carbone4

NET ZERO INITIATIVE
FOR APPAREL & FOOTWEAR

Guidance on avoided emissions

NET ZERO INITIATIVE

Carbone 4 team
Maxime Aboukrat, Senior Consultant
Madeleine d'Arrentieres, Consultant
Rodrigo Baranna, Project leader
Julie Daunay, Principale, co-manager of the Carbon Neutrality team
Clémence Descours, Senior consultant
César Dugast, Manager, co-manager of the Carbon Neutrality team
Céleste Grillet, Senior Consultant
Clémene Lacharme, manager of the Luxe & Retail team
Jean-Baptiste Sultant, Project leader
Jean-Marc Jancovici, founding partner
Alain Grandjean, founding partner
Laurent Morel, partner

External contributors
Chloé
Decathlon
Hermès
Intersport
Louboutin
LVMH
Picture

The team is grateful to the experts of the scientific committee who contributed to this guide.

Page layout: Louise Badoche (Carbone 4)

The organisations supporting the NZI initiative do not necessarily adhere to all the concepts presented herein.

Carbone 4, 2023

Table of contents

Executive summary

This is **the guidance** document **to Pillar B of the NZI dashboard applied to the Apparel & Footwear sector**. Pillar B aims to quantify a company's positive impact on greenhouse gas emissions of its ecosystem. We focus here on the contribution of a company's solutions to reduce their clients direct and indirect emissions compared to a reference situation. This report is divided in two parts:

- **Part 1:** the Apparel and footwear sector's contribution to global neutrality.
- **Part 2:** the Apparel and footwear sectoral toolbox to estimate avoided emissions.

PART 1 – THE APPAREL & FOOTWEAR SECTOR'S CONTRIBUTION TO GLOBAL NEUTRALITY

Summary of challenges of decarbonization in the apparel and footwear sector

- **Growth in production and consumption, along with a decline in the use of clothing increases the apparel and footwear sector's GHG emissions.** This makes it challenging to meet sector's science-based reduction target through energy efficiency and decarbonization alone - without a decrease in production.
- **For the sector to reduce its annual clothing production in terms of volume and to decarbonize its value chain, the consumer's wardrobe, and habits must evolve.** The wardrobe of the future should be slimmed down and rely mostly on existing clothes (second-hand, rental) and with less outgoing flow thanks to repair and long-lasting clothes.

Summary of Apparel and Footwear's role in decarbonization

- **The only scientifically valid definition of "net zero" currently applies only to the earth itself.** The Net Zero Initiative considers each company as an entity that must contribute to the goal of global and national carbon neutrality using a series of independent indicators to align a company's climate performance with the global net zero target.

- **Pillar B is aimed at quantifying a company's impact on the decarbonization of its value chain, outside its own reporting scope (pillar A).** A company's contribution to decarbonization - products, and services to avoid emissions i.e., their capacity to decarbonize their clients, in comparison to a reference situation.
- **The main lever to reduce the sector's emissions is to reduce the number of new garments and footwear produced,** by increasing the number of times existing clothes are worn and by increasing the number of wears of new clothe; Reduction of the carbon footprint of new garments and footwear is also a lever.

- **Avoided emissions claims should promote companies' decarbonizing products and services.** However, since over-consumption is the sector's main issue in terms of GHG emissions, **it is essential to limit these claims to those companies who do not encourage over-consumption.** Eligibility criteria are therefore defined to restrict avoided emissions claims to only those companies whose business models are not based on over-consumption.

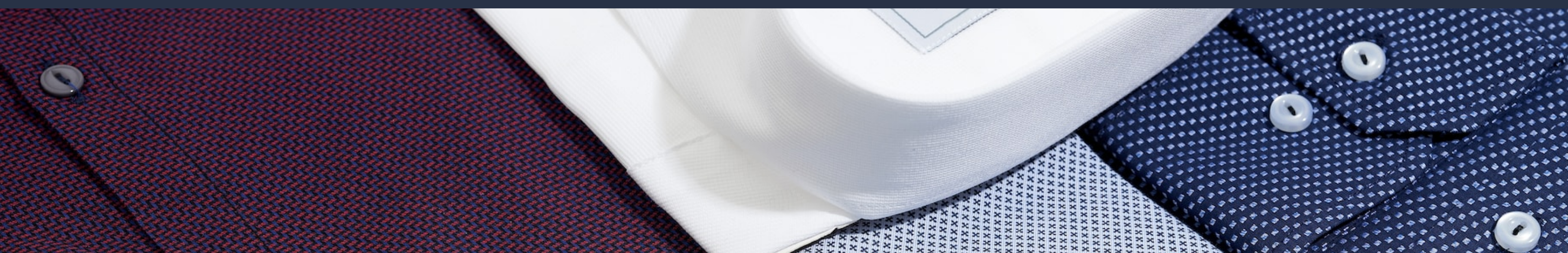
PART 2 – THE APPAREL & FOOTWEAR SECTORAL TOOLBOX TO ESTIMATE AVOIDED EMISSIONS

Summary of the toolbox content

This toolbox centralizes methodological results for the Apparel and Footwear sector and provides sector-specific methodological guidelines on avoided emissions, for each solution/context pairing. For certain solutions, the toolbox also provides detailed methodology sheets and a first estimation of avoidance factors (AFs) for a specific combination of solution and context.

Solutions	Methodological sheet	Avoidance factor
Repair	✓	*Repair of a pair of leather shoes*
Second-hand	✓	*Sale of a second-hand pair of jeans*
Rental	✓	*Rental of a wedding-dress*
Extrinsically long-lasting	✓	-
Physically long-lasting	✓	*Sale of a physically long-lasting t-shirt (PEF score 1,17)*
Low-carbon	✓	*Sale of a low carbon t-shirt in recycled cotton*

Guidance on avoided emissions for Apparel & Footwear companies



PART 1

The Apparel & Footwear sector - contribution to global neutrality

Introduction

This guidance forms part of the Net Zero Initiative (NZI) to establish a rigorous, ambitious framework for companies to make a fair contribution to the global net zero target. The NZI framework has been developed on a global scale using generic methods and publications.
In order to make this NZI framework more operational, sector-specific guidance is being developed. The purpose of this document is to **present a list of solutions that can avoid emissions in the Apparel & Footwear sector** and to provide **methodological guidance** on how to estimate these avoided emissions. It has been designed to help companies in the Apparel and Footwear sector to transform their businesses in-depth and has been developed with the sponsorship of companies within the sector.

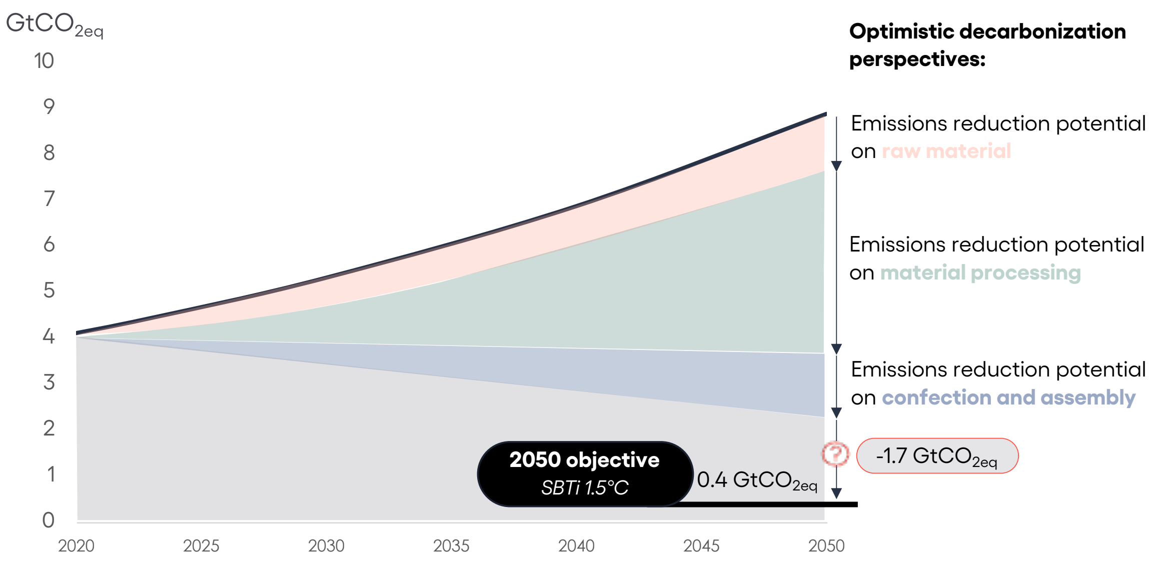
This document should be read as a **compliment to "The pillar B guide"** published by the Net Zero Initiative in June 2022. "The pillar B guide" provides a general methodological framework for calculating and reporting avoided emissions as well as a toolbox containing detailed methodologies and numerical applications (avoidance factors - AF) for three business sectors. This report enhances the guide with methodologies and AF specific to the Apparel & Footwear sector.

Decarbonization in the Apparel & Footwear sector: key issues

1. Key figures and issues

"**Clothing production worldwide doubled** between 2000 and 2015, outpacing GDP growth during that period"[1]. At the same time, **clothing use has reached an all-time low**: the number of times an item is worn fell by more than 10% from 2000 to 2015[2].
The Apparel & Footwear sector is expected to continue its fast growth to reach $3 trillion in 2030[3]. As the graph below shows, this growth is incompatible with the sectors' climate ambitions. GHG emissions reduction target cannot be met only through energy efficiency and decarbonization. Sufficiency, and in particular a decrease in production, is an essential part of the equation.

Apparel & Footwear sector's emissions projection (2019 - 2050) and optimistic decarbonization potential



Note: Decarbonization perspectives for distribution were also considered but are less significant thus not displayed on the graphic.

Sources: SBTi sectoral guidance for Apparel & Footwear, Quantis *Measuring Fashion* 2018, Euromonitor, Carbone 4 analysis

*Figure 1 - **Apparel and Footwear sector emissions reduction perspectives***

The graph shows Apparel & Footwear sector emissions in 2019 and their evolution towards 2050 including the forecasted growth of the sector. Each colored band represents the emissions reductions that can be expected with very optimistic hypotheses for each step in the sector's value chain. These optimistic decarbonization perspectives would reduce the sector's emissions to around 2 Gt in 2050, a value that is still higher than the SBTi's 1.5°C target for 2050, which stands at 0.4 GtCO2).

[1] WRAP – changing our clothes
[2] Ellen MacArthur foundation – a new textile economy

Even with the most optimistic decarbonization perspectives for apparel and footwear involving each step of its value chain, **the sector fails to meet 2050 reduction objectives without decreasing production**.
Besides carbon emissions, the sector must also address social impacts, and further environmental impacts including plastic and chemical pollution or pressure on biodiversity.
The sector's challenge is to move away from the over-consumption model while retaining its core functions of providing clothing and footwear to people for purposes that vary greatly depending on their socio-economic context - items can be practical, or a symbolic or social statement.

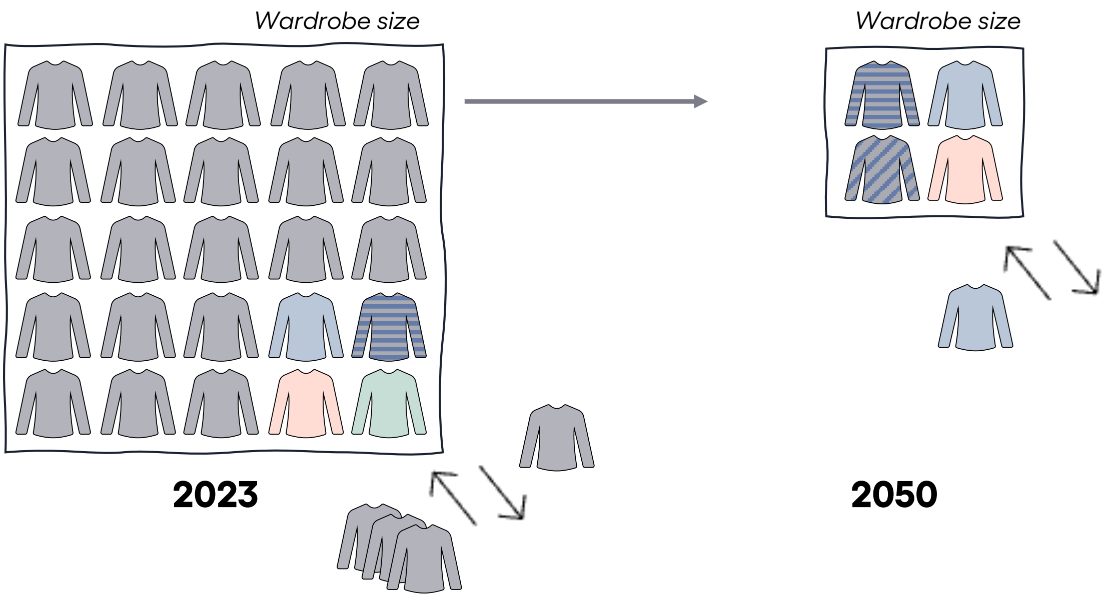
2. What are we going to wear: the 2050 wardrobe vs 2023

a. Illustration of wardrobe stock and flows

Every wardrobe is individual. Clothes reflects individual style, habits, budget and taste but also a person's convictions. The content of each person's wardrobe varies across countries, cultures and has considerably changed throughout time.
A wardrobe can be described as a person's stock of clothes resulting from the flow of incoming clothes (purchased, received as gifts, inherited, etc.) and outgoing clothes (discarded, donated, etc.).

To respect its carbon budget, the fashion industry, must **reduce its yearly clothing production in volume** and **decarbonize its value chain**. The consumer's wardrobe and **habits must evolve**.

Assuming that the wardrobe of 2050 will be much smaller than that of 2023, the incoming flow will rely mainly on existing clothes (second-hand, rental, etc.) and the outgoing flow will be reduced, thanks to repair or longer-lasting clothing. And the fewer clothes bought brand new will be produced with a lower carbon footprint per item than in 2023.



The colour of the t-shirt represents **its specific type:**

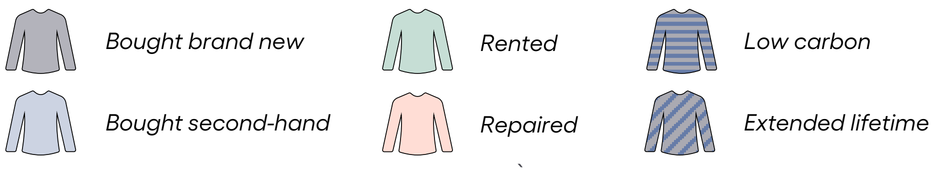


*Figure 2 - **Evolution towards a low-carbon wardrobe***

b. Individual carbon budget pathway towards 2050 in a 1.5°C scenario

In 2021, the average French person's clothing emitted 200 kgCO_2e per year[3].
By 2030, those emissions must be reduced by 42%[4] to respect the carbon budget for a global warming of **1.5°C.**
Therefore, in 2030 a French person need to reduce their clothing emissions to 116 kgCO_2e per year on average, and reduce this further to 20 kgCO_2e by 2050 (-90% compared to 2021 according to SBTi)[5].

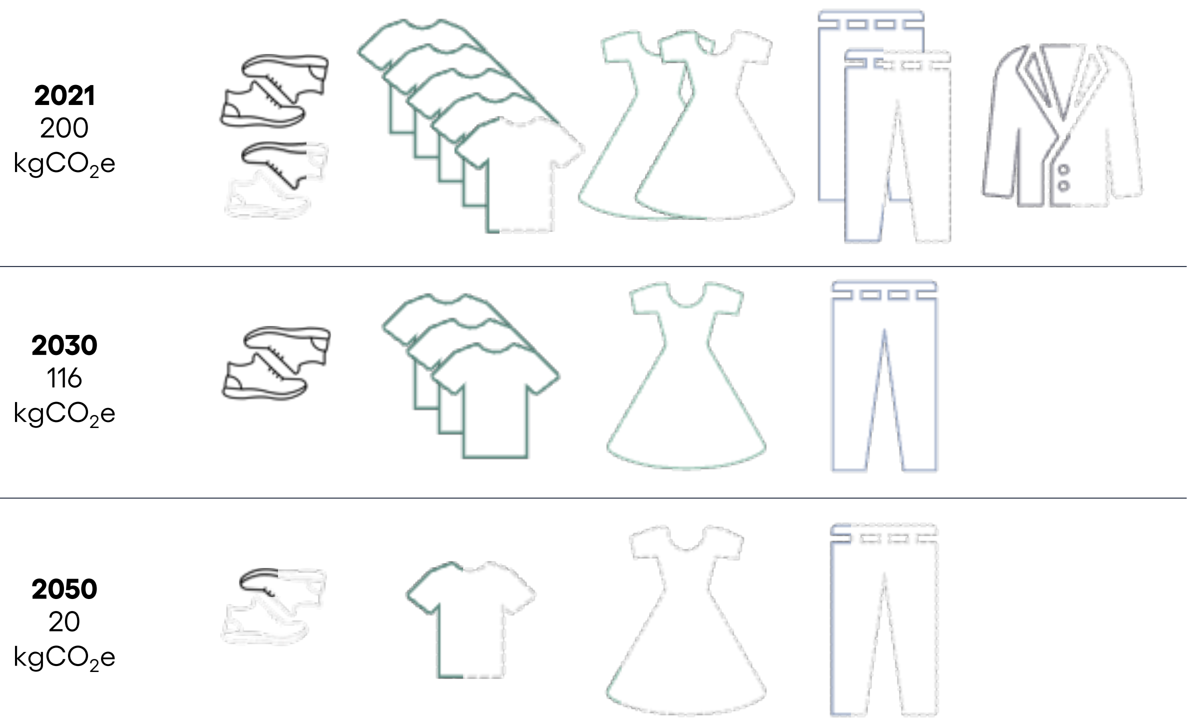


*Figure 3 – **Representation of fictional yearly purchases of new clothes corresponding to the annual carbon budget for apparel & footwear in France***

[3] MyCO_2 by Carbone 4
[4] Science Based Target Initiative (SBTi)
[5] With today's level of emission per item, it means for example buying approximately in 2030: one pair of sports shoes (~20kgCO_2e), one pair of jeans (~25 kgCO_2e), one sweater (~30 kgCO_2e), 3 t-shirts (~7 kgCO_2e per item), and one viscose dress (~50 kgCO_2e); Ademe – poids carbone des biens et équipements

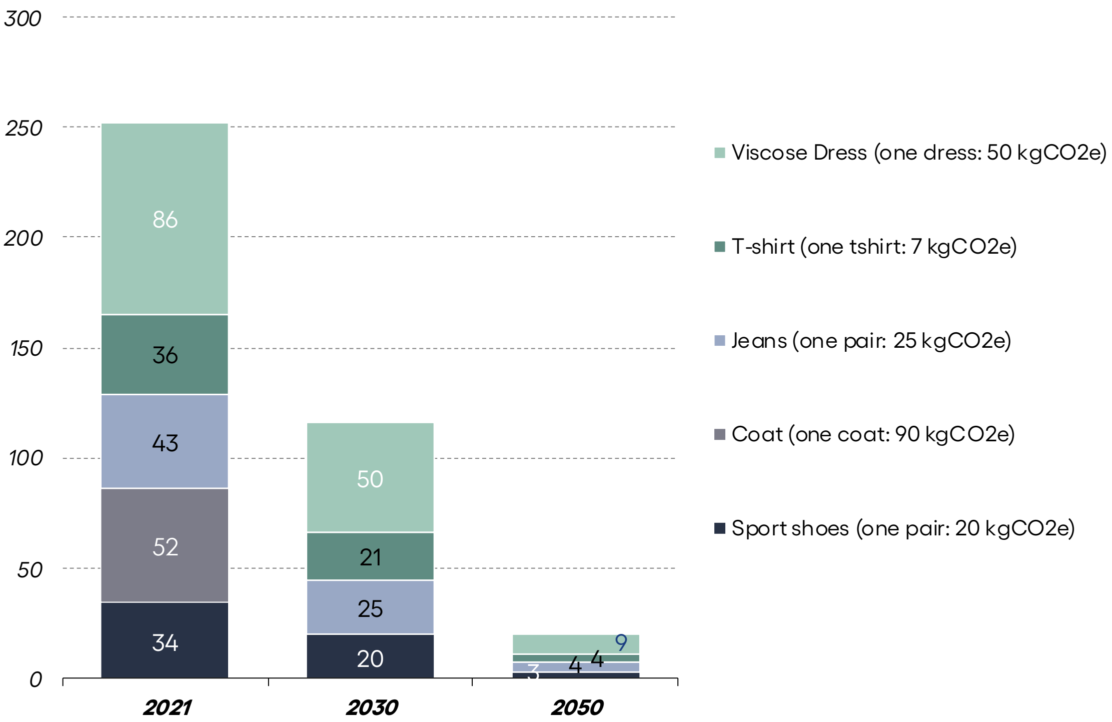


Figure 4 – ***Total emissions for one year of brand-new purchases for one person (example of breakdown per item) – kgCO₂e***

Note: these representations correspond to a carbon budget for apparel and footwear fully spent on brand-new clothes. This carbon budget will have a different breakdown, including low-carbon solutions such as second-hand, rental, repair etc.

The role of Apparel & Footwear solutions in decarbonization

1. The Net Zero Initiative framework

In June 2018, Carbone 4 launched the Net Zero Initiative and laid the foundations for the first interpretation of "net zero emissions" with the publication of its associated reference framework for companies.

Since the only scientifically-valid definition of "net zero" applies to planet Earth[6], with the potential to apply to government actors[7], the Net Zero Initiative considers the company as an entity that must above all seek to **contribute at the right level to the goal of global and national carbon neutrality.**

Thus, the notion of a "net zero" or "neutral" company is set aside and replaced by a series of independent indicators used to **align the climate performance of a company with global net zero.**

This matrix can also be seen as **the generalization of the carbon footprint tool**, enriched with new metrics capable of covering blind spots of classical reporting methodologies, in particular:

- the notion **of the climate utility of a product/service,**
- the **protection and development of carbon sinks,**
- monitoring **financial contributions** (of non-financial companies) to low-carbon transition (by going beyond the notion of "offset", which wrongly implies the possibility of "avoiding the climate change problem" by purchasing carbon credits).

