# Product Carbon Footprint Approach and Calculation Methodology

CDP x CO2AI Pilot: Supplier methodology manual

**APRIL 2023**

CDP
DISCLOSURE INSIGHT ACTION
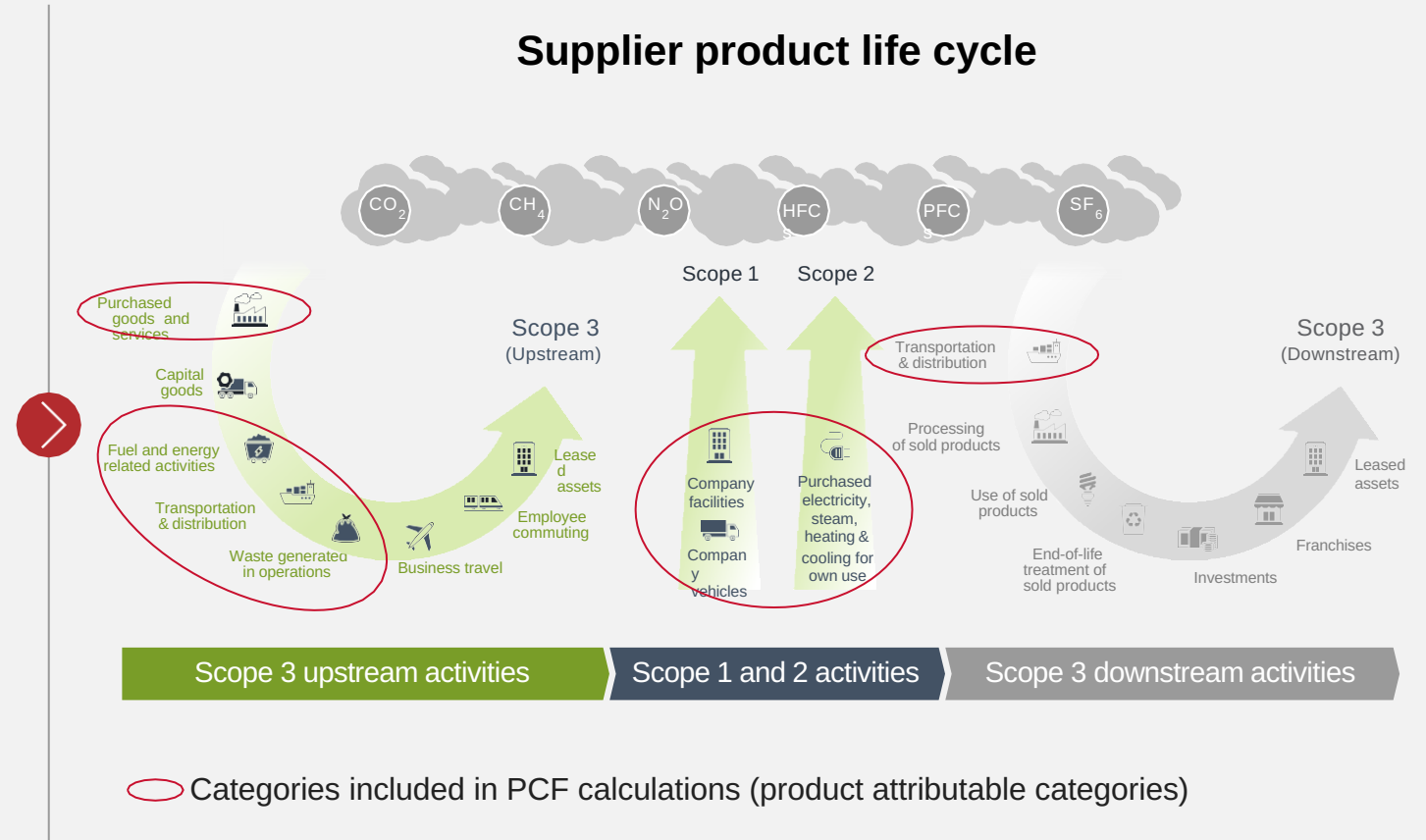
CO2 AI

# Summary

# What is a Product Carbon Footprint (PCF)

PCF measures the carbon equivalent **emissions attributable to a product**

It estimates the total emissions of greenhouse gas (GHG) associated with a specific product throughout its life cycle

PCF accounts for:

- Product related emissions of scope 1, 2
- Select product attributable S3 emission[1]
- Product related Transport & Distribution emissions (S3 downstream) to client facilities

**Supplier product life cycle**



Scope 3 upstream activities | Scope 1 and 2 activities | Scope 3 downstream activities

Categories included in PCF calculations (product attributable categories)

# Manual terminology

Within this manual, the following terminology respectively refer to:

**Studied product**

Product for which we want to compute a Product Carbon Footprint (PCF)

**Allocation rules**

Guidelines to allocate company-level[1] emissions to the studied product

**Client**

Company requesting a PCF on CO2 AI Product Ecosystem

**Supplier**

Company submitting its PCF data on CO2 AI Product Ecosystem

**Tier 2 supplier**

Company providing the supplier with raw material (or packaging) needed to manufacture the studied product
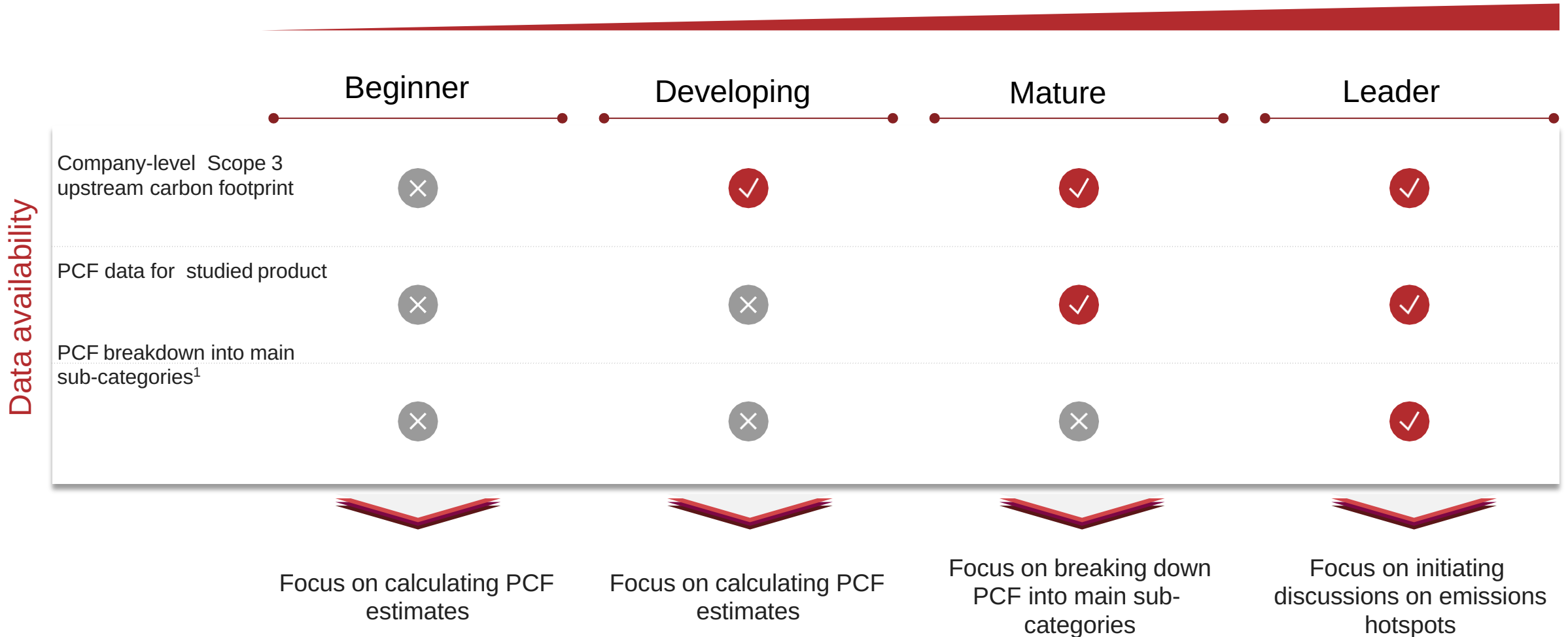
1. Or equivalent e.g., plant, regional

