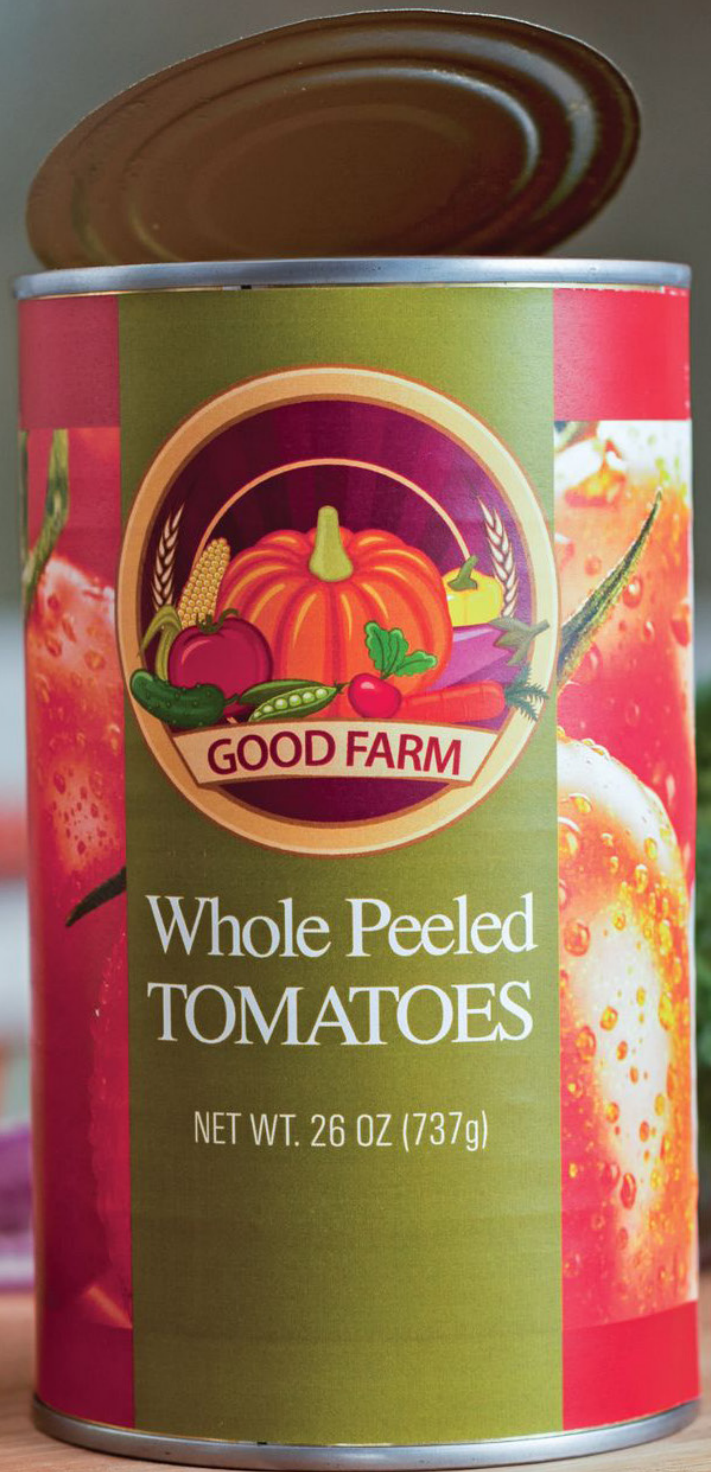


Food Waste

Turning a Challenge
into an Opportunity

Whitepaper 2020



CROWN

Brand-Building Packaging™

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Understanding the Challenge

According to the United Nations Environment Programme, one third of all of the food produced in the world each year – more than 1.3 billion metric tons – is wasted, representing 3.3 billion metric tons in annual carbon dioxide emissions.

In fact, if global food waste were represented as a standalone country it would be the third largest emitter of greenhouse gases globally behind China and the U.S.