[6] IPCC (2018), *Global Warming of 1.5°C (SR15)*
[7] ADEME (2021), *Les avis de l'ADEME: la neutralité carbone*

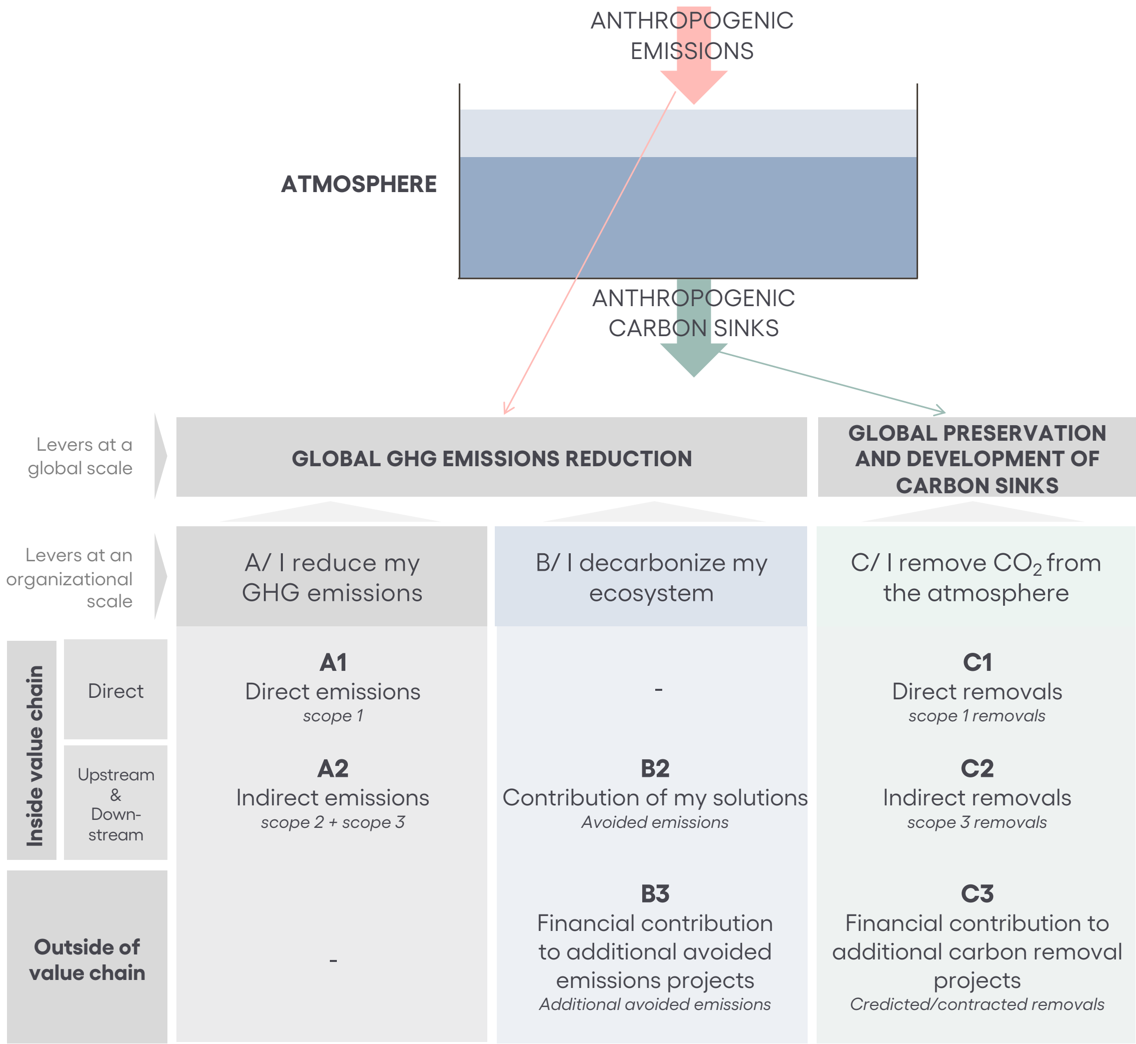


*Figure 5 – **The three pillars of Net Zero Initiative at the company scale***

The breakdown of the goal of global net zero emissions on the scale of a company shows three pillars of action: the reduction of the company's carbon footprint, avoiding the emissions of third parties, and the capture of CO_2 from the atmosphere in carbon sinks. The table at the bottom of the diagram is the dashboard of Net Zero Initiative.

2. The pillar B: products and services to avoid emissions

Pillar B of the NZI dashboard aims to **quantify the company's impact on value chain decarbonization**, outside its own perimeter of reporting (pillar A)**.** It is composed of three main families:

- **The company's contributions to decarbonization (B2)**, i.e., their **capacity to reduce their clients direct and indirect GHG emissions, in comparison to a reference situation** (avoided emissions).
- **The company's financial contribution to additional projects to reduce/avoid emissions outside its value chain (B3),** and in particular – but not alone - the purchase of "carbon credits" (certified emission reductions).

*Figure 6 – **Avoiding emissions can be done via products and services sold, investments and financing projects outside the value chain***

a. The difference between reduction in Pillar A and avoided emissions in Pillar B

Whereas the carbon footprint measures greenhouse gases emitted – and variations over time, analysis of avoided emissions consists of a theoretical comparison over a given timeframe between a real situation (situation and solution developed by the company) and a contrafactual virtual situation (reference situation), i.e., which never took place.

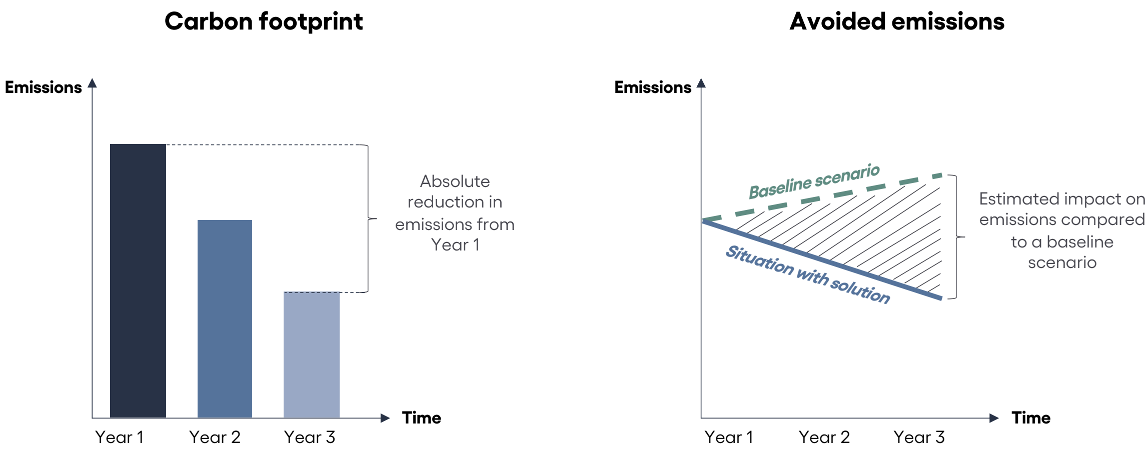


*Figure 7 - **Difference between a carbon footprint (left) and avoided emissions (right).***
Note that the emissions perimeter considered differs: for carbon footprint reduction, the emissions are accounted for from the company's perspective, while for avoided emissions, they are accounted for from the clients' perspective

	Carbon footprint	Avoided emissions
Principle	Measure of GHG emissions of an activity for a given year. Reductions (or increases) of emissions reflect the **evolution through time.**	Estimation of "positive" carbon impact of an action. Avoided emissions are the **comparison between a real situation** (situation with the solution) **and a theoretical situation** (reference situation).
Reference	Reductions (or increases) of emissions are **quantified in comparison to the level of emissions of a historic reference year** in a constant perimeter.	Avoided emissions are **quantified in comparison to a contrafactual reference situation**, that would have occurred in the absence of the solution.
Uncertainty	The measure is based on real emissions, **so uncertainty is low.**	The reference is a non-verifiable fictional situation, **so uncertainty is high.**

*Table 1 - **Main differences between carbon footprint and avoided emissions***

See Appendix for more details on "The difference between reduction in Pillar A and avoided emissions in Pillar B".

b. Two types of avoided emissions

Depending on the case, avoided emissions can represent:
- The **effective reduction of emissions** in comparison to previously higher emissions.
- The **lower increase of emissions** in comparison with a theoretical reference scenario that would have generated greater emissions.

See Appendix for more details on "Two types of avoided emissions".

c. Why should an Apparel & Footwear company calculate avoided emissions?

For every Apparel & Footwear company, reduction on pillar A (induced emissions) must be the priority. However, as companies actively develop solutions to decarbonize the sector beyond their own value chain, new business models are emerging. Avoided emissions is the indicator to promote those alternative business models and demonstrate which contribute most to global neutrality, paving the way for the sector.

3. The Apparel & Footwear sector's emissions reduction levers and solutions

a. Emissions reduction levers of Apparel & Footwear

The Apparel and Footwear sector's yearly GHG emissions are those released in the atmosphere during a given period by garments and footwear either produced during that year or existing garments and footwear (e.g.: found in people's wardrobe, shops or elsewhere).

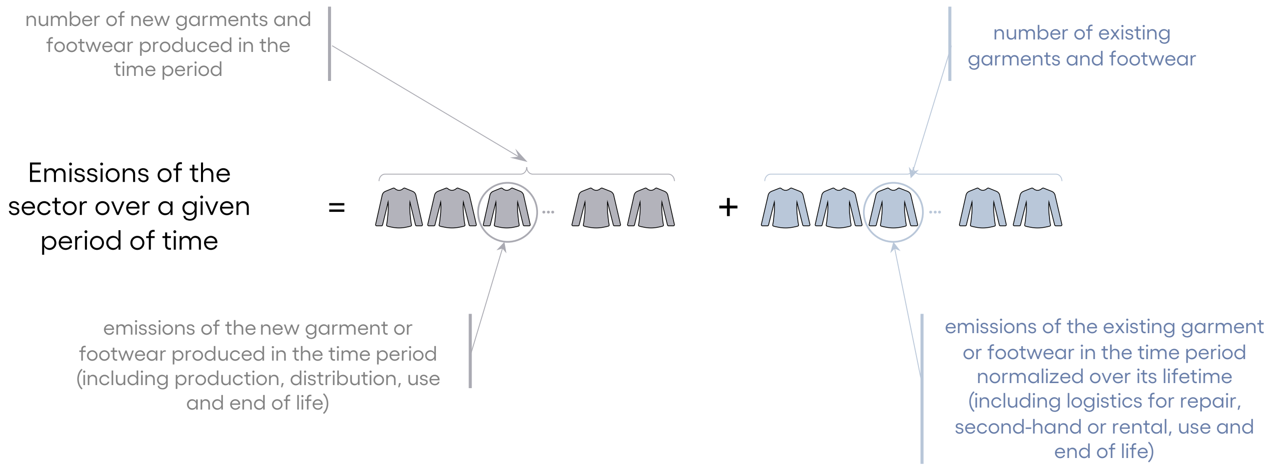


*Figure 8 - **Emissions of the apparel and footwear sector***

The main levers to reduce emissions over the given period are:

- to **reduce the number of new garments and footwear produced**
- to **reduce the carbon footprint of new garments and footwear**

Another lever would be to reduce the carbon footprint of existing items – e.g., repair and end-of-life of existing items. <u>This reduction lever is, however, excluded from the scope of this report because its impact in terms of emissions reduction is secondary.</u> Emissions related to use – laundry, are also excluded from the scope of this report, as they will be accounted for in the decarbonization strategies of other sectors (ex: household appliances manufacturer, energy).

Reducing the number of new garments and footwear produced

The main levers to reduce the number of new garments and footwear produced over the given period are:

- increase average number of wears of existing items in a given period.
- increase = average number of wears of new items in a given period.

$$\underbrace{\#wears_{total}}_{\text{Total need in garment and footwear}} = \#wears\ of\ new\ items + \#wears\ of\ existing\ items$$

$$\#wears_{total} = [average\ \#wears\ per\ new\ item] * \#new + [average\ \#wears\ per\ existing\ item] * \#existing$$

$$\Longrightarrow \#new = \frac{\#wears_{total} - [average\ \#wears\ per\ existing\ item] * \#existing}{[average\ \#wears\ per\ new\ item]}$$

*Figure 9 - **Number of new garments and footwear produced in a given period depending on number of wears and the existing items***

Another lever would be to reduce the total number of wears needed by the population over a given period (i.e. changing clothes less often, for example by wearing the same clothes during the day and in the evening). This reduction lever is excluded from the scope of this report, as clothing and footwear companies have little influence on this parameter as solution providers. Nevertheless, it is important to emphasize that companies do have an influence on this parameter, through their advertising campaigns.

Five levers to reduce Apparel & Footwear sector's emissions

- **Increase average number of wears of existing** garments and footwear
- **Increase average number of wears of new** garments and footwear
- **Reduce carbon footprint of new** garments and footwear
- Reduce carbon footprint of existing clothes (use & end-of-life)
  Out of report's scope because levers of reduction are in the hand of other sectors
- Reduce total number of wears needed
  Out of report's scope because of limited influence from apparel & footwear companies as solution providers

b. Identified solutions to avoid emissions in Apparel & Footwear

Hereafter is a list of solutions acting on the three first levers of reduction for the Apparel & Footwear sector:

Solution	Reduction lever	Description of solution	Potential challenges
Repairing garments and footwear	**Increase average number of wears of *existing* garments and footwear.**	Products and services that reduce sector emissions by **extending the lifespan of existing items.** These solutions act on the **physical lifespan** and increase the number of wears of existing garments and footwear.	Lack of repair services providers; lack of competitivity of repair price compared to new purchases
Selling second-hand garments and footwear	**Increase average number of wears of *existing* garments and footwear.**	Products and services that reduce sector emissions by **extending the lifespan of existing items by changing user**. These solutions act on **extrinsic lifespan** and increase number of wears of existing items.	Increased consumption as a "guilt-free" purchase or because it is more affordable (rebound effect) and indirect financing of new items (e.g. vouchers).
Renting garments and footwear	**Increase average number of wears of *new or existing* garments and footwear.**	Products and services that reduce the sector's emissions by **extending the lifespan of existing items**. These solutions act on the **extrinsic lifespan** and increase number of wears of existing items by increasing number of users.	Important logistics emissions minimizing or cancelling avoided emissions; fail to increase the total number of wears
Selling long-lasting garments and footwear	**Increase average number of wears of *new* garments and footwear.**	Products and services that reduce the sector's emissions by **extending the lifespan of existing items for one user.** These solutions act on the **extrinsic or physical lifespan**[8] and increase the number of wears of existing items.	Increased consumption as a "guilt-free" purchase (rebound effect) **Revenue reduction since fewer garments are sold (worn for longer periods)**
Selling low-carbon garments and footwear	**Reduce carbon footprint of new garments and footwear**	Products and services that reduce sector emissions by **reducing the carbon intensity over lifespan of brand-new items** through the improvement of the production, usage, and end-of-life steps.	Increased consumption as a "guilt-free" purchase (rebound effect)

*Table 2 - **Synthesis of solutions analyzed and the reduction lever which they are related to***

See Appendix for more details on "Existing initiatives".

[8] Physical lifespan is defined as the number of times a garment or footwear is worn to the point where it can no longer be worn (deterioration in appearance or functionality). Extrinsic lifespan is defined as the number of times a garment or footwear is worn before it is no longer worn by the owner, for reasons other than deterioration in appearance or functionality (no longer fits, no longer in fashion, etc.)

4. Practical guidance on avoided emissions calculation for Apparel & Footwear sector

a. Eligibility criteria for Apparel & Footwear companies

Eligibility criteria intend to **limit any misuse of avoided emissions and target mostly solutions consisting in the sale of new garments and footwear** because there is no guarantee that consumers will not buy items in addition to "the solution".

Context

When analyzing solutions for new garments and footwear, which generate substantial additional production emissions compared to existing clothes, there is no guarantee that consumers will not buy items in addition to "the solution".

As the apparel and footwear sector does not answer only basic needs, consumers can buy as many eco-designed clothes as they want or can afford.
Consequently, a way to prevent greenwashing using these avoided emissions methodologies on new sustainable garments and footwear must be found (*see solutions methodological sheets - Selling brand-new physically long-lasting, Selling brand-new extrinsically long-lasting, Selling brand-new low-carbon*). The aim here is to highlight the risk of rebound effect on quantity, under cover of quality or eco-design or related to the brand's business model.

The aims of the following eligibility criteria are thus to exclude the possibility of claiming avoided emissions for companies that encourage over-consumption (commercial practices, marketing practices, etc.).

In order to claim avoided emissions, a brand must:

- Align with *criteria on the brand's business model* (Gate 1 & Gate 2)
- If avoided emissions are claimed for brand-new items, these items must comply with the *criteria for brand-new items* (Gate 3, 4, 5 and 6)
- If avoided emissions are claimed for existing items, these items must comply with the *gate for existing items* (Gate 7)

Criteria on the brand's business model:

Gate 1: Collection renewal
Are eligible for avoided emissions claim, brands which release four or fewer collections per year. Brands can either include capsule collections in this count to claim avoided emissions on the capsule's items or exclude capsule collections from this count but then shall not claim for avoided emissions from items in the capsules excluded.

Gate 2: Number of references[9]
Are eligible for avoided emissions claim,
- brands with fewer than 5000 references OR
- brands with between 5 000 - 15 000 references and whose number is stable or decreasing year on year.

[9] Source: « En mode climat » ; brands with less than 5000 get 100% bonus and brands with more than 20 000 references get 0% bonus; brands with 15 000 references or fewer corresponds to a 33% bonus as a ratio between the two thresholds

Associated definitions:

- **Collection:** group of several new references released the same time, in the same geography.
- **Capsule:** group of several new references released at the same time whose common denominator is not seasonality (e.g.: collaboration with another brand or artist).
- **Brand:** the brand here refers to the group level and not to the different brands that can be found within the group.
- **Reference:** a reference is the association of a cut and a color; size and minor changes (e.g.: material composition) do not define a new reference.
  Note: only apparel and footwear references should be considered here.

Criteria for brand-new items:

Gate 3: Promotional sales
Are eligible for avoided emissions claim, references sold without any type of promotional sale (sales, private sales, Black Friday, etc.).

Gate 4: Availability for sale
Are eligible for avoided emissions claim, items sold available for sale at least for 6 months.

Gate 5: Derisory prices
Are eligible for avoided emissions claim, references sold above the average price of its potential repair or with an associated repair solution developed by the brand competitive with buying new.

Gate 6: Advertising
Are eligible for avoided emissions claim, sustainable references sold on which advertising carefully avoids greenwashing (no claim of product neutrality or low carbon unless proven and sourced, no use terms with no normative content such as “responsible” or “green”, no statement on the fact that buying more is not an issue, no focus on the sustainable solutions to hide unsustainable practices elsewhere in the company).

Gate for existing items:

Gate 7: Incitation to buy new
Are not eligible for avoided emissions claim, solutions regarding existing items (rental, second-hand, repair…) which encourage the purchase of brand-new products at the same time. *E.g.: vouchers, cash-back systems.*

b. Illustration of the calculation methodology

Illustrate the solution versus the reference situation

Avoided emissions are an estimate of the positive effect of a solution on GHG emissions in comparison to a reference situation that would have occurred without the solution. Avoided emissions are the difference between the induced emissions of the reference situation and the emissions with the solution:

Avoided emissions = Emissions $_{\text{reference situation}}$ – Emissions $_{\text{situation with the solution}}$

To compute avoided emission, all the emissions of fabrication, transport, utilisation, end of life, etc. are considered for the reference situation and the situation with the solution.

Detailed calculation of avoided emissions of a t-shirt in recycled cotton:

For data used in the calculation, see the numerical application of Solution 5 – Low carbon new garment and footwear.
To calculate the emissions avoided **by a solution**, the company must take the following steps:

1. Assess emissions in the situation with the solution

Total emissions of a **t-shirt in recycled cotton** = Emissions of **production** and **logistics** + Emissions of **usage** *per wear* x #wears + Emissions of **end of life**

Total emissions of a **t-shirt in recycled cotton** = 3,6 $kgCO_2e$ + 0,01 $kgCO_2e$/wear x 115 wears + 0,3 $kgCO_2e$

Total emissions of a **t-shirt in recycled cotton** = **4,9 $kgCO_2e$**

2. Assess emissions in the reference situation

The reference situation is the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative.

In this example, the consumer has three alternatives, for which emissions over a lifespan must be calculated: 1) Buy an average brand-new t-shirt, 2) Buy a brand-new t-shirt in recycled cotton elsewhere, or 3) Do nothing.

Thus, a first step is to calculate **emissions over a lifespan of every alternative**:

→ Alternative 1: Buy an **average brand-new t-shirt**

Total emissions of a **brand-new t-shirt** = Emissions of **production** and **logistics** + Emissions of **usage** *per wear* x #wears + Emissions of **end of life**

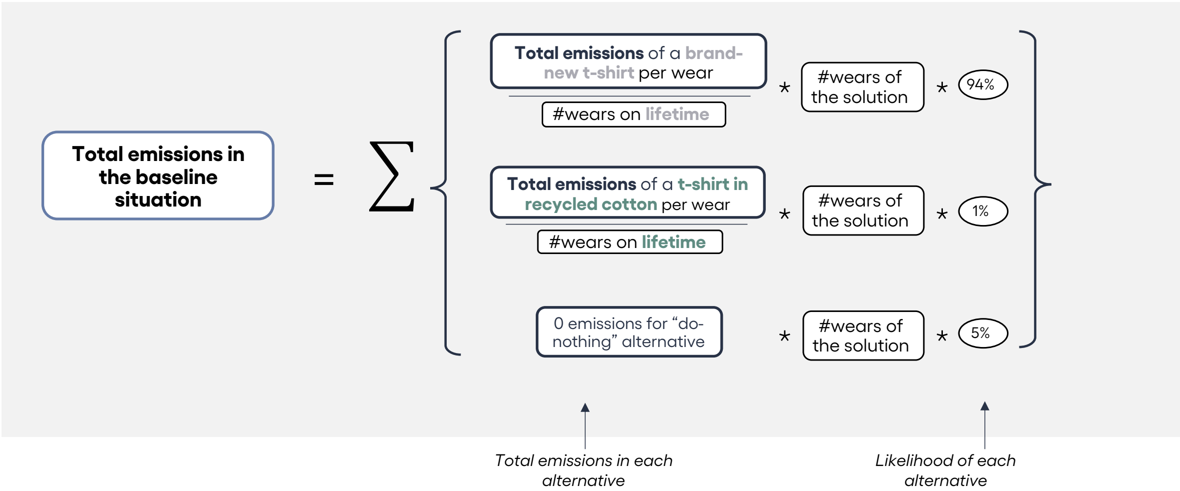
Total emissions of a **brand-new t-shirt** = 5,2 $kgCO_2e$ + 0,01 $kgCO_2e$/wear x 115 wears + 0,3 $kgCO_2e$

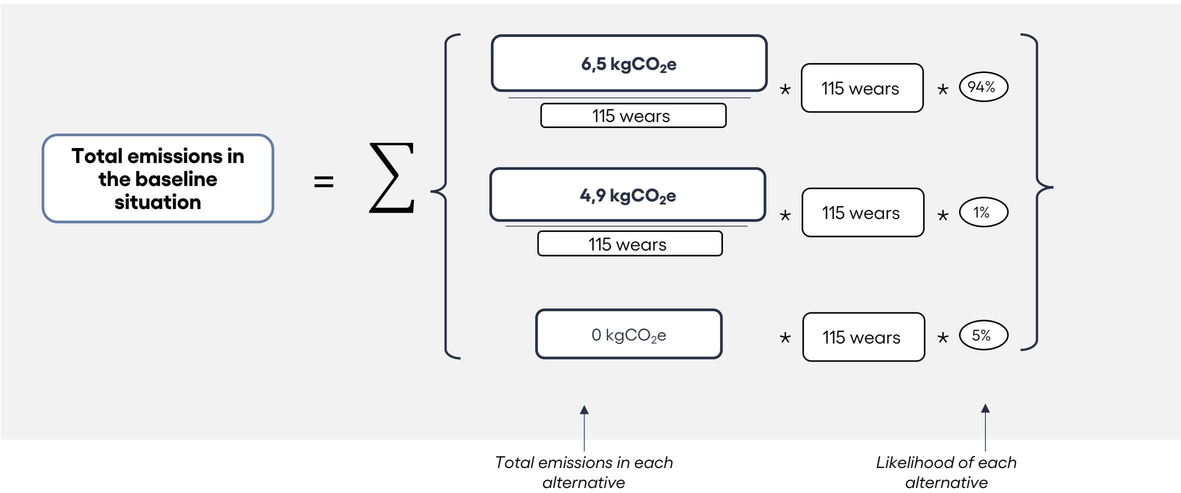
Total emissions of a **brand-new t-shirt** = **6,5 $kgCO_2e$**

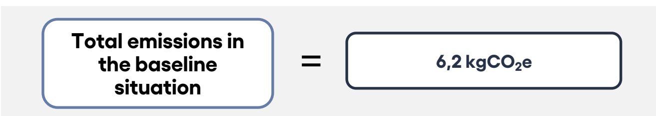
→ Alternative 2: Buy a **brand-new t-shirt in recycled cotton elsewhere**, the emissions over a lifespan are exactly the same as those of the situation with the solution.

→ Alternative 3: **Do nothing**: there are no emissions. The higher the share of this alternative, the lower the shares of the other alternatives and the lower the emissions in the reference situation.

Secondly, the **total emissions** in the reference situation are evaluated:







Note: here number of wears is the same in each alternative so referencing emissions per wear might seem redundant. However, in other solutions acting on lifespan, alternatives have a different number of wears than the solution.

