

Reducing the Environmental Impacts of Packaging using Lifecycle Assessments

Summary of key aspects

Social Impact from **IGD**



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Executive Summary

Lifecycle assessment is a valuable tool, enabling companies to make decisions to help reduce the environmental impact of their packaging, in line with our industry's shared ambition.

Using lifecycle assessment

Lifecycle assessment (LCA) is a critical tool for evaluating, comparing and optimising the environmental performance of packaging. It provides insight into a diverse range of environmental impacts of a packaging product or system.

It allows the analysis of design traits that drive environmental performance and helps prevent moving the problem from one environmental area to another.

It informs future-proof decisions on packaging solutions.

Our shared ambition

IGD, together with key stakeholders from across the food and consumer goods industry created a shared ambition – to halve the environmental impact of all packaging systems by 2030.

Achieving the ambition will require a 20% reduction in packaging, and maximising efficiencies across the full value chain, from raw materials to its end-of-life processes.

LCAs should be used to inform decisions that focus on achieving significant environmental impact reductions to help deliver the ambition.

About this guide

The guide explains six key aspects that should be addressed through an LCA to enable robust decision-making.

It can be used to help commission, conduct, communicate and act upon lifecycle assessment.

Use our '[Food and consumer goods packaging lifecycle assessment - Best practice guide](#)' to undertake an industry standardised LCA approach.

Lifecycle Assessments (LCA)

A critical tool for measuring and reducing packaging impacts



Lifecycle assessment (LCA) is used to measure the environmental impacts of a product, service or system across its entire lifecycle, from raw material extraction through to processing, production, use and end-of-life processes.



For food and consumer goods packaging, LCA can be used to analyse and compare the environmental impact of different packaging designs, materials and systems such as single use versus refill and reuse.

LCAs identify impact hotspots and critically inform decisions to reduce impact, without simply moving the problem from one environmental area to another.



In this guide, we have highlighted some of the key issues and considerations that determine the environmental impacts of packaging, that influence lifecycle assessment. It aims to support decisions that lead to big reductions in impact in line with our industry ambition.



Use this guide to help inform, commission, conduct, communicate and act upon lifecycle assessment.

A shared ambition

To **halve** the environmental impacts of all **packaging** systems by **2030** whilst still enhancing the benefits and quality enjoyed of products and their packaging today



The 2030 ambition looks beyond current legislation and addresses all packaging materials.

It covers a range of environmental impacts including climate change, water, land use and virgin resource use to tackle this critical industry issue.

The ambition creates a platform for accelerating industry's progress towards a sustainable packaging system.

Achieving this bold ambition will require equally ambitious, evidence-based action.

Our insights* found that hitting the 2030 ambition will require a 20% reduction in the amount of packaging on the market, combined with significant environmental efficiency gains.

