Trading companies

Application guideline

Carbon Added Accounting

Make the CO_2e footprint of products and services demonstrably reliable

Connekt

Topsector Logistiek

Table of Contents

1 Trading companies

This guideline describes the application of Carbon Added Accounting for trading companies based on the principle:

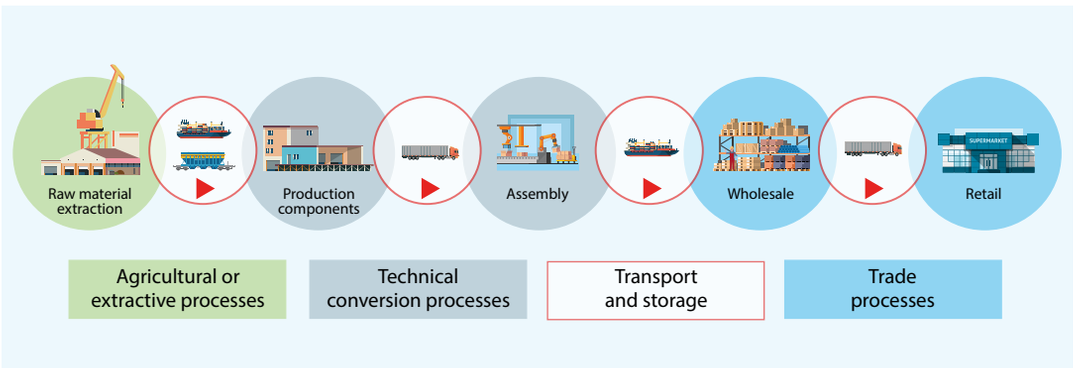
CO_2e input + CO_2e added = CO_2e output

Trading companies play an important role in the value chains of physical goods flows. In this guideline, the trading processes of storage and (re)packaging are taken as an example in which the CO_2e output from the CO_2e input, any changes in packaging and the CO_2e added are allocated to the outgoing goods flow. This allows trading companies to determine in detail which CO_2e emissions are generated, where the most benefits from emission reductions can be achieved and use this information for marketing purposes and cross-industry benchmarking.

2 Role in the value chain

Carbon Added Accounting considers, among other things, value chains, such as chains with physical goods flows, which, for example, start with agricultural or extractive processes of whose products continue through storage and transport to successively a semi-manufacture producer, an end-manufacturing producer, trading companies (e.g. wholesale, retail) to finally reach the consumer. Various organisational typologies have been drawn up for each of these processes from the accountancy perspective as a tool for the administrative organisation and internal control (AO/IC) on the flows of money and goods.

Organisational typologies in a chain of physical goods flows

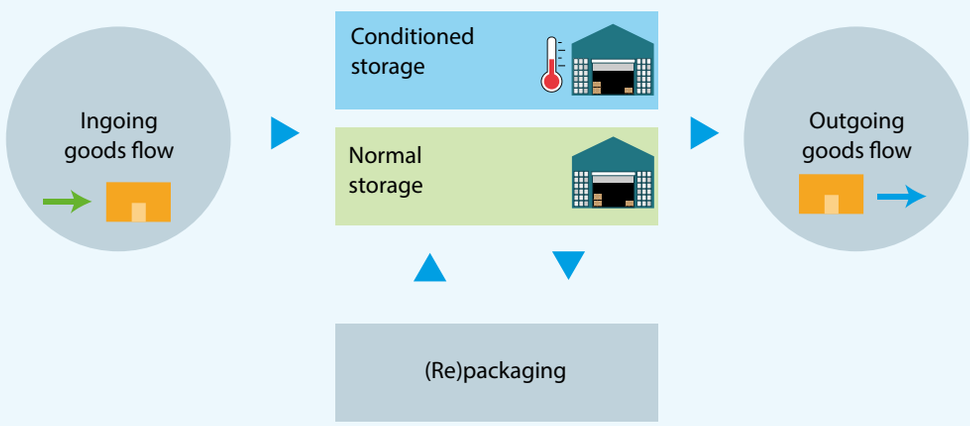


However, these typologies are not only applicable for differences in financial management and audits, but they are also suitable as an aid for CO_2e calculations.