3. Assess avoided emissions

Total avoided emissions = Total emissions in the baseline situation - Total emissions in with the solution

Total avoided emissions = 6,2 $kgCO_2e$ - 4,9 $kgCO_2e$

Total avoided emissions = 1,2 $kgCO_2e$

c. Avoided emissions of reduction or lesser increase for apparel & footwear

Once avoided emissions are assessed, a company can determine what share of avoided emissions are those of “reduction” or of “lesser increase” types.

In the Apparel and Footwear sector, the type of avoided emissions depends on **whether the solution answers an existing need** (avoided emissions of reduction) **or a new need** (avoided emissions of lesser increase).

Example 1: a consumer starts a new job or a new sporting activity and needs suitable new clothes – new need, avoided emissions of “lesser increase”.

Example 2: a consumer has a pair of sports shoes that he can no longer wear because they are too worn, so he buys another pair

Solutions addressed in this guidance (except for the repair solution, see below) **can answer** both **existing needs** or **new needs**.
To determine if the purchase answers an existing or a new need, **the company shall conduct a customer survey** (see *How to create an effective customer survey*).

Specific case: repair solution

Repair is the simplest situation. When a customer takes a garment or footwear to a repair service, it means that they were using it, and are willing to use it again after repair. For repair, 100% of avoided emissions of the solution are avoided emissions of reduction.

d. Practical issues – Managing complexity

Data granularity

Collecting data is the most challenging part of avoided emissions calculations. Precise data collected through customer surveys, LCAs or laboratory tests must be prioritized, although using averages and proxies might not be avoided.

Data type to prioritize, by order of precision and thus of priority:

1. **Actual data** collected through customer surveys, LCAs or laboratory tests (PEF).
2. **Market average data** or **other market segment** data used with relevant and conservative **proxies**.
   Ex: data collected for German consumers can be used for French consumers using statistical adjustments to reflect the difference in age breakdown.
3. Conservative **hypotheses** carefully constructed.

Proxys or hypotheses must always be **conservative**, meaning they must tend to minimize avoided emissions. This means that **induced emissions** in the **situation with the solution** must be **maximized** and **induced emissions** in the reference **situation** must be **minimized**.

Level of precision

Each calculation's accuracy depends on available information, publicly and within a company, but also on the complexity of the calculation. Indeed, accuracy will vary for a company that sells several thousand items a year using various solutions and a company that sells a small number of items with only one solution.

Net Zero Initiative distinguishes three levels of precision.

Vision	Precision	Description
Solution specific	**High** – this approach not recommended by Net Zero Initiative for Apparel & Footwear, to be used only when the data available allows it and if the calculation is not too time-consuming.	Carbon footprint specific to each item sold. A company must perform a detailed calculation for each solution with in-depth knowledge of the sales context for the use scenario. ***Example***: *the carbon footprint of a blue second-hand cotton shirt sold to a customer living in France who will wear it once a week for 5 years.*
Company average	**Average** – this approach is recommended by Net Zero Initiative for Apparel & Footwear.	Average carbon footprint of the solution specific to each company. The company must perform a detailed calculation, by considering average customers habits corresponding to the product in question and service category. ***Example***: *average carbon footprint of a brand's second-hand service.*
Market average	**Low** – this approach should be adopted for a preliminary assessment of avoided emissions.	Average carbon footprint of the solution in a given market. In this vision, carbon footprint is not specific to the company, it can be standardized for a given type of solution, a given geographical location and a given market segment. ***Example***: *average carbon footprint of luxury second-hand clothing sold to the average luxury customer.*

*Table 3 - **Description of three avoided emissions visions***

See Appendix for more details on "Level of precision".

Market segment typology

Data used for calculations must be specific to each market segment. Customer habits may vary greatly per market segment and these habits are key to calculate avoided emissions.

This distinction between market segments matters only if the item is used differently across market segments. For items with the same use across market segments (for example: a sport t-shirt or a wedding dress), it is possible to calculate with no specific market segment and therefore include in the reference situation alternatives from other segments than the one of the solutions.

Example: The alternative to "renting a luxury wedding dress" could be buying a low-cost wedding dress, buying a second-hand premium wedding dress, etc.
Alternatives to "purchasing a luxury long-lasting handbag" or "Purchasing a mass market long-lasting bag", will differ since those consumers' purchasing habits differ. Those two solutions cannot be compared.

Market segment	Description
Luxury	Highest prices
Premium	Medium prices
Mass market	Lowest prices

Table 4 - ***Description of three market segments***

Data used to calculate must also be specific to the type of items. Net Zero Initiative recommends the 13 categories of garments and footwear classification proposed by the PEF (Product Environment Footprint) for Apparel & Footwear.

Companies may use their own classification system if more precise than the one presented here. The goal is not to have a too high-level classification that would induce comparisons between very different items.

Figure 10 – ***Classification of apparel and footwear item***[10]

[10] Extract from https://pefapparelandfootwear.eu/whats-behind-the-methodology/#categories

PART 2

Apparel & Footwear Sectoral toolbox

Introduction

This toolbox centralizes methodological guidelines on avoided emissions for the Apparel & Footwear sector covered in the present report.

For each solution to avoid emissions the toolbox contains:

- an explicit **methodological sheet** setting out a rigorous method to calculate avoided emissions.
- applications of the solution to a specific item with a calculation of avoided emissions, i.e., the **avoidance factor (AF)** associated with this solution for the item.

What you will find in this toolbox

The Net Zero Initiative Apparel & Footwear toolbox presents 5 types of solutions for avoiding emissions in the sector. For each solution (except *Selling long-lasting garments*), at least one specific application is studied, and an avoidance factor calculation.

No	Solution	Description	Specific application	Avoidance factor in France
1	**Repairing garments** & **footwear**	Products & services that reduce emissions by **extending existing items lifespans.** These solutions act on the **physical lifespan** and increase number of wears of existing items.	Replacing the sole of a leather shoe	Yes
2	**Selling second-hand garments** & **footwear**	Products & services that reduce emissions by **extending lifespans of existing items by changing user**. These solutions act on **extrinsic lifespan** and increase number of wears of existing items.	Selling a second-hand pair of jeans Selling a second-hand coat	Yes
3	**Renting garments** & **footwear**	Products & services that reduce the sector's emissions by **extending the lifespan of existing items**. These solutions act on the **extrinsic lifespan**, increasing number of wears for existing items by increasing number of users.	Renting a wedding dress	Yes
4	**Selling long-lasting garments** & **footwear**	Products & services that reduce emissions by **extending existing items' lifespans for one user.** These solutions act on **extrinsic or physical lifespan** and increase number of wears of existing items.	Selling a long-lasting t-shirt	Yes
			Selling extrinsically long-lasting clothes	No*
5	**Selling low-carbon garments** & **footwear**	Products & services that reduce emissions by **reducing carbon intensity over brand-new items'** lifespans through improvement of production, usage, and end-of-life steps.	Selling a t-shirt made of recycled cotton	Yes

*Table 5 - **Synthesis of families of solutions analyzed, specific solutions treated, and examples of avoidance factors calculated for the Apparel & Footwear sector***

* There are many ways to make a garment extrinsically long-lasting: making it timeless, customize it, sell it at a higher price... All these ways depend greatly on consumer habits and can vary hugely across market segments. They also act on different aspects of the item, making this family very heterogenous. Also, no data was found on consumer habits towards specifically extrinsically long-lasting garments, preventing us from calculating avoided emissions.

Specific issues to the Apparel & Footwear sector

As explained in Part 2, **increasing lifespans of both existing and brand-new garments and footwear** could reduce the volume of new items produced each year, leading to an absolute reduction of emissions in the Apparel and Footwear sector.

Since extending an item's lifespan means it is worn more times, **these additional wears can replace the purchase and production of a new item** (if the industry also tackles issues of disposal of unsold items at the same time).
A crucial question is **how to determine accurately lifespan and/or number of wears for an item**.

This is addressed in the following part "*Ways to estimate the lifespan of garments and footwear*".

To compute avoided emissions for a solution, **considerable data is necessary**. This can at time only be accessible by asking customers about their purchasing choices and their habits with regard to their wardrobe. **Obtaining reliable data through customer surveys with minimum bias can be complex.**
This topic is addressed in the following part: "*How to create an effective customer survey*".

Solutions methodological sheets

1. Solution 1 – Repair

Repair addresses a garment or footwear's physical durability. An item can be broken because of an incident (rip, crack, broken zip or other) or because of intensive wear (e.g.: climbing shoe sole).
Repairing an item that cannot be worn anymore lengthens its lifespan by making it wearable again. Repair can also occur when an item is partly broken (ex: broken zip lock, lining detached…) or worn out (e.g.: changing a shoe sole, sewing elbow supports…).

Important note: selling sustainable garments or footwear could lead to avoided emissions but only in the context of a limited or decreasing volume growth of the apparel and footwear segment considered. To be compliant with this guidance, brands whose commercial practices encourage over-consumption and/or over-production shall not compute avoided emissions.

Please refer to the section *Eligibility criteria for Apparel & Footwear companies* to decide whether the product is eligible to an avoided emissions calculation.

GENERAL APPROACH

To evaluate avoided emissions through repair, **GHG emissions in a situation <u>with</u> the solution** and **GHG emissions in the same situation <u>without</u> the solution** (the reference situation) will be compared.

- By repairing an item: Its lifespan is extended (for a shoe sole, its lifespan is assumed to be extended from its initial lifespan before repair but that might vary depending on the type of repair (see <u>*Ways to estimate the lifespan of the solutions*</u>).

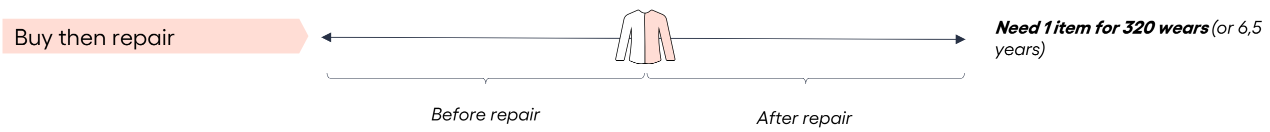


Figure 11 - ***Illustration of the situation with the solution. Figures are illustrative.***

<u>In the reference situation</u>: the consumer accesses alternatives on the market to satisfy the same lifespan/number of wears. The consumer can buy a brand-new item, repair the item (elsewhere than in the solution situation), or do nothing at all. The reference situation is thus the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative (i.e., the distribution of customers behavior among the different alternatives).

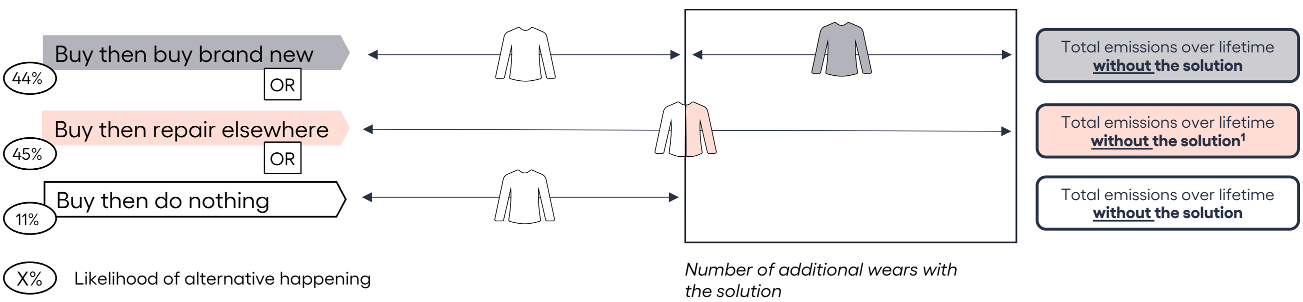


Figure 12 - ***Illustration of alternatives without the solution. Figures are illustrative.***

Why are second-hand and rental not considered as alternatives?
Second-hand and rental solutions extend an item's <u>extrinsic</u> lifespan, whereas repair extends the item's <u>physical lifespan</u>. Since second-hand or rental act on extrinsic lifespans, they would not act on the limiting lifespan. Thus, a second-hand or rented item would be worn the same number of times as a new one, so lifecycle emissions would differ only slightly from new (except for logistics emissions which are considered negligible here). The method and data needed for the calculation is simplified by excluding those two alternative solutions.

REBOUND EFFECT

There is no identified rebound effect for repair.

SITUATION WITH THE SOLUTION – CALCULATION

In the repair solution, emissions over the item's entire lifespan must be considered.

Calculation in a company-wide average approach

To evaluate GHG emissions with repair, a lifecycle assessment (LCA) must be carried out. This must be calculated according to the type of repair and type of product repaired.

This LCA will evaluate:

- Company-specific average emissions of **production** per item and **logistics** leading to their brand-new sell.
- Company-specific average emission of **use** before repair (washing, drying, ironing, dry-cleaning…).
- Company-specific average emission of **repair and logistics** around this repair (spare parts, shipping the product, energy consumption, etc.).
- Company-specific average emission of **usage** after repair (that includes washing, drying, ironing, dry-cleaning…).
- Company-specific average emissions of **end-of-life** treatment (incineration, landfill…).

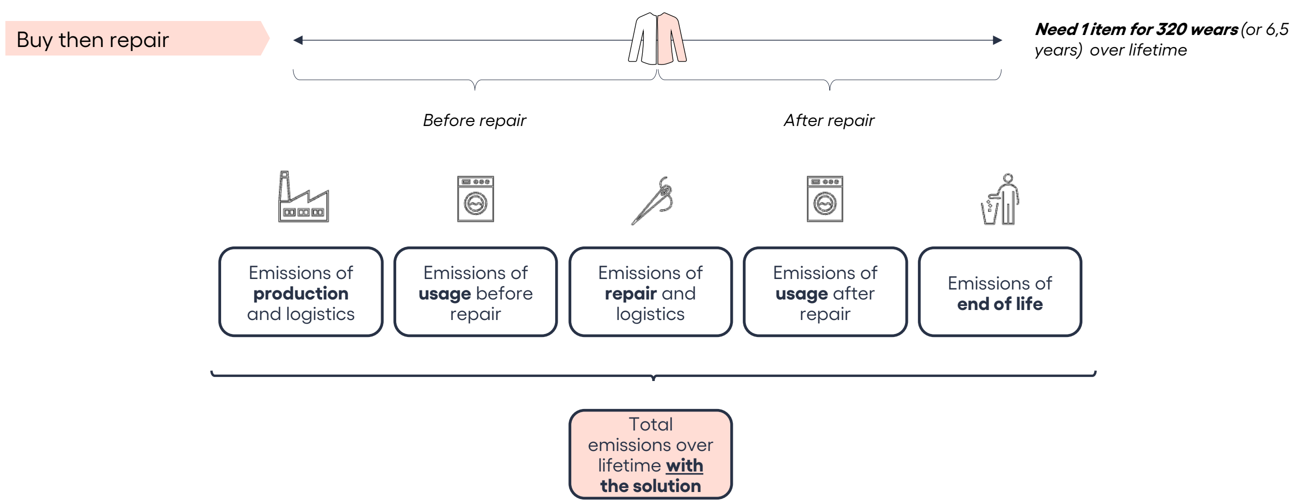


*Figure 13 - **Illustration of emissions to integrate into the calculation with each solution. Figures are illustrative.***

Calculating market average

For market average emissions calculations, instead of company-specific data, data are market averages: applicable for a company conducting the same types of repair, for the same types of products, within the same market segment.

REFERENCE SITUATION – CALCULATION

Calculations in a company-wide average approach

In the reference situation, the item's emissions before **repair** must be exactly the same as in the situation with solution.
To evaluate emissions **after repair**, data on the alternative to repair must be collected. In a company-wide average approach, it is strongly advised to collect this data through a customer survey (see *How to create an effective customer survey*).

For each alternative, an LCA must be conducted to **evaluate the alternative's emissions over its total life cycle**. This LCA must include production, logistics, usage, and end-of-life GHG emissions. The resulting **emissions must be calculated per wear.** This way, they can be attributed to the reference situation for the same number of wears than the additional number of wears allowed by repair.

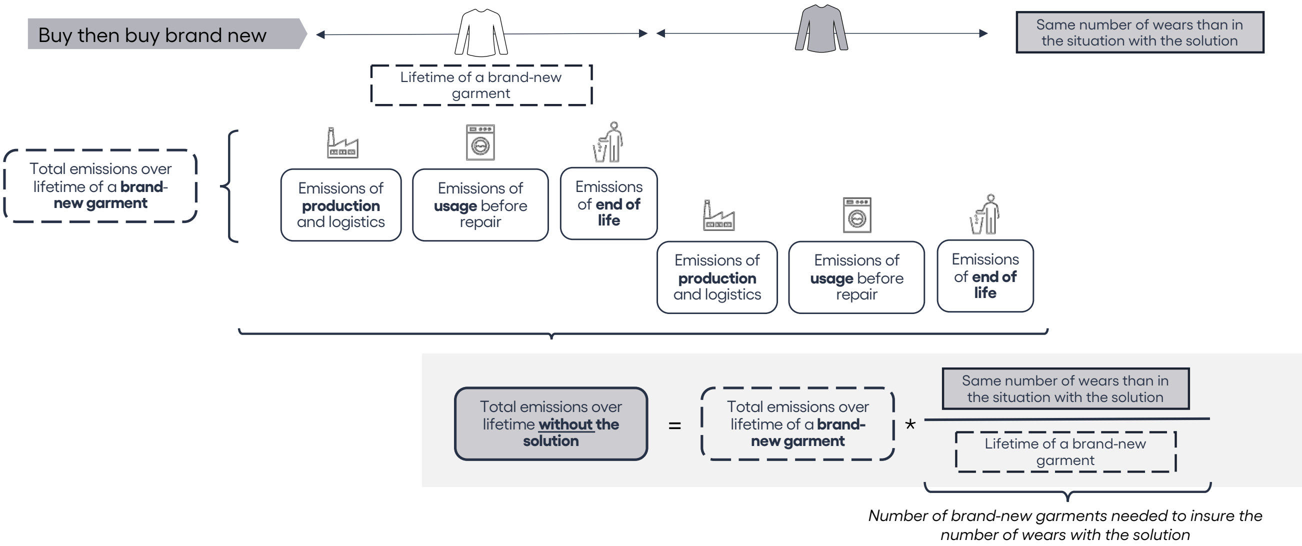


Figure 14 - ***Example for alternative to repair - Buy new. Figures are illustrative.***

This approach must be applied to each alternative.

Total emissions in the reference are the sum of each alternative's emissions multiplied by the likelihood of the alternative happening.

The data on the alternative's likelihood must be collected through a customer survey.

Calculation in market average approach

For market average emissions calculations, instead of using company-specific data, the data are market averages: the data is applicable for any company doing the same type of repair, for the same type of products, and in the same market segment.

AVOIDED EMISSIONS CALCULATIONS

Finally, avoided emissions are the difference between the emissions in the reference situation and in the solution. These are **avoided emissions of reduction**, as this solution reduces the sector's emissions as compared to the past situation (before the sale of the solution).

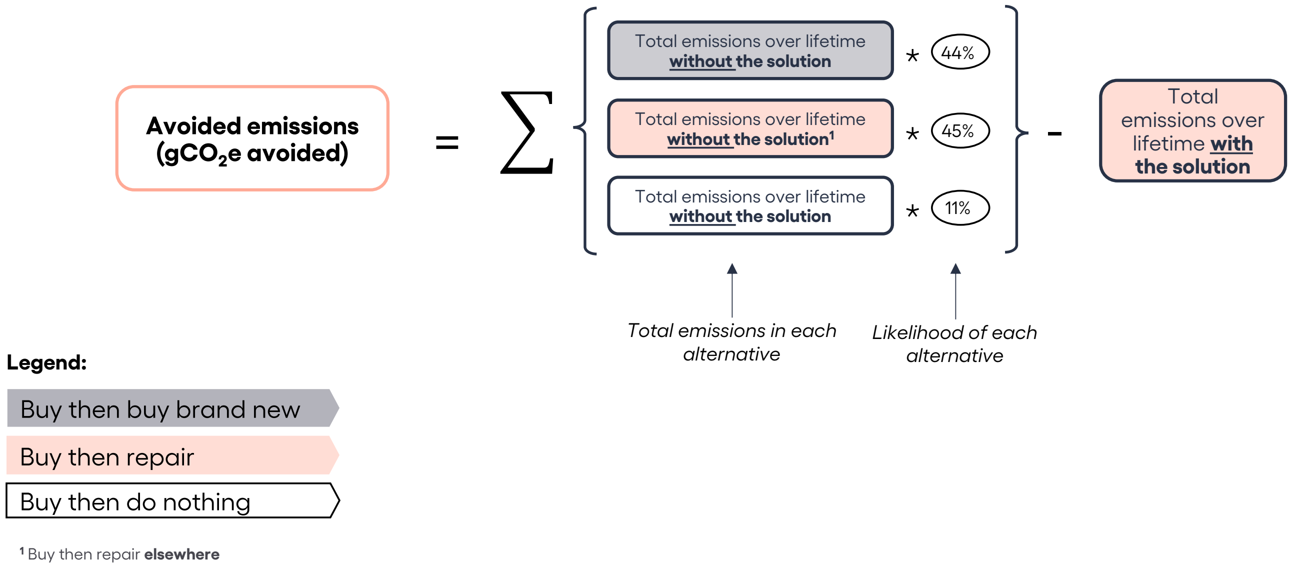


*Figure 15 - **Illustration of the calculation of avoided emissions for the repair solution. Figures are illustrative.***

IMPORTANT PARAMETERS FOR THIS SOLUTION

Repair can avoid emissions although not always. This can depend on:
- lifespan extension after repair, the further a lifespan is extended, the more it avoids emissions.
- emissions related to repair logistics, if the item needs to travel far, this will Impact avoided emissions.
- carbon footprint of the repaired part, if the repaired part represents a large part of the original item (thus a large share of production emissions) this larger share decreases the avoided emissions through repair compared to a smaller part (e.g.: replacing the entire lining of a jacket emits almost as many emissions as buying a new jacket versus only replacing a smaller part such as the zipper, which has a small carbon footprint in itself)
- the share of each alternative, the higher emissions of alternatives compared to the solution, the greater the avoided emissions. E.g.: repairing items belonging to consumers who normally don't opt for repair, avoids more emissions than repairing items for a conscious consumer, since the reference situation emissions are higher.

OVERVIEW OF THE NECESSARY DATA

This data must be collected for one specific market segment, one specific geography and one specific category of garment and footwear (see *Market segment typology* for categories).

Necessary data	Company-wide average approach	Market average approach
Number of **wears before repair**	Company specific data. This data can be collected through a **consumer survey.**	Market average data. This data can be collected through a **published consumer behavior study.**
Number of wears after repair	Company specific data. This data can be collected through a **consumer survey.**	Market average data. This data can be collected through a **published consumer behavior study.**
Emissions in the situation with the solution: - Cradle to gate emissions - End-of-life emissions - Usage emissions - Repair logistics emissions	Company specific data. Cradle-to gate and end-of-life emissions data can be collected through **specific LCAs**. Usage emissions data can be collected through a **consumer survey**. Repair logistics emissions can be collected through a **carbon footprint** of the repair activity.	Market average data Cradle-to gate and end-of-life emissions data can be collected through **average LCAs**. Usage emissions data can be collected through a **published consumer behavior study**. Repair logistics emissions can be collected through **average LCAs of repair activities**.
Emissions in the reference situation: - Cradle to gate emissions for each alternative - End-of-life emissions for each alternative - Usage emissions for each alternative - Emissions of repair and logistics	Company specific data and market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each company-specific alternative.** Usage emissions for each alternative data can be collected through a **consumer survey**. Emissions of repair and logistics can be collected through **average LCAs of repair activities**.	Market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each market-average alternative.** Usage emissions for each alternative data can be collected through a **published consumer behavior study**. Emissions of repair and logistics can be collected through **average LCAs of repair activities**.
Likelihood of alternatives	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**
Number of wears on total lifespan for each alternative	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**

*Table 6 - **Overview of necessary data for avoided emission calculations for repair***

AVOIDANCE FACTOR

Avoided emissions through repairing a pair of leather shoes.
The data used for this estimation is a combination of data from literature, published databases, and baseline hypotheses.