# Summary

Introduction

> **How to define my supplier data readiness level?**

Calculation methodology per supplier data readiness

# Data availability & effort needed to calculate PCF varies – 4 data readiness levels identified

| | Beginner | Developing | Mature | Leader |
|---|---|---|---|---|
| Company-level Scope 3 upstream carbon footprint | ✕ | ✓ | ✓ | ✓ |
| PCF data for studied product | ✕ | ✕ | ✓ | ✓ |
| PCF breakdown into main sub-categories[1] | ✕ | ✕ | ✕ | ✓ |

Data availability

| Focus on calculating PCF estimates | Focus on calculating PCF estimates | Focus on breaking down PCF into main sub-categories | Focus on initiating discussions on emissions hotspots |

1. If supplier data allows for categorization (e.g., breakdown of PCF into raw material, production, distribution. categories)
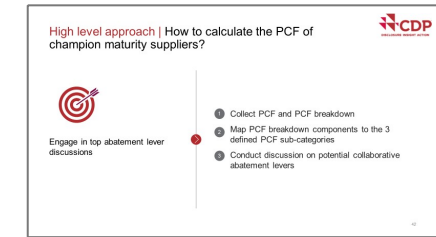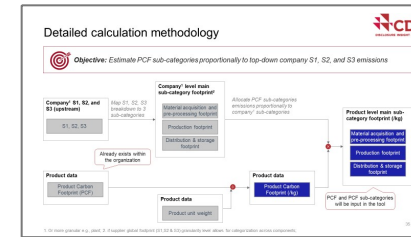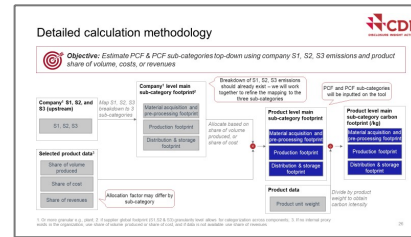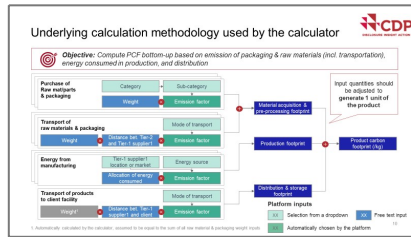
# You will find in this manual a differentiated workplan to reach PCF, depending on your supplier data readiness

| Beginner | Developing | Mature | Leader |
|---|---|---|---|

**Input**

**Beginner**
- Studied product cradle-to-gate info : bills of material, packaging, energy consumed & distribution

**Developing**
- Scope 1,2 & 3 (upstream) footprint
- Required products volume or costs share (revenue share if not available)

**Mature**
- Scope 1,2 & 3 (upstream) footprint
- Studied product PCF

**Leader**
- Studied product PCF
- Product PCF sub-categories breakdown

**Not input on the platform**, used for offline calculations only

**Output**

**Beginner**
- PCF bottom-up estimate
- PCF sub-categories breakdown

Use of the self-service calculator feature

**Developing**
- PCF top-down estimate
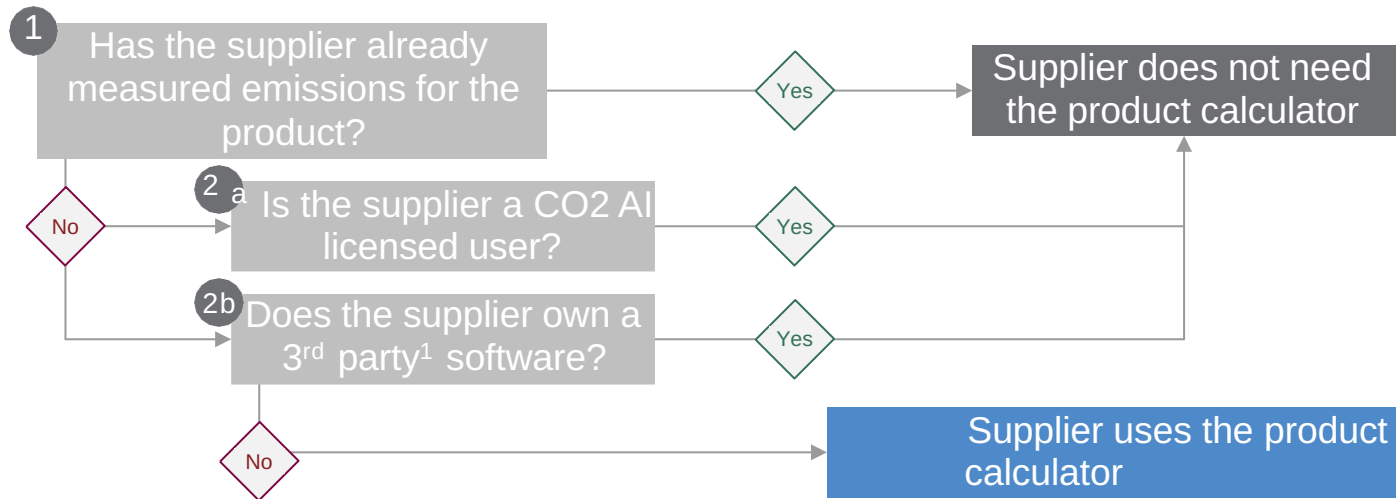- PCF sub-categories breakdown (if sufficient data granularity)

**Mature**
- PCF sub-categories breakdown (if sufficient data granularity)

**Leader**
- PCF sub-categories breakdown
- PCF CDP module 4 categories breakdown (if relevant[1])

1. Meant only for suppliers already familiar with CDP module 4 questionnaire, no specific guidance provided

# Product Ecosystem calculator aims to provide a safety net to suppliers who are not able to estimate their emissions

**Several possible cases for how supplier may measure emissions prior to submitting those on the platform**

**1** Has the supplier already measured emissions for the product?

**2** **a** Is the supplier a CO2 AI licensed user?

**2b** Does the supplier own a 3<sup>rd</sup> party[1] software?

Yes → Supplier does not need the product calculator

Yes

Yes

No

No → Supplier uses the product calculator

**The product calculator is a "safety net" for suppliers**

**But all suppliers submit emissions in the same way**

Regardless of how suppliers measure emissions, the data is submitted on the platform by **filling the same data request form**

1. E.g., in-house LCA expert, 3<sup>rd</sup> party consultancy, etc.

# Summary

# Summary

Introduction
How to define my supplier data readiness level?

