Improving or selecting packaging to minimise environmental impact

In a nutshell

<table>
<tr><th colspan="5">Summary</th></tr>
<tr><td colspan="5">Best practice is to minimise the environmental impact of packaging (i.e. primary, secondary and tertiary packaging), throughout the product life cycle, for example by the use of:

• eco-design tools to simulate the environmental performance of the packaging during the design,
• ‘lightweighting’, i.e. packaging with reduced weight but the same protective performance,
• bulk packaging of ingredients delivered by suppliers to the company,
• refills, e.g. refillable packaging to be returned to the food and beverage manufacturer,
• returnable secondary and tertiary packaging,
• packaging containing recycled material,
• packaging containing bio plastics provided that the environmental benefits of this choice can be proven.

Furthermore, best practice is for food and beverage manufacturers to help consumers reducing the food waste they generate, by:

• using modified atmosphere packaging to increase shelf-life of products,
• identifying the optimum portion size of the packaging with a view to better cater for different lifestyles and households to reduce leftovers,
• including messages on packaging recommending optimised storage of the food product to avoid its spoilage.</td></tr>
<tr><th colspan="5">Target activities</th></tr>
<tr><td>All food and beverage manufacturing</td><td>Processing of coffee</td><td>Manufacturing of olive oil</td><td>Manufacture of soft drinks</td><td>Manufacture of beer</td></tr>
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<tr><th colspan="5">Applicability</th></tr>
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- Packaging-related CO_2 emissions per weight/volume unit of product manufactured (packaging g CO_2eq/g or ml of product)
- Weight of packaging per weight/volume unit of product manufactured (g of packaging/g or ml of product)
- Percentage of packaging which is recyclable (%)
- Percentage of recycled material content in packaging (%)
- Average density of net product category per volume of packaged product (kg of product/l of packaged product)