> ***N.B.:*** *it is recommended to use this calculation for a first estimation of avoided emissions only. It is recommended to calculate avoided emissions using company-wide average approach as much as possible.*

Category of emissions	Value	Source
Emissions of **production and logistics**	13 $kgCO_2e$ per pair of leather shoes	Ademe
Emissions of **usage**	0 $kgCO_2e$ per wear	Carbone 4 hypothesis
Emissions of **end-of-life**	1 $kgCO_2e$ per pair of leather shoes	Ademe
Emissions of **repair (incl. logistics)**	1 kgCO2e	Carbone 4 hypothesis based on Ademe ACV (1/3 of raw materials and assembling emissions)

Table 7 - ***Emission data for leather shoes (reference situation and situation with the solution)***

Alternative	Share	Source	Number of wears on lifespan	Source
Buy brand-new	44%	Leather UK	365 wears	Carbone 4 hypothesis (shoes worn once every five days for five years)
Repair	45%	Leather UK	730 wears	Carbone 4 hypothesis based on a 10-year lifespan for shoes repaired once
Do nothing	11%	Leather UK	/	/

Table 8 - ***Share of alternatives – reference situation - Repair a pair of leather shoes***

By applying the method described before, avoided emissions for repairing a pair of shoes are obtained:

Total avoided emissions of repairing a pair of leather shoes	**9 $kgCO_2e$**
Avoided emissions of lesser increase	0%
Real reduction avoided emissions	100%

Table 9 - ***Avoided emissions by the repair of a pair of leather shoes***

2. Solution 2 - Second-hand

A first user gets rid of an item due to boredom, not fitting, etc. This item has not reached its physical end-of-life and can still be worn. Selling this item second-hand will lengthen its lifespan. Second-hand addresses the issue of the extrinsic durability of a garment or footwear by changing owners.
Second-hand can help reduce the production of brand-new items by leveraging existing garments and footwear.

Important note: selling sustainable garments or footwear might lead to avoided emissions but only in the context of a limited or decreasing volume growth of the Apparel and Footwear segment considered. To be compliant with this guidance, brands whose commercial practices encourage over-consumption and/or over-production shall not compute avoided emissions. Please refer to the section *Eligibility criteria for Apparel & Footwear companies* to decide whether the product is eligible for an avoided emissions calculation.

GENERAL APPROACH

To evaluate avoided emissions of second-hand **GHG emissions in a situation with each solution** and **GHG emissions in** the reference situation **- without the solution** - are compared.

- **With** a second-hand item: thanks to the sell, the item's lifespan is extended (from its initial lifespan).

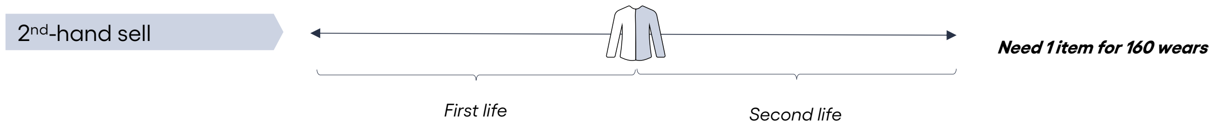


Figure 16 - ***Illustration of the solution. Figures are illustrative.***

In the reference situation: The original owner does not get rid of their item.
The second-hand buyer has alternatives on the market to satisfy the same lifespan/number of wears: buy a brand-new item, buy a second-hand item elsewhere, rent an item, or do nothing at all. The reference situation is thus the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative (i.e., the distribution of customers behavior among the different alternatives).

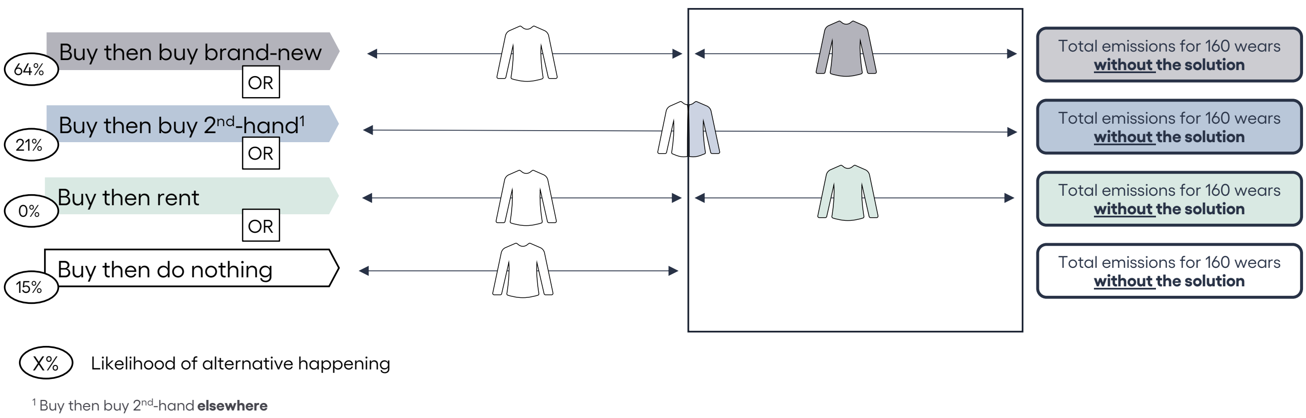


Figure 17 - ***Illustration of alternatives without the solution. Figures are illustrative.***

REBOUND EFFECT

Two possible rebound effects are identified for a second-hand sell:

- If the alternative to buying second hand is **not buying any item**, there is a rebound effect. This rebound effect is considered in the alternative "buy then do nothing", it can be high and impact significatively the emissions avoided by the solution and should be specifically assessed through a customer survey (see *How to create an effective customer survey)*.

Example:

Vinted, an online second-hand platform asked buyers the following question:
"If you had not found this product on Vinted, would you have bought this, or a similar product, brand new?"

Note: the survey considers « brand-new » as the only alternative to second-hand.

No, definitely not	17%
Unlikely	21%
Maybe, I'm not sure	23%
Likely	24%
Yes, definitely	15%

Table 10 - ***Answers to survey question on brand-new as an alternative to second-hand bought on Vinted***

The "do-nothing" share (the rebound effect) can be evaluated conservatively as all the "No, definitely not", "Unlikely" and half the "Maybe, I'm not sure" answers. That is a **rebound effect of 50%.**

Source: Vinted Climate Change Impact Report - Understanding Avoided Emissions of Second-Hand Shopping on Vinted

A **first owner** could purchase an Item knowing it could be sold on second-hand easily (this is especially relevant for online marketplaces). The item could then be **worn for a shorter time** because the owner had the opportunity of selling it second hand. To take this into account, the number of wears used to estimate average emissions per wear for first ownership with each solution can be shorter than the number of wears for first ownership in the reference situation.

N.B.: *To include the rebound effect concerning the first-hand owner, who might have worn the item less knowing it could be sold second-hand, a specific calculation must be made. An example is given in the methodological focus "Ways to estimate the lifespan of garments and footwear".*

THE SECONDHAND SOLUTION – CALCULATION

In the second-hand solution, emissions over the item's entire lifespan must be considered.

Calculation in a company-wide average approach

To evaluate GHG emissions of the second-hand sell, a life cycle assessment (LCA) must be carried out. Note that this calculation must be conducted per type of product. This LCA will evaluate:

- Company-specific average emissions of **production** per items and **logistics** leading to their brand-new sell.
- Company-specific average emission of **use** in the first life (washing, drying, ironing, dry-cleaning…).
- Company-specific average emission of **logistics** for second- hand sell (shipping product, energy consumption, etc.).
- Company-specific average emission of **usage** in second life (washing, drying, ironing, dry-cleaning…).
- Company-specific average emissions of **end-of-life** treatment (incineration, landfill…).

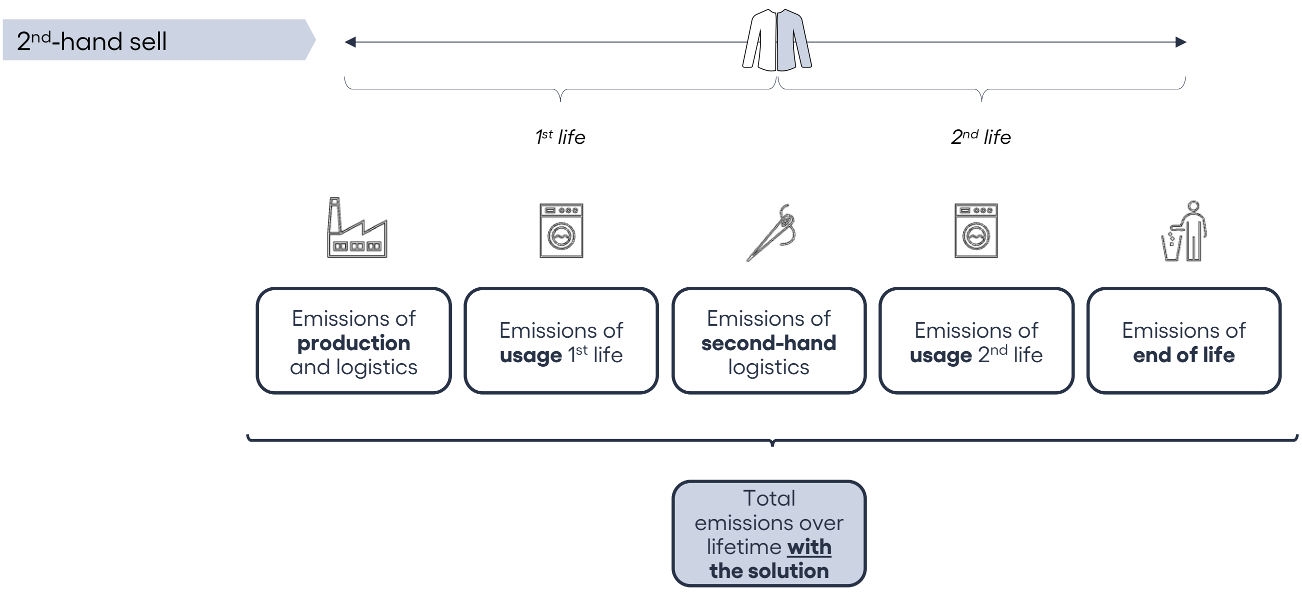


Figure 18 ***- Illustration of emissions to integrate in the calculation with each solution. Figures are illustrative.***

Calculation in market average approach

For market average emissions calculations, the approach is the same except that instead of using data specific to the company evaluating avoided emissions, the data are market averages: applicable for any company selling on second-hand the same type of items within the same market segment.

REFERENCE SITUATION – CALCULATION

Calculation in a company-wide average approach

In the reference situation, emissions corresponding to a garment or footwear's first life must be the exact same as in the second- hand solution.

To evaluate **second-life emissions**, data on the second-hand alternative must be collected. In a company-wide average approach, a customer survey is strongly advised to collect this data (see *How to create an effective customer survey*).

For each alternative, an LCA must be conducted to **evaluate alternative emissions on total life cycle**. This LCA must include production, logistics, usage, and end-of-life GHG emissions. The resulting **emissions must be calculated per wear.** This way, they can be attributed to the reference situation for the same number of wears than the additional number of wears allowed by the second-hand sell.

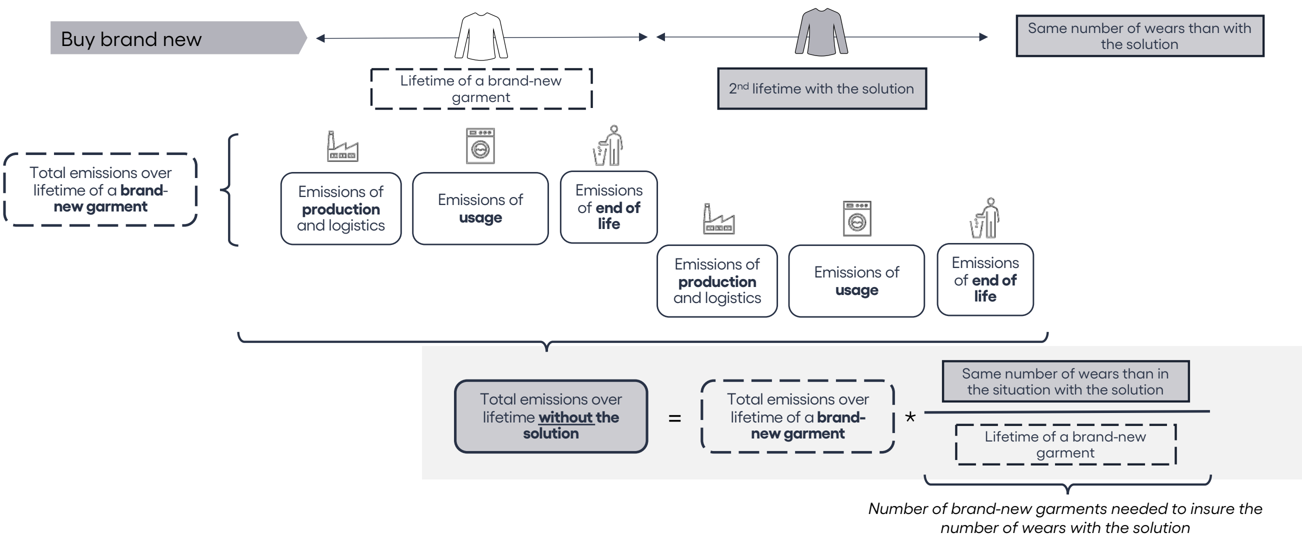


Figure 19 ***- Example for the alternative to second-hand - Buy new. Figures are illustrative.***

Example: *if the alternative to buying a second-hand jacket for 30 wears after its first life is buying a brand-new jacket for 40 wears over its lifespan; the reference situation will correspond to the first life emissions of the initial jacket before second-hand sell + LCA emissions of the new jacket * 30 wears / 40 wears.*

This approach must be applied to every alternative.
Total emissions in the reference situation are the sum of the emissions of every alternative multiplied by the likelihood of the alternative.

The data on the likelihood of the alternative must be collected through the customer survey.

Calculation in market average approach

For market average emission calculations, the approach is the same except that instead of using data that are company-specific, data are market averages: appliable for any company selling second-hand the same type of items and in the same market segment.

AVOIDED EMISSIONS CALCULATION

Finally, avoided emissions are the difference between emissions in the reference situation and the solution. These avoided emissions are **avoided emissions of lesser increase**: this solution avoids new emissions occurring, but does not reduce the sector's emissions as compared to the past situation (before the sale).

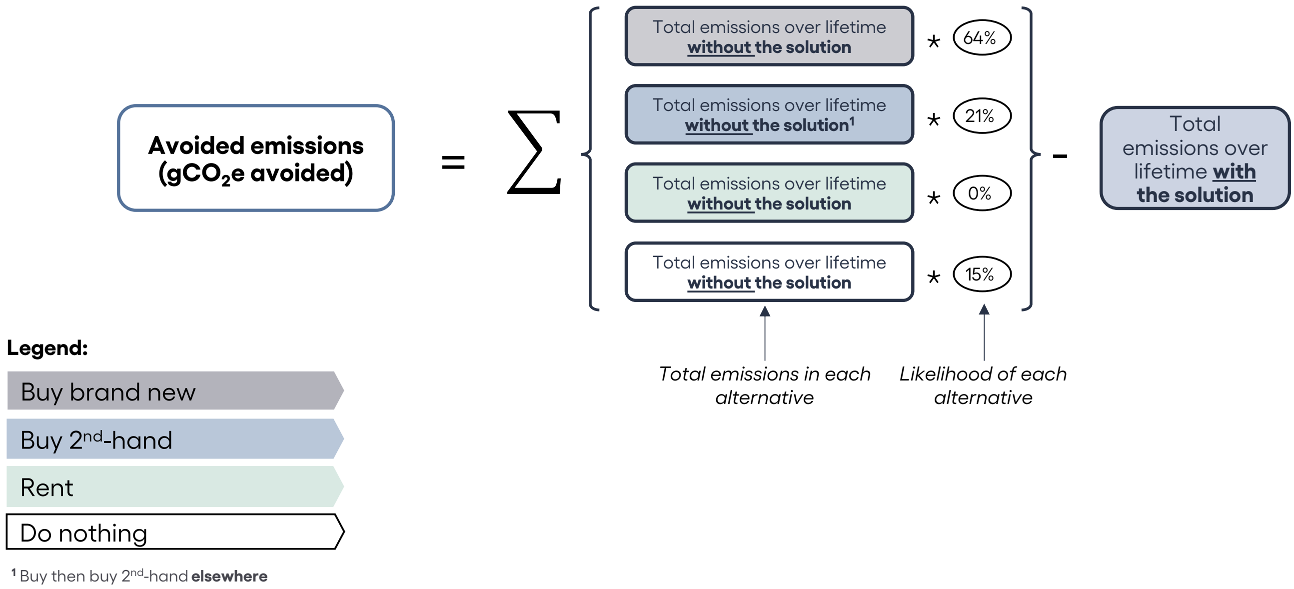


Figure 20 - ***Illustration of avoided emissions calculation for second-hand solution. Figures are illustrative.***

IMPORTANT PARAMETERS FOR THIS SOLUTION

Selling second-hand can avoid emissions, but not always. This can depend on:

- Additional number of wears second- hand.
  To avoid emissions, total number of wears on the product's lifecycle (first life and second life based on the product's extrinsic durability) must be greater than for the alternatives.
- Number of wears in first life, i.e., the rebound effect linked to the seller.
  The existence of second-hand resell might have induced the first owner to buy an item they didn't need.
- The share of each alternative.
  The higher the share of alternatives with higher emissions than the solution, the more avoided emissions there will be.
  E.g.: if you sell a second-hand garment to a consumer who normally buys brand new clothing, this avoids more emissions than selling to a "conscious" consumer who buys mostly second-hand (the reference emissions are greater).

OVERVIEW OF NECESSARY DATA

This data must be collected for one specific market segment, for one specific geography and for one specific category of garment and footwear (see *Market segment typology* for categories).

Necessary data	Company-wide average approach	Market average approach
Number of **wears in the first life**	Company specific data. This data can be collected through a **consumer survey directed at second-hand clothes providers** (former clients for example).	Market average data. This data can be collected through a **published consumer behavior study.**
Rebound effect for the seller (diminution of number of wears)	Company specific data. This data can be collected through a **consumer survey directed at second-hand clothes providers** (former clients for example).	Market average data. This data can be collected through a **published consumer behavior study.**
Number of wears in second life.	Company specific data. This data can be collected through a **consumer survey directed at second-hand buyers** or evaluated with a price-based ratio (using the resale price).	Market average data. This data can be collected through a **published consumer behavior study** or evaluated with a price-based ratio.
Emissions with the solution: - Cradle to gate emissions - End-of-life emissions - Usage emissions for the garment - Second-hand logistics emissions	Company specific data. Cradle-to gate and end-of-life emissions data can be collected through **specific LCAs**. Usage emissions data can be collected through a **consumer survey**. Second-hand logistics emissions can be collected through a **carbon footprint** of the activity.	Market average data Cradle-to gate and end-of-life emissions data can be collected through **average LCAs**. Usage emissions data can be collected through a **published consumer behavior study**. second-hand logistics emissions can be collected through **average LCAs of second-hand activities**.
Emissions in the reference situation: - Cradle to gate emissions for each alternative - End-of-life emissions for each alternative - Usage emissions for each alternative - Logistics emissions for each alternative	Company specific data and market average data. Cradle-to gate and end-of-life emissions data collected through **average LCAs of each company-specific alternative.** Usage emissions for each alternative data collected through a **consumer survey**. Alternatives' logistics emissions collected through **average LCAs of each alternative.**	Market average data. Cradle-to gate and end-of-life emissions data collected through **average LCAs of each market-average alternative.** Use emissions for each alternative data collected through a **published consumer behavior study**. Alternatives' logistics emissions collected through **average LCAs of each alternative.**
Likelihood of alternatives	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**
Number of wears on total lifespan for each alternative	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**

*Table 11 - **Overview of the necessary data for avoided emission calculation for second-hand***

AVOIDANCE FACTOR

Second-hand pair of jeans

Avoided emissions estimated for the sale of a second-hand pair of jeans.
The data used is a combination of certain brand specific data, and data from published databases and literature.

> ***N.B.:*** *this calculation is recommended for a first estimation of avoided emissions only. To calculate avoided emissions, the company-wide average approach Is recommended as much as possible.*

Category of emissions	Value	Source
Production and logistics Emissions	20 $kgCO_2e$ per pair of jeans	Levi's
Use emissions	0,05 $kgCO_2e$ per wear	Levi's and WRAP
End-of-life emissions	0,9 $kgCO_2e$ per pair of jeans	Levi's
Second-hand logistics emissions	1,9 $kgCO_2e$	Carbone 4 conservative hypothesis based on Levi's data
Rental logistics emissions (for alternative)	0,03 $kgCO_2e$	Carbone 4 conservative hypothesis based on Levi's data

*Table 12 - **Emission data for a pair of jeans (reference situation and situation with the solution)***

Alternative	Share	Source	Number of wears on lifespan	Source
Buy brand-new	64%	QSA Partners	263 wears	WRAP
Buy second-hand elsewhere	21%	QSA Partners	355 wears	WRAP
Rent	0%	QSA Partners	75 wears	WRAP
Do nothing	15%	QSA Partners	/	/

*Table 13 – **Share of alternatives - reference situation – Selling a second-hand pair of jeans***

To **estimate number of second-hand wears**, a price proxy is used. The underlying hypothesis is that extrinsic durability can be evaluated through price only. Other methods (conducting a consumer survey for example) might be more adequate and give more precise results.

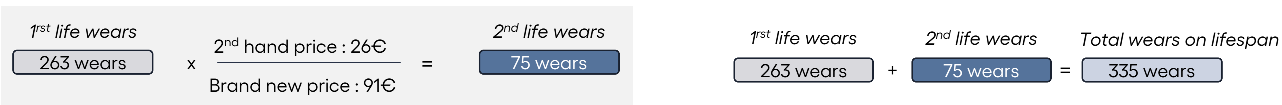


*Figure 21 - **Illustration of the calculation of the number of second-hand wears using a price-based method***

Finally, by applying the method described before, avoided emissions for a second-hand pair of jeans are obtained:

Total avoided emissions for a second-hand pair of jeans = 2,16 $kgCO_2e$

Second-hand coat

Avoided emissions for the sale of a second-hand coat have been estimated.
The data used for this estimation is a mix of some brand specific data, data from published databases and literature.

> ***N.B.:*** *this calculation is recommended for a first estimation of avoided emissions only. To calculate avoided emissions, the company-wide average approach is recommended as much as possible.*

Category of emissions	Value	Source
Emissions of **production and logistics**	85 $kgCO_2e$ per coat	Ademe
Emissions of **usage**	0,003 $kgCO_2e$ per wear	Ademe
Emissions of **end-of-life**	2 $kgCO_2e$ per coat	Ademe
Emissions of **second-hand logistics**	1,9 $kgCO_2e$	Carbone 4 conservative hypothesis based on Ademe's data
Emissions of **rental logistics** (for alternative)	0,03 $kgCO_2e$	Carbone 4 conservative hypothesis based on Ademe's data

*Table 14 - **Emission data for a coat (reference situation and situation with the solution)***

Alternative	Share	Source	Number of wears on lifespan	Source
Buy brand-new	61%	QSA Partners	363 wears	WRAP
Buy second-hand elsewhere	25%	QSA Partners	464 wears	WRAP
Rent	0%	QSA Partners	/	/
Do nothing	14%	QSA Partners	/	/

*Table 15 - **Share of alternatives - reference situation – Selling a second-hand coat***

To **estimate number of second-hand wears**, the same price proxy as for the second-hand pair of jeans was used.

Finally, by applying the method described previously, avoided emissions for a second-hand coat are obtained:

Total avoided emissions for a second-hand coat = 2,38 $kgCO_2e$

3. Solution 3 - Rental

Garments and footwear can be rented to users to maximize number of wears across their lifespan.
Rental addresses the issue of an item's extrinsic durability by changing owners.
Rental can reduce production of brand-new items by leveraging existing clothing.