Calculation methodology per supplier data readiness

**Beginner**  Developing Mature  Leadership

Compute PCF bottom-up based on emission of packaging & raw materials (incl. transportation), energy consumed in production, and distribution
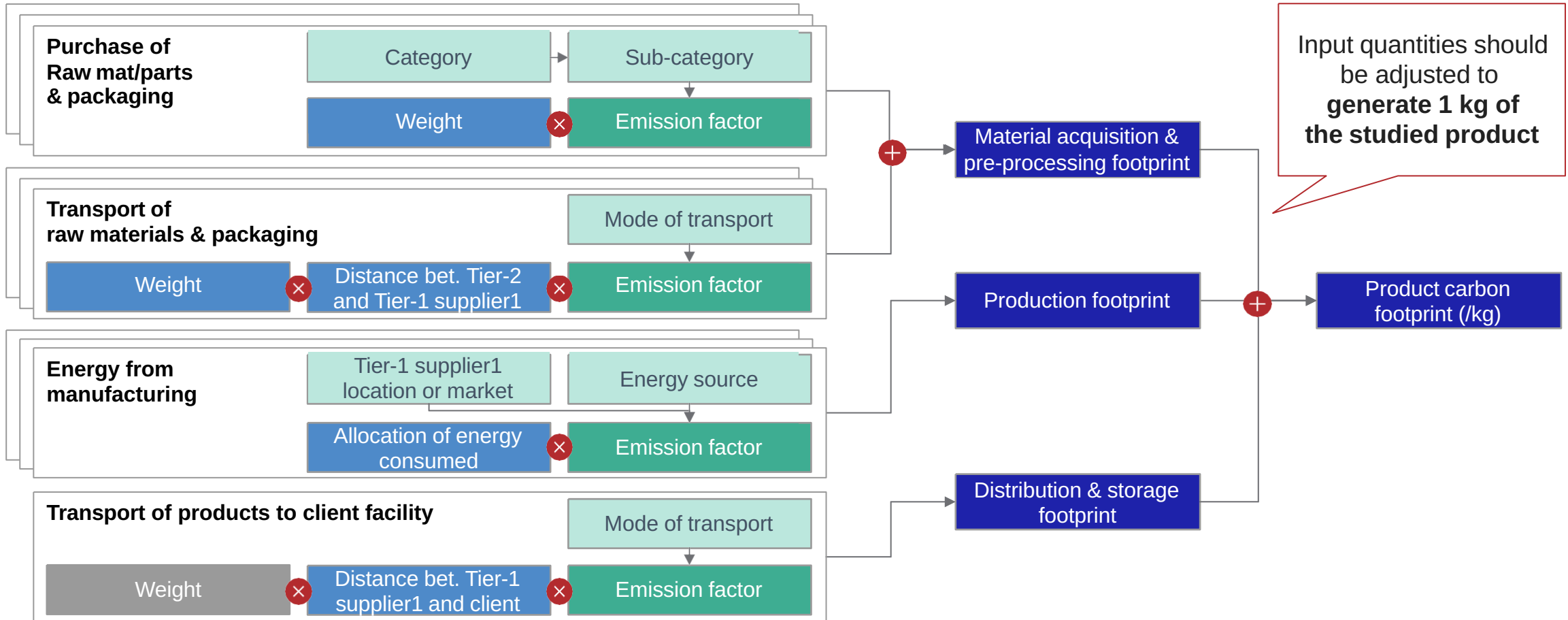
**1** Collect product cradle-to-gate inputs needed to generate 1 kg of product (cf. data request)
- List of raw materials & packaging types, weights and transportation journey (inc. transport modes & distance) to your facilities
- Quantity & type of energy consumed
- Distribution journey[1] from your facilities to client facilities

**2** Align on allocation rules if needed (primarily for energy consumed)    🔍 Zoom further

Disclose used allocation rules and justify the choice in the free text field when sharing PCF on the platform

**3** Input activity data into free PCF calculator to get PCF estimate

# Underlying calculation methodology used by the calculator

**Objective:** *Compute PCF bottom-up based on emission of packaging & raw materials (incl. transportation), energy consumed in production, and distribution*

**Purchase of Raw mat/parts & packaging**
- Category → Sub-category
- Weight × Emission factor

**Transport of raw materials & packaging**
- Mode of transport
- Weight × Distance bet. Tier-2 and Tier-1 supplier1 × Emission factor

**Energy from manufacturing**
- Tier-1 supplier1 location or market → Energy source
- Allocation of energy consumed × Emission factor

**Transport of products to client facility**
- Mode of transport
- Weight × Distance bet. Tier-1 supplier1 and client × Emission factor

Material acquisition & pre-processing footprint

Production footprint

Distribution & storage footprint

Product carbon footprint (/kg)

Input quantities should be adjusted to **generate 1 kg of the studied product**

**Platform inputs**  XX Free text input   XX Selection from a dropdown   XX Automatically chosen by the platform
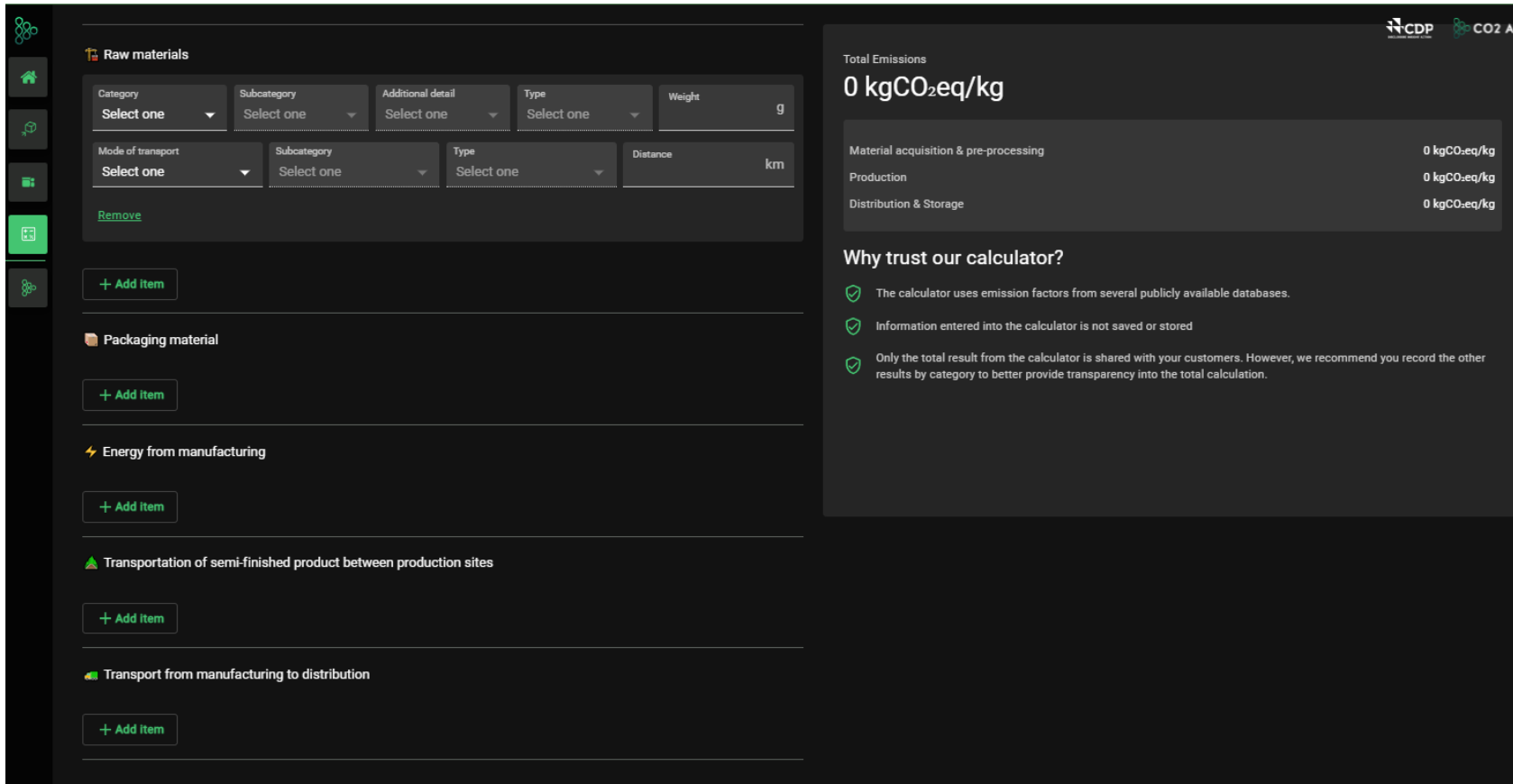
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# We will leverage our calculator to compute the PCF

Zoom further



If not already completed, please share the **name and email of your point of contact** to receive login credentials

# Deep-dive| Purchase and transportation of packaging & raw materials



After data collection, it is required to work on allocation rule as pilot tool currently supports **1 transport mode per material**

Packaging & raw materials consumption to **produce 1 kg of the studied product**

- What are the types of packaging and raw materials needed in the production of the studied product?