In emerging economies, 40% of waste occurs in early stages of the food value chain, mainly post-harvest and during processing. Meanwhile, in industrialized countries, the same percentage is lost at later stages in the value chain, namely at retail and consumer levels. The former can be attributed to poor harvesting techniques, storage facilities and transportation infrastructure, while the latter can be due to issues like stores throwing away misshapen food that is

otherwise fit for consumption or food spoiling before being used. The majority of food waste in Western countries comes from consumer homes, with 7.3 million tons and approximately 60 million metric tons from the U.K. and U.S. respectively.¹

Packaging lies in the middle of the food value chain. Currently, there is a lot of pressure on brands from consumers and retailers to reduce or remove packaging. However, the research that has been published in the last ten years focuses on the indirect environmental benefit of packaging through food waste reduction. It is possible, in certain instances, to increase the environmental

impact of packaging by a significant proportion provided it gives a small reduction in food waste, as the net effect on the environment is reduced overall as a result. In short, well designed packaging can have a positive environmental impact and is far from waste itself due to its ability to reduce food waste.

This white paper provides a closer look at food waste reduction, its importance and the benefits associated with addressing the issue during the packaging development process. It also highlights the impact food waste has for consumers. The paper draws on research undertaken and provided by Dr. Lilly Da Gama, a food waste consultant and founder of The Food Waste Doctor, which looks at the environmental balance between food and packaging waste and how packaging providers can help effect positive change. It also includes data from research conducted by the University of Delaware and supported by Crown Holdings, Inc. (Crown) which focuses on the impact of food waste.



“The majority of food waste in Western countries comes from consumer homes, with 7.3 million tons and approximately 60 million metric tons from the U.K. and U.S. respectively.”

¹ Source: WRAP (<https://www.wrap.org.uk/content/household-food-and-drink-waste-uk-0>)
Source: RTS (<https://www.rts.com/resources/guides/food-waste-america/>)
Source: Metal Packaging Europe (<https://metallpackagingeurope.org/article/metal-packaging-true-circular-economy>)



1.1

The importance of the material

Metal packaging has a natural advantage where food waste reduction is concerned, given the shelf life potential of canned goods, portion control, easy-open functionality, and its ability to better protect products throughout the supply chain even at ambient temperatures. Food waste and packaging waste need to be considered together, as fundamentally important elements for brands to examine when selecting formats for food and beverage packaging. These intrinsic values present many opportunities to increase consumer satisfaction, brand loyalty and spend.

1.2

Digging into the impact of packaging

Dr. Da Gama's breakthrough moment was experienced while cooking stir fry for a friend. The friend had commented that she would be more inclined to buy the beef they were using if it were wrapped in butcher's paper, as opposed to the plastic tray it was presented in.

This simple exchange sparked an entire research project on the impact packaging has on food waste and if less is actually more.

What Dr. Da Gama found was that packaging reduction has been the focus for quite some time, even though food waste has many more environmental impacts and, in many ways, a greater impact on the planet than its packaging (see Figure 1).

Encouraging consumers to use the right packaging format to reduce food waste has a positive impact, and if brands are able to provide those formats through close collaboration with their packaging providers, this positive impact can be reinforced. Single-serve formats are a

prime example here. While more packaging is used per 100g of product, by encouraging consumers to only use what they need – as opposed to opening a far larger container and then wasting the excess product – the overall environmental impact is decreased.

As with so many things, there is a balance to be struck.