Important note: selling sustainable garments or footwear could lead to avoided emissions but only in the context of limited or decreasing volume growth of the Apparel and Footwear segment considered. To be compliant with this guidance, brands whose commercial practices encourage over-consumption and/or over-production shall not compute avoided emissions. Please refer to the section *Eligibility criteria for Apparel & Footwear companies* to decide whether a product is eligible for an avoided emissions calculation.

GENERAL APPROACH

To evaluate avoided emissions of rental, **GHG emissions with the solution** and **GHG emissions in the reference situation without the solution** will be compared.

- **With** rental: the item is worn by several customers.

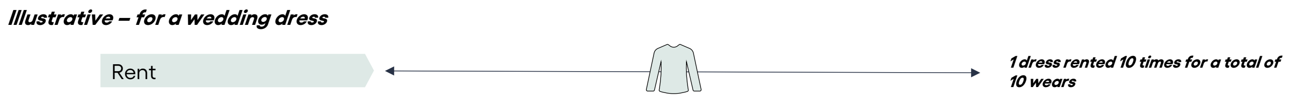


Figure 22 - ***Illustration of the solution. Figures are illustrative.***

In the reference situation: Renters could have chosen a market alternative to satisfy the same lifespan/number of wears: buy a brand-new item, buy a second-hand item elsewhere, rent an item elsewhere, or do nothing at all. The reference situation is thus the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative (i.e., the distribution of customers behavior among the different alternatives).

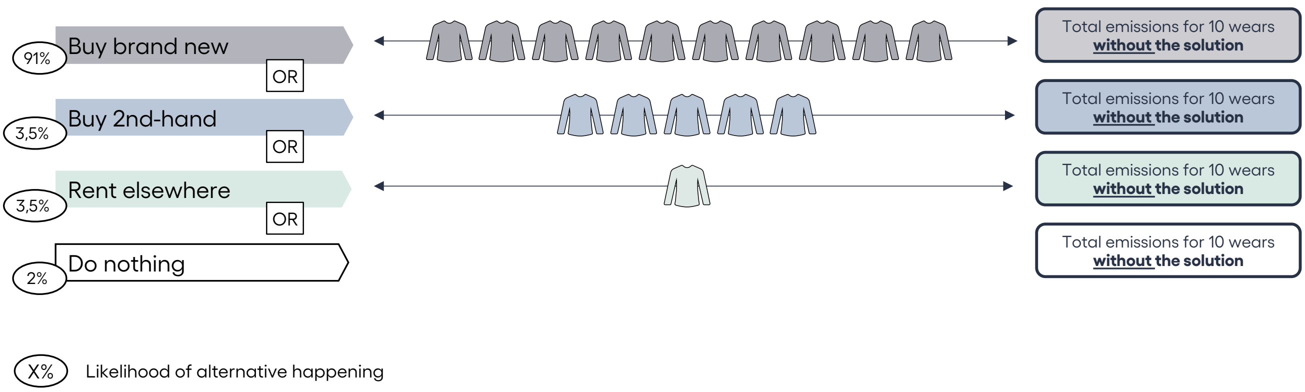


Figure 23 - ***Illustration of alternative without the solution. Figures are illustrative.***

REBOUND EFFECT

One possible rebound effect is identified for rental:

- If the alternative to renting is **not buying any item**, there is a rebound effect. This rebound effect is considered in the alternative "buy then do nothing".

THE RENTAL SOLUTION – CALCULATION

under the rental solution, an item's entire lifespan must be considered.

Calculation in a company-wide average approach

To evaluate GHG emissions second-hand, a life cycle assessment (LCA) must be carried out. Note that the calculation must be conducted per type of product rented. This LCA will evaluate:
- Company-specific average emissions of **production** per item and the **logistics** leading to their brand-new sell.
- Company-specific emission of **use** for each rental (washing, drying, ironing, dry-cleaning…).
- Company-specific emission of **logistics** for each rental (shipping the product, energy consumption, etc.).
- Company-specific emissions of **end-of-life** treatment (incineration, landfill, etc.).

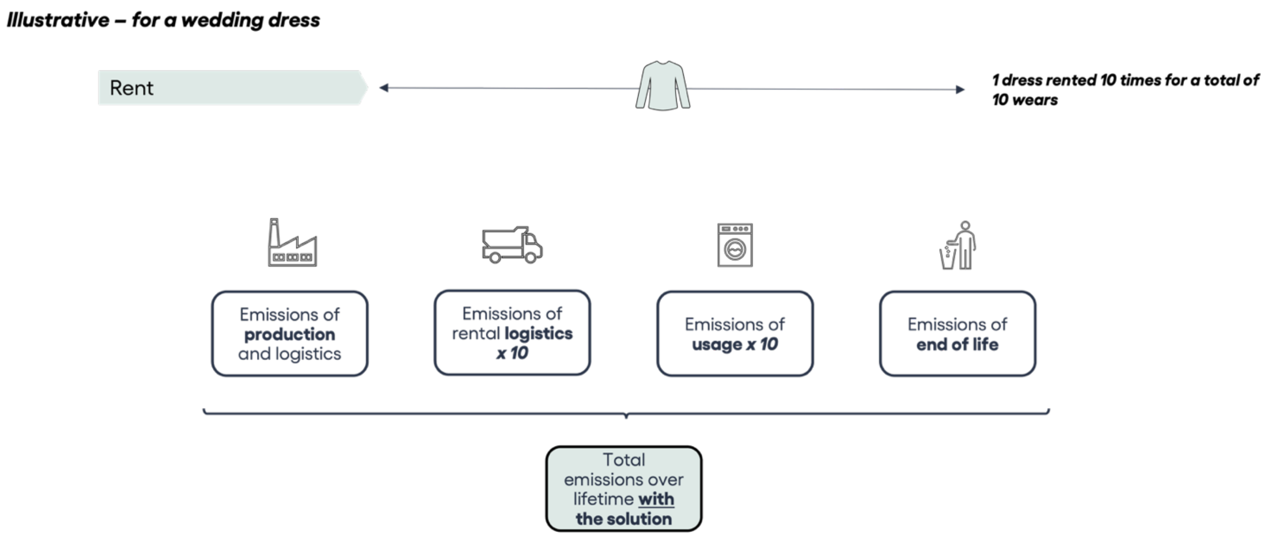


Figure 24 - ***Illustration of emissions to integrate into the calculation. Figures are illustrative.***

Calculation in market average approach

For market average emissions calculation, the approach is the same except that instead of using company-specific data, data are market averages: applicable for any company renting the same type of items and in the same market segment.

REFERENCE SITUATION – CALCULATION

Calculation in a company-wide average approach

To evaluate emissions in the reference situation, data on renting alternatives must be collected. In a company-wide average approach, collect this data through a customer survey is strongly advised (see *How to create an effective customer survey*).

For each alternative, an LCA must be conducted to **evaluate alternative emissions across its total lifecycle**. This must include production, logistics, usage, and end-of-life GHG emissions. The resulting **emissions must be calculated per wear.** They can thus be attributed to the reference situation for the same number of wears than the additional number of wears allowed by rental.

Illustrative – for a wedding dress
Example for one alternative – if the consumer buys brand new instead of renting

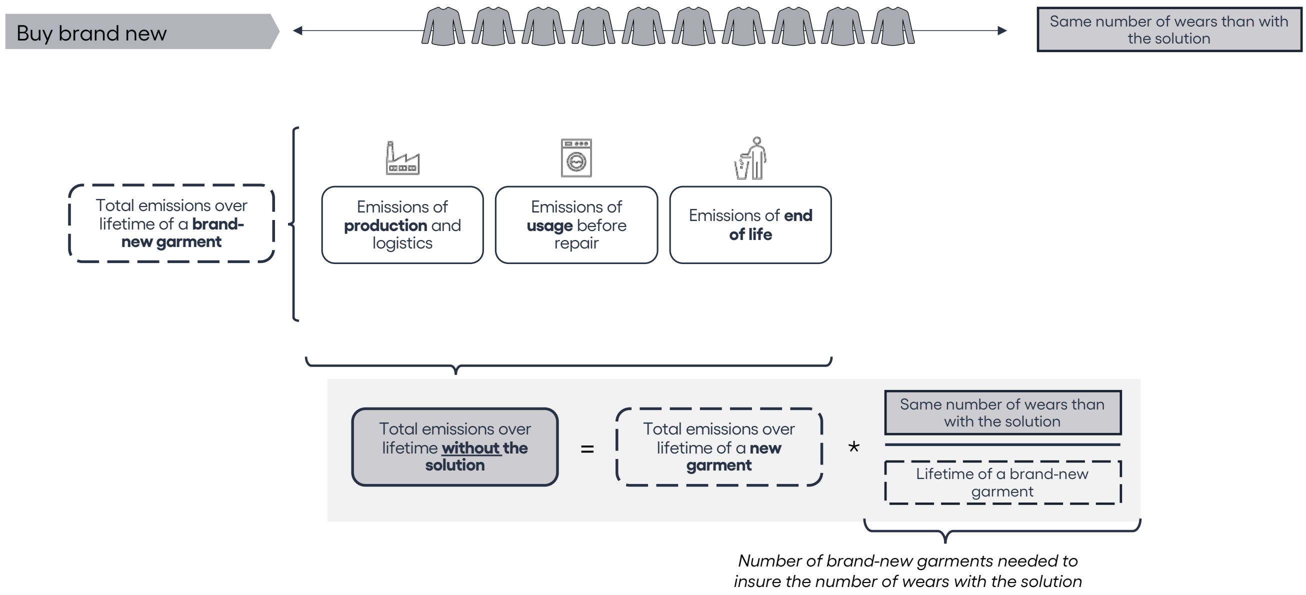


Figure 25 - ***Example for the rental alternative - Buy new. Figures are illustrative.***

This approach must be applied to every alternative.
Total emissions in the reference situation are the sum of emissions of every alternative multiplied by the likelihood of the alternative occurring.
Data on the likelihood of the alternative must be collected through the customer survey.

Calculation in market average approach

For market average emissions calculations, the approach is the same except instead of using company-specific data, data is market averages: applicable for any company renting the same type of items and in the same market segment.

AVOIDED EMISSIONS CALCULATION

Finally, avoided emissions are the difference between the emissions in the reference situation and the solution.

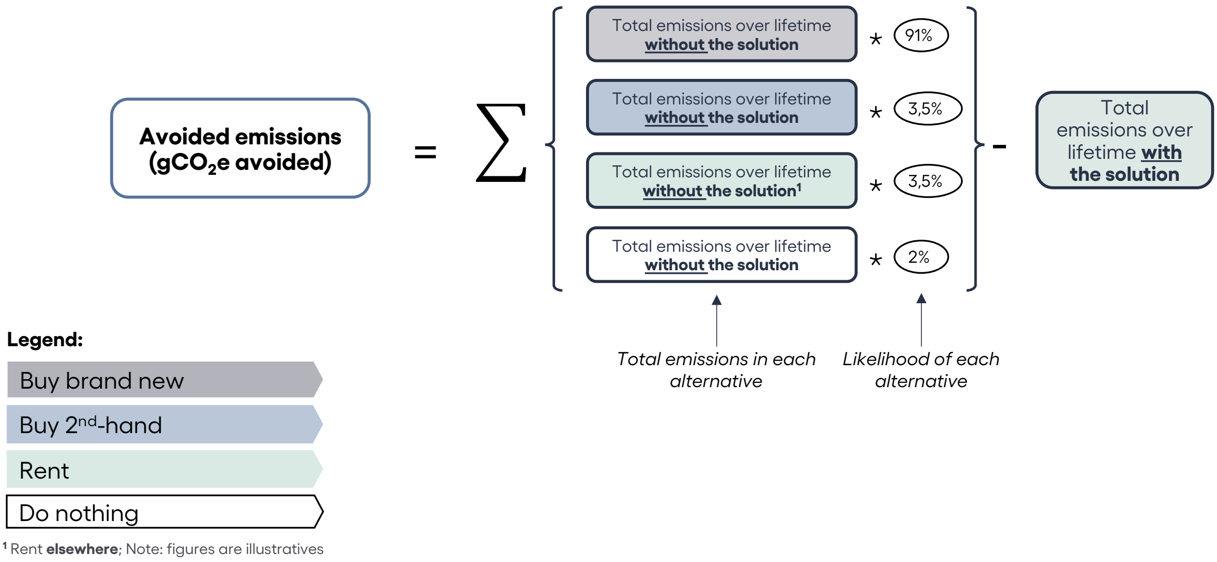


Figure 26 - ***Illustration of avoided emissions calculation for the renting solution. Figures are illustrative.***

IMPORTANT PARAMETERS FOR THIS SOLUTION

Rental can avoid emissions, but not always. This can depend on:

- **Number of wears,** i.e., number of rentals over a lifespan. Some rental business models (e.g.: a monthly delivery of clothes subscription) don't allow enough wears to match the number of wears of a non-rented item and compensate for the additional logistics emissions.
- **Logistics emissions**. These emissions can be high if customers need to go to rental outlet by car for example.
- **Share of each alternative**, the higher the share of alternatives with higher emissions than the solution, the greater avoided emissions. E.g.: if you rent a wedding dress to a person who would have bought it brand-new, this avoids more emissions than selling to a consumer who would have bought it second-hand instead (reference situation emissions will be higher).

OVERVIEW OF THE NECESSARY DATA

This data must be collected for one specific market segment, for one specific geography and for one specific category of garment and footwear (see *Market segment typology* for categories).

Necessary data	Company-wide average approach	Market average approach
Number of **wears per rental**	Company specific data. This data can be collected through a **consumer survey.**	Market average data. This data can be collected through a **published consumer behavior study.**
Number of rentals per garment	Company specific data.	Market average data.
Number of wears in the brand-new and second-hand first life alternatives	Company specific data. This data can be collected through a **consumer survey.**	Market average data. This data can be collected through a **published consumer behavior study.**
Number of wears in the second life for the second-hand alternative	Company specific data. This data can be collected through a **consumer survey** or evaluated with a price-based ratio.	Market average data. This data can be collected through a **published consumer behavior study** or evaluated with a price-based ratio.
Emissions in the situation with the solution: - Cradle to gate emissions - End-of-life emissions - Usage emissions for the garment - Rental logistics emissions	Company specific data. Cradle-to gate and end-of-life emissions data can be collected through **specific LCAs**. Usage emissions data can be collected through a **consumer survey**. Rental logistics emissions can be collected through a **carbon footprint** of the activity.	Market average data Cradle-to gate and end-of-life emissions data can be collected through **average LCAs**. Usage emissions data can be collected through a **published consumer behavior study**. Rental logistics emissions can be collected through **average LCAs of rental activities**.
Emissions in the reference situation: - Cradle to gate emissions for each alternative - End-of-life emissions for each alternative - Usage emissions for each alternative - Alternatives' logistics emissions	Company specific data and market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each company-specific alternative.** Usage emissions for each alternative data can be collected through a **consumer survey**. Alternatives' logistics emissions can be collected through **average LCAs of each alternative.**	Market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each market-average alternative.** Usage emissions for each alternative data can be collected through a **published consumer behavior study**. Alternatives' logistics emissions can be collected through **average LCAs of each alternative.**
Likelihood of alternatives	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**
Number of wears on total lifespan for each alternative	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**

Table 16 - ***Overview of necessary data for avoided emissions calculations for rental***

AVOIDANCE FACTOR

Avoided emissions for a rented wedding dress.
The data used for this estimation is a combination of data from published databases, literature, and hypotheses.

> ***N.B.:*** *this calculation is recommended for a first estimation of avoided emissions only. To calculate avoided emissions, the company-wide average approach is recommended as much as possible.*

Category of emissions	Value	Source
Emissions of **production and logistics**	287,5 $kgCO_2e$ per wedding dress	Carbone 4 calculation
Emissions of **usage**	0,10 $kgCO_2e$ per wear	Carbone 4 study on dry-cleaning
Emissions of **end-of-life**	0,9 $kgCO_2e$	Ademe
Emissions of **rental logistics**	1,9 $kgCO_2e$	Carbone 4 hypothesis (half the emissions of transport, logistics & retail)
Emissions of **second-hand logistics** (for alternative)	0,03 $kgCO_2e$	Carbone 4 hypothesis (half the emissions of transport, logistics & retail)

Table 17 - ***Emission data for a wedding dress (reference situation and solution)***

Alternative	Share	Source	Number of wears on lifespan	Source
Buy brand-new	91%	Mariage.net survey	1 wear	C4 hypothesis
Buy second-hand	3,5%	Mariage.net survey	2 wears	C4 hypothesis
Rent elsewhere	3,5%	Mariage.net survey	10 wears	C4 hypothesis based on price benchmark.
Do nothing / borrow	2%	C4 hypothesis	/	/

Table 18 - ***Share of alternatives - reference situation – Renting a wedding dress***

Finally, by applying the method described previously, avoided emissions for a wedding dress rental. (10 rentals on lifespan) are obtained:

> Avoided emissions per rental = 240 $kgCO_2e$/rental
>
> **Total avoided emissions for a rented wedding-dress = 2400 $kgCO_2e$**

4. Solution 4.a - Physically long-lasting new garments and footwear

Important note: To avoid emissions, **physically long-lasting new garments and footwear must have an extrinsic lifespan longer than their physical lifespan** to be considered a solution, otherwise they are discarded before their physical end-of-life so do not avoid emissions.
E.g.: a very strong plastic bag, discarded after three uses though it could have lasted a hundred, does not avoid emissions.
Thus, it is recommended companies should not *use the methodology for physically long-lasting items when what is actually limiting the item's lifespan is its extrinsic durability (e.g., it will be out of fashion before it is unusable,*see *How to create an effective customer survey*).

A user buys a brand-new item. After wearing it for some time the item becomes worn out, the consumer cannot wear it anymore. This is the end of its "physical lifespan". Some items have longer physical lifespans than the market average because they are designed specifically (stronger fabric, weaving, features replacement parts, easy to repair…). This type of brand-new item provides a garment or footwear's physical durability through particular properties to lengthen their lifespan.
This extension of brand-new clothing's lifespan can help reduce production of brand-new items.

Important note: selling sustainable brand-new garments or footwear could lead to avoided emissions but only in the context of a limited or decreasing volume growth of the Apparel and Footwear segment. To be compliant with this guidance, brands whose commercial practices encourage over-consumption and/or over-production shall not compute avoided emissions for selling brand-new garments, even sustainable ones. Please refer to the section *Eligibility criteria to compute avoided emissions for brand-new garments*, to decide whether the product is eligible for avoided emissions calculations.

GENERAL APPROACH

To evaluate avoided emissions of physically long-lasting garments, **GHG emissions with the solution** and **GHG emissions in the** reference situation, are compared.

- By selling a brand-new physically long-lasting item: through design or other, the item's physical lifespan is longer than the market average for this type of item.

Illustrative – for a physically long-lasting jacket solution

*Figure 27 - **Illustration of the solution.***
Figures are illustrative.

In the reference situation: the consumer can access market alternatives to satisfy the same extended lifespan/additional number of wears. The consumer can buy a brand-new (long-lasting or not) item, rent an item, buy second-hand, repair or do nothing at all. The reference situation is thus the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative (i.e., the distribution of customers behavior among the different alternatives).

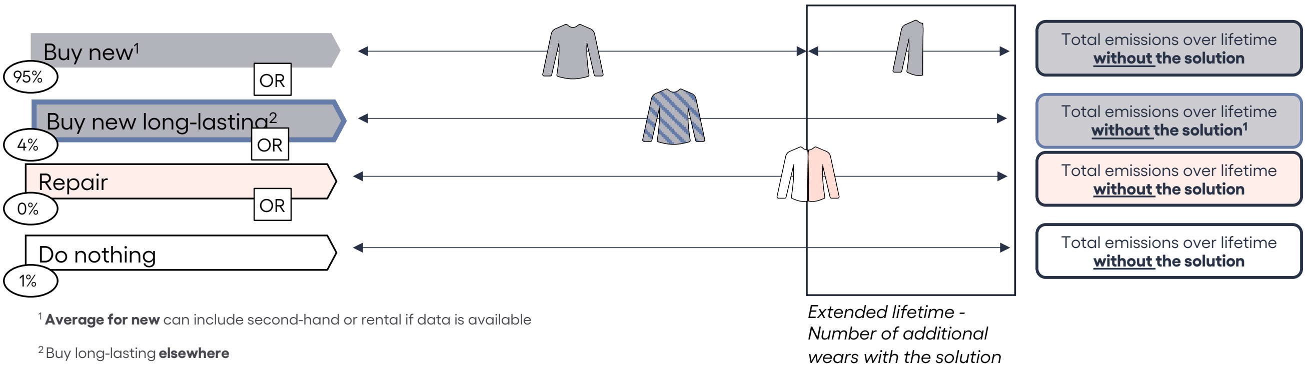


Figure 28 - ***Illustration of alternatives. Figures are illustrative.***

REBOUND EFFECT

The rebound effect of selling sustainable brand-new garments or footwear is that:

- This can **encourage consumption, as a "guilt-free" purchase** and does not necessarily replace another purchase. And, as an additional purchase, does not reduce Apparel and Footwear sector emissions in absolute terms.
- for physically long-lasting items, this property might not extend number of wears if **the item's extrinsic lifespan is shorter than its physical lifespan.** Modelled here as the "Do nothing" alternative.
- Extended physical lifespan to achieve **quality at production** might increase carbon footprint of production compared to market average.

THE PHYSICALLY LONG-LASTING SOLUTION – CALCULATION

For selling brand-new physically long-lasting items, emissions over the item's entire lifespan must be considered.

Calculations in a company-wide average approach

To evaluate GHG emissions of a line of physically long-lasting items sold by a company, a life cycle assessment (LCA) must be carried out. Note that the calculation must be conducted per type of item sold. This LCA will evaluate:

- Company-specific **average emissions of production** per garment or footwear **and logistics** leading to their brand-new sell, including potential additional emissions due to specific long-lasting design.
- Company-specific **average emissions of usage** during average and extended lifespan of the item (washing, drying, ironing, dry-cleaning…).
- Company-specific average emissions of **end-of-life** treatment (incineration, landfill…).

-

Illustrative – for a physically long-lasting jacket solution

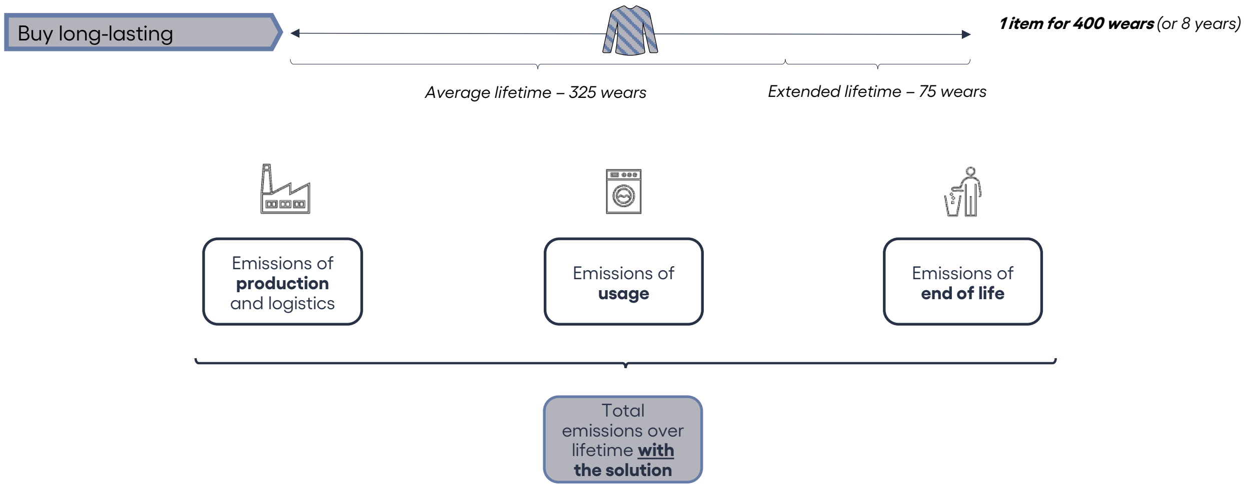


Figure 29 - ***Illustration of emissions to integrate in calculations. Figures are illustrative.***

Calculation in market average approach

It is not possible to use market average emissions calculations for this solution. Indeed, extended use stems from the garment or footwear's specific properties. These are different to the market average for the same type of item.

