WHITE PAPER

TRIVIUM PACKAGING

Building on LIFE CYCLE ASSESSMENTS to holistically measure packaging sustainability

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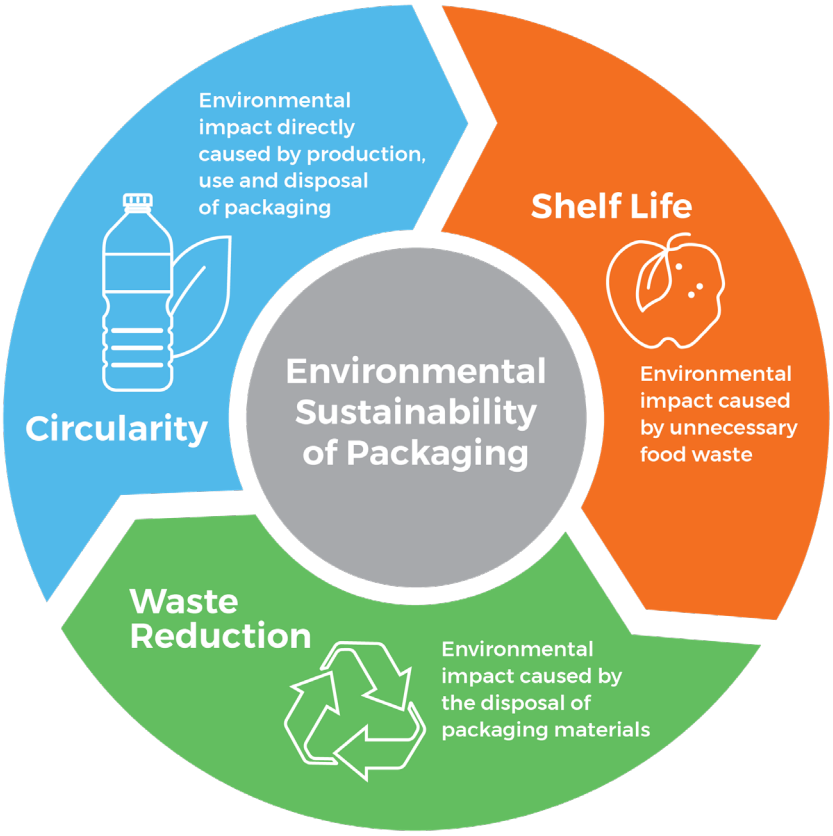
Introduction

Packaging material selection has become more complex in this era of increased environmental awareness. The importance of sustainability is undeniably growing. In the Trivium 2020 Buying Green report, a global survey of more than 15,000 consumers, 67% of the respondents consider themselves environmentally conscious[1].

Brands considering sustainability as part of their packaging decisions have tended to rely on Life Cycle Assessment (LCA) tools in their decision-making processes.

LCAs are an important tool in evaluating material sustainability; however, they only present a partial picture of a material's environmental impact. When making material selection decisions that will favourably position a brand with environmentally conscious consumers, it's important to take a more holistic view of sustainability[2].

In this white paper, we present an approach to a Holistic Packaging Sustainability Assessment that expands traditional LCA methods to account for circularity while also factoring in the impact of packaging materials on the waste stream and improving shelf life.



Components of a Holistic Packaging Sustainability Assessment

Capturing Circularity in LCAs

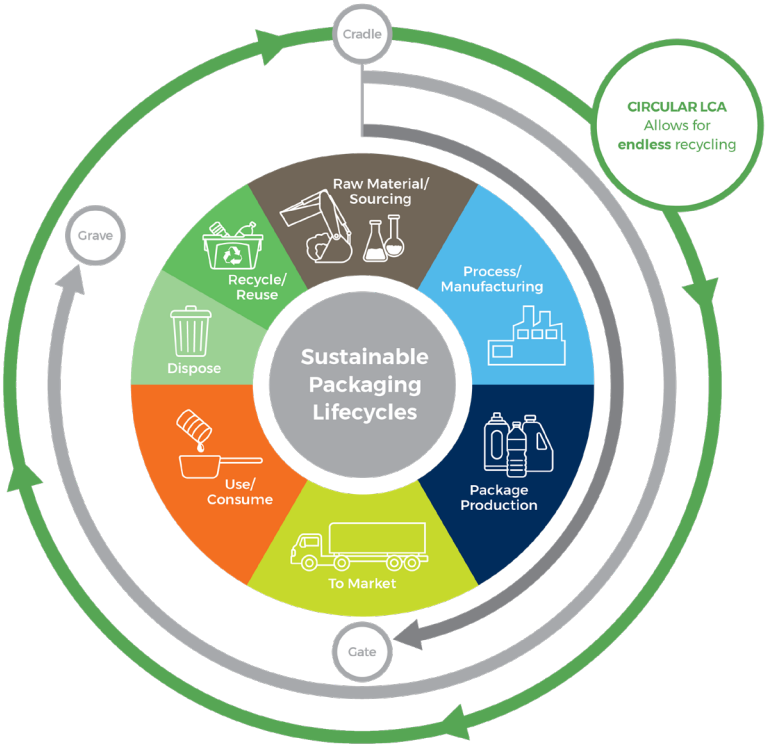
Life Cycle Assessment tools were first introduced in the 1960s to determine the environmental impact of packaging products. LCAs compare the range of effects assignable to various packaging materials by quantifying all inputs and outputs of production and supply chain activities while assessing how their material flows affect the environment. They can be particularly valuable in quantifying CO_2 emissions associated with material production and transportation.