- What quantity (weight in kg) is needed of each packaging and raw material to produce 1 kg of the studied product?

- For each packaging and raw material used in the production, what is the transport mode, distance covered (in km), and weight displaced (in kg) from your suppliers to your facilities? Please collect all transport modes

# Packaging and raw material transportation emissions – Allocation rules

**If your raw material (or packaging) is sourced through different journeys[1]**

1. Separate each journey as a different item line

2. Average the weight of each item line based on sourcing ratio

**If your raw material are transported through several transport modes**

1. Identify the transport mode with highest emission factor (ranking available in allocation rules)

2. Input transport mode with highest emission and corresponding distance covered along the journey

A **journey** is defined as the **distance & transport modes covered by a raw material** (or packaging) with a known weight **to get from a specific supplier plant to a specific production plant.**

A raw material can be transported by **several transport mode along its journey**

EXAMPLE

**80g** of water is needed to produce 1 kg of studied product

**60%** of water sourced from supplier A

Tier 2 supplier A

100km

50km

**40%** of water sourced from supplier B

Tier 2 supplier B

50km

Supplier
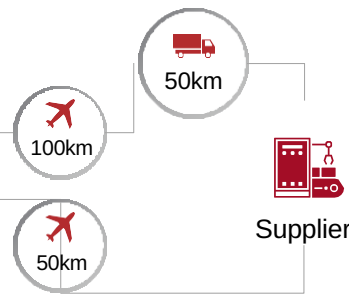
**Item Water - Journey A**
Weight= 80g x 60% =48g
Transport mode=Plane
(as plane is more emitting than truck)  Distance = 100km
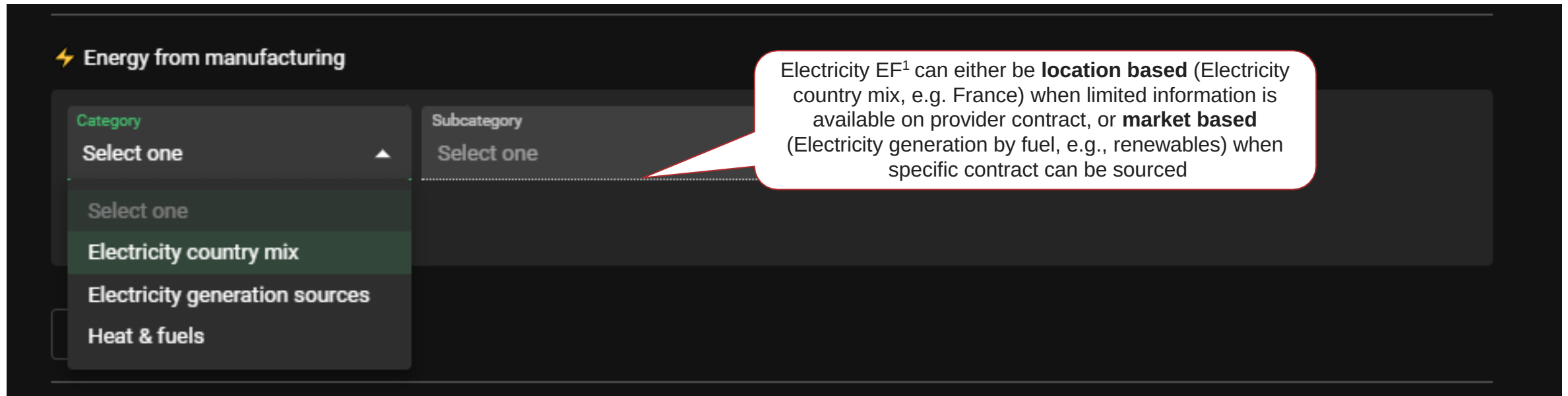
**Item Water - Journey B**
Weight= 80g x 40% =32g
Transport mode=Plane
Distance = 50km

1. Example of different journeys: 50% of raw material A is sourced from one supplier and 50% is sourced from another supplier

# Deep-dive| Energy consumed in the manufacturing



- What is the energy consumed in (KWh) to produce 1 kg of the studied product?
- If energy consumed per studied product kg production is not available, allocate energy based on volume produced

1. EF=Emission Factor

# Energy consumed emissions

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Allocation of energy consumed in the production should be **revised based on each supplier**, taking into account available data and **existing internal processes to allocate energy consumption**

The following allocation guidelines can be **leveraged if there is no internal view on energy consumption** or emissions

**Step 1:** Decide on energy type – for electricity :

- Where possible, source electricity contracts from each supplier to use market-based emission factors
- For a given geography[1], if you miss data about certain providers, then only use geography's location-based factors with aggregate emission factor to avoid any double counting

**Step 2:** Allocate energy consumption to 1 kg of product:

- Define a period & level at which the calculation will be conducted e.g., over the last 3 years at the plant level

Energy consumed at X level $\times$ Studied product share of volume at X level $\div$ Number of studied product kg produced at X level

If data is not available, use share of costs or share of revenues

___ Amount of energy consumed in the production of 1 kg of studied product (to be input in the platform)

1. Energy providers are in the same geography

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# Deep-dive| Transportation of final product to client facilities



- What is the unit of production currently used for the studied product? (e.g., 1L bottle, 1 roll)
- What is the journey covered by the studied product from your facilities to client facilities in terms of transport mode and distance covered (in km)? Please collect all transport modes

# Special case: What if studied product is distributed through different journey to customer site?

## Input an averaged itinerary into the calculator
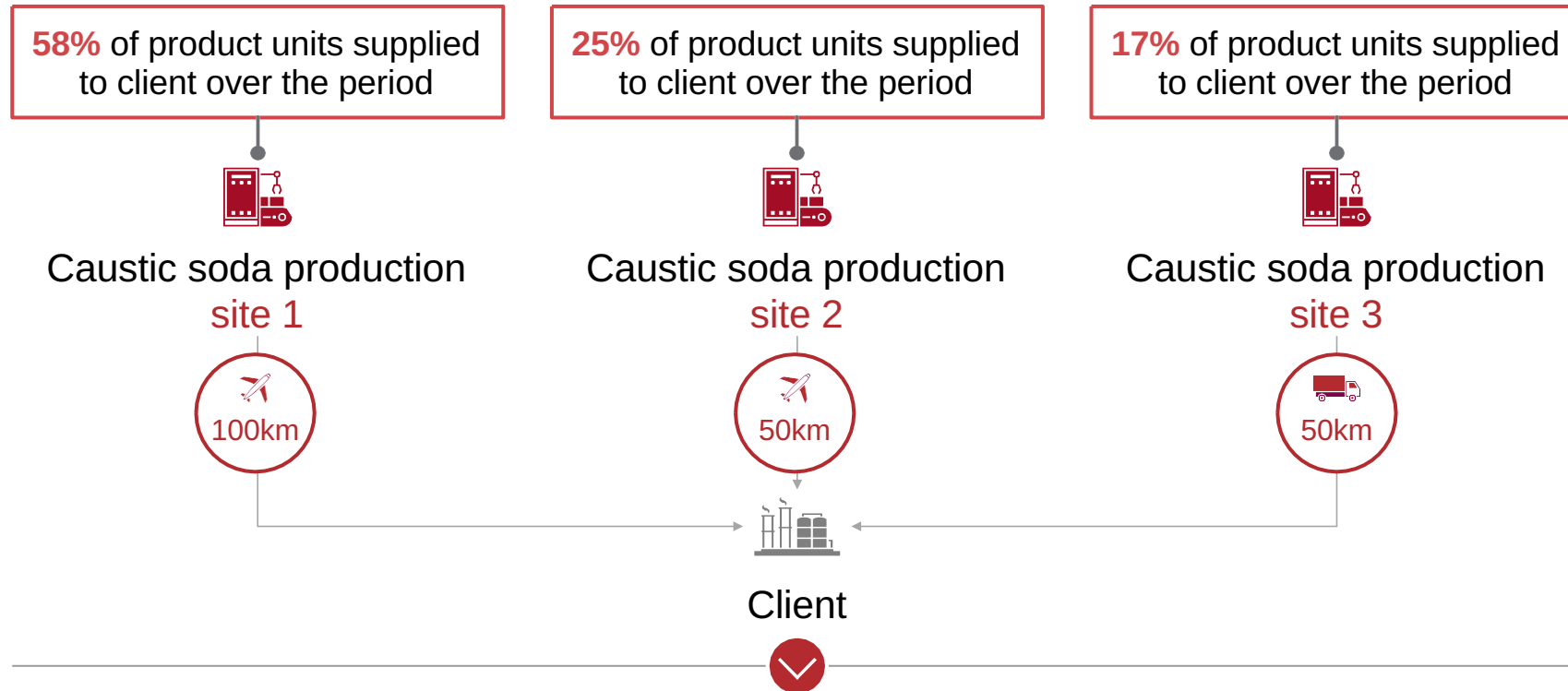
**58%** of product units supplied to client over the period