3 Trading companies

Trading companies can be both wholesale and retail. In principle, the wholesale sector (e.g. wholesalers, importers) supplies to other companies, while the retail sector (e.g. department stores, supermarkets, regular shops) supplies to private individuals. In recent years, the boundaries between wholesale and retail have become blurred due to the enormous increase in online sales via web shops - both to companies and to individuals - with physical deliveries by (independent) delivery services.

In this guideline, trading companies are defined as companies with a flow of goods without a technical conversion process, with - whether or not conditioned - physical storage, including any (re)packaging of these goods.

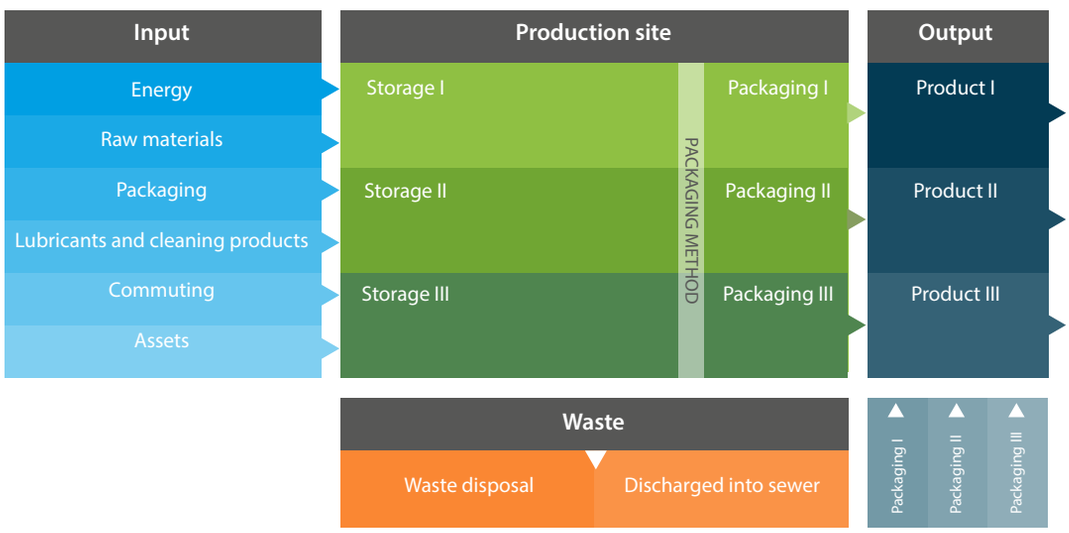


Schematic representation of the main activities of trading companies

4 Calculation and allocation CO_2e based on CO_2e input + CO_2e added

In the case of trading companies, the CO_2e input largely comprises purchased products, packaging and any fixed assets (GHG protocol scope III). CO_2e added is the added energy in the trading process through the consumption of fuels (GHG protocol scope I) and electricity (GHG protocol scope II). CO_2e added is created by the energy consumption for any (re)packaging lines and for the heating and lighting of the location(s).