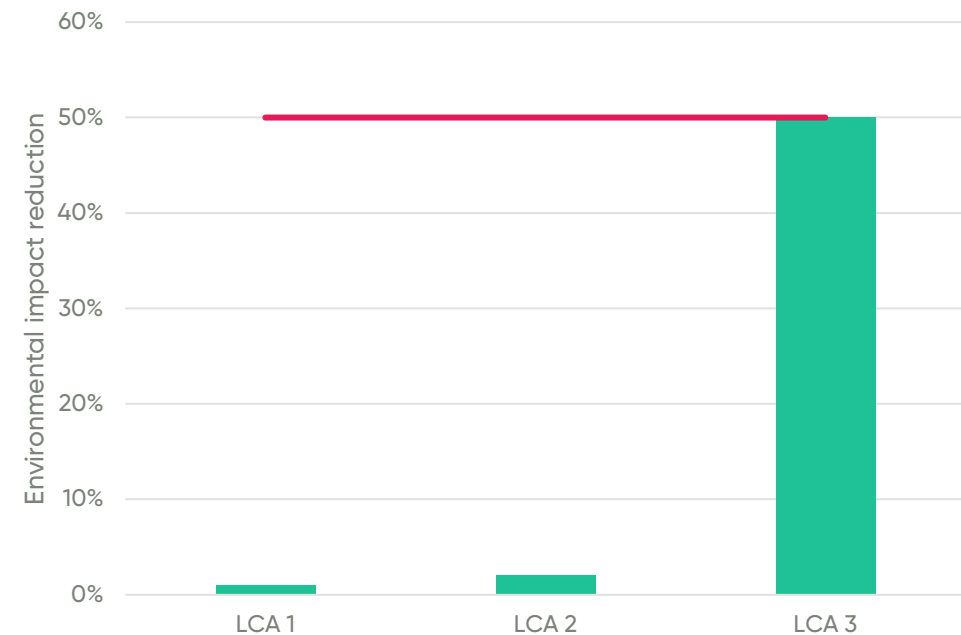
Maximising impact reduction

LCA for packaging can inform decisions that support maximum environmental impact reductions

Current LCA practice often focuses on finding marginal improvements on the status quo.

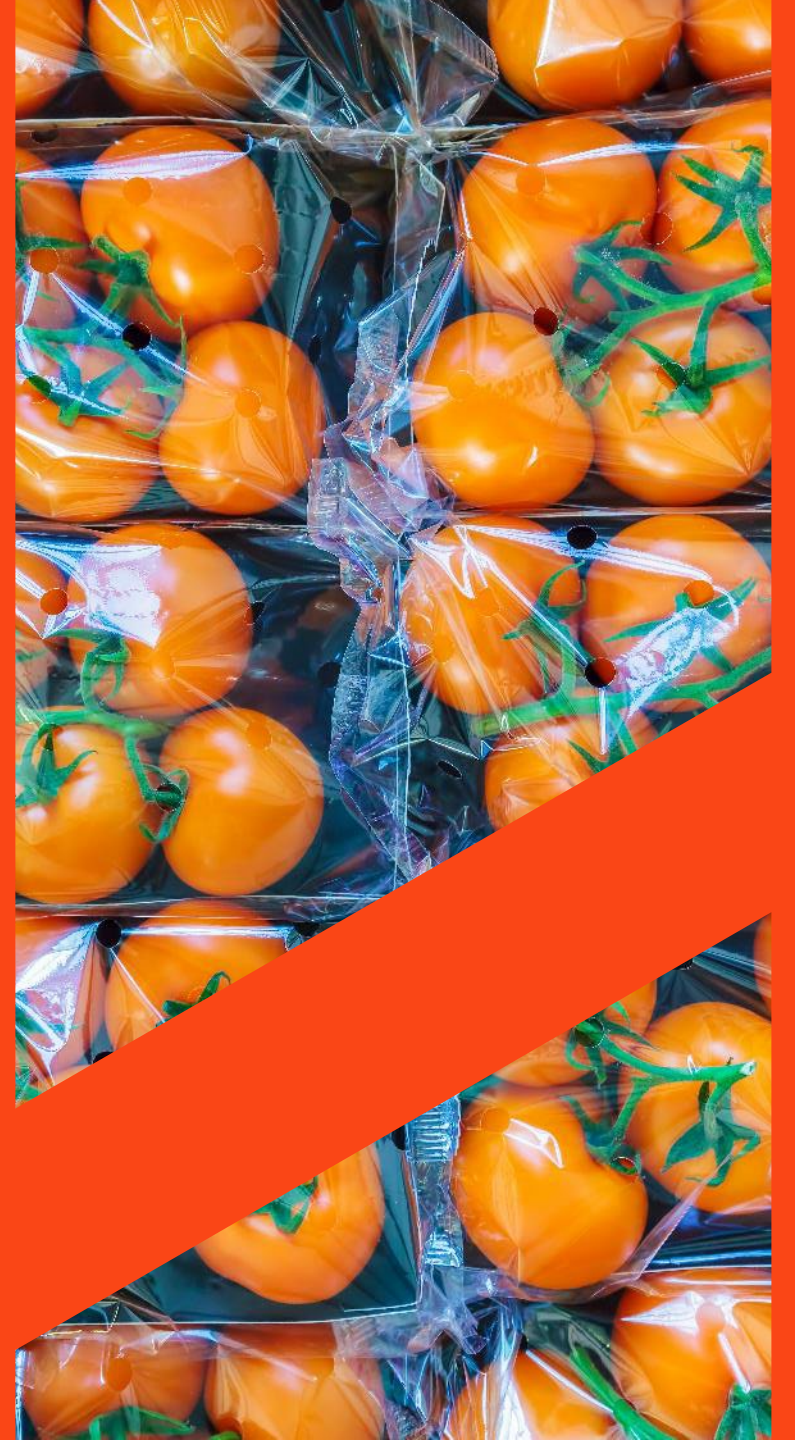
To meet the shared ambition, LCAs must scale up their outcomes, and consistently include change scenarios capable of delivering 50% impact reductions.

