Allocation rules guidelines to input CO2 AI Product Ecosystem PCF calculator

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1 Purpose

The purpose of this document is to support those utilizing the Product Ecosystem Self Service PCF Calculator in providing inputs according to the GHG Protocol. This document frames approved allocation methods, and reiterates key insights on raw and packing materials, energy from manufacturing, and transport. This guidance is general and non-exhaustive, please refer to the GHG Protocol on Product Life Cycle Accounting and Reporting Standard for greater specificity.

2 General guidance – *based on GHG Protocol*

"Companies shall avoid allocation wherever possible by using process subdivision, redefining the functional unit or using system expansion." GHG Protocol

"If allocation is unavoidable, companies shall allocate emissions and removals based on the underlying physical relationships between the studied product and co-product(s). When physical relationships alone cannot be established or used as the basis for allocation, companies shall select either economic allocation or another allocation method that reflects other relationships between the studied product and co-product(s)." (GHG Protocol)

2.1 Physical allocation

"When performing physical allocation, the factor chosen should most accurately reflect the underlying physical relationship between the studied product, co-product, and process emissions and removals." (GHG Protocol)
Example of physical allocation factors:

- Mass
- Volume
- Number of units

"For example, a truck transports two products: fruits and vegetables. There is a clear physical relationship between the two products and their emissions contributions because the fuel use per unit of product in a transport vessel is dependent on the mass or volume of their load. To determine which physical allocation factor best describes this relationship, a company should determine the limiting factor of the transportation mode (typically mass or volume)." (GHG Protocol)

2.2 Economic allocation

"Economic allocation is the division of emissions from a common process to the studied product and co-product(s) according to the economic values of the products when leaving the multi-output process.

When selecting an economic allocation factor, companies should use the price of the co-product(s) directly after it leaves the common process (i.e., its value prior to any further processing). When this direct price is not available or cannot be evaluated, market prices or prices at a later point of the life cycle may be used, but downstream costs should be subtracted to the fullest extent possible." (GHG Protocol)

2.3 Other relationships

"The "other relationships" allocation method uses established sector, company, academic, or other sources of conventions and norms for allocating emissions when neither physical nor economic allocation is applicable.

When no established conventions are available and the other allocation methods are not applicable to the common process, a company may make assumptions on the common process in order to select an allocation method." (GHG Protocol)

3 Allocation rules tracking guidance

"Describe any allocation problems in the inventory and which allocation method was used. If more than one allocation method was applicable, disclose which method was used and justify the choice." (GHG Protocol)

4 Specific guidance / *Declination of GHG Protocol general guidance to specific situations*

4.1 Raw materials / Packaging material

4.1.1 What if the raw material used during the manufacturing process ends up both into the studied product and into other outputs?

If the manufacturing process includes other outputs than only studied products, the raw material consumption must be allocated between studied product & co-products based on a physical allocation factor (number of units, weight).

No raw material consumption should be allocated to waste.
Waste is defined as an output without economical value. If an output is then used to manufacture another product or sold to another company, it is not considered as a waste but as a co-product.

4.1.2 What if the same raw material is transported across different transportation modes (e.g., 100 km first leg through truck trailer, 300km second leg through train)?

A journey is defined as the distance & transport means covered by a raw material (or packaging) to get from a specific supplier plant to a specific production location.

If a raw material is transported through more than 1 transportation mode along its journey, you should complete the associated transport section in the following way:

- Transport type: be conservative & indicate the most emitting transportation mode – refer to below ranking – (truck trailer in the question example)
- Distance: indicate the corresponding travelled distance only (100km by truck trailer in the question example)

Warning: please **do not duplicate the line for the raw material in question**, otherwise it would double count raw material production emissions!!