Over the years, these tools have been refined and incorporated into international standards such as ISO 14040 and 14044[3], which define the process for conducting an LCA. Yet, even when different tools are working according to a standardized framework, the absolute outcome of the tools can be difficult to compare due to differences in database contents, methods of calculation, and elements taken into account for the calculation.

The relative values of different LCA outcomes from one single tool can be considered as an indication of the sustainability impact. As a result, LCAs remain an important method to evaluate the environmental footprint of packaging materials though it is imperative that brands settle on a single tool for their comparison. In the packaging industry, three main types of LCAs have been used:

- **Cradle-to-Gate**: This is an assessment of a partial product life cycle from resource extraction (cradle) to the factory gate. The use phase and disposal phase of the product are omitted in this assessment.
- **Cradle-to-Grave**: This assessment extends from resource extraction (cradle) to the use and disposal phases (grave)[4]. This is referred to as a linear approach[5].
- **Circular LCA**: This is a specific type of cradle-to-grave assessment where the end-of-life disposal step for the product is a recycling process back to new products. In order to create a circular economy assessment at the product level, all different aspects related to product circularity should be investigated, including recycled content, recycling rate, intrinsic recyclability, yield during recycling, and potential to substitute primary resources[6].

Packaging material made of steel or aluminum is infinitely recyclable without a loss of quality[7], and recycling aluminum saves 95% of the energy required for primary production[8]. Metal is a "permanent material"[9]; therefore, the LCA for these materials is best captured with a Circular LCA, which fully appreciates the energy footprint of packaging products made of metal.



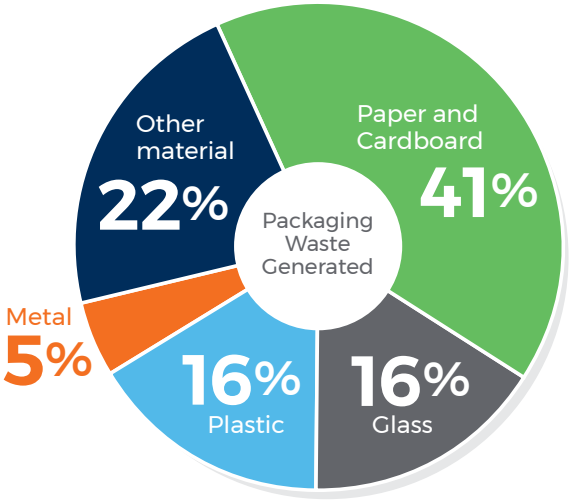
Cradle-to-Gate and Cradle-to-Grave LCAs don't capture the environment impact of packaging material throughout its entire lifecycle. A Circular LCA is required to quantify impact throughout the full material lifecycle.

Reducing Packaging Waste

The second pillar in a Holistic Packaging Sustainability Assessment is a consideration of the impact packaging materials have on the waste stream. This is becoming increasingly important as media and environmental organizations raise awareness of the impact of packaging waste on the environment[10].

In the Trivium 2020 Buying Green report, 59% of participants said they are less likely to buy a product in harmful packaging and 47% said they won't buy products that are harmful to the environment, so material matters.

Of the 86.7 million tonnes of packaging waste generated in Europe in 2016, 41% was made up of paper and cardboard. Plastic and glass accounted for 16% each, while metal made up only 5%[11].



Breakdown of packaging waste generated in Europe in 2016.

According to EuroStat[12], the recycling rates for both paper and metal are higher than 80%, glass is at 76% and plastics is at 41%. The recycling of steel packaging has recently hit a new all-time high of 82.5%, according to figures issued by APEAL[13].