**25%** of product units supplied to client over the period

**17%** of product units supplied to client over the period

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.**

**More than 1 journey** for a single product[1]?

Caustic soda production site 1

Caustic soda production site 2

Caustic soda production site 3

100km

50km

50km

Client

Truck

Airplane

Distance: 17% x 50km=8,5 km

Distance: (58% x 100km) + (25% x 50km)= 70,5 km

Refer to the document – Allocation rules - "How to complete the transport section of the calculator when I can inform only 1 itinerary?" for more detailed information

1. Example of different journey: Customer sources the studied product from different production sites

# Recap | Data you will need to input the calculator

1. What is the unit of production currently used for the studied product? (e.g., 1L bottle, 1 roll)

2. What are the packaging and raw materials needed in the production of the studied product?

3. What quantity (weight in kg) is needed of each packaging and raw materials to produce 1 kg of the studied product?

4. For each packaging and raw material used in the production, what is the transport mode, distance covered (in km), and weight displaced (in kg) from your suppliers to your facilities? Please collect all transport modes

5. What is the energy consumed in (KWh) to produce 1 kg of the studied product? If energy consumed per unit produced is not available, collect relevant energy consumption data

6. What is the journey covered by the studied product from your facilities to client facilities in terms of transport mode and distance covered (in km)? Please collect all transport modes

# Example: Caustic soda PCF for Beginner supplier
## Overview of supplier situation

**Water and plastic Tier 2 supplier**

- ~100 km by truck container

**Sodium chloride Tier 2 supplier**

- ~200 km by truck containers
- ~800 km by train

**Caustic soda Supplier**

- ~200 km by train
- ~5,000 km by container shipping (1,000 to 1,999 teu)
- ~50 km by truck container

**Client being supplied caustic soda**

- Produces caustic soda
- Producing 1 kg of caustic soda requires 1.7t sodium chloride, 0.5t water, and is packaged in 0.1t of plastic
- Energy consumed by kg of caustic soda is not available
- Plant data for 2020, producing EDC and caustic soda:
  - Location: Europe
  - 10,000MWh consumed
  - Caustic soda produced: 1,000 kg estimated to be ~30% of total volume produced at the plant for 2020

# Example: Caustic soda PCF for Beginner supplier
Data input into calculator

## Raw materials

- Sodium chloride:
  - Weight: 1,700 kg
  - Transport: 1,000km through truck given that truck has a higher emission factor than train
- Water:
  - Weight: 500 kg
  - Transport: 100km by truck container

## Energy consumed

- Type: location based - country mix, European average given lack of more data
- Consumption:
  - For 1,000 kg of caustic soda: plant energy x share of volume = 10,000 MWh x 30% = 3,000 MWh
  - For 1 kg of caustic soda: 3,000 KWh

## Packaging

- Plastic:
  - Weight: 100 kg
  - Transport: 100km by truck container

## Distribution

- Transport: create one item per transport mode[1]
  - 200 km by train
  - 5,000 km by 1,000 to 1,999 teu shipping container
  - 50km by container truck

1. Final product follow only 1 journey to be distributed to client site

# Appendix - Beginner

# Special case: What if 2 different raw materials are shipped using the same transportation mean?

What if 2 raw materials are shipped using the same transportation mean, **how to avoid double counting**?

➤➤ Emission factors being expressed in carbon intensity per kg of transported raw material (kgCO2eq./kg), there is **no risk of double counting**.

You can **directly enter the distance travelled by each raw material**.

### EXAMPLE
You have 1 truck transporting several raw materials (including raw material not used for studied product)

*Not involved in production of studied product*

*Raw Material 3*
Raw Material 2
Raw Material 1     Raw Material 2

300 km     100 km

Tier 2 supplier    Supplier Production site 1    Supplier Production site 2

➤➤
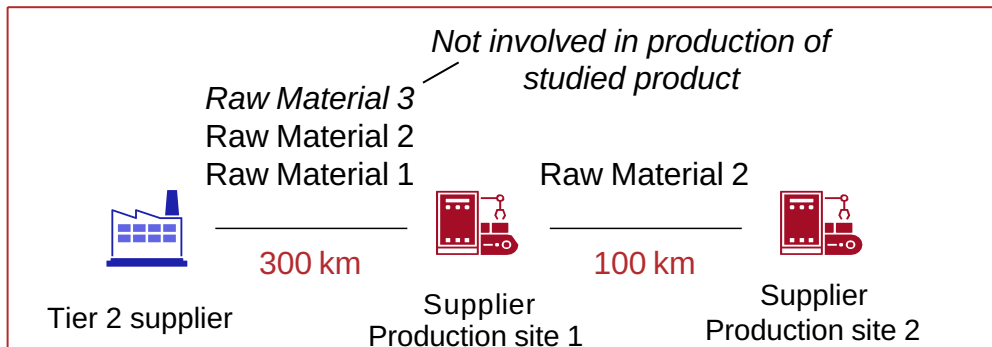
**Raw Material 1**
- ▲ Weight: Input the weight of raw material needed to produce 1 kg of product
- ▲ Transport category: Truck
- ▲ Travelled distance: 300km

**Raw Material 2**
- ▲ Weight: Idem
- ▲ Transport category: Truck
- ▲ Travelled distance: 400km

**Raw Material 3**
- ▲ Do not input in the platform as this raw material is not needed to produce studied product

# How to account for by-product emissions?

> **Example:** 2kg steel are used & 3,000 KWh of electricity are consumed in the manufacturing process to produce 1kg of studied product. Outputs of the process include:
> ▲ 1kg of studied product
> ▲ 500g of a co-product
> ▲ 70g of waste

| | | Studied product | Co-product | Waste |
|---|---|---|---|---|
| Definition | | Product whose PCF is being investigated | Output, with an economical value, used to input another product or directly sold to another company | Unused output, without any economical value |
| Allocation rule | | Raw material & energy allocated between studied product & co-product only (exc. waste) based on a physical factor (e.g., weight) | | No raw material nor energy allocated to waste |
| Material acquisition & pre-processing | Steel | ~67% of steel = 1,34kg *Volume-based allocation* | ~33% of steel = 0,66kg *Volume-based allocation* | 0kg of steel allocated to waste |
| Energy | Electricity | ~67% of energy *Volume-based allocation* | ~33% of energy *Volume-based allocation* | 0KWh of energy allocated to waste |

# Summary

Introduction
How to define my supplier data readiness level?