General diagram of trading companies



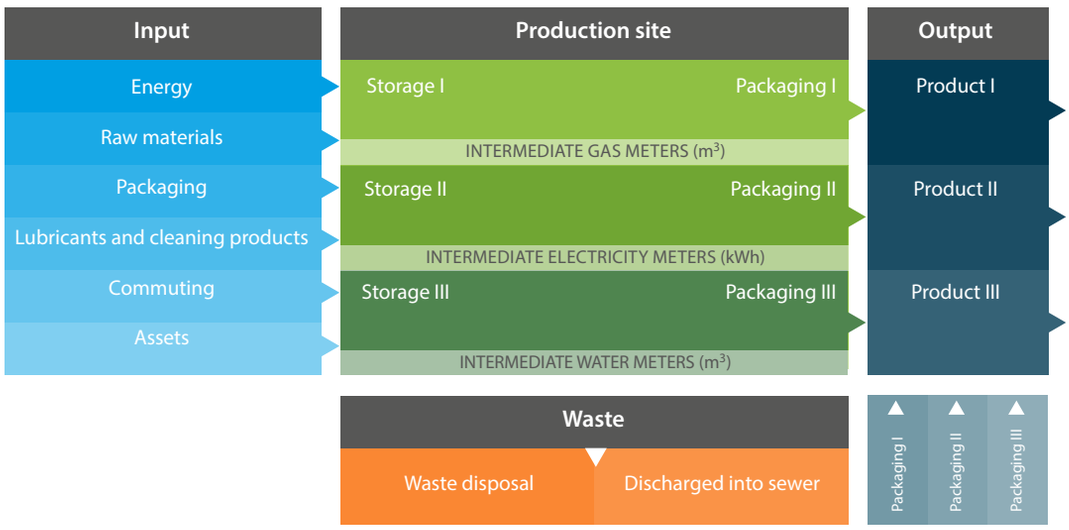
Determining CO_2e input

The CO_2e of purchased goods and packaging materials, or GHG scope III, can often not be accurately determined in practice. After all, this sometimes requires reliable data from suppliers, sometimes from abroad. Therefore, scope III is usually calculated based on the average emission factor per unit (e.g. taken from technical data sheets) multiplied by the purchased quantity. However, as the principle of Carbon Added Accounting becomes more widely adopted in the value chain, the reliability and understanding of the CO_2e of purchased goods and packaging increase. Particularly because the trading companies are often located at the end of the value chain.

Determining CO_2e added

Scope I and II can largely be accurately determined for trading companies, often even with data quality category gold, based on the monthly energy bills of the chain partner. These accounts are also easy to verify by accountants for accuracy, timeliness and completeness by means of correlation checks with bank payments and meter readings.

Correlation checks between utility bills and the (intermediate) meters



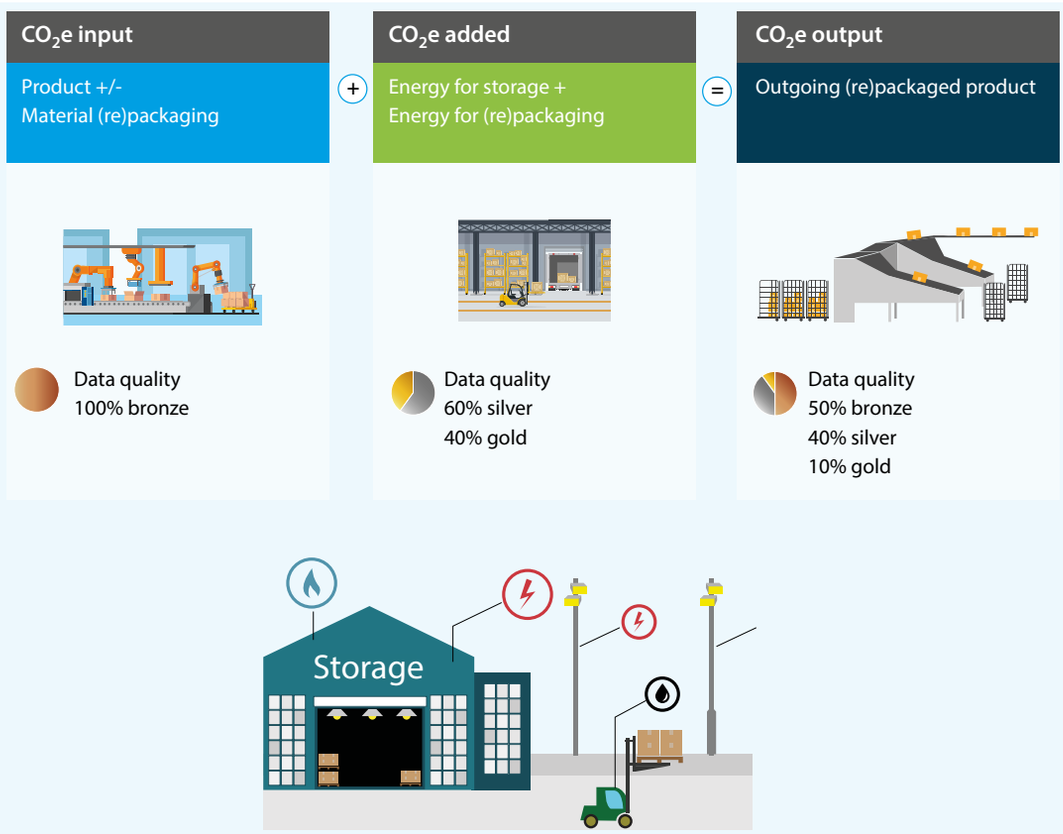
The application of data quality is even more important in chain administrations. Generally each chain party can establish the consumption of scope I and II accurately and with high data quality, and the data quality of the final footprint in chain administrations will increase automatically.