Example of marginal vs 50% impact reductions



Key aspects of an LCA

from **IGD**

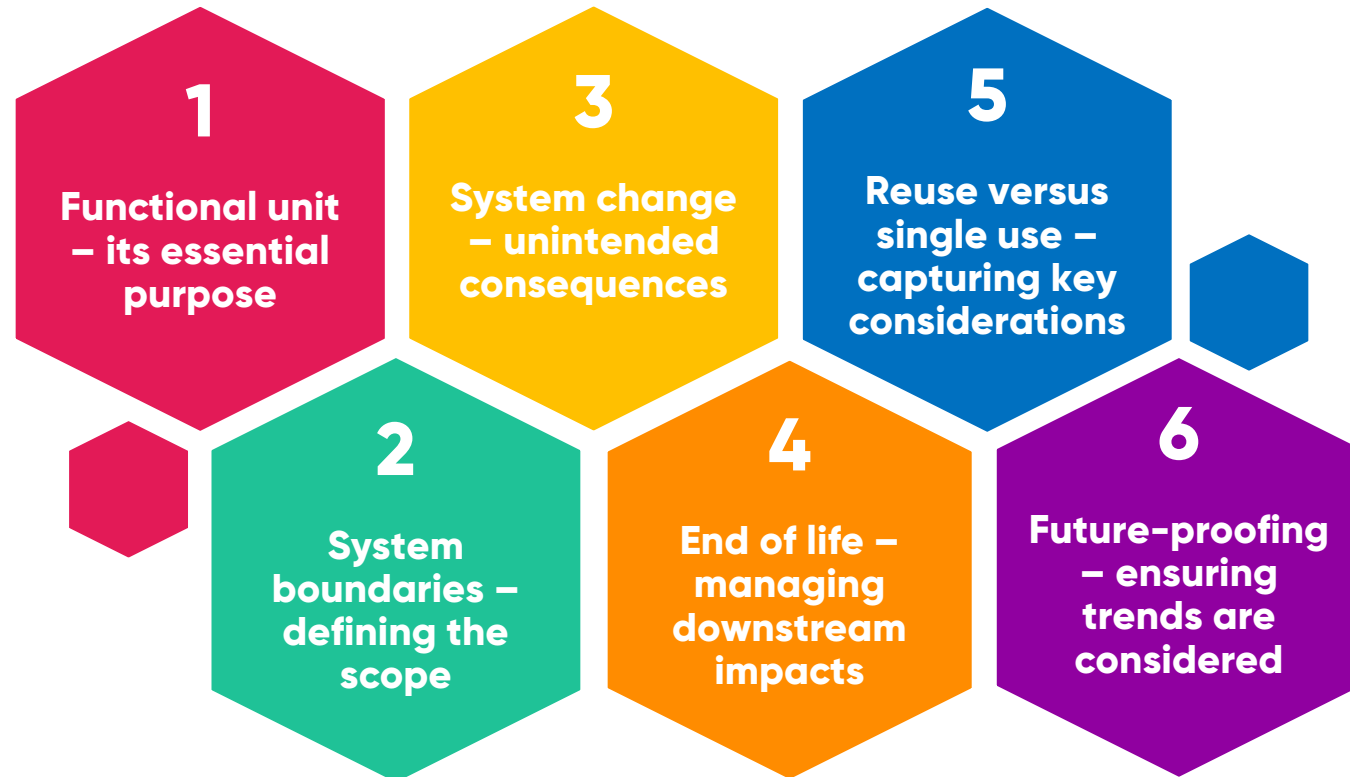


Six key considerations

LCA is a detailed but valuable process

To maximise optimal outcomes and decisions from a lifecycle assessment, there are six aspects that should be addressed.

