gasoline	"Combustion/Gasoline"
4		Heavy oil A	"Combustion/Heavy oil A"
5		Heavy oil B	"Combustion/Heavy oil B"
6		Heavy oil C	"Combustion/Heavy oil C"
7		LPG	"Combustion/LPG"
8		Utility gas 13A	"Combustion/Utility gas 13A"

There is no life cycle GHG emission related to the use of "steam" and "purchased electricity."

The “GHG Emission Factors for the CFP Pilot Project” shall not be applied to purchased electricity used in foreign countries, since the amount of life cycle GHG emissions related to the supply of purchased electricity varies significantly by country, reflecting the differences in power supply composition. For the “amount of life cycle GHG emissions related to the supply of purchased electricity,” reference data that is applicable as secondary data in this PCR is suggested (See Section F.1.2.1).

F.1.2 Data to which “GHG Emission Factors for the CFP Pilot Project” is not applied

F.1.2.1 Purchased electricity Outside of Japan

There is no data in the “Tentative Database of GHG Emission Factors for the CFP Pilot Project” that is applicable to this data item.

F.1.2.2 Biodiesel and bioethanol

There is no data in the “Tentative Database of GHG Emission Factors for the CFP Pilot Project” that is applicable to this data item.

F.2 Life cycle GHG emissions related to water supply

For the amount of life cycle GHG emissions related to the supply of water, relevant data in the “Tentative Database of GHG Emission Factors for the CFP Pilot Project” shall be used. Correlation with the GHG emission factors is as follows.

	Data item	Correlation with “GHG Emission Factors for the CFP Pilot Project”
1	Clean water (tap water)	“Tap water”
2	Industrial water	“Industrial water”

When applying the “GHG Emission Factors for the CFP Pilot Project” listed above as the amount of life cycle GHG emissions related to water supply in foreign countries, the validity of application of such data must be provided, since the “GHG Emission Factors for the CFP Pilot Project” listed above is intended for water used in Japan.

F.3 Life cycle GHG emissions related to manufacturing of containers, packaging materials, materials used for transport and other materials

- For plastics containers, packaging materials and materials used for transport, there are two types of secondary data: (a) Secondary data on resin manufacturing and (b) Secondary data on molding. When using these data, there shall not be unreported or double-counted life cycle GHG emissions related to molding.
- For paper containers, packaging materials and materials used for transport, there are secondary data on paper manufacturing and secondary data that takes into account paper manufacturing and molding. When using these data, there shall not be unreported or double-counted life cycle GHG emissions related to molding.

- The amount of life cycle GHG emissions related to transport is not included in the following secondary data list. The amount of life cycle GHG emissions related to transport shall be evaluated by collecting primary data or applying transport scenario for each life cycle stage.
- When applying the "GHG Emission Factors for the CFP Pilot Project" and reference data listed below to materials manufactured in foreign countries and processes implemented in foreign countries, the validity of application of such data must be provided, since the "GHG Emission Factors for the CFP Pilot Project" listed below is intended for materials manufactured in Japan and processes implemented in Japan.

F3.1 Plastic containers, packaging materials and materials used for transport

F3.1.1 Secondary data of resin manufacturing

For the amount of life cycle GHG emissions related to resin manufacturing, relevant data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" shall be used.

F3.1.2 Secondary data of molding

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

F3.1.3 Paper containers, packaging materials and materials used for transport

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

F.3.1.4 Metallic materials

For the amount of life cycle GHG emissions related to manufacturing of metallic materials, relevant data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" shall be used.

F.3.1.5 Other materials

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

F.4 Life cycle GHG emissions related to treatment of wastes and wastewater

F.4.1 Application of "GHG Emission Factors for the CFP Pilot Project"

For the items listed below, data on "manufacturing" and "combustion" for the relevant fuels in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" shall be used. Correlation with the GHG emission factors is as follows.

	Data item	Correlation with "GHG Emission Factors for the CFP Pilot Project"
1	Crushing	"Crushing"
2	Incineration	"General waste incineration"
3	Landfill	"Landfill (managed type)"

When applying the "GHG Emission Factors for the CFP Pilot Project" listed above to processes implemented in foreign countries, the validity of application of such data must be provided, since the data listed above is intended for processes implemented in Japan.
Data for "Incineration" is the amount of life cycle GHG emissions derived from fuel consumption for incineration of waste. Therefore the amount of CO_2 emissions derived from carbon atoms in the waste must be separately calculated and added. Reference data related to the amount of life cycle GHG emissions derived from incineration of waste is shown in Section F.4.2.