REFERENCE SITUATION – CALCULATION

Calculation in a company-wide average approach

In the reference situation, emissions corresponding to the item's **average life** must be the exact same as in the situation with solution.

To evaluate emissions **after average lifespan**, data on the alternative to physically long-lasting items must be collected. Collecting this data through customer surveys is strongly advised (see *How to create an effective customer survey*).

For each alternative, an LCA must be conducted to **evaluate the alternative's emissions over its total life cycle**. This LCA must include production, logistics, usage, and end-of-life GHG emissions. The resulting **emissions must be calculated per wear.** This way, they can be attributed to the reference situation for the same number of wears than the additional number of wears allowed by extended lifespan of the physically long-lasting garment.

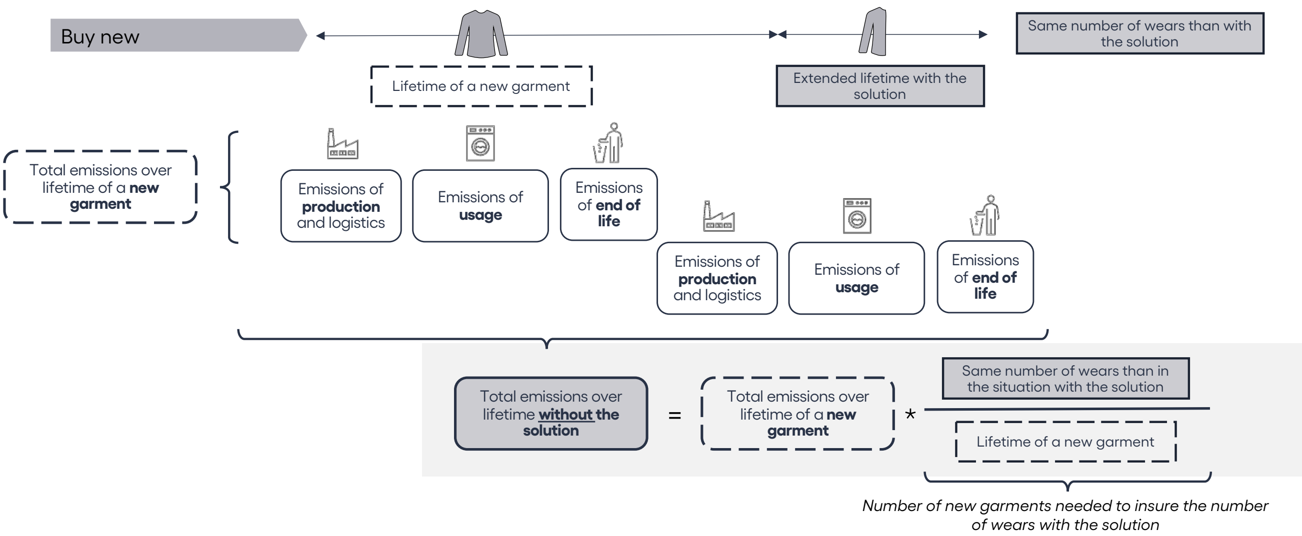


Figure 30 - ***Example for the alternative to rental - Buy new. Figures are illustrative.***

Example: *if the alternative to buying a physically long-lasting jacket, to be worn 400 times, thus 75 more times than a new jacket on average, is buying a new jacket for 325 wears over its lifespan; the emissions in the reference situation correspond to the new jacket's LCA emissions* 400 wears / 325 wears.*

This approach must be applied to every alternative.
Total emissions in the reference situation are the sum of emissions from every alternative multiplied by the likelihood of the alternative occurring.
Data on the likelihood of the alternative must be collected through the customer survey.

Calculations of market average

For market average emissions calculations, the approach is the same except instead of evaluating alternatives through customer surveys, they can be assessed using market average studies. And instead of evaluating emissions of specific company alternatives, emissions are evaluated for average alternatives on the market.

AVOIDED EMISSIONS CALCULATIONS

Finally, avoided emissions are the difference between the reference situation's emissions and the emissions under the solution. These can be **avoided emissions of lesser increase**, they avoid new emissions from occuring but don't reduce emissions of the sector in absolute terms because of its growth, or **Real reduction avoided emissions**, when the solution doesn't participate in the sector's growth.

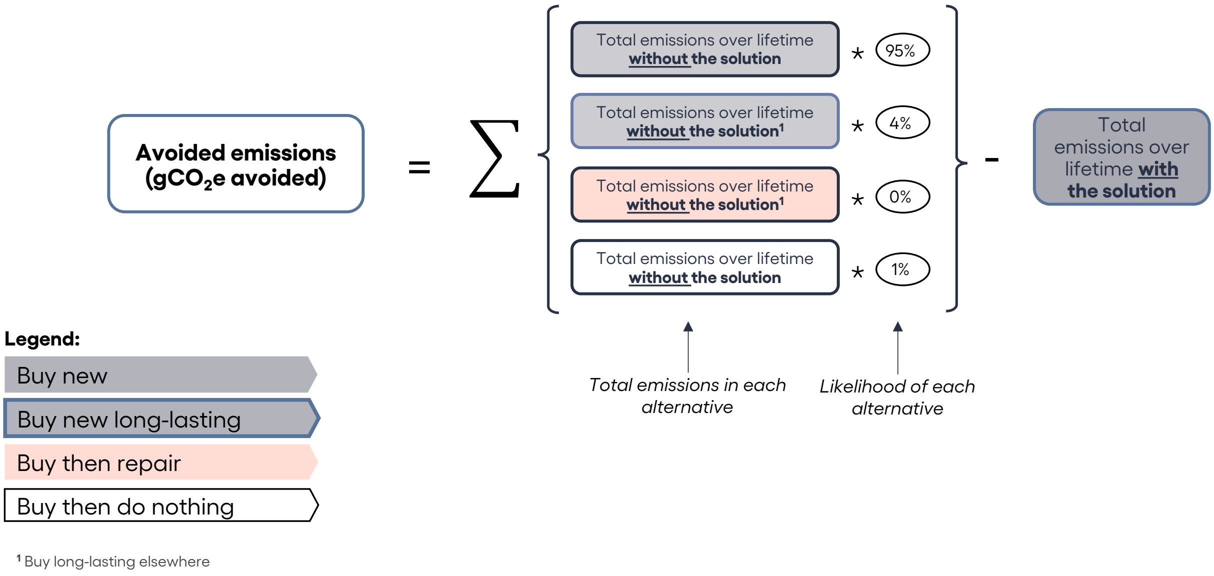


Figure 31 - ***Illustration of avoided emissions calculations for physically long-lasting new garment solution. Figures are illustrative.***

IMPORTANT PARAMETERS FOR THIS SOLUTION

Selling new physically long-lasting garments or footwear can avoid emissions. But not always. This can depend on:

- the additional physical lifespan compared to the average for the same type of item on the same market, the longer the additional physical lifespan, the more emissions are avoided by the solution.
- how high the carbon footprint of production of the physically long-lasting garment compared to the same type of item on the same market, the higher the production emissions are, the fewer emissions are avoided by the solution.
- share of each alternative, the higher the share of alternatives with higher emissions than the solution, the more avoided emissions there will be. E.g.: if you sell the item to a consumer that normally doesn't buy sustainably, this will avoid more emissions than selling it to a conscious consumer (reference situation emissions will be higher).

OVERVIEW OF NECESSARY DATA

This data must be collected for one specific market segment, for one specific geography and for one specific category of garment or footwear (see *Market segment typology* for categories).

Necessary data	Company-wide average approach	Market average approach
Number of **additional wears**	Company specific data. This data can be collected through **physical durability experiments**.	Market average data. This data can be collected through a **published consumer behavior study.**
Emissions in the situation with the solution: - Cradle to gate emissions - End-of-life emissions - Usage emissions for the garment	Company specific data. Cradle-to gate and end-of-life emissions data can be collected through **specific LCAs**. Usage emissions data can be collected through a **consumer survey**.	Market average data Cradle-to gate and end-of-life emissions data can be collected through **average LCAs**. Usage emissions data can be collected through a **published consumer behavior study**.
Emissions in the reference situation: - Cradle to gate emissions for each alternative - End-of-life emissions for each alternative - Usage emissions for each alternative - Additional logistics emissions for repair.	Company specific data and market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each company-specific alternative.** Usage emissions for each alternative data can be collected through a **consumer survey**. Repair logistics emissions can be collected through **average LCAs of repair activities**.	Market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each market-average alternative.** Usage emissions for each alternative data can be collected through a **published consumer behavior study**. Repair logistics emissions can be collected through **average LCAs of repair activities**.
Likelihood of alternatives	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**
Number of wears over total lifespan for each alternative	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**

*Table 19 - **Overview of the necessary data for avoided emissions calculation for physically long-lasting items***

AVOIDANCE FACTOR

Avoided emissions for a long-lasting t-shirt with a PEF durability score of 1,17. The data used for this estimation is a combination of certain brand specific data, data from published databases and literature and hypotheses.

> ***N.B.:*** *this calculation is recommended for a first estimation of avoided emissions only. To calculate avoided emissions, the company-wide average approach is recommended as much as possible.*

Category of emissions	Value	Source
Emissions of **production and logistics – average t-shirt**	5,2 $kgCO_2e$ per t-shirt	Ademe
Emissions of **production and logistics – long-lasting t-shirt**	5,7 $kgCO_2e$ per t-shirt	Carbone 4 hypothesis (10% more than average t-shirt)
Emissions of **usage**	0,01 $kgCO_2e$ per wear	Ademe
Emissions of **end-of-life**	0,3 $kgCO_2e$	Ademe

Table 20 - ***Emission data for a t-shirt (reference situation and solution)***

Alternative	Share	Source
Buy brand-new – average t-shirt	95%	C4 hypothesis based on the data below
Buy brand-new – t-shirt in recycled cotton	4%	C4 hypothesis based on the market share for "sustainable" clothing
Repair	0%	C4 hypothesis (lack of data)
Do nothing	1%	C4 hypothesis, sensibility analysis below with a variation of this share

Table 21 - ***Share of alternatives - reference situation – Selling a physically long-lasting t-shirt***

To estimate number of wears, a t-shirt's average number of wears (115 wears, source: WRAP) is multiplied by the PEF durability score:

Alternative	PEF durability score	Number of wears	Note
Buy brand-new – average t-shirt	1	115	
Buy brand-new – t-shirt in recycled cotton	1,17	135	115 wears * 1,17 (PEF score) = 135 wears
Repair	/	/	0% alternative – data was not retrieved
Do nothing	/	/	

Table 22 – ***Data and hypotheses on physical durability***

Finally, by applying the method described previously, avoided emissions for a recycled cotton t-shirt with a 1% rebound effect (do-nothing alternative) are obtained:

Total avoided emissions of long-lasting t-shirt with a 1% rebound effect (do nothing alternative) = 0,34 $kgCO_2e$

SENSITIVITY ANALYSIS

The share of "do-nothing" was based on a hypothesis. To go beyond this hypothesis, the sensibility of avoided emissions to the share of "do-nothing" alternative was analyzed. **Above 5% of rebound effect there are no avoided emissions**. This supports the idea that brands driving consumption cannot be eligible to claim avoided emissions.

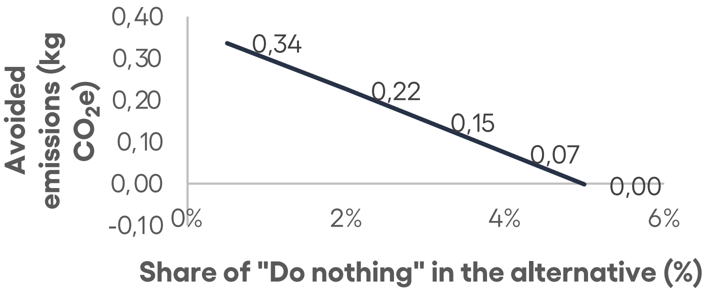


*Figure 32 - **Avoided emissions of a long-lasting t-shirt depending on rebound effect - (kgCO₂e)***

5. Solution 4.b - Extrinsically long-lasting new garments and footwear

A user buys a brand-new garment or footwear, and after wearing it for some time, tires of it and does not wish to wear it anymore. It is the end of the "extrinsic lifespan" of the item with this user. Some items have longer extrinsic lifespan than the market average because they are well-designed (timeless design, versatile designs, …) or have an extrinsic value (customized, carrying a story, …). This type of brand-new item addresses the issue of an item's extrinsic durability by specific properties and lengthens the lifespan of brand-new garments or footwear.
Extrinsically long-lasting new items can help reduce production of brand-new garments or footwear by extending lifespan of brand-new items.

Important note: selling sustainable brand-new items could lead to avoided emissions but only in the context of limiting or decreasing volume growth within apparel and footwear. To be compliant with this guidance, brands whose commercial practices encourage over-consumption and/or over-production shall not compute avoided emissions for selling brand-new garments, even sustainable ones. Please refer to the section *Eligibility criteria to compute avoided emissions for brand-new garments*, to decide whether the product is eligible for avoided emissions calculations.

GENERAL APPROACH

To evaluate avoided emissions of extrinsically long-lasting garments **GHG emissions in the situation with the solution** and **GHG emissions in the** reference situation without, will be compared.

- **With** a brand-new extrinsically long-lasting item: thanks to design or something else, the item's extrinsic lifespan is longer than the market average lifespan for this type of item.

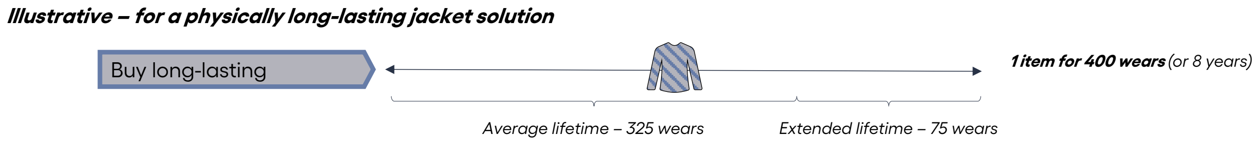


*Figure 33 - **Illustration of the solution. Figures are illustrative.***

In the reference situation: the consumer has alternatives on the market to satisfy the same extended lifespan/additional number of wears. The consumer can buy a brand-new (long-lasting or not) item elsewhere, rent an item, buy second-hand, or do nothing at all. The reference situation is thus the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative (i.e., the distribution of customers behavior among the different alternatives).

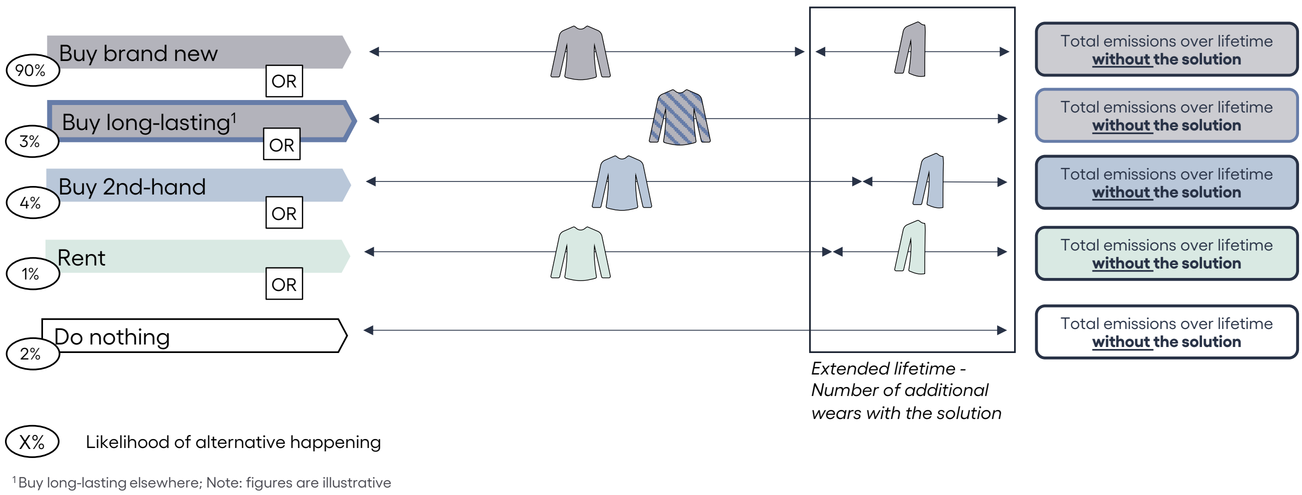


*Figure 34 - **Illustration of the alternatives. Figures are illustrative.***

REBOUND EFFECT

The rebound effect to selling sustainable brand-new clothes is that it can **encourage consumption, as "guilt-free" purchases** and does not necessarily replace another purchase. So, as an additional purchase, this solution does not reduce Apparel and Footwear sector emissions in absolute terms. Modelled here as the likelihood of the "Do nothing" alternative.

THE LONG-LASTING SOLUTION – CALCULATION

When selling brand-new extrinsically long-lasting garments or footwear, emissions over the item's entire lifespan must be considered.

Calculation in a company-wide average approach

To evaluate GHG emissions of a line of extrinsically long-lasting products sold by a company, a life cycle assessment (LCA) has to be carried out. This must be calculated per type of product sold. This LCA will evaluate:

- Company-specific **average emissions of production** per item **and the logistics** leading to their brand-new sell, including potential additional emissions due to specific long-lasting design.
- Company-specific **average emissions of use** during the average and the extended lifespan of the item (washing, drying, ironing, dry-cleaning…).
- Company-specific average emissions of **end-of-life** treatment (incineration, landfill…).

Illustrative – for an emotionally long-lasting jacket solution

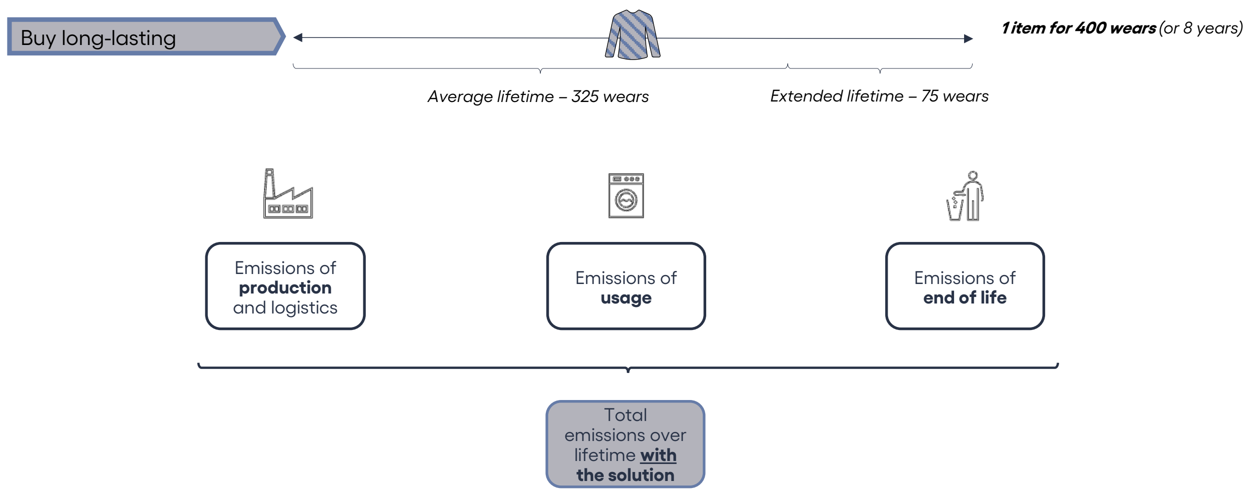


Figure 35 - ***Illustration of emissions to integrate in the calculation. Figures are illustrative.***

Calculation in market average approach

It is not possible to use market average emissions calculation for this solution. Indeed, extended use allowed by the solution comes from the garment's specific properties. These properties are therefore different than the market average for the same type of garment.

REFERENCE SITUATION – CALCULATION

This data must be collected for one specific market segment, for one specific geography and for one specific category of garment and footwear (see *Market segment typology* for categories).

Calculation in a company-wide average approach

In the reference situation, emissions corresponding to the item's **average life** must be the exact same as in the situation with solution.

To evaluate emissions **after average lifespan**, data on the alternative to extrinsically long-lasting items must be collected. Collecting this data through a customer survey is strongly advised (see *How to create an effective customer survey*).

For each alternative, an LCA must be conducted to **evaluate emissions of the alternative on its total life cycle**. This LCA must include production, logistics, usage, and end-of-life GHG emissions. The resulting **emissions must be calculated per wear.** This way, they can be attributed to the reference situation for the same number of wears than the additional number of wears allowed by extended lifespan of the extrinsically long-lasting item.

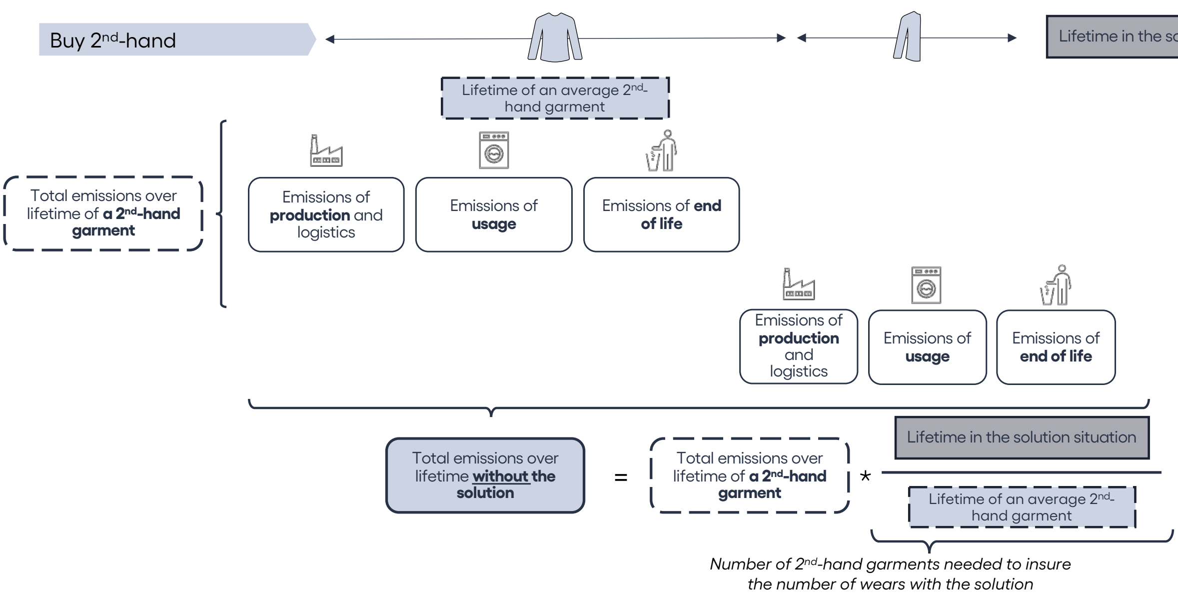


Figure 36 - ***Example of life-cycle emissions of alternatives to new long-lasting garments - second-hand alternatives. Figures are illustrative.***

This approach must be applied to every alternative.
T**otal emissions in the reference situation** are the sum of emissions of every alternative multiplied by the likelihood of the alternative happening.
Data on the likelihood of the alternative must be collected through the customer survey.

> ***Note:*** *In the reference situation for an extrinsically long-lasting garment or footwear, alternatives exclude repair, since this solution does not act on the extrinsic durability but on the physical durability.*

Calculation in market average approach

For market average emissions calculations, instead of evaluating the likelihood of alternatives by customer surveys of the brand, they can be assessed using market average studies. And instead of evaluating emissions of specific alternatives for the company, emissions are evaluated for average alternatives on the market.

AVOIDED EMISSIONS CALCULATION

Finally, avoided emissions are the difference between emissions in the reference situation and emissions with the solution. These avoided emissions can be **avoided emissions of lesser increase**, they avoid new emissions but don't reduce sector emissions in absolute terms because of growth, or **Real reduction avoided emissions**, when the solution doesn't participate in the sector's growth.