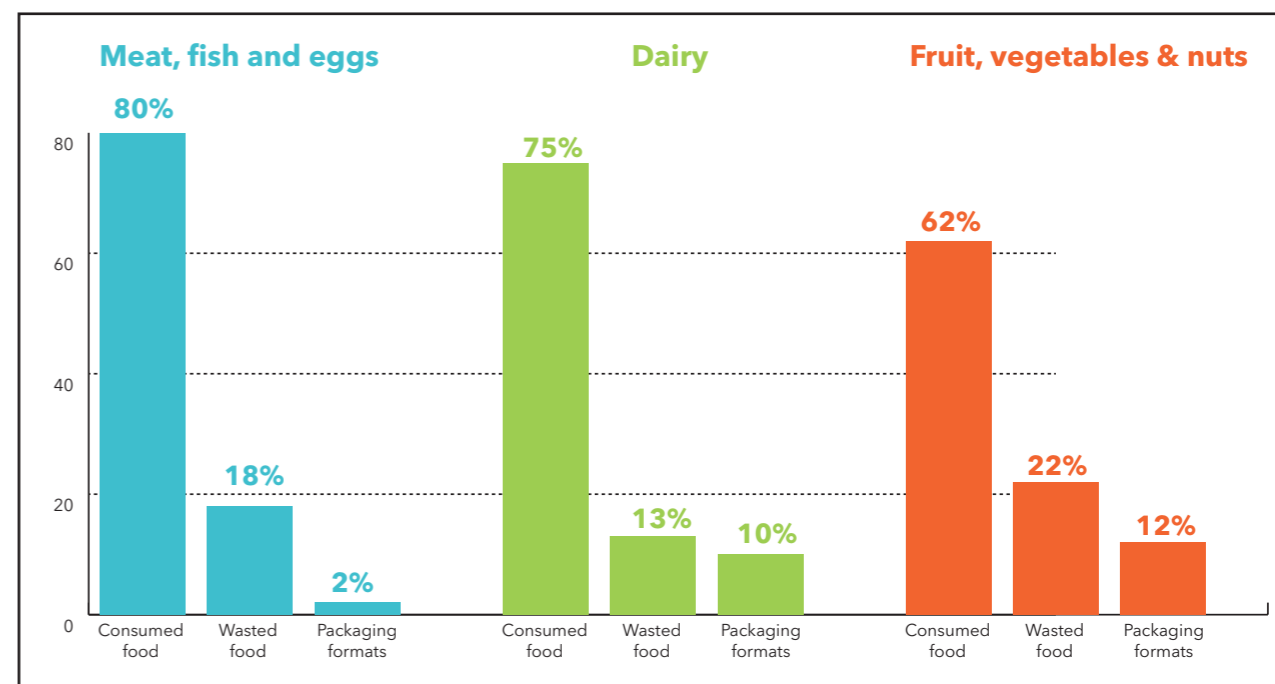


FIGURE 1 - Greenhouse gas contributions of packaging, food consumed and food wasted across three food groups (created by Verghese et al., 2014 adapted by Wikstrom et al., 2018, pp. 4)

Attitudes

How food and beverage manufacturers manage and explore this environmental balance and the functional development of packaging to target consumer food waste is critical.

It would be very easy to lay the burden of responsibility at the door of consumers, but this would be somewhat counterproductive and causes manufacturers to overlook the potential benefits to the company provided by food waste reduction.

It is not uncommon for brands to take action on problems like food waste in reaction to consumer feedback. However, sometimes the desired packaging solution is perceived to be unfeasible owing to the expenses associated with implementation such as retooling or other changes to the production process that account for technical constraints and overall performance.

By collaborating with a packaging provider to help solve the problem from the beginning, and inviting consumer opinion, the proper solutions can be developed to deal with food waste reduction in an efficient, more cost-effective manner.

2.1

Addressing the issue

That is not to say that a negative can't be turned into a positive. Dr. Da Gama recalls several examples of excellent solutions evolving from consumer complaints. For example, a consumer complained that a cake had gone stale as it was not possible to consume the entire product in a reasonable amount of time. The brand responded by packaging the cake in individual portion sizes, which not only increased the shelf life of the product, but also reduced the potential for food waste and increased consumer satisfaction at the same time.

There are several packaging formats that lend themselves to this approach, and many that would be cost effective if suppliers were involved from the initial ideation cycle.

This will be discussed further in section five of this white paper.

2.2

Environmental trajectory

A company's history often limits its future in terms of decision-making capabilities. Dr. Da Gama's theory of environmental trajectory stems from the fact that organizations in the packaged food sector have focused so intensely on packaging waste reduction over the years that it becomes ingrained in how they think, which may result in difficulties when it comes to addressing food waste. Over time, these businesses may have built competencies and made investments that make it difficult to see alternative approaches from an environmental perspective.

Even when the decisions should be clear, it can be hard to act on them as it may be seen as undoing the progress that has been made to reduce packaging waste. For instance, in Dr. Da Gama's research, every case that decreased food waste had corresponding increases

in packaging waste, which led to several projects being rejected despite the benefits to food waste reduction.

This was partly because of concerns that manufacturers had over consumers responses to products with increased packaging levels, regardless of whether it decreased environmental impacts through food waste reduction.

A New Approach

So how can manufacturers solve the main causes of consumer food waste?

The key lies in beginning to view food and its packaging as a single environmental unit. In order to do this, brand owners need to gain an understanding of the true environmental impact a product has, which can be done through lifecycle assessments. This means involving sustainability teams more intimately in the process to identify where the balance may lie in increasing packaging to reduce food waste and ensuring that food waste is treated as an equal priority to packaging waste.