This guide explains each aspect to help inform the approach, question outcomes and create a robust basis on which decisions can be made when completing an LCA.



1. Functional unit – its essential purpose

A functional unit (FU) describes a common performance outcome, against which physically different things which perform the same function can be fairly compared and assessed

A FU in a food and consumer goods packaging LCA should reflect its essential purpose to *preserve, protect and contain a product*, without presupposing how that functionality might be achieved (e.g. by specifying a packaging material, format etc.).

Secondary functionality (e.g. branding, stackability etc.) should not be included, as these are non-essential.



An example of a suitable FU for a soft drink container would be:

"preserving, protecting and containing a 500ml serving of a carbonated soft drink"

This FU enables a fair assessment of different packaging solutions capable of performing the same function (e.g. single-use bottles, reusable bottles, cans).

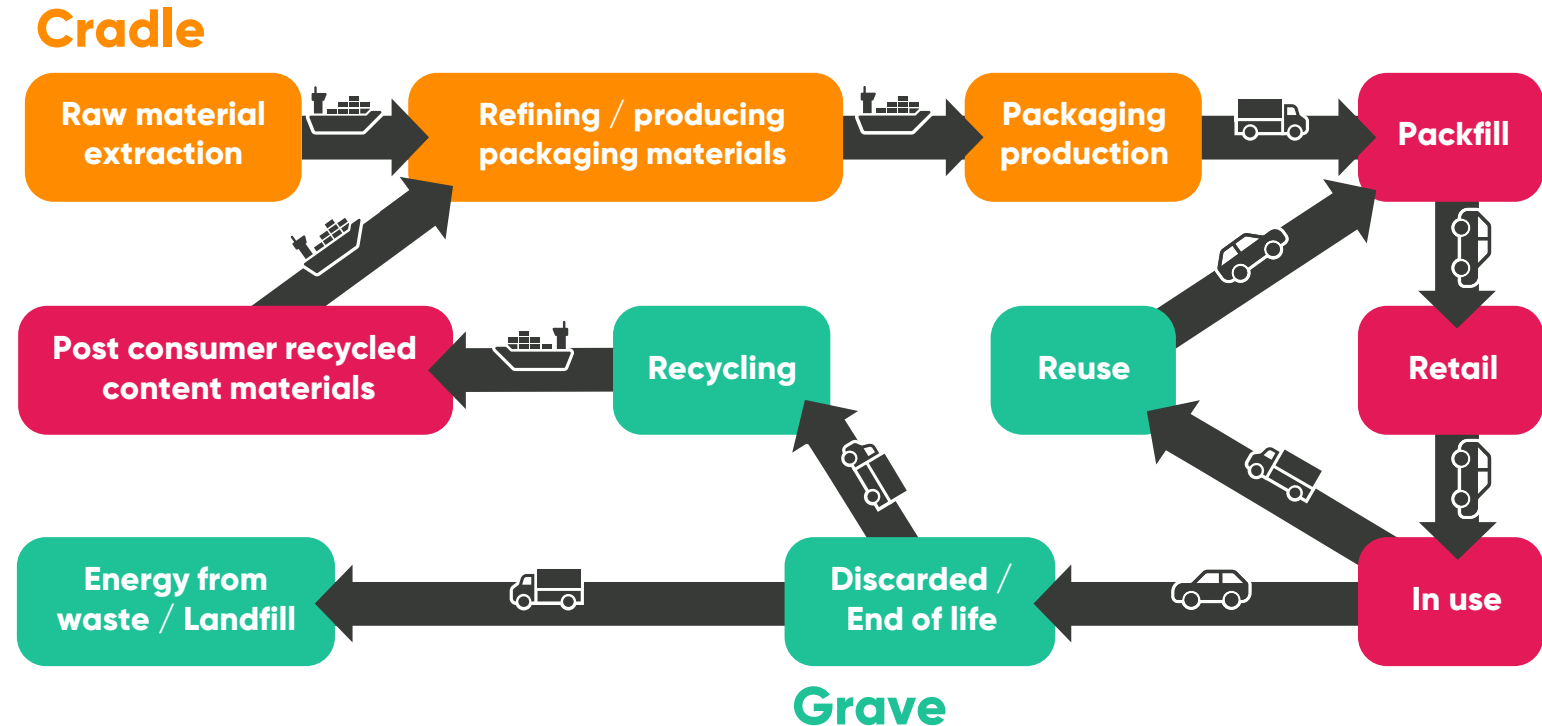
Consider whether the packaging is needed if the purpose is focused on a secondary functionality