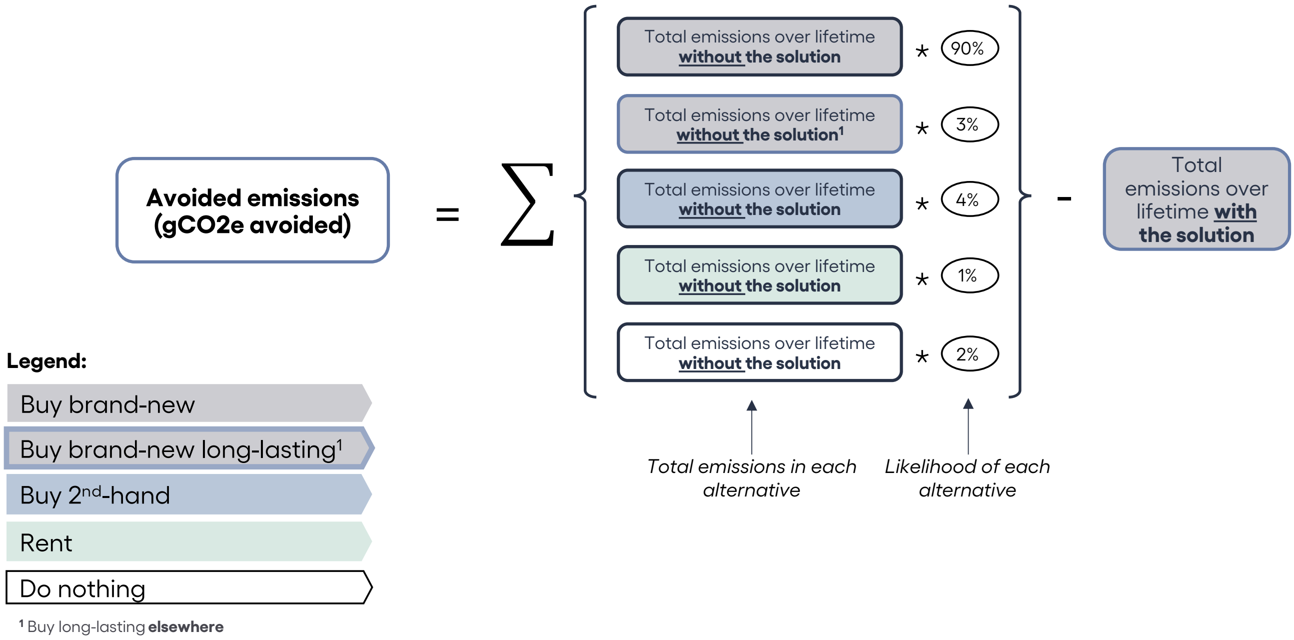


*Figure 37 - **New long-lasting garment avoided emissions calculation example. Figures are illustrative.***

IMPORTANT PARAMETERS FOR THIS SOLUTION

Selling new extrinsically long-lasting garments and footwear can avoid emissions, but not always. This can depend on:

- length of additional extrinsic lifespan compared to market-average lifespan for the same type of item on the same market, the longer the additional extrinsic lifespan, the more emissions are avoided by the solution.
- how high the production carbon footprint of the extrinsically long-lasting item compared to the same type of item on the same market, the higher the production emissions are, the less emissions are avoided by the solution.
- share of each alternative, *when selling a product or a service, a company can avoid more or less emissions depending on who it is sold to, e.g. by introducing a sustainable product to someone who typically average products, the greater the avoided emissions, than selling the same sustainable product to someone who typically buy this kind of items previously.*

OVERVIEW OF NECESSARY DATA

This data must be collected for one specific market segment, for one specific geography and for one specific category of garment and footwear (see *Market segment typology* for categories).

Necessary data	Company-wide average approach	Market average approach
Number of **additional wears**	Company specific data. This data can be collected through **customer surveys**.	Market average data. This data can be collected through a **published consumer behavior study.**
Emissions in the situation with the solution: - Cradle to gate emissions - End-of-life emissions - Usage emissions for the garment	Company specific data. Cradle-to gate and end-of-life emissions data can be collected through **specific LCAs**. Usage emissions data can be collected through a **consumer survey**.	Market average data Cradle-to gate and end-of-life emissions data can be collected through **average LCAs**. Usage emissions data can be collected through a **published consumer behavior study**.
Emissions in reference situation: - Cradle to gate emissions for each alternative - End-of-life emissions for each alternative - Usage emissions for each alternative - Second-hand and rental logistics emissions	Company specific data and market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each company-specific alternative.** Usage emissions for each alternative data can be collected through a **consumer survey**. Second-hand and rental logistics emissions can be collected through **average LCAs of second-hand and rental activities**.	Market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each market-average alternative.** Usage emissions for each alternative data can be collected through a **published consumer behavior study**. Second-hand and rental logistics emissions can be collected through **average LCAs of second-hand and rental activities**.
Likelihood of alternatives	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**
Number of wears on total lifespan for each alternative	This data can be collected through a **consumer survey.**	This data can be collected through a **published consumer behavior study.**

*Table 23 - **Overview of the necessary data for avoided emissions calculation for extrinsically long-lasting items***

AVOIDANCE FACTOR

Here, no avoidance factor is calculated since the market average calculation is not possible for this solution, as it is too specific to the type of garment and why it has an extended physical lifespan to find appropriate data.

6. Solution 5: Low-carbon new garments and footwear

A user buys a brand-new garment or footwear with lower emissions over a lifespan than the market average for this type of item (because production processes or the materials used reduces emissions compared to market average). This type of brand-new item addresses the issue of an item's carbon footprint through specific properties or design and reduces emissions over lifespan of brand-new garments and footwear.
Low-carbon new garments or footwear can help reduce GHGs emissions of brand-new garments by reducing emissions at one or several steps of their lifespan – production, logistics, usage, end-of-life.

Important note: selling sustainable brand-new garments or footwear <u>might</u> lead to avoided emissions but only in the context of a limited or decreasing volume growth of the particular Apparel and Footwear segment in question. To comply with this guidance, brands whose commercial practices encourage over-consumption and/or over-production shall not compute avoided emissions for selling brand-new garments, even sustainable ones. Please refer to the section <u>*Eligibility criteria to compute avoided emissions for brand-new garments*</u>, to decide whether a product is eligible for avoided emissions calculations.

GENERAL APPROACH

To evaluate avoided emissions of low-carbon brand-new items **GHG emissions in the situation <u>with</u> the solution** and **GHG emissions in the reference situation <u>without</u> the solution** will be compared.

- **<u>With</u>** selling a brand-new low-carbon item: thanks to design or another feature, the item's carbon footprint over its lifespan is reduced compared to the market average for this type of item.

Illustrative – for a low-carbon t-shirt

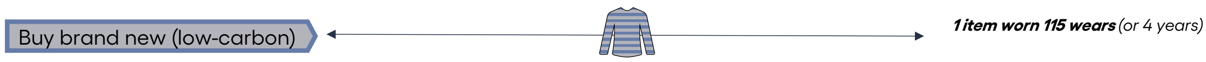


Figure 38 - ***Illustration of the solution. Figures are illustrative.***

<u>In the reference situation</u>: the consumer has market alternatives to satisfy the same lifespan/number of wears. The consumer can buy a brand-new (not low carbon) item or do nothing at all. The reference situation is thus the weighted average of the emissions of each possible alternative to the solution for the consumer, the weights being the likelihood of each alternative (i.e., the distribution of customers behavior among the different alternatives).

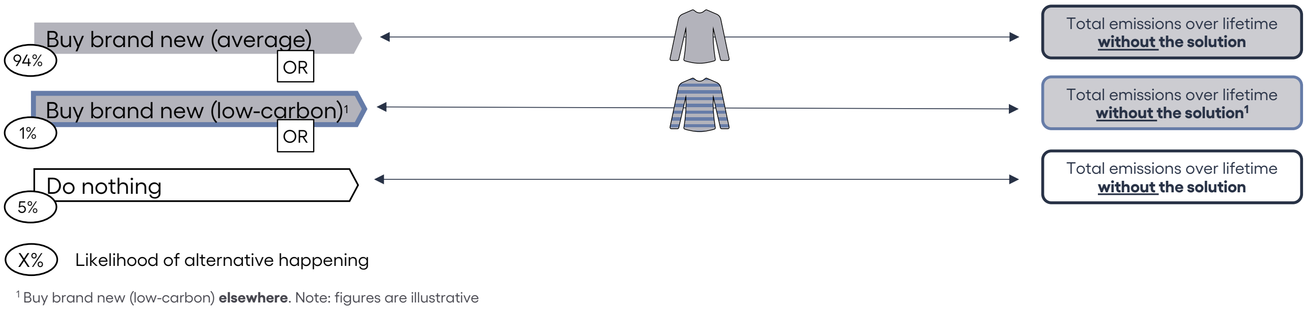


*Figure 39 - **Illustration of the alternatives. Figures are illustrative.***

> ***Note:*** *In the reference situation for a low-carbon item, alternatives do not include second-hand, repair and rental,* ***since the solution*** **"low-carbon garment and footwear"** ***do not act on the durability (either physical or extrinsic) but on lifecycle GHG emissions****.*

REBOUND EFFECT

The rebound effect to selling sustainable brand-new clothes is that it can **encourage consumption, as a "guilt-free" purchase** and does not necessarily replace another purchase. As an additional purchase this solution does not reduce Apparel and Footwear sector emissions in absolute. This rebound effect is considered in the alternative "Do nothing".

THE BRAND-NEW LOW-CARBON SOLUTION – CALCULATION

When selling brand-new low-carbon garments or footwear, emissions over the item's entire lifespan item must be considered.

Calculation in a company-wide average approach

To evaluate GHG emissions of a company's low-carbon product line, a life cycle assessment (LCA) has to be carried out. Note that the calculation must be done per type of product sold. This LCA will evaluate:

- Company-specific **average production emissions** per item **plus logistics** leading to their brand-new sell.
- Company-specific **average usage emissions** during the item's average lifespan (washing, drying, ironing, dry-cleaning…).
- Company-specific average **end-of-life** emissions - treatment, incineration, landfill…

Illustrative – for a low-carbon t-shirt

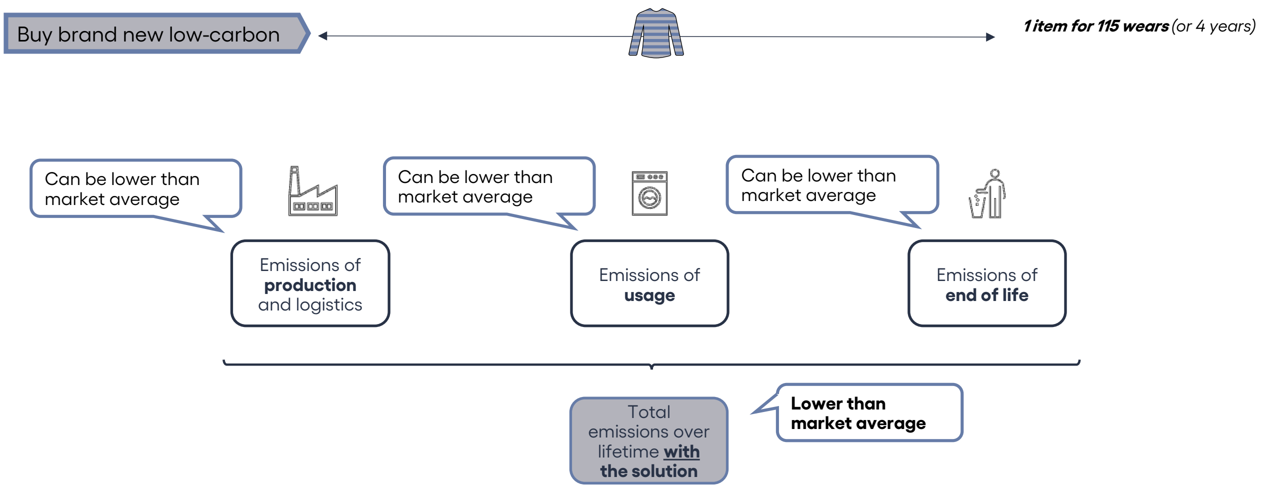


Figure 40 - ***Illustration of emissions to integrate in the calculation. Figures are illustrative.***

Calculation in market average approach

For market average emission calculation, the approach is the same except that instead of evaluating the average emissions of one particular brand's product line, they must be evaluated for the average low-carbon item across all brands.

REFERENCE SITUATION – CALCULATION

Calculation in a company-wide average approach

In the reference situation, **alternatives have the same lifespan as the solution**. The difference Is the carbon footprint of the alternatives.

To evaluate emissions in the reference situation, data on the alternatives to low-carbon items must be collected. In a company-wide average approach, collecting this data through a customer survey is strongly advised. (see *How to create an effective customer survey*). For each alternative, an LCA must be conducted to **evaluate emissions of alternatives over its total life cycle**. This LCA must include production, logistics, usage, and end-of-life GHG emissions.

Illustrative – for a low-carbon t-shirt alternative

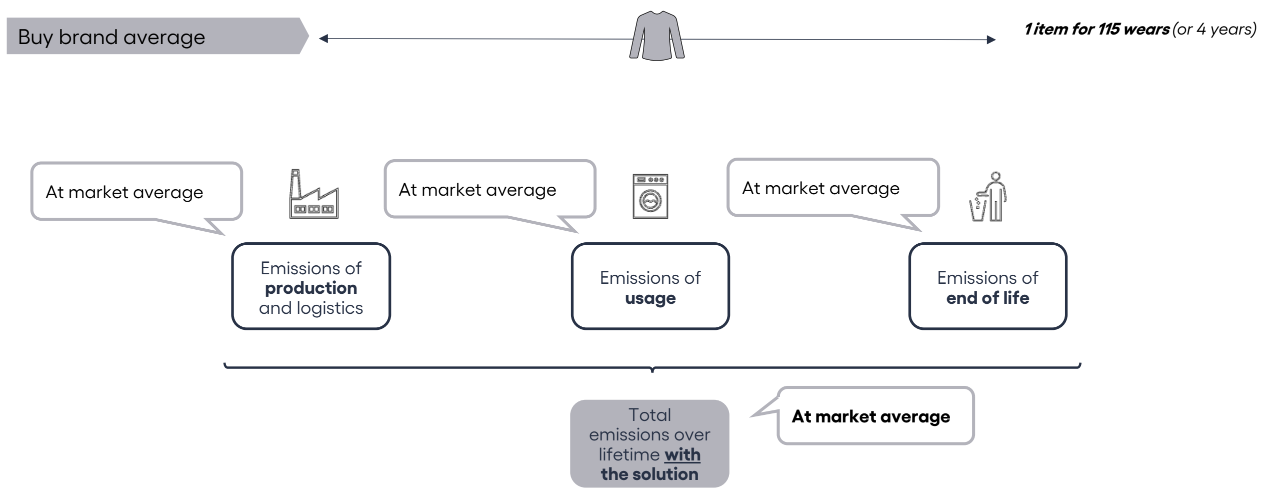


Figure 41 - ***Example of lifecycle emissions for new low-carbon garments alternatives - Buy new***

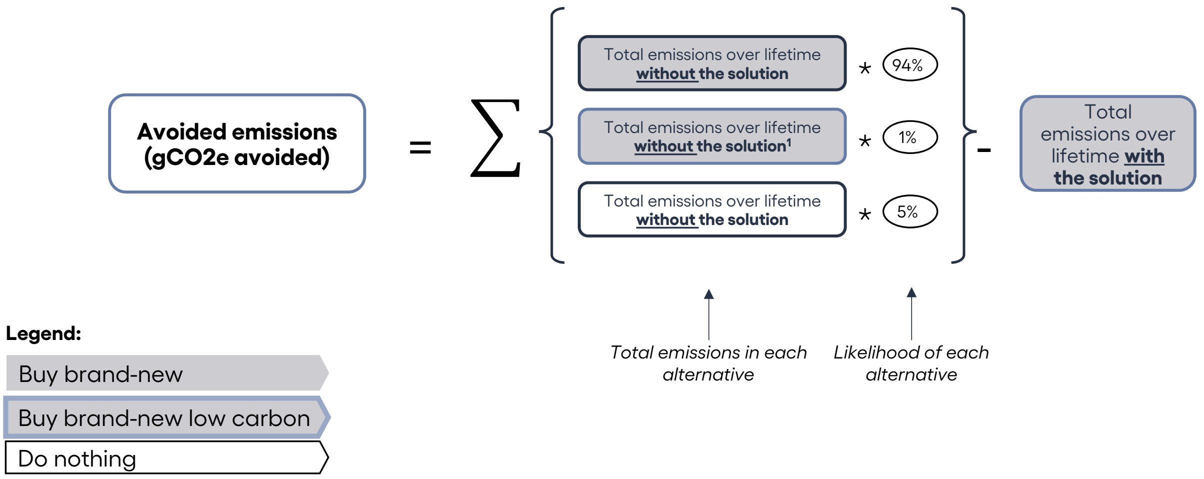
This approach must be applied to every alternative.
Total emissions in the reference situation are the sum of the emissions of every alternative multiplied by the likelihood of the alternative occurring.
Data on that likelihood must be collected through customer surveys.

Calculation in market average approach

For market average emissions calculation, the approach is the same except that instead of using company-specific data, market averages are used: applicable for any company selling the same type of low-carbon garments or footwear within the same market segment.

AVOIDED EMISSIONS CALCULATION

Finally, avoided emissions are the difference between the reference emissions and the solution. These avoided emissions can be **avoided emissions of lesser increase**, they avoid new emissions occurring but don't reduce sector emissions in absolute terms because of its growth. Or they can be **Real reduction avoided emissions**, when the solution doesn't participate to the sector's growth.



[1] Buy brand new (low-carbon) **elsewhere**. Note: figures are illustratives

Figure 42 - ***New low-carbon garment avoided emissions calculation example. Figures are illustrative.***

IMPORTANT PARAMETERS FOR THIS SOLUTION

Selling new low-carbon garments and footwear can avoid emissions. But not always. This can depend on:

- the carbon footprint of the low-carbon item compared to the same type of item on the same market. The higher production emissions are, the less emissions are avoided by the solution.
- the share of each alternative, the higher the share of alternatives with higher emissions than the solution, the more avoided emissions there will be. E.g.: selling an item to a consumer who normally doesn't buy sustainably will avoid more emissions than selling to a conscious consumer (the reference situation emissions will be higher).

OVERVIEW OF NECESSARY DATA

This data must be collected for one specific market segment, for one specific geography and for one specific category of garment and footwear (see *Market segment typology* for categories).

Necessary data	Company-wide average approach	Market average approach
Number of **average wears**	Market average data.	Market average data.
Emissions in the situation with the solution: - Cradle-to-gate emissions - End-of-life emissions - Usage emissions for the garment	Company specific data. Cradle-to gate and end-of-life emissions data can be collected through **specific LCAs**. Usage emissions data can be collected through a **consumer survey**.	Market average data Cradle-to gate and end-of-life emissions data can be collected through **average LCAs**. Usage emissions data can be collected through a **published consumer behavior study**.
Emissions in the reference situation: - Cradle to gate emissions for each alternative - End-of-life emissions for each alternative - Usage emissions for each alternative	Company specific data and market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each company-specific alternative.** Usage emissions for each alternative data collected through a **consumer survey**.	Market average data. Cradle-to gate and end-of-life emissions data can be collected through **average LCAs of each market-average alternative.** Usage emissions for each alternative data collected through a **published consumer behavior study**.
Likelihood of alternatives	Data collected through a **consumer survey.**	Data collected through a **published consumer behavior study.**

Table 24 - ***Overview of necessary data for avoided emissions calculations for low-carbon items***

AVOIDANCE FACTOR

The avoided emissions for a recycled cotton t-shirt.
The data used for this estimation is a combination of certain brand specific data, data from published databases and literature and hypotheses.

> ***N.B.:*** *this calculation is recommended for a first estimation of avoided emissions only. To calculate avoided emissions, the company-wide average approach is recommended as much as possible.*

Category of emissions	Value	Source
Production and logistics – average t-shirt	5,2 $kgCO_2e$ per t-shirt	Ademe
Production and logistics –t-shirt in recycled cotton	3,6 $kgCO_2e$ per t-shirt	Carbon 4 calculation based on Ademe data
Usage	0,01 $kgCO_2e$ per wear	Ademe
End-of-life	0,3 $kgCO_2e$	Ademe

Table 25 - ***Emission data for a t-shirt (reference situation and solution)***

Alternative	Share	Source	Number of wears on lifespan	Source
Buy new average t-shirt	94%	C4 hypothesis based on the data below	115 wears	WRAP
Buy brand-new – recycled cotton t-shirt	1%	Ellen McArthur Foundation	115 wears	WRAP
Do nothing	5%	C4 hypothesis, sensibility analysis below with a variation of this share	/	/

Table 26 - ***Share of alternatives - reference situation – Selling a low-carbon t-shirt***

Finally, by applying the method described previously, avoided emissions for a recycled cotton t-shirt with a 5% rebound effect (do-nothing alternative) are obtained:

Total avoided emissions of recycled cotton t-shirt with a 5% rebound effect (do-nothing alternative) = 1,2 $kgCO_2e$

SENSITIVITY ANALYSIS

The share of “do-nothing” was based on an hypothesis. To go further, the sensibility of avoided emissions to the share of “do-nothing” alternative was analyzed. **Above 24% of rebound effect meant no avoided emissions**. This supports the idea that brands driving consumption cannot be eligible to claim avoided emissions.

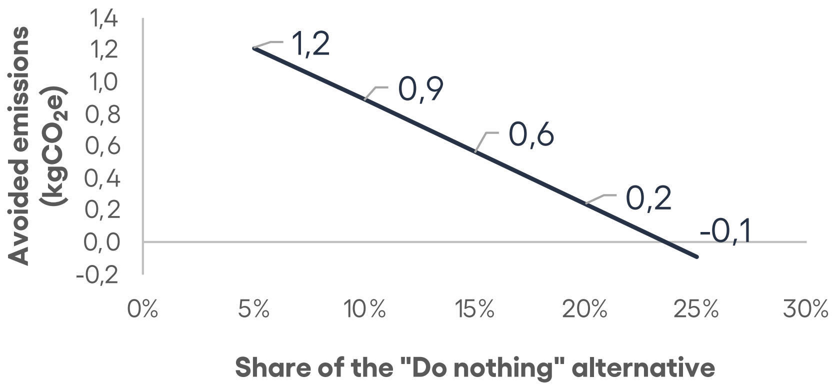


Figure 43 - ***Avoided emissions of a recycled cotton t-shirt (kgCO2e) depending on rebound effect***

Ways to estimate the lifespan of garments and footwear

1. Possible options to assess the lifespan of a garment or footwear

A garment or footwear's lifespan is defined as **the number of times a garment is worn**.

An Item's lifespan depends on two factors:
- **physical durability**, how long the item will be wearable before it is broken or worn out.
- **extrinsic durability**, how long will the owner want to wear the item (depends on fashion trends, consumption habits, price, etc.).

To evaluate avoided emissions, the shortest lifespan between physical and extrinsic must be chosen.