3.1

Crying over spilled milk

To return to the assertion that an increase in packaging can help to reduce food waste, one company Dr. Da Gama worked with was looking to reimagine milk packaging. In the U.K., where milk is one of the most wasted products – with over 330,000 metric tons wasted annually – an

initiative was underway to redesign the packaging label to educate consumers about the environmental impact of wasting food. The plan was to encourage consumers to freeze milk if it wasn't going to be used in time rather than leaving it to spoil.

However, halfway through the project, the manufacturer realized that milk packaging had been lightweighted so much that there was a risk of the container splitting under freezing temperatures (tests showed approximately 10% of products could be lost in this way). The team didn't perceive it as necessary to conduct environmental assessments on the lost milk because a separate assessment had already been conducted on the packaging. The mindset was firmly fixed on packaging waste.

Had that environmental assessment been carried out at the beginning of the process, this issue may have been identified at a point where it would have been

far easier to effect change to the packaging itself. The key here is to change the mindset, however even if this had come to light at an earlier point, the packaging waste may still have been the key concern.

3.2

Environmental whack-a-mole

Targeting packaging waste alone can stunt the development of sustainability and environmental competencies within an organization. Looking at complex issues such as packaging and food waste, where there will definitely be trade-off decisions to make, a lack of environmental assessments means it is a lot harder to manage and get it right. And many organizations say, "Well, why do we need to find that exact balance? Can we not just aim to find the right direction?" and they absolutely can. However, not having sound environmental competencies in place, every

time a new issue comes up, organizations are essentially playing what Dr. Da Gama describes as environmental whack-a-mole, where they will bash one down, but then something else will pop up in 10 years' time.

Giving sustainability teams the opportunity to actually set environmental policy is a key step toward improving food waste percentages. Given free rein to examine all of the environmental issues facing an organization during product development, they can address the different challenges that arise from their assessment and prioritize them based on experience.

Changing the company narrative on food and packaging waste is an enormous undertaking. Getting people talking about food waste and understanding how significant its environmental impacts are and how much an environmental policy is needed, is tremendously significant considering how ingrained these issues can become within an organization.

"Giving sustainability teams the opportunity to actually set environmental policy is a key step toward improving food waste percentages."



Section 4:

Food Waste as an Opportunity

The opening food waste provides lies in brands recognizing the market opportunities and working toward reducing it along with its environmental impact.

Environmental balance between food and packaging waste is vital – how can brands and their packaging providers address it and market it to consumers in order to increase competitive value as much as possible?

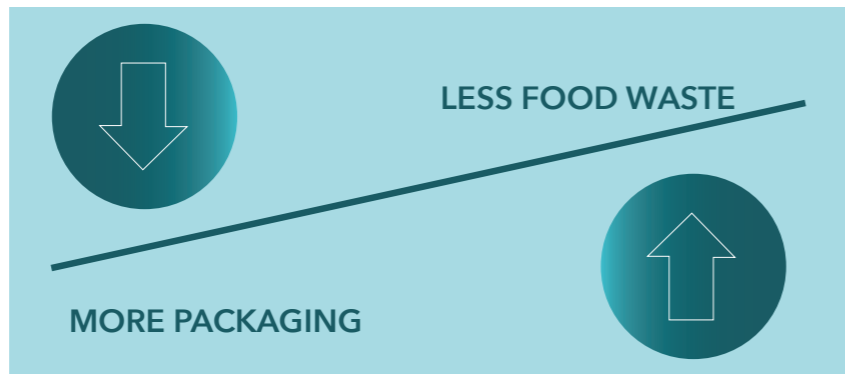


FIGURE 2 - Trade-offs between food and packaging waste (Vergheze & Lewis, 2015)