2. Systems boundaries – defining the scope

Packaging LCAs must consider the whole life impacts of packaging, from cradle to grave

System boundaries define which stages within the packaging lifecycle are included within the assessment.

LCA results are only comparable if they are based on the same system boundaries.



The more you understand the lifecycle of your packaging, the better you'll be able to identify reduction opportunities throughout. This requires working with stakeholders throughout your supply chain.

3. System change – unintended consequences

Changes in packaging can have knock-on environmental effects. These must be accounted for to ensure impacts are reduced, and not merely transferred



Product waste

If a change in packaging results in a change (+/-) in product waste, the environmental impacts of this must be accounted for.



Supply chain impacts

Changes in packaging can affect supply chain performance, and in turn, environmental impacts.



Product changes

If a packaging change supports a shift in product format (e.g. from liquid to powder), the resulting environmental savings in the product lifecycle should be accounted for.

How can you design packaging that maximises the overall environmental performance of the product it contains?

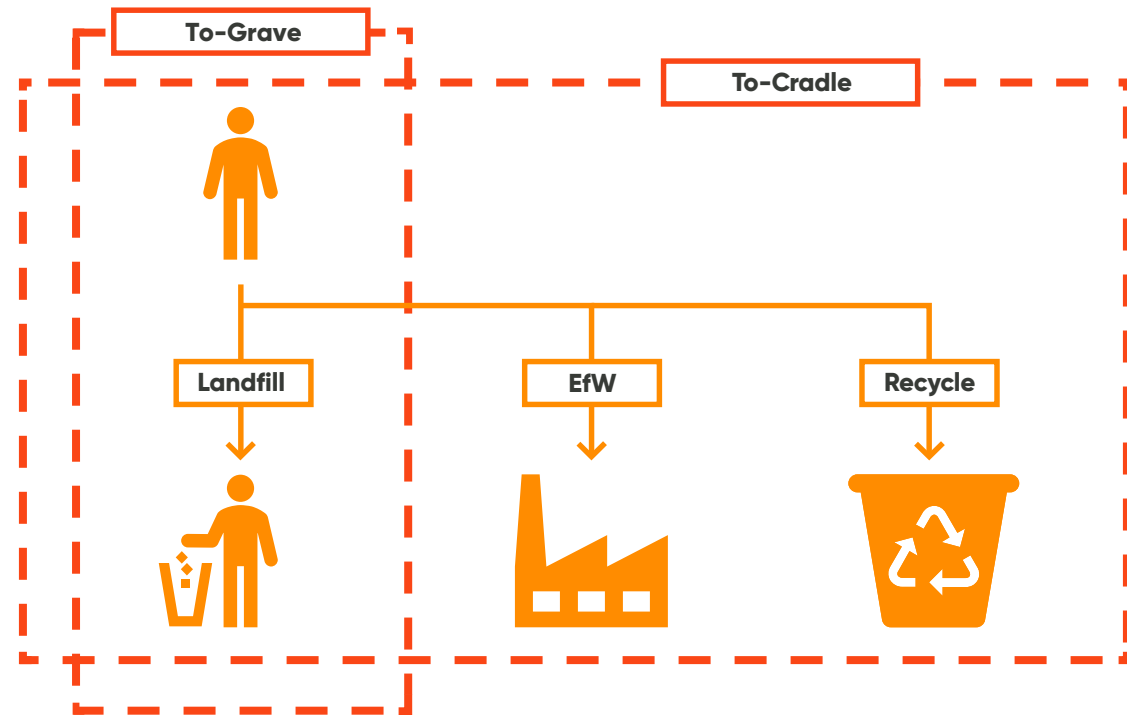
4. End of life – managing downstream impacts