Descending ranking of high-level transportation sub-category[1] by carbon emissions (1 as most emitting transportation mode):

1. Freight aircraft
2. Truck
3. Specialized cargo
4. Train
5. Container ship
6. General cargo
7. Bulk carrier

Descending ranking of detailed transportation type[1] by carbon emissions (1 as most emitting transportation mode):

1.a. Freight aircraft > Air traffic continental
1.b. Freight aircraft > Unknown type
1.c. Freight aircraft > Air traffic intercontinental
2.a. Truck > Truck trailer
2.b. Truck > Unknown type
2.c. Truck > Truck container
3.a. Specialized cargo > Cargo vehicle transport
5.a. Container ship > Container ship a: 0-999 teu
5.b. Container ship > Container ship b: 1,000-1,999 teu
7.a. Bulk carrier > Bulk carrier a: 0-9,999 dwt
3.b. Specialized cargo > Unknown type
4.a. Train > Unknown type
5.c. Container ship > Container ship c: 2,000-2,999 teu
5.d. Container ship > Container ship d: 3,000-3,999 teu
5.e. Container ship > Container ship e: 4,000-7,999 teu
5.f. Container ship > Unknown type
6.a. General cargo > General cargo b: 5,000-9,999 dwt
6.b. General cargo > General cargo a: 0-4,999 dwt
6.c. General cargo > Unknown type
3.c. Specialized cargo > Refrigerated cargo
5.g. Container ship > Container ship f: 8,000+ teu
6.d. General cargo > General cargo c: 10,000+ dwt
7.b. Bulk carrier > Bulk carrier b: 10,000-34,999 dwt
7.c. Bulk carrier > Bulk carrier c: 35,000-59,999 dwt
7.d. Bulk carrier > Bulk carrier d: 60,000-99,999 dwt
7.e. Bulk carrier > Unknown type
7.f. Bulk carrier > Bulk carrier e: 100,000-199,999 dwt
7.g. Bulk carrier > Bulk carrier f: 200,000+ dwt

Source: 1/ DEFRA

4.2 Energy from manufacturing

4.2.1 How to determine the electricity generation type to be selected for the studied product?

For electricity providers in the same geography, combining "Electricity generation by fuel" (market-based method) and "Electricity country-mix" (location-based method) together results in double counting – if you miss data for certain providers, use "Electricity country mix" type only, as an aggregated emission factor.

- For a given geography, if you have granular data about electricity type **for all of your providers**, then you should:
    1. Choose the category "Electricity generation by fuel"
    2. Create one line per electricity provider contract (there should be no "Electricity country mix" line)

- If you miss data about certain providers, then you should:
    1. Create only one line for the country energy consumption with the category "Electricity country mix"
    2. Indicate the country in question in "Type"

4.2.2 How to determine the energy quantity to be allocated to the studied product?

Energy allocation rule can be based on a physical or economical factor:

- Number of units. This factor is reasonable when all units get through the same processes.
- Weight
- Product current economic value at the concerned production stage (or market value if current value not available)

In most cases, physical factors should be prioritized over economical factors.

If manufacturing process outputs include both co-products and waste, the energy consumption must only be allocated to co-products. No energy should be allocated to waste.
Waste is defined as an output without economical value. If an output is then used to manufacture another product or sold to a company, it is not considered as a waste but as a co- product.

4.3 Transport from manufacturing to distribution

4.3.1 I have several production site locations for the studied product, how to complete the transport section of the calculator when I can inform only 1 journey?

A journey is defined as by the distance & transport means covered by the studied final product to get from a specific production site to a specific client location.

If several legs of the studied finished product travelled through different journey over the period, you should design an average journey to input the platform distribution section.
For example, if you have, over a given period (e.g., 1 year):

- 70 units of finished product travelling from Production site A to customer location by 100km airplane
- 30 units of finished product travelling from Production site B to customers location by 50km airplane
- 20 units of finished product travelling from Production site C to customers location by 50km truck

First, you should weight each itinerary based on the share of transported number of units. Here:

- 70/(70+30+20)=58% of finished product travels by 100km airplane
- 30/(70+30+20)=25% of finished product travels by 50km airplane
- 20/(70+30+20)=17% of finished product travels by 50km truck

Then, to inform the average itinerary in the calculator, you should create one line per transport mode.

1/ First line:

- Category: Airplane
- Distance: In this line, you can input the sum of both weighted airplane itinerary. Here: (100km x 58%)+(50km x 25%)=70,5km travelled by airplane in average.

2/ Second line:

- Category: Truck
- Distance: You should only input the weighted distance travelled by truck. Here: (50km x 17%)=8,5km travelled by truck in average.