Allocation of CO_2e input and CO_2e added to CO_2e output

Storage

In storage, the goal is to maintain a stock of goods[1] to - whether or not in display for (private) customers - to then deliver from that stock after an order placed by customers. This is therefore different from transhipment, where the aim is to move goods, including the load carrier, from one means of transport to another. In principle, the CO_2e of the outgoing goods flow is made up of the CO_2e input of the relevant product plus the CO_2e added and any changes in packaging (e.g. from large packaging to small packaging).

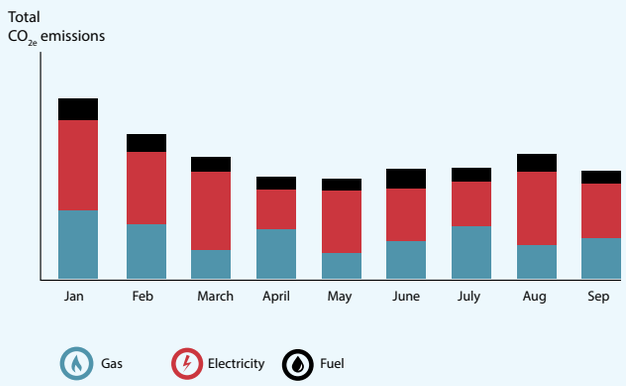
The CO_2e output of transported packaging (including data quality)



The CO_2e emissions of a storage facility naturally consist of the energy and fuel used for storage, including gas (e.g. heating) and electricity (e.g. lighting) for the buildings and any packaging lines, but also the fuel or electricity used for (mobile) internal transport such as pallet trucks and forklifts.

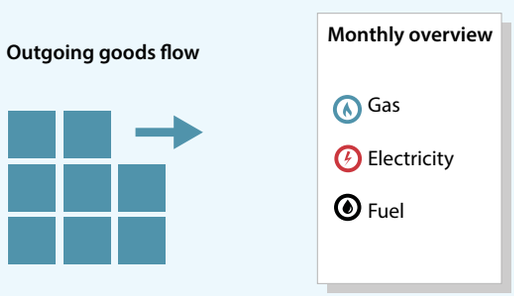
In most cases, the contribution of storage to the total emissions in the value chain will be relatively small, except for storage where refrigerated or frozen products are kept for a longer period of time.

1 Bulk goods without their own load carrier are normally dumped in silos or pumped into tanks.



The energy consumed in a reporting period can be determined from the energy bills (e.g. gas, electricity) of that period plus the fuel consumption (e.g. diesel) for internal transport. In practice, more and more use is made of electrified internal transport, which normally forms part of the periodic electricity bill. With modern measuring equipment (e.g. smart meters, fleet software), periodic energy consumption can be determined more and more accurately, sometimes even on a weekly, daily or hourly basis, which increases the data quality of the energy data. This energy consumption is relatively easy to convert into CO_2e emissions. The CO_2e emissions are calculated based on the amount and type of energy consumed. The Dutch emission factors for each form of energy consumption per unit can be found at www.co2emissiefactoren.nl.

A second source of greenhouse gases is refrigerant leakage from conditioned storage. Refrigerants can make a significant contribution because some of these agents have a significantly higher greenhouse effect per kilogram than regular CO_2. Such a contribution is expressed in CO_2 equivalents, abbreviated as CO_2e. The CO_2e factor can range from 1 to 4,470 kg, and in the latter case the leakage of 1 kilogram of refrigerant is equivalent to the emission of 4,470 kg of regular CO_2. The leakage of refrigerants in the reported period must therefore also be counted and allocated.