Recycling rates for metal are higher than other materials because metal packaging is easily sorted from other waste with magnets and current separators. The recycled material has a high market value as metals do not lose quality in recycling.

After the collection and sorting of the used packaging materials, the next step is recycling. The raw materials of some packaging materials lose their purity in recycling and therefore cannot be reused for the same application and must be downcycled.

Plastics are more sensitive to downcycling compared to glass and metal. Metal packaging stays recyclable and maintains the quality of the virgin counterparts no matter how many times it is recycled. Glass can be similarly recycled if properly separated in the different base colours[14].

The European Union recently excluded Waste-to-Energy (WtE) incineration from the recycling list[15]. Materials that aren't recycled become potential debris, which can have a negative environmental impact.

We cannot afford to lose valuable recourses and should focus on packaging materials that have proven high recycling rates. In addition, consumers are expecting companies to support their sustainable lifestyle choices with sustainable packaging materials[16].

Research has identified that packaging can be used as a communication channel to encourage consumers to sort their food packaging waste. The efficiency of the waste management system and the quality of recycled products can thus be affected by the proper design of food packaging[17]. Prominently displaying recycling information, such as the Metal Recycles Forever logo, can help educate consumers and encourage recycling.

METAL
TM
recycles
forever

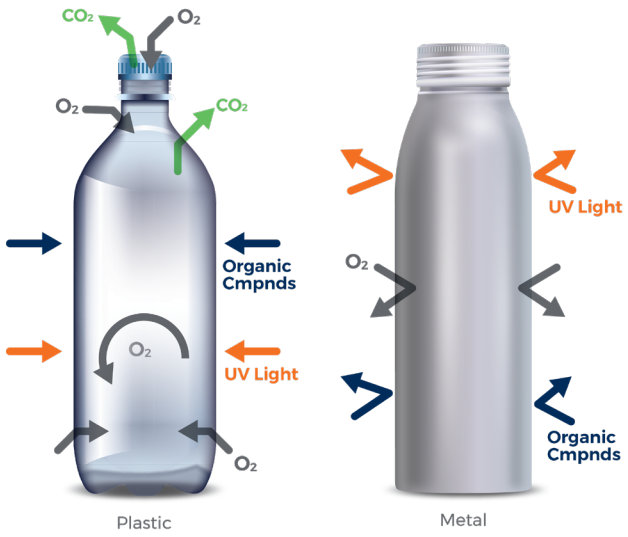
Reducing Food Waste with Extended Shelf Life

The principal roles of food packaging are to protect food products from outside influences and damage, to contain the food, and to provide consumers with ingredient and nutritional information[18]. Of all packaging materials, metal provides the strongest barrier properties between the outside world and the product. It also has a high inherent strength.

Inadequate preservation/protection, storage, and transportation have been cited as causes of food waste and food waste can have significant environmental costs[19]. According to an assessment by the UN Food and Agriculture Organization (FAO), 6.7% of all global greenhouse gases come from food waste[20].

If the correct packaging material is chosen, packaging can reduce total waste by extending the shelf life of foods, thereby prolonging their usability[21]. Extending the shelf-life of food would help reduce significant amounts of food waste – both in supermarkets and in consumers' homes – according to experts in the field[22]. If just one fourth of all the food currently lost or wasted was saved, it would be enough to feed 870 million people[23].

Metal outperforms other materials in extending shelf life and providing strong protection for food. For example, vegetables can be preserved up to five years in metal[24].



Metal packaging is impermeable, protecting contents from light and oxygen, and prolonging shelf life.

Conducting a Holistic Packaging Sustainability Assessment

Addressing multiple factors when evaluating the sustainability of the various packaging options is important. In this white paper we've presented a more comprehensive approach to a packaging sustainability assessment.

How you weigh and prioritize the factors presented will depend on the characteristics of the product you are packaging, but building on current assessment practices to view sustainability more holistically is a necessary step forward in food and beverage manufacturer's ability to meet their own sustainability goals and satisfy the demands of their customers.

This holistic approach could include:

- A Circular LCA that accounts for differences in the various factors that comprise circularity of the materials being evaluated.
- An assessment of packaging materials' impact on the waste stream. What are the recycling rates of the materials being evaluated?
- An assessment of the materials' functionality, including the ability to protect products during transportation and the expected shelf life and how these factors impact expected food waste.

When evaluated within this framework, metal packaging demonstrates a clear advantage in each component of a Holistic Packaging Sustainability Assessment.

For More Information

If you have questions or would like more information, visit: triviumpackaging.com

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