Packaging can enable impacts and benefits beyond the scope of its lifecycle

A typical packaging LCA uses what is called a cradle-to-grave approach. This approach 'cuts off' any impacts for disposal other than landfill from the LCA. For example, the process and impacts of recycling packaging or generating energy from waste (EfW) are not included within the LCA.

This means that if decisions were made based **solely** on LCA results, the more beneficial routes of recycling or EfW may not be considered, and landfill could appear to be a more environmentally friendly option. Therefore, recyclability may not be made a priority.

Adopting a 'cradle-to-cradle' mindset means looking beyond the results of the LCA to consider the packaging's wider environmental impact and should be used alongside packaging LCA. This will encourage producers to consider whether packaging can be easily recycled or reused to avoid landfill.



Whether your packaging is recycled or sent to EfW at end-of-life may not affect its footprint, but it does affect the planet, so ensure this is considered.

5. Reuse versus single-use – capturing key considerations

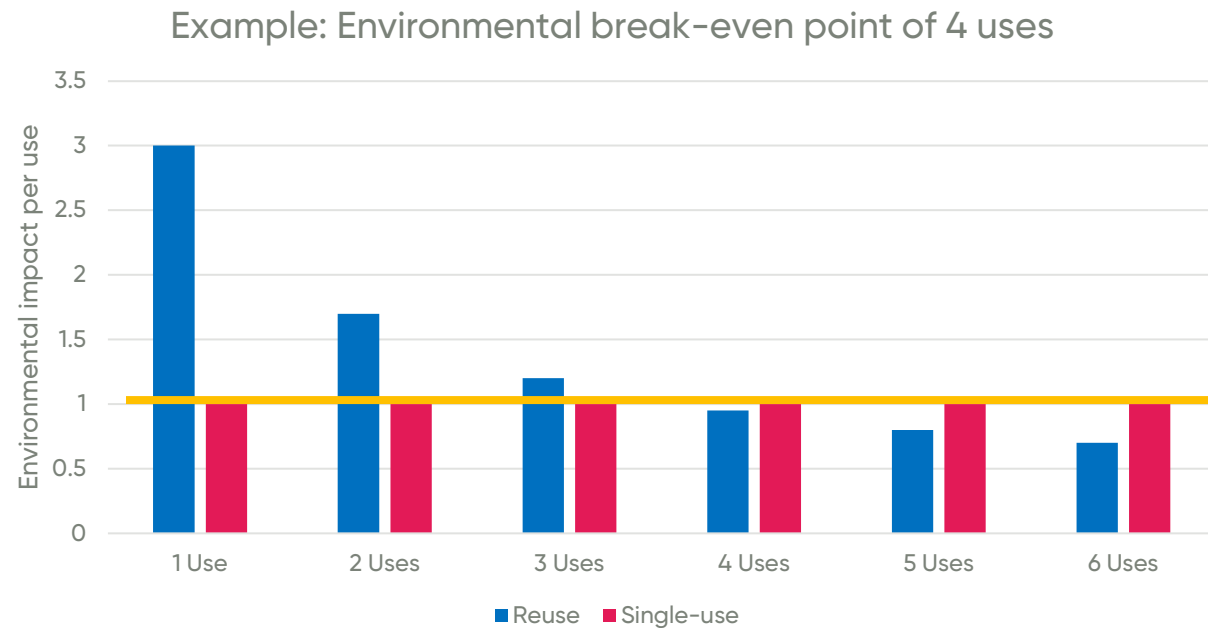
Reusable packaging is important to reduce single-use packaging and to meet the ambition

Reusable packaging usually starts with higher environmental impacts than single-use packaging, as it is made of heavier, more durable material.