Calculation methodology per supplier data readiness

Beginner  **Developing**  Mature  Leader

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# High level approach | How to help Developing maturity suppliers to calculate a PCF?

Estimate PCF and PCF sub-categories breakdown top-down using company S1, S2, and S3 emissions and product share of volume/costs[2]
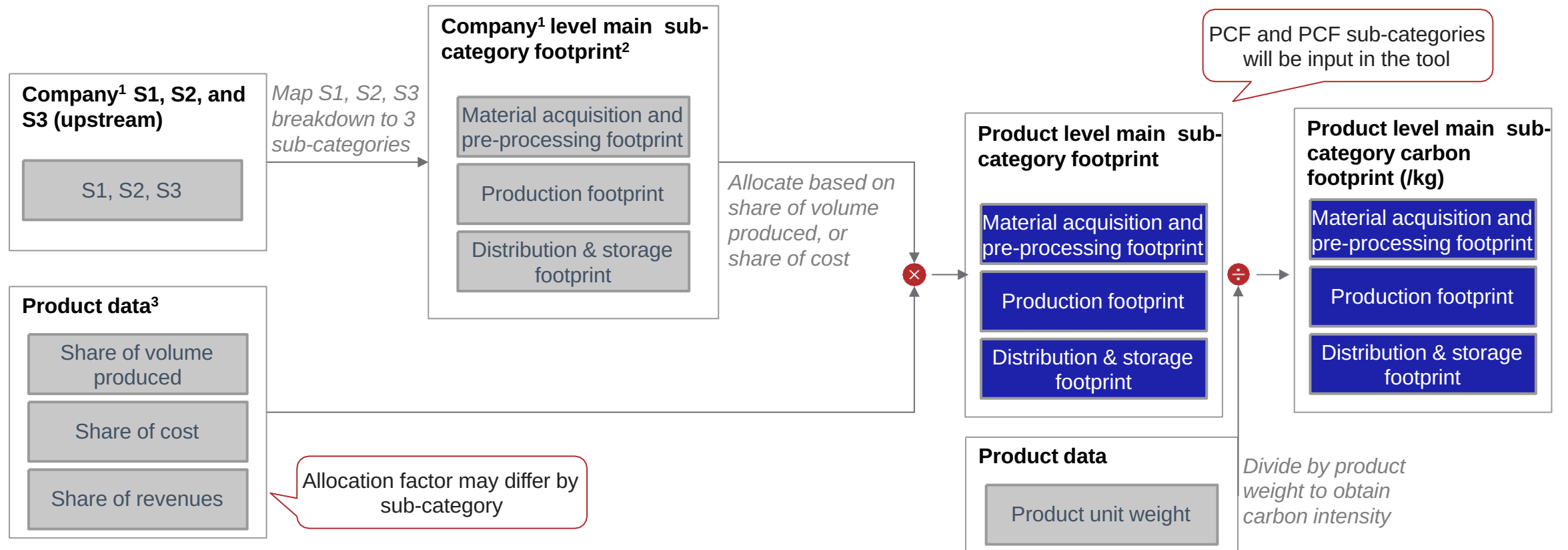
1. **Collection |** Collect company-level[1] S1, S2, S3 emission data with full available granularity

2. **Mapping |** Map company-level[1] S1, S2, S3 emissions to 3 defined sub-categories[2]

3. **Allocation |** Apply product share of volume/costs[3] to the mapping to estimate PCF and PCF sub-categories

# Detailed calculation methodology

**Objective:** *Estimate PCF & PCF sub-categories top-down using company S1, S2, S3 emissions and product share of volume, costs, or revenues*

**Company[1] S1, S2, and S3 (upstream)**

> S1, S2, S3

*Map S1, S2, S3 breakdown to 3 sub-categories*

**Company[1] level main sub-category footprint[2]**

> Material acquisition and pre-processing footprint
>
> Production footprint
>
> Distribution & storage footprint

*Allocate based on share of volume produced, or share of cost*

**Product data[3]**

> Share of volume produced
>
> Share of cost
>
> Share of revenues

> Allocation factor may differ by sub-category

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**Product level main sub-category footprint**

> Material acquisition and pre-processing footprint
>
> Production footprint
>
> Distribution & storage footprint

**Product data**

> Product unit weight

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> PCF and PCF sub-categories will be input in the tool

**Product level main sub-category carbon footprint (/kg)**

> Material acquisition and pre-processing footprint
>
> Production footprint
>
> Distribution & storage footprint

*Divide by product weight to obtain carbon intensity*

1. Or more granular e.g., plant; 2. if supplier global footprint (S1,S2 & S3) granularity level allows for categorization across components; 3. If no internal proxy exists in the organization, use share of volume produced or share of cost, and if data is not available use share of revenues

# We will input the PCF and PCF breakdown on the tool

Do you have your $CO_2$eq emissions at product-level already available?*

◉ Yes   ○ No

⬤▢ Detailed Life Cycle level

**Emissions**

| Material acquisition and pre-processing | |
|---|---|
| 30 | kgCO₂eq/kg |

| Production | |
|---|---|
| 14 | kgCO₂eq/kg |

| Distribution and storage | |
|---|---|
| 1 | kgCO₂eq/kg |

| Product use | |
|---|---|
| 20 | kgCO₂eq/kg |

| End of life | |
|---|---|
| 3 | kgCO₂eq/kg |

If not already completed, please share the **name and email of your point of contact** to receive login credentials

# Mapping | We define 3 high level PCF Lifecycle categories

**Material acquisition and pre-processing**

Starts with resources extraction, ends with product components entering your production facilities

*Primarily S3 upstream*

**Production**

Starts with product components entering your production facilities, ends with finished product exiting your production facilities

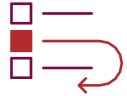*Primarily S1 & S2*

**Distribution & storage**

Starts with finished product exiting your production facilities, ends with product entering your client hands
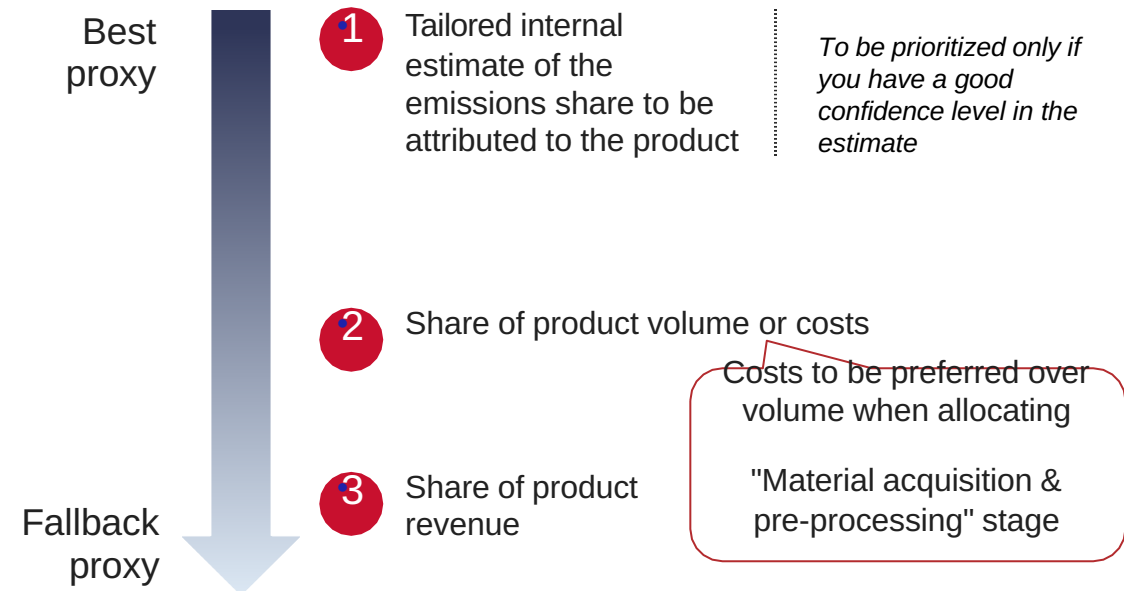
*S3 downstream distribution*