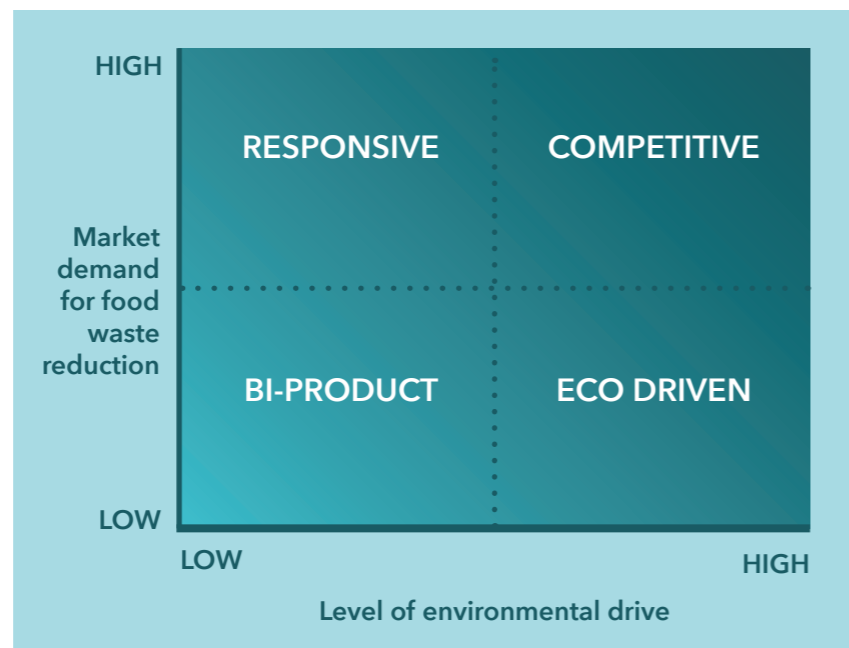


FIGURE 3 - Impetus Matrix (Da Gama, 2019)



4.1

Adding value to consumers

There are several ways that manufacturers can add value and contribute to food waste reduction through packaging. Ergonomic design can reduce the instances of spillage, which is a large contributor to food waste in the home. This is particularly the case with children, who may struggle to grip certain formats, and the elderly, who may be experiencing a reduction in dexterity. Improving the ease of opening can be just

as impactful. A good example is canned fish. Often, product will be lost when the can is opened as the contents may, in part, be splashed when the end is removed. New ends and closures that prevent this eventuality also reduce food waste. Improving convenience in this way adds considerable value to the consumer and can, in some instances, facilitate the entrance of products into new markets.


Given its versatility, different formats and sizes are also easily achievable in metal. By providing options for various eating occasions, households of different sizes can ensure they are only buying what they will need at any one time. A family of four, for example, could buy a large tin of vegetables to accompany a meal, while an individual could purchase a single-serve variant to reduce the risk of wastage.

Collaborate with Packaging Partners Early for Best Outcomes

Many brands will formulate a detailed product brief before they approach the packaging manufacturer. At this point, it can be too late for the packaging provider to make alternative recommendations about technology. As a result, brands miss the opportunity to utilize the packaging manufacturers' expertise when it comes to the functional development of the packaging – in areas such as openability, size, shape and recloseability – while keeping costs down.

When packaging manufacturers are involved from the very start of a project, they can provide guidance on the best format and potentially develop new functionalities or enhancements to achieve the desired goal.

Involving a packaging supplier after product development often means it is too late to incorporate the necessary changes in the production process. It can also translate to high costs, which can put an end to food waste initiatives before they have a fighting chance to get started and leaving packaging waste to be brought back to the forefront.



“When packaging manufacturers are involved from the very start of a project, they can provide guidance on the best format.”

Metal Packaging in the Fight Against Food Waste

In terms of combating food waste, metal packaging offers powerful benefits from the moment a product is placed inside it. When compared to other packaging formats, cans preserve their contents and provide a long and stable shelf life, they do not require refrigeration, saving money and energy, and they have an unprecedented safety record.

6.1

Keeping the good in

Simply put, the canning process keeps the good in and the bad out. It destroys a variety of pathogens and deactivates enzymes that might otherwise cause continued deterioration of the food or beverage within.

It provides a hermetically sealed barrier against light and oxygen – the main causes of premature degradation of products – and is the only process (food canning), through heat treatments, that ensures the complete destruction of spores of *B. cereus*.² In addition, as many canned items are processed within hours of picking, essential nutrients are prevented from breaking down.

For beverages, craft beer often has a shorter shelf life than mass produced alternatives, therefore these products benefit enormously from the barrier qualities of metal. Similarly, canned tomatoes have been shown to maintain the majority of the lycopene – a vital cancer fighting element – found in freshly picked tomatoes (and in some cases even increase the amount of lycopene).