F.4.2 Applicable reference data

F.4.2.1 Life cycle GHG emissions related to sewage treatment

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

F.4.2.2 GHG emissions from incineration of wastes

There is no data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" that is applicable to this data item.

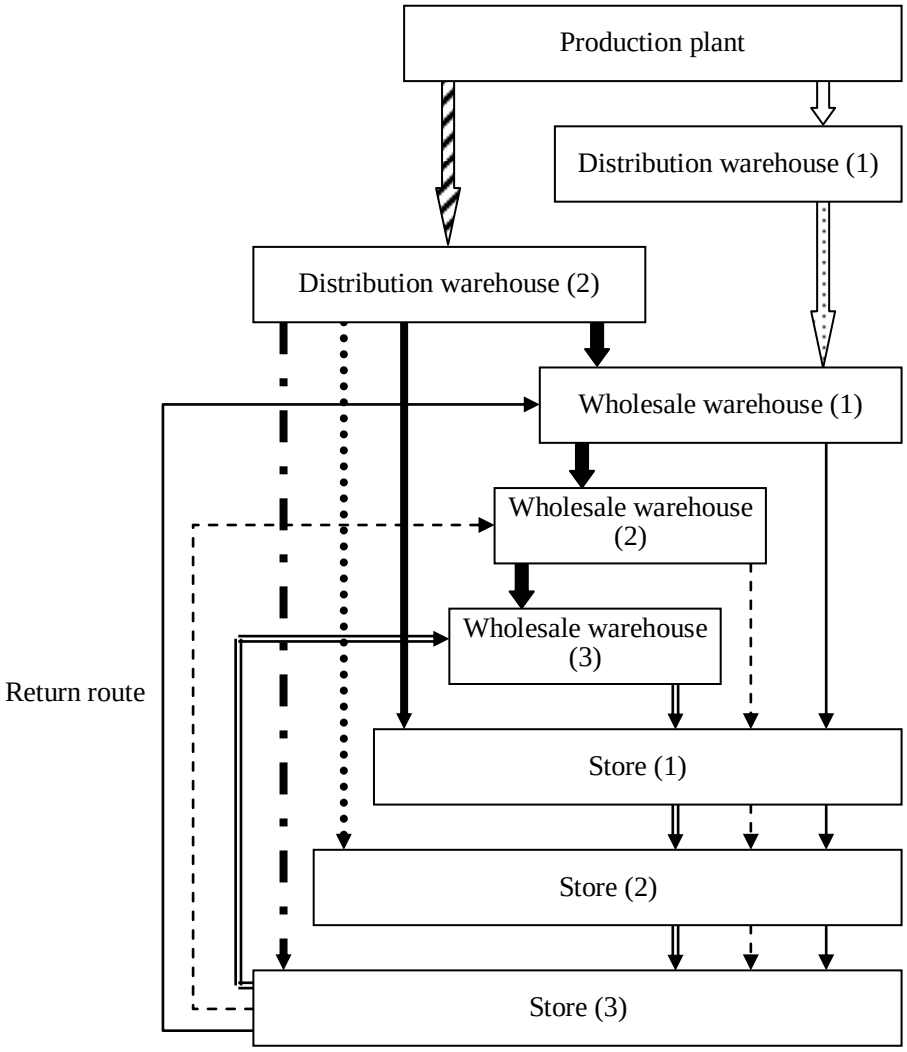
F.5 GHG emissions by fuel consumption per transport ton-kilometer

For the items listed below, relevant data in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" may be used. For truck transport, however, the amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer, for average loading rate, is not provided in the said Database. Therefore, the closest lower loading ratio (e.g. 50 % if average is 62 %) shall be applied when applying the GHG emission factors.

- Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer in truck transport, by vehicle size and by loading ratio
- Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer in railway transport
- Amount of life cycle GHG emissions from fuel consumption per transport ton-kilometer in ship transport, by vessel size

Data for truck transport and railway transport in the "Tentative Database of GHG Emission Factors for the CFP Pilot Project" listed above are intended for transport processes implemented in Japan. However, these data may be applied to overseas transport processes, since the amount of life cycle GHG emissions for truck transport and railway transport is dependent on the means of transport more than on country-specific circumstances.

Annex G Typical flow of the distribution process



*The same arrow represents the same vehicle.

- Energy consumption at temporary storage site in the plant is not included, since it is assumed that product is promptly shipped to distribution warehouse after production.
- After unloading cargo at store (3) (the final destination), the vehicle is assumed to return to wholesale warehouse without any cargo.

Annex A: Life Cycle Flow Chart

(Provisional Translation)
PA-AG-01 Potato chips (the products made with domestic potatoes direct from contracted farmers) (Nov. 30, 2009)