However, the impact per use of reusable packaging declines the more it is reused, whereas for single-use packaging, it is fixed.

The point at which the impact per use are equal is the 'environmental break-even point' after which, any additional reuse(s) will result in an environmental benefit.

A lower break-even point is better, because it means fewer reuses are required before environmental benefit is achieved.

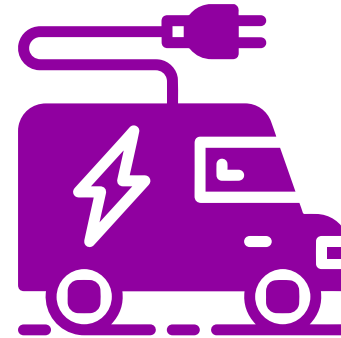


The smaller the difference in packaging impact between single-use and reusable packaging, the easier it is to reach a breakeven point. Minimising packaging losses, and preparation for reuse impacts, is also key.

6. Future-proofing – ensuring trends are considered

It is important to take into account future trends when deciding on the best packaging option

LCAs which fail to consider future trends can quickly become out of date and lead to poor decision-making. It is important to consider future trends and how they could affect the results of your LCA.



Two essential trends to always consider are how grid and transport decarbonisation could affect your decision. For example, how might the break-even point of a reusable packaging solution change as a result?

Including these scenarios within LCA can future proof decisions on packaging, for long-term sustainable solutions.

Consider how business strategy or key trends might change over the next decade, and what effect that would have

Focus on big impact reductions

from **IGD**



Interpreting & sharing results

LCA should be published to ensure full transparency and accountability

Interpreting results

Results should be presented to clearly show the impact of packaging and outline any limitations of the analysis including data quality and assumptions.

All sources of data and calculations should be included to increase consistency and repeatability of the assessment.

Avoid 'cherry picking' what is reported as this can mislead the results.

Sensitivity analysis

Sensitivity analysis is used to determine which pieces of data hold the most influence on LCA results. This is important to consider especially if data has high uncertainty or is of low quality.

For food and consumer goods packaging LCAs, the following should have a sensitivity analysis:

- Food product losses across the lifecycle
- Carbon intensity for transport and electricity
- Reuse scenarios
- End-of-life outcomes.

Transparency

Improving transparency and knowledge sharing of packaging impacts is critical to accelerate reductions and achieve the industry ambition.

Sharing of LCAs in full maximises their environmental benefit and avoid unnecessary duplication.

Summary and next steps

Use our **Best Practice Guide** to complete robust, accurate, and ambitious packaging LCAs

1 / LCAs inform decisions

- ▲ LCAs help to inform packaging decisions. They provide a comprehensive assessment of impacts.
- ▲ Using the six key aspects to consider outcomes will help ensure a more robust LCA.

2 / Focus on achieving big reductions

- ▲ LCAs should be used to inform changes that promote environmental excellence.
- ▲ It is important to ensure environmental impacts are significantly reduced – which in turn will help achieve our shared ambition.

3 / Make LCAs comparable

- ▲ To make food and consumer goods packaging LCAs repeatable, reliable and comparable, use our [best practice guide](#)
- ▲ By reducing design subjectivity and ambiguity, this guide should also reduce the cost of completing LCAs.

How to get involved

IGD is convening industry and key stakeholders to address these challenges and drive tangible, positive change.

1

Join our network

- Our working group aims to drive progress towards the ambition to halve the environmental impacts of all packaging systems by 2030

2

Partner with us on projects

- Trial solutions that drive consumer engagement for reusable packaging
- Test our new [Packaging LCA Best Practice Guide](#)

Get in touch at sustainability@igd.com