Source: GHG Protocol ; BCG analysis

# Mapping | How to map company-level emission items into our 3 defined high-level PCF categories?

| Scope | Scope details - emission items (GHG P.) | High-level Lifecycle categories (GHG Protocol) |
|---|---|---|
| Scope 3 upstream | Purchased goods & services | Material acquisition & pre-processing |
| | Capital goods | Not included in PCF |
| | Fuel & energy related activities | Material acquisition & pre-processing |
| | Transportation & distribution | Material acquisition & pre-processing |
| | Business travel | Not included in PCF |
| | Employee commuting | Not included in PCF |
| | Leased assets | Not included in PCF |
| | Treatment of waste generated in operations | Production |
| Scope 1 | Direct emissions from owned company facilities | Production |
| | Direct emissions from owned company vehicles | Upstream transportation to your production facility: Material acquisition & pre-processing<br>Within your own operations: Production<br>Downstream transportation to your client: Distribution & S. |
| Scope 2 | Purchased electricity, steam, heating | Production |
| Scope 3 downstream | Transportation & distribution | Distribution & storage |

Source: GHG Protocol; BCG analysis

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**Prioritize allocation factor**
in below order, depending on data availability

Best proxy

**1** Tailored internal estimate of the emissions share to be attributed to the product

*To be prioritized only if you have a good confidence level in the estimate*

**2** Share of product volume or costs

Costs to be preferred over volume when allocating

"Material acquisition & pre-processing" stage

**3** Share of product revenue

Fallback proxy

**Allocate company-level[1] emissions**
based on chosen proxy

Define a period & level at which the calculation will be conducted e.g., over the last 3 years at the company level

Lifecycle stage emissions $\times$ Studied product share (based on chosen proxy) $\div$ Number of units produced for studied product

Or company-level total emissions if data granularity did not allow lifecycle mapping

$=$ Product Lifecycle stage carbon intensity

1. Or equivalent e.g., plant, regional

# Data you will need to obtain a top-down PCF

**Product data**

1. What is the unit of production (e.g., 1L bottle) currently used for the studied product and its weight?

2. How many units of the product were produced on a given period / level?

**Emission data**

3. What are the components that compose the S1, S2, and S3 emissions? Please collect all available granularity levels

4. How do these components map to defined Lifecycle sub-categories[1]?

5. Do you have an internal estimate of the share of the emissions on a given period / level that should be attributed to the product? If not, please collect share of volume produced or share of cost over the period / level to be used as a proxy[2]

# Example

# Data input

Company A produces caustic soda in units of 2 kg

Company A plant level emissions (2020):

- Raw mat. & packaging: 200 ktCO2e
- Non-product attributable: 100 ktCO2e
- Production: 500 ktCO2e
- Distribution: 50 ktCO2e

Company A plant level data (2020):

- Caustic soda: 1,000 units produced accounting for ~40% of volume & 45% of costs

1. 100ktCO2e non-product attributable processes (e.g., employee commuting, business travel) emissions are not included into PCF.

## Caustic soda PCF sub-categories

- PCF material acquisition and pre-processing

$$= \frac{(\ \textit{Plant level material emissions} * \% \textit{ of costs}\ )}{\textit{Number of units produced}} = \frac{(200 ktCO2eq * 45\%)}{1000\ \textit{units}} = 0.08 ktCO2e$$

- PCF production

$$= \frac{(\ \textit{Plant level production emissions} * \% \textit{ of volume}\ )}{\textit{Number of units produced}} = \frac{(500 ktCO2eq * 40\%)}{1000\ \textit{units}} = 0.2 ktCO2e$$

- PCF distribution & storage

$$= \frac{(\ \textit{Plant level distribution emissions} * \% \textit{ of volume}\ )}{\textit{Number of units produced}} = \frac{(50 ktCO2eq * 40\%)}{1000\ \textit{units}} = 0.02 ktCO2e$$

## Caustic soda PCF

- PCF[1] of all caustic soda produced = sum of PCF sub-categories emissions = 0.08ktCO2e + 0.2ktCO2e + 0.02ktCO2e = 0.3ktCO2e
- Carbon intensity of caustic soda = caustic soda PCF/ caustic soda weight = 0.03ktCO2e / 2kg=0.015ktCO2e/kg

# Summary

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How to define my supplier data readiness level?

Calculation methodology per supplier data readiness

Beginner  Developing  **Mature**  Leader

# High level approach | How to help Mature maturity suppliers to breakdown a PCF?

Estimate PCF sub-categories proportionally to top-down company S1, S2, and S3 emissions
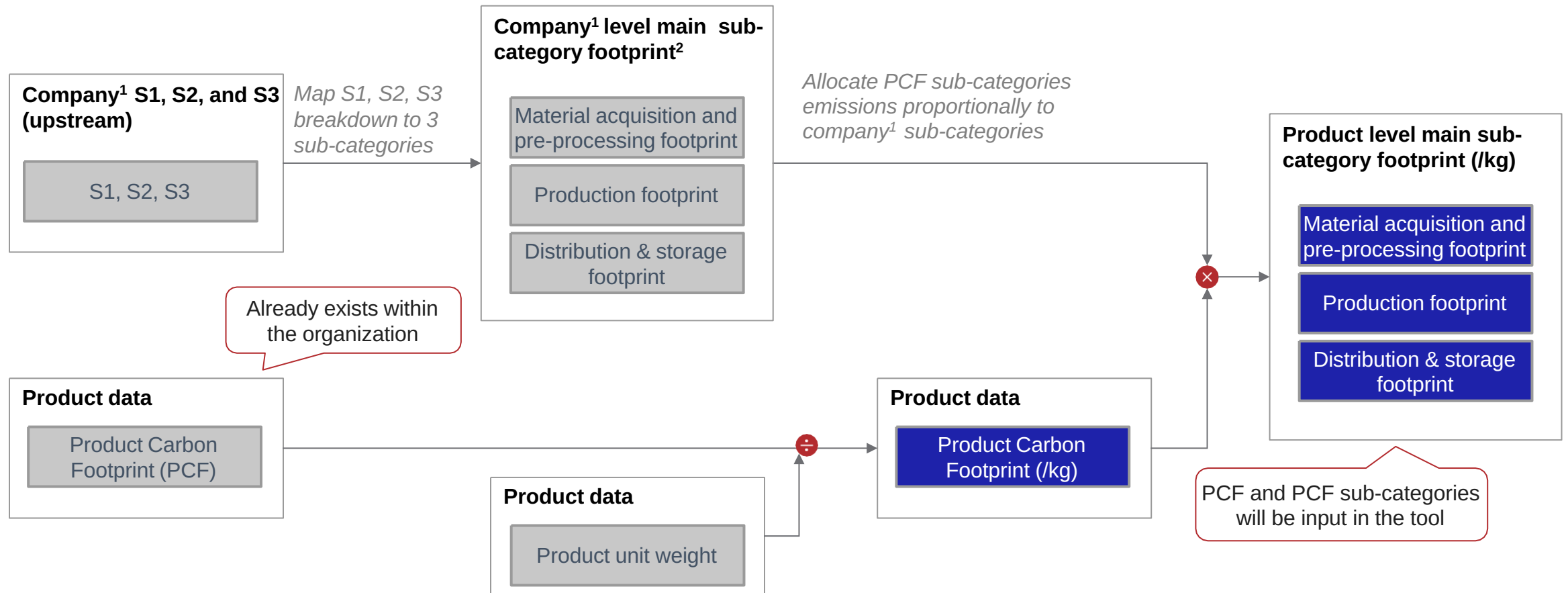
**1** Collection | Collect company-level[1] S1, S2, S3 emission data with full available granularity