Method of lifespan assessment	Type of durability addressed	Description	Calculation
Customer survey	Extrinsic durability	A customer survey can evaluate an item's lifespan. *further guidance on how to create effective customer surveys Is available in the next section.*	<u>Question examples:</u> *How long do you plan to keep wearing this item? [Several options given in years].* *Answer: X* *How many times a year do you plan to wear this garment? [Several options given].* *Answer: Y* $Lifetime = X * Y$ <u>Or</u> *How attached are you to this item? [Several options given].* *Why are you attached to this item.? [e.g.: expensive price, customized/rare; emotional value…].* Answers can be transformed into a ratio to be applied to average lifespan for a given type of garment, in each country for a given market segment. $Lifetime = Attachement\ ratio * Average\ lifetime$

	Physical durability (e.g.: for repair)		<u>Question examples:</u> Note: here, examples are given for repair to find out how long items lasted before becoming worn-out and needing repair. *How long did you keep wearing this item (actually wearing it, not possessing it without using it)? [Several options given in years]. Answer: X* *How many times a year did you wear this item? [Several options given]. Answer: Y* $$Lifetime = X * Y$$ *<u>Or</u>* *How frequently/intensively did you use this item? [Several options given].* Answer can be transformed into a ratio that can be applied to average lifespan for a given type of item, in each country for a given market segment. $$Lifetime = Intensity\ of\ use\ ratio * Average\ lifetime$$
Price-based	Extrinsic durability	For some solutions, when an item changes owner (repair, second-hand, rental), price can be used as a proxy to estimate lifespan. *Note: this method assumes that extrinsic durability depends only on price.*	<u>Example for second hand:</u> $$Second\ lifetime = 1rst\ lifetime * \frac{2nd\_hand\ price}{1rst\_hand\ price}$$ <u>Example for rental:</u> $$Rental\ lifetime = Average\ number\ of\ wears\ per\ rental^{1} * \frac{1rst\_hand\ price}{rental\ price}$$ 1 - The average number of wears per rental must be determined through a customer survey
Physical durability experiments	Physical durability	The PEF (Product Environmental Footprint) method can be used when the physical lifespan must be determined.	*See PEF methodological guidance.* *The methodology provides insights on appropriate item types of segmentation and normalized test for each category defined.* $$Lifetime = PEF\ coefficient * Average\ lifetime$$
Published customer studies	Extrinsic or physical durability	Market average studies can be used to estimate the garment's lifespan.	*Market studies are good data sources when calculating avoided emissions if they analyze the item of interest, in the same context and market segment. But since they are usually not focused on the exact perimeter needed, they can be used as proxy but provide less reliable data than other methods described above.*

*Table 27 – **Recommendations on lifespan calculation***

2. Recommendations for each solution

a. Repair

Repair is a generic term. Calculations should be conducted for each specific type of repair using relevant data especially for lifespan before and after repair.

In a company-specific approach, customer surveys are suitable to determine **first-life** parameters since the customer requires the repair service at the end of a garment or footwear's first life. This helps determine the number of wears over a first lifespan.
For a market-average approach, published consumer studies should be used and in certain cases extrapolated if data for specific use cases are not available (different geographic market of market segment).

The **lifespan after repair** can be determined using physical durability experiments, or customer surveys in a company-specific approach and published consumer studies in a market-average approach.

b. Second-hand

First lifespan should be estimated with customer surveys in a company-specific approach if the reseller has access to data regarding the garment or footwear's first lifespan (e.g.: C2C reselling platform, drop-off charity shops).
In those instances, a second-hand seller does not have access to first owner data, then published consumer studies should be used, in a market-average approach. And data extrapolated if specific use case is not available.

Second lifespan can be determined in company-specific approach with price-based methods using the second-hand sale price and estimating the first-hand sale price or with customer surveys when the second-hand sell occurs or with published customer studies in a market-average approach.

How to include rebound effect for first-hand owner:
The reference situation emissions must be calculated for the same number of wears than the solution. However, when including rebound effect for first-hand owners, the number of wears in the first life is smaller with the solution (due to rebound effect) than in the reference situation. To include both this difference and the necessity to evaluate both situations according to the same number of wears, a ratio must be applied on the reference situation emissions corresponding to the alternative to the first life. This ratio is the number of first-hand wears, with the rebound effect, for the first owner divided by the average number of wears of a brand-new item.

Example: (*All data are Illustrative)*

Questions asked:

To first owners:
Would you have bought this coat if you knew you wouldn't be able to resell this product?
Yes –95%
I'm not sure – 1%
definitely not – 4%

From these answers were estimated the rebound effect to be of 5%.
The market average for this item being 200 wears, the number if first-hand wears including a rebound effect of 5% is: 200*95% = 190 wears

<u>To second owners:</u>
1. ***How long will you keep wearing this item?***
Average answer: 2,5 years
2. ***How many times a year will you wear it?***
Average answer: 20 times
The average number of second-hand wears is: 2,5*20 = 50 wears

Market average number of wears for a brand-new item	200 wears
Rebound effect for first-hand owner	5% less wears
Number of first-hand wears:	190 wears
Number of second-hand wears:	50 wears

Emissions in the reference situation:

<u>Alternative to the 190 first-hand wears:</u>

Average number of wears of a brand-new item	200 wears
LCA emissions of a brand-new item worn 200 times	60 $kgCO_2e$

With **rebound effect**, the number of first-hand wears in the situation with the solution is 190 and not 200 (market average). Therefore, alternative to first life must be calculated for 190 wears too.
60*190/200 = **57 $kgCO_2e$**

<u>Alternative to the 50 second-hand wears:</u>
<u>First alternative:</u> Buy brand-new.
80% of consumers purchase a brand-new item instead of the second-hand item:

Share of the alternative	80%
Number of wears to find an alternative to	80% of 50 wears = 40 wears
Emissions of the alternative *LCA emissions with 200 wears *40/200*	12 $kgCO_2e$

<u>Second alternative:</u> Do nothing
20% of consumers don't purchase anything instead of the second-hand item:

Share of the alternative	20%
Number of wears to find an alternative to	/
Emissions of the alternative	0 $kgCO_2e$

Total reference situation emissions: 57+12+0 = **69 $kgCO_2e$**

Emissions in the situation with the solution:

Total number of wears (first life 190 wears, second life 50 wears)	240 wears
Total emissions (including second-hand logistics)	63 $kgCO_2e$

Avoided emissions: 69-63 = **6 $kgCO_2e$**

c. Rental

Rental lifespan should be an accessible data for the rental company, for company-specific data. Otherwise, the price-based method or published customer studies can be used to determine rental lifespan of the garment.

d. Physically long-lasting new garments

For this solution, in a company-specific approach, the lifespan can be determined with physical durability experiments (using the PEF methodology for example) **if and only if** the sold product has a longer extrinsic durability than physical durability (to be determined through customer surveys). Otherwise, avoided emissions calculations for this solution are not correct and must not be conducted.

In a market average approach, published customer studies can be used but might have very limited application for this specific solution.

e. Extrinsically long-lasting new garments

In a company-specific approach, lifespan can be determined using customer surveys to ask the buyer about the product they purchase) **If and only if** the product sold has a longer physical durability than extrinsic durability (to be determined with physical durability experiments).

In a market average approach, published consumer studies can be used but might have limited scope for this specific solution.

f. Low-carbon new garments

For this solution, since the lifespan is not the parameter enabling avoided emissions, this calculation should be defined with published consumer studies and should be the same than for not low-carbon alternative garments or footwear.

How to create an effective customer survey

a. Objectives of conducting a customer survey

To help companies obtain useful data to compute avoided emissions, customer surveys, **working with statistical sociologists** to avoid statistical bias, are recommended.

Customer surveys can collect <u>two types of data</u>:

- **Data on the product line on which the avoided emissions is computed for the solution situation** (e.g., number of wears over lifespan, intensity of use, lifespan in years, most frequently needed repair, usage practices, logistics (customer travel)).
- **Data on alternatives and their likelihood for the reference situation** (e.g., what the customer would have done if he hadn't bought this product or service). This also helps to quantify the **impact of the rebound effect of the solution** (e.g., the likelihood that the customer wouldn't have bought any product or service instead).

Data can then be used to accurately compute avoided emissions with a company-wide average approach.

b. How to formulate a customer survey: recommendations

<u>General recommendations:</u>

- use multiple-choice instead of open answers.
- randomly rank answers to prevent any bias.
- ask questions about specific purchases at the time of purchasing goods or services or later on with a survey sent by email for example.
- provide examples to help customers understand questions.
- don't ask too many questions to have a good answer rate.

<u>Specific recommendations:</u>

→ Identify **if the lifespan is determined by extrinsic or physical durability** and **adapt alternatives considered for calculation** accordingly.

Illustration:
For which reason are you more likely to stop wearing this item?

- *I don't know*
- *For reasons linked to the item's physical state (damaged, worn out, …)*
- *For reasons not linked to the item's physical state (unsuitability, out of fashion, out of size…)*

*Answers below mean the main limitation to wearing the item is **extrinsic durability**.*

- *Unsuitability*
- *Out of fashion*
- *Other reasons not linked to the item's physical state*
- *Out of size*

Answers below mean the main limitation to wearing the item is ***physical durability****.*

- *Worn out*
- *Damaged*
- *other reasons linked to the physical state of the item*

⟶ To collect data on **number of wears**, split the question between lifespan in years and intensity of use.

Illustration:

1. ***How long will you keep wearing this item?*** *(I don't know, 1 year, 3 years, 5 years, 7 years, 10 years or more)*
2. ***How many times a year will you wear it?*** *(I don't know, less than 10 times, between 10 and 20 times, between 20 and 30 times, between 30 and 40 times, 40 times or more)*

OR

2. ***How many times a year will you wear it?*** *(I don't know, almost never, a few times a year, a few times a month, a few times a week, almost every day)*

Note: adapt this question for seasonal garments and footwear (winter jackets can't be worn every day): *how many times will you wear it in winter/summer/mid-season?*

⟶ To collect **lifespan** data, propose multiple-choice answers centered on the market-average for this garment.

Illustration:

1. ***How long will you keep wearing this coat?*** *(I don't know, less than 2 years, about 4 years, about 7 years, about 10 years, about 12 years or more)*
2. ***How long will you keep wearing this t-shirt****? (I don't know, less than 1 year, about 2 years, about 4 years, about 6 years, about 7 years or more)*

⟶ Identify **if the purchase answers an existing or new need** and **determine the share of "reduction" or "lesser increase"** in avoided emissions.

Illustration:

For which reason have you purchased this pair of shoes *(I don't know, I like their design, I start a new outdoor activity, I must replace a pair previously owned, I find them affordable, other reason – please detail)*

Answers listed below mean potential avoided emissions are ***real avoided emissions****:*

- *I need to replace a pair previously-owned*
- *I'm starting a new outdoor activity*

All the other answers mean potential avoided emissions are ***avoided emissions of lesser increase.***

c. Example for B2C second-hand activity

Questions to obtain required data to compute avoided emissions when selling a second-hand garment:

⟶ **<u>Number of wears in first life</u>** (to ask the seller or to estimate based-on published consumer studies for this type of garment)

Illustration:

1. ***For how long did you wear this coat?*** *(about 10 years, less than 2 years, about 4 years, I don't know, about 12 years or more, about 7 years)*
2. ***How many times a year did you wear it?*** *(40 times or more, less than 10 times, I don't know, between 30 and 40 times, between 10 and 20 times, between 20 and 30 times)*

<u>OR</u>

2. ***How often did you wear this coat before you stopped wearing it?*** *(once a year, I haven't worn this product, several times in a week, I wore it once, daily, once a week, several times in a month, several times in a year, once a month, less than once a year, I don't know / I'm not sure)*

⟶ **<u>Rebound effect for the seller</u>** (to ask the seller if the number of first life wears is estimated from published studies)

Illustration:

1. ***Would you have bought this coat if you knew you wouldn't be able to resell this product?*** *(Yes – definitely - maybe - I'm not sure – unlikely – likely - no - definitely not)*

⟶ **<u>Number of second life wears</u>** (to ask the buyer or to estimate, see 3. Ways to estimate lifespans of each solutions)

Illustration:

1. ***How long will you keep wearing this coat?*** *(less than 2 years, about 10 years, about 4 years, I don't know, about 12 years or more, about 7 years)*
2. ***How many times a year will you wear it?*** *(I don't know, between 10 and 20 times, 40 times or more, between 20 and 30 times, between 30 and 40 times, less than 10 times)*

⟶ **<u>Emissions in the situation with the solution</u>** (usage emissions, end-of-life emissions)

Illustration:

How do you usually take care of clothes you don't wear anymore? *(I don't know, donate, discard in regular bin, discard in recycling bin, keep unused in my closet*

⟶ **<u>Likelihood of alternatives</u>** (to ask the buyer or to estimate from market-based studies for this solution)

Illustration:

For second-hand: ***What would you have done if you hadn't bought this garment?*** *(I don't know, I would have bought a similar brand-new garment, I would have bought it second-hand elsewhere, I would have rented it, I wouldn't have bought anything)*

Appendix

1. The difference between reduction in Pillar A and avoided emissions in Pillar B

Carbon footprint reduction, especially the reduction of the item scope 3 "usage of products and services sold"[11], is frequently confused with avoided emissions. The difference is the **standpoint taken:**

- **Regarding carbon footprint reduction, the standpoint is the company's,** where a comparison is made of the emissions of solutions sold from year to year.
- **Regarding avoided emissions, the standpoint is the client's**, where a comparison is made between two situations, one with and the other without the solution sold by the company.

[11] Emissions of "Usage of products and services sold" correspond to the scopes 1&2 of the end user (GHG protocol). For apparel and footwear this includes the washing, ironing, and dry-cleaning of the product

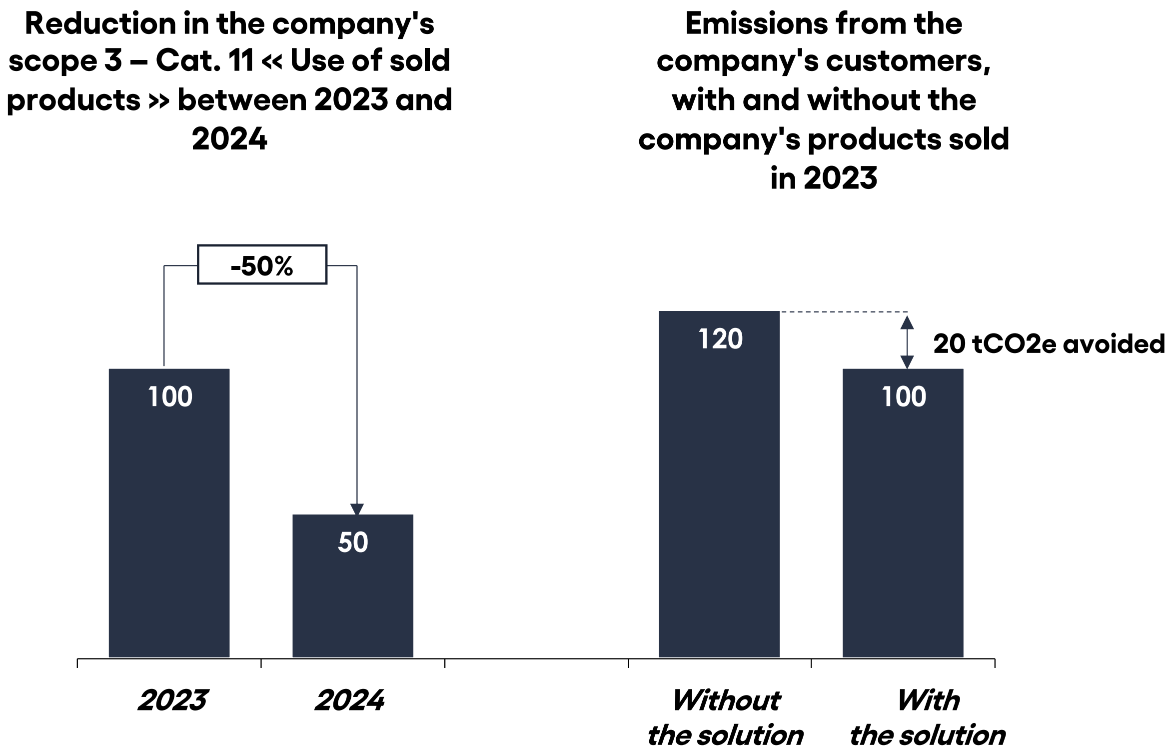


Figure 44 – **Difference between carbon footprint reduction of products and services sold by a company and avoided emissions through the same products and services**

The accounting of generated emissions (Pillar A) and the estimation of avoided emissions (Pillar B) are **synergetic approaches** for managing a company's impact on the climate; **however, they use fundamentally different methods.**

Avoided emissions are highly dependent on context. Avoided emissions always depend on the product (or service) and in which context it is sold, thus determining the reference situation.

Sometimes, the solution or the action on the product portfolio does not have any effect on emissions in the company's value chain but only on emissions outside the value chain. In this case, there are only avoided emissions for this solution or action on the product portfolio.
In other cases, which will often be the case for the Apparel and Footwear sector, the solution or the action on the product portfolio also impacts emissions in the value chain (pillar A). In these cases, **there can be both avoided emissions and a carbon footprint reduction,** but their quantification is, of course, different.

2. Two types of avoided emissions

This difference between the two types of avoided emissions is considered in the Net Zero Initiative reference framework. Thus, two subcategories of avoided emissions are established:

- **Avoided emissions (AE):** the difference in emissions between the situation with a solution and a reference situation. They are broken down into two types:

  - **Avoided emissions of the "reduction" type (AE_R):** share of avoided emissions (AE) corresponding to a real reduction of emissions in comparison with the previous situation.

- **Avoided emissions of the "lower increase" type (AE_{LI}):** share of avoided emissions (AE) corresponding to an increase in emissions in comparison to the previous situation, but lower than the reference situation.

The AE, AE_R and AE_{LI} conform to the following equation:

$$\boxed{AE = AE_R + AE_{LI}}$$

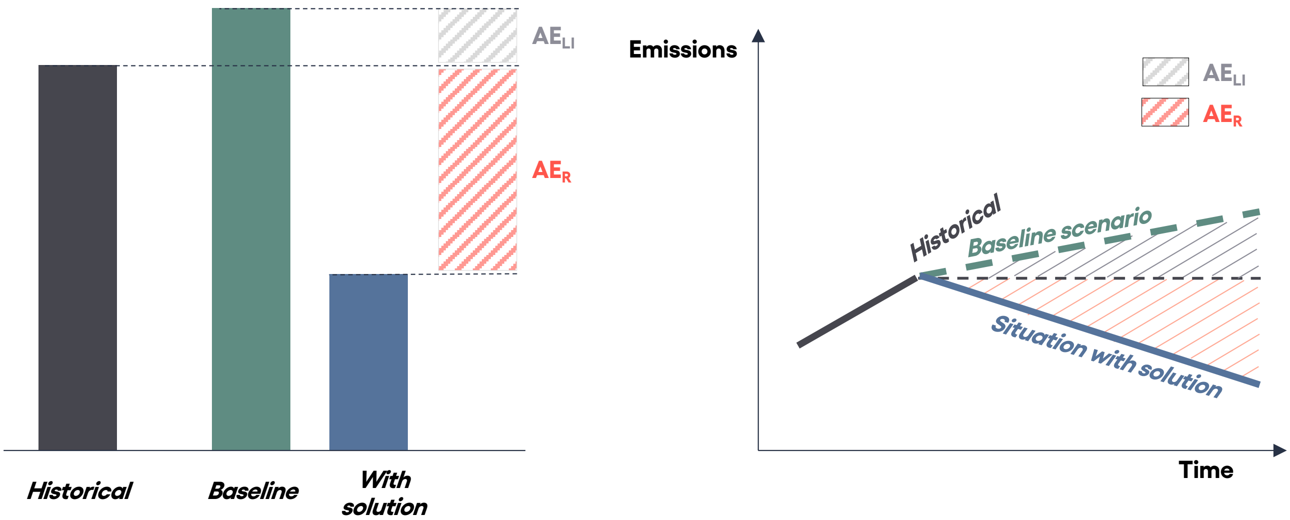


*Figure 45 – **Aggregated view of the entire lifespan (left) and annual lifespan (right) of the solution and the difference between the two types of avoided emissions – reduction (AE_R) and avoided emissions – lower increase (AE_{LI})***

Distinguishing **reduction type** avoided emissions and **lower increase** type avoided emissions allows the company to have a precise view of a solution's impact in the decarbonization of its ecosystem, and to strategize accordingly. The role played by this physical distinction of avoided emissions has not yet been determined in the Net Zero Initiative reference framework, but will be included in forthcoming updates.

Net Zero Initiative recommends companies to:

1. **Calculate total avoided emissions (AE).**
2. **As much as possible, calculate share of avoided emissions – reduction (AE_R) and the share of avoided emissions – lower increase (AE_{LI}) in this total AE.**
3. **As much as possible, report and manage AE_R and AE_{LI} separately.**

Communication on the avoided emissions of a solution can be formulated as follows: *"Solution XX will avoid xx tCO_2e of emissions throughout its lifespan [or avoid xx tCO_2e annually]. x% of these avoided emissions corresponds to a real reduction of emissions".*

The proposition here is not to impose making a distinction between AE_R and AE_{LI} for communications intended for the public. However, it is important to make this distinction in publications intended for more expert readers (for example, extra-financial report).

3. Existing initiatives

Key initiatives aimed at giving guidance towards decarbonization to Apparel & Footwear companies already exist. The Net Zero Initiative used these existing initiatives to inform this guide and in particular:

- ***En mode climat***, a French Apparel & Footwear lobby aiming to convince governments to regulate the sector. The organization published *Proposition pour intégrer la durabilité émotionnelle dans l'affichage environnemental textile*. (Proposition to integrate extrinsic durability into textile environmental labelling).
- The ***Waste and Resources Action Program*** (**WRAP**), a British climate-action NGO which published several textiles reports (*Square your cycle*, *Clothing longevity Protocol*).
- The ***Product Environmental Footprint*** **(PEF)**, methodology measuring product environmental footprints following similar rules across the European Union. Specific methodologies have been developed for physical durability. Extrinsic durability methodologies are under construction.

4. Level of precision

a. Solution-specific vision

Aiming at the highest level of precision possible is always recommended. However, for Apparel & Footwear, **the solution-specific level is not recommended**. A calculation at a solution-specific level implies looking precisely at, for example, the exact pair of jeans bought second-hand by a specific consumer. The data needed for this level of precision is too difficult to obtain.

b. Company-specific vision

To evaluate avoided emissions, **it is highly recommended a company-specific approach**. Indeed, avoided emissions of decarbonizing solutions for apparel and footwear depend on consumer habits (number of wears per garments, etc.). It is easier to obtain a solid view of these habits by looking at the company's pool of customers. As customers vary per market segment, and therefore per brand, their habits vary too and can lead to very different avoided emissions results.

E.g.: A company renting clothes to an already environmental-friendly customer base will have lower avoided emissions than a company that manages to rent clothes to huge clothing consumers. Since the latter consumers have higher emissions to reduce.

c. Market average vision

A **market average calculation** can also be conducted. However, it is very difficult to collect market average data. Generalization of customers' habits needs to correspond to the specific customers of the addressed market segment. *Market average data can be collected, calculated and published by industrywide entities such as Apparel & Footwear confederations and various bodies.*

<u>It is possible to cross-reference accuracy levels for avoided emissions calculations.</u>
E.g.: *the solution may have been calculated with a company-specific approach and the reference situation with a market average approach.*

Sources for avoidance factors calculation

<u>Second-hand:</u>
Jeans - LCA emissions: http://levistrauss.com/wp-content/uploads/2015/03/Full-LCA-Results-Deck-FINAL.pdf
Share of alternatives: QSA Partners - *Buying pre-loved clothing means buying less new clothes?*
Number of wears: WRAP – *Square your cycle* ; WRAP - *Clothing longevity Protocol*
2nd hand price: QSA Partners - *Buying pre-loved clothing means buying less new clothes?*

<u>Rental</u>:
Wedding dress – LCA emissions: Carbone 4 study for a retail company ; Base empreinte Ademe ; Quantis database
Share of alternatives: Mariages.net 2022 survey

<u>Repair</u>:
Leather shoes – LCA emissions: Base empreinte Ademe
Share of alternatives: Leather UK - https://leatheruk.org/wp-content/uploads/2022/09/leather-survey-concept_final-WEB.pdf

<u>Lower emissions:</u>
Recycle cotton t-shirt: Base empreinte Ademe ; Carbone 4 calculation
Share of alternatives: Ellen MacArthur Foundation - A New Textiles Economy: Redesigning fashion's future
Number of wears: WRAP – Square your cycle ; WRAP - Clothing longevity Protocol

carbone4

Carbone 4 is the first independent consultancy specialised in low carbon strategy and adaptation to climate change.

Constantly on the lookout for low amplitude signals, we deploy a systemic view of the energy-climate issue and put all our rigour and creativity to work to transform our clients into leaders in the climate challenge.

Contact: contact@carbone4.com