² Source: EFSA (European Food Safety Authority) (<https://www.foodnavigator.com/Article/2005/04/11/Reducing-risk-on-Bacillus-cereus-to-food-chain-EFSA-opinion>)

6.2

Robust protection throughout the supply chain³

Cans, especially food cans, need to be strong to withstand the heat sterilization process, during which pressure builds up inside the can. It is this robustness that provides outstanding protective qualities throughout the retail supply chain, where they may travel long distances and go through many different processes before arriving on retail shelves. However, the can has also been lightweighted without losing functionality and its protective qualities, with a ~30% reduction of weight on average over the past 30 years.⁴ In addition, metal packaging provides the most tamper-resistant and tamper-evident options on the market today.

³ Source: SupplyChainDive (<https://www.supplychaindive.com/news/developed-countries-food-waste-consumer-level-supply-chain/558023/>)

⁴ Source: APEAL (<https://www.steelforpackaging.org/steel-for-packaging-recycling-and-resource-saving/steel-for-packaging-thinner-and-lighter-steels/>)

“If the entire U.S. fruit and vegetable supply were canned, rather than packed for refrigeration or freezing, the estimated savings would be ~22 million metric tons of CO₂. To put this into perspective, a typical car produces approximately 4.6 metric tons of CO₂ per year, so it would be similar to removing over 4.7 million cars from the roads.”

6.3

>1bn liters of food saved globally

In collaboration with Crown, the University of Delaware conducted research into the effects of metal packaging on food waste and discovered that food cans alone save in excess of 1 billion liters of food every year, when compared to food packaged for refrigeration or freezing. Many products in the fruit and vegetable categories were analyzed and the results were conclusive. Sweetcorn is a good example. When produced for fresh consumption, the loss by consumers on average equaled 32%, while losses amounted to 36% for frozen varieties. However, on average, just 7% of canned sweetcorn was wasted. This is particularly important in terms of preservation, as surplus products – or gluts – can be canned to avoid food waste and to provide much needed nutrition for a growing global population throughout the year, particularly during hunger gaps.

5 Source: The Guardian (<https://www.theguardian.com/environment/2009/sep/08/food-waste>)

6 Source: Metal Packaging Europe (<https://metalpackagingeurope.org/article/metal-packaging-true-circular-economy>)

6.4

Controlling portion sizes

The versatility of cans, as we have mentioned, means they can be produced in an almost infinite number of shapes and sizes to suit consumer needs. On-the-go, single-serve portions are highly popular, and family sized options and everything in between can ensure the correct amount of product is delivered. These variations can also be combined with advanced functionality – be it ergonomics to ensure a firm grip is maintained to avoid spillages, or easy to open closures that make the product accessible to those with reduced dexterity.

6.5

Accessibility to food and beverages

Global hunger is still a sad reality. Around one in nine people on the Earth do not have access to enough food to live a healthy life, and with the population expected to rise to approximately 9 billion people by 2050, there has to

be action taken. Reducing food waste through processes like canning could help to feed this growing population with minimal increased strain on the planet's resources and agricultural land. Shockingly, food wasted in the U.S. and Europe alone would alleviate the hunger of those living in global poverty, essentially feeding some 1.5 billion people.⁵

6.6

Effortlessly sustainable

One of the key elements of metal packaging is its sustainable credentials. In addition to the myriad benefits already outlined here, metal is infinitely recyclable without loss of properties, helps reduce food waste and the greenhouse gases it generates and saves a considerable amount of energy in transport and storage when compared to fresh or frozen products. Approximately 80% of metal ever produced is still in use today⁶ and metal packaging requires two times less energy to transport and store than fresh products and three times less than is needed for frozen food.

Section 7:

What It All Means

In conclusion, what is clear from both research and experience is that well designed food and beverage packaging can have an overwhelmingly positive impact on the environment.

What is of concern is the impact of food waste that has long been unobserved or unaddressed. Metal packaging is one format that brings a wide variety of benefits to the table in the fight against food waste, while having the adaptability and versatility to meet the needs of food and beverage manufacturers globally in a sustainable manner.

How brands engage with packaging suppliers is key, along with attitudes toward internal environmental and sustainability assessments that include food waste as a key metric.

There is a significant opportunity that exists to make a tangible impact both environmentally and commercially, but it will take bravery and conviction to do what needs to be done.

In terms of the war on packaging waste, metal has all but won. The battle for food waste reduction has only just begun.

Download our Food Waste Infographic for a quick overview



For more information on how
metal packaging can help your
brand combat food waste
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