Allocation of energy consumption in storage activities can be done in great detail. In practice, the following method is both defensible and accepted: the allocation to the load takes place on the basis of the outgoing flow of goods in the same period as the energy and fuel was measured. In practice, the weight of the outgoing goods flow is the most common unit for the CO_2e to be allocated to.

Below is a simple example of the CO_2e allocation of energy to the outgoing flow of goods.

An e-commerce shipper with a 10,000-m^2 warehouse ships 5,000,000 packages in the month of March.

In March, 150,000 kWh of electricity was consumed and 34,000 m^3 natural gas.

The total emissions of the warehouse are:
150,000 kWh x 0.427 gram per kWh = 71,250 kg CO_2e
34,000 m^3 x 2.085 gram per m^3 gas = 64,260 kg CO_2e

Total 135,510 kg CO_2e = 27.1 grams of CO_2e per package.

(Source emission factors: www.co2emissiefactoren.nl)

(Re)packaging

(Re)packaging includes activities such as packing, crating and palletising. This can be done both by hand and with (semi) automatic packaging lines. In the latter case, in the case of significant (material) energy consumption, the energy consumption of the packaging line must be allocated to the products that are packaged with it in the same way as is done at production companies. The energy consumption of the packaging line must be measured separately, which often happens in operational excellence-oriented companies, or is estimated on the basis of the specifications of the supplier(s) of the packaging line.

Packaging also adds CO_2e footprint to the end products. Normally, the packaging method (e.g. type of packaging, quantity of product) leads to unique product codes, making these product codes a good starting point for similarly calculating the allocation of CO_2e emissions to end products in their specific packaging via the packaging batches. Insight into CO_2e emissions (and other waste) gives parties new insights and dimensions with regard to process efficiency, decision-making and focus with regard to reducing emissions. When packaging products, the CO_2e of the material of the packaging can be attributed to the packaged products and the original packaging often leads to - whether or not recyclable - waste.

During such CO_2e allocation, both the data quality and the GHG scope in the calculations must be traceable, so the end products do not only contain the calculated CO_2e values, but also the breakdown of these according to both data quality level (Bronze, Silver, Gold and Gold+) and GHG scope (I, II and III) which demonstrate the context of the CO_2e values (see: Carbon Added Accounting Application Guideline Data Quality).

6 Correlation checks

Partly from an accountant's perspective, the data must be correct (read: the data is accurate), complete (read: all data is available) and timely (read: the data relates to the intended reporting period). Moreover, this prevents carbon leakage because CO_2e would not be calculated or allocated.

To this end, correlation checks can be made that follow the movement of money and goods, or the value cycle of the trading company, consisting of the incoming flow of goods, the storage of goods and the outgoing flow of goods. Correlation checks can be drawn up for this as, for example, the purchase of goods and packaging materials versus the inflow of goods and packaging materials versus stock movements versus debtor payments. But also the sale of goods versus the outflow of goods versus stock changes versus debtor payments. If the data differences in the correlation checks are small, the data quality is usually high. Any data differences in the correlation checks must be explained and and, where necessary, supplemented by modelling, which then leads to data completeness and thus lower data quality.

7 Insight

The Carbon Added Accounting method uses logical methods to allocate CO_2e of all three GHG scopes to end products, whilst preserving the data quality category. This provides insight into the CO_2e emissions generated to produce and - whether or not conditioned - stock agricultural products, to pack them if necessary and to be able to deliver them to customers. This gives the manufacturer the detailed operating information needed for (continuous) improvements. It can also be used by the producer to determine which CO_2e emissions are generated per delivered end product and packaging unit, which can be used for mutual benchmarking or for marketing purposes.

Trading companies
Application guideline Carbon Added Accounting.
Make the CO_2e footprint of products and services demonstrably reliable.

Connekt/Top Sector Logistics
Ezelsveldlaan 59
2611 RV Delft
+31 15 251 65 65
info@topsectorlogistiek.nl
www.carbonaddedaccounting.org

Connekt

Topsector Logistiek