**2** Mapping | Map company-level[1] S1, S2, S3 emissions to 3 defined sub-categories[2]

**3** Allocation | Allocate PCF sub-categories emissions proportionally to company[1] sub-categories

# Detailed calculation methodology



**Objective:** *Estimate PCF sub-categories proportionally to top-down company S1, S2, and S3 emissions*

**Company[1] S1, S2, and S3 (upstream)**

S1, S2, S3

*Map S1, S2, S3 breakdown to 3 sub-categories*

**Company[1] level main sub-category footprint[2]**

Material acquisition and pre-processing footprint

Production footprint

Distribution & storage footprint

*Allocate PCF sub-categories emissions proportionally to company[1] sub-categories*

**Product level main sub-category footprint (/kg)**

Material acquisition and pre-processing footprint

Production footprint

Distribution & storage footprint

Already exists within the organization

**Product data**

Product Carbon Footprint (PCF)

**Product data**

Product unit weight

**Product data**

Product Carbon Footprint (/kg)

PCF and PCF sub-categories will be input in the tool

1. Or more granular e.g., plant; 2. if supplier global footprint (S1,S2 & S3) granularity level allows for categorization across components;

# Mapping | We define 3 high level PCF Lifecycle categories

|  |  |  |
|---|---|---|
| **Material acquisition and pre-processing** | **Production** | **Distribution & storage** |
| Starts with resources extraction, ends with product components entering your production facilities | Starts with product components entering your production facilities, ends with finished product exiting your production facilities | Starts with finished product exiting your production facilities, ends with product entering your client hands |
| *Primarily S3 upstream* | *Primarily S1 & S2* | *S3 downstream distribution* |

Source: GHG Protocol ; BCG analysis

# Mapping | How to map company-level emission items into our 3 defined high-level PCF categories?

| Scope | Scope details - emission items (GHG P.) | High-level Lifecycle categories (GHG Protocol) |
|---|---|---|
| Scope 3 upstream | Purchased goods & services | Material acquisition & pre-processing |
| | Capital goods | Not included in PCF |
| | Fuel & energy related activities | Material acquisition & pre-processing |
| | Transportation & distribution | Material acquisition & pre-processing |
| | Business travel | Not included in PCF |
| | Employee commuting | Not included in PCF |
| | Leased assets | Not included in PCF |
| | Treatment of waste generated in operations | Production |
| Scope 1 | Direct emissions from owned company facilities | Production |
| | Direct emissions from owned company vehicles | Upstream transportation to your production facility: Material acquisition & pre-processing<br>Within your own operations: Production<br>Downstream transportation to your client: Distribution & S. |
| Scope 2 | Purchased electricity, steam, heating | Production |
| Scope 3 downstream | Transportation & distribution | Distribution & storage |

Source: GHG Protocol; BCG analysis

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# We will input the PCF and PCF breakdown on the tool



Emission values

You can use CO2AI free tool to help you assess your product level emissions, open calculator

**Material acquisition and pre-processing ***

Value *                    Textfield label *

                           kgCO2/kg

**Production ***

Value *                    Textfield label *

                           kgCO2/kg

**Distribution and storage ***

Value *                    Textfield label *

                           kgCO2/kg

If not already completed, please share the **name and email of your point of contact** to receive login credentials

# Data you will need to breakdown PCF into Lifecycle stages

**Product data**

1. What is the unit of production (e.g., 1L bottle, 1 roll) currently used for the studied product and its weight?

**Emission data**

2. What is the PCF of the product?

3. What are the components that compose the S1, S2, and S3 emissions? Please collect all available granularity levels

4. How do these components map to our defined sub-categories[1]?

# Example

# Data input

Company A produces caustic soda in units of 2kg

Over 2020, Company A conducted an emission analysis and identified a caustic soda of PCF of **0.3ktCO2e/kg** without further breakdown

Company A plant level emissions (2020):

- Raw mat. & packaging: 200 ktCO2e
- Non-product attributable: 100 ktCO2e
- Production: 500 ktCO2e
- Distribution: 50 ktCO2e

## Plant-level emission sub-categories

- Total plant level attributable emissions[1] = 200ktCO2e + 500ktCO2e + 50ktCO2e = 750ktCO2e
- Material acquisition and pre-processing = 200ktCO2e, (i.e. ~27% of total plant emissions)
- Production = 500ktCO2e (i.e. ~67% of total plant emissions)
- Distribution & storage = 50ktCO2e (i.e. ~6% of total plant emissions)

## Caustic soda PCF

- PCF = 0.3ktCO2e/kg

## Caustic soda PCF sub-categories

- PCF Material acquisition & pre-processing

  = ($Plant\ level\ material\ emissions\ ratio * PCF$) = $0.03ktCO2e/kg * 27\% = 0.08ktCO2e/kg$

- PCF Production

  = ($Plant\ level\ production\ emissions\ ratio * PCF$) = $0.03ktCO2e/kg * 67\% = 0.2ktCO2e/kg$

- PCF Distribution & Storage

  = ($Plant\ level\ distribution\ emissions\ ratio * PCF$) = $0.03ktCO2e/kg * 6\% = 0.02ktCO2e/kg$

1. 1. 100ktCO2e non-product attributable processes (e.g., employee commuting, business travel) emissions are not included into PCF.

# Summary

Introduction

How to define my supplier data readiness level?

Calculation methodology per supplier data readiness

Beginner  Developing  Mature  Leader

>

# High level approach | How to help Leader maturity suppliers to breakdown a PCF?

Map your PCF breakdown into our defined categories & engage in emissions hotspots discussions

**1** Collecting | Collect PCF and PCF breakdown

**2** Mapping | Map PCF breakdown components to the 3 defined PCF sub-categories

> Suppliers already submitting to **CDP module 4** can directly share module 4 breakdown on the platform[1]

**3** Engaging | Conduct discussion on emissions hotspots

1. When entering emission values, select "Detailed Life Cycle level" on Product Ecosystem interface to share CDP module 4 PCF breakdown

# Mapping | We define 3 high level PCF Lifecycle categories

**Material acquisition and pre-processing**

Starts with resources extraction, ends with product components entering your production facilities

*Primarily S3 upstream*

**Production**

Starts with product components entering your production facilities, ends with finished product exiting your production facilities

*Primarily S1 & S2*

**Distribution & storage**

Starts with finished product exiting your production facilities, ends with product entering your client hands

*S3 downstream distribution*

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Source: GHG Protocol ; BCG analysis

# We will input the PCF and PCF breakdown on the tool

## Emission values

You can use CO2AI free tool to help you assess your product level emissions, open calculator

### Material acquisition and pre-processing *

Value *  |  Textfield label *

kgCO2/kg

### Production *

Value *  |  Textfield label *

kgCO2/kg

### Distribution and storage *

Value *  |  Textfield label *

kgCO2/kg

If not already completed, please share the **name and email of your point of contact** to receive login credentials

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# Data you will need to map your PCF breakdown into Product Ecosystem sub-categories

**Product data**

1. What is the unit of production (e.g., 1L bottle, 1 roll) currently used for the studied product and its weight?

**Emission data**

2. What is the PCF of the product?

3. What are the components of the PCF? Please collect all available granularity levels

4. How do these components map to our defined sub-categories[1]?