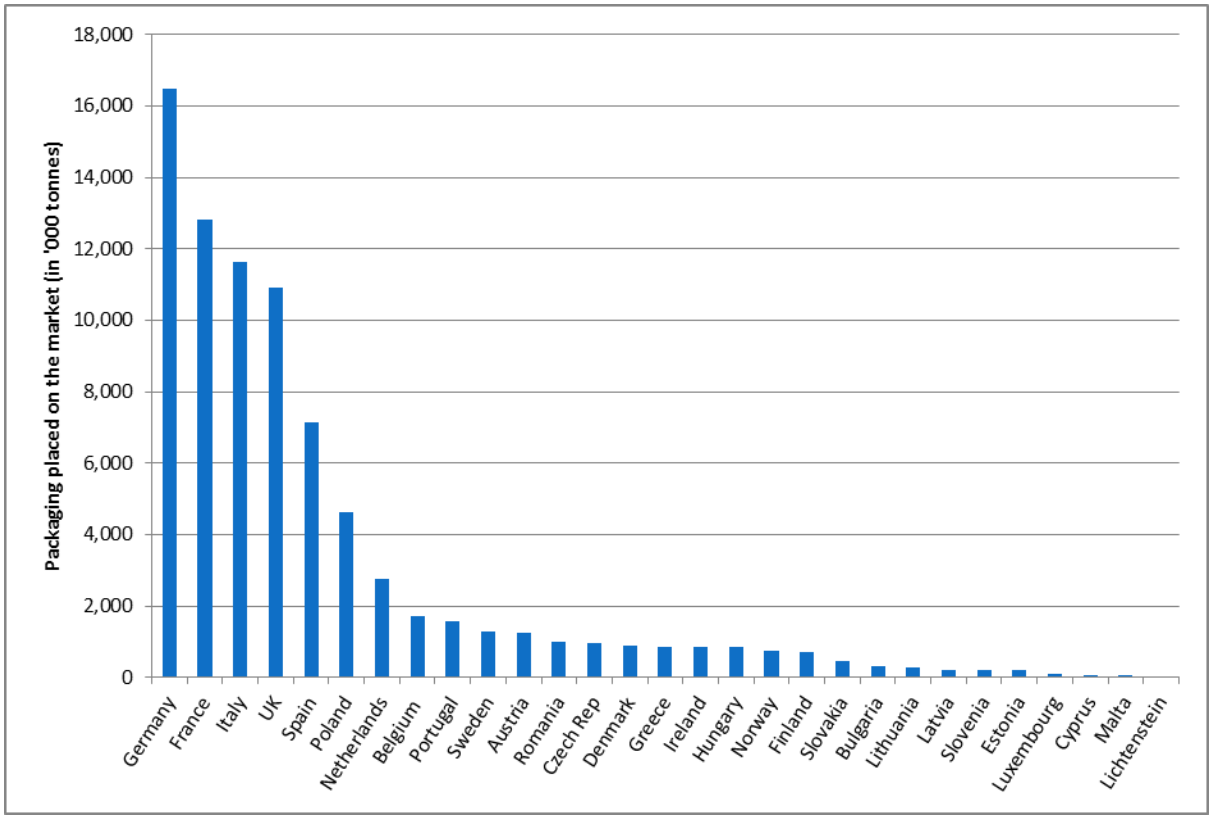
Benchmarks of excellence

- An eco-design tool is employed when designing packaging to identify options with a low environmental impact.

Description

On a global scale, the food and drink supply chain represents the most significant sector in terms of the volume and value of packaging used, with an estimated value of around EUR 280 billion (70%) of the total EUR 400 billion market (Pera technology, 2014). In 2011, over 80 million tonnes of packaging was placed on the market from the EU27 countries, with Germany, France, Italy and the UK accounting for nearly 65% of the EU27 total, see Figure 1. Food and drink manufacturers account for approximately two-thirds of the total EU used packaging by weight (Food and Drink Europe, 2014).

Figure 1: Total packaging placed on the market (in thousand tonnes) (EUROPEN 2014)



The European Organisation for Packaging and the Environment (EUROPEN) reports that over the past twenty years, considerable progress has been achieved in the end-of-life management of packaging, largely through extended producer responsibility (EPR) schemes for packaging waste (EUROPEN, 2014).

This best practice describes how frontrunners improve the design of the packaging they use (i.e. primary, secondary and tertiary) to minimise its environmental impact throughout the product life-cycle. Eco-design can be defined as ‘designing product and packaging systems to ensure products (including their packaging) can be produced, distributed, used and recovered with minimum environmental impact at lowest social and economic cost’ (Defra, 2009). This is particularly pertinent within the food sector where the relationship between the packaging and the product is so interdependent. Table 1 shows the list of factors that need to be considered when designing packaging and highlights the complexity of the design process.

Table 1: A summary of the functions of packaging (EUROPEN, 2013)

Functions of packaging	**Descriptions**
Protection	• Prevent breakage (mechanical protection) • Prevent spoilage (barrier to moisture, gases, light, flavours and aromas) • Prevent contamination, tampering and theft • Increase shelf life
Handling	• Transport from producer to retailer • Point of sale display
Waste reduction	• Enable centralised processing and re-use of by-products • Facilitate portioning and storage • Increase shelf life • Reduce transport energy
Unitisation	• Provision of consumer units • Provision of retail and transport units
Convenience	• Product preparation and serving • Product storage • Portioning

Functions of packaging	Descriptions
Promotion	• Description of product • List of ingredients • Product features and benefits • Promotional messages and branding
Information	• Product identification • Product preparation and usage • Nutritional and storage data • Safety warnings • Contact information • Opening instructions • End of life management

This best practice outlines seven approaches to minimise the environmental impact of packaging:

- Eco-design tools
- Lightweighting
- Bulk packaging
- Refills
- Returnable packaging
- Packaging using recycled material
- Bio plastics

However, packaging is key to preserve food products and avoid food waste at consumer level. In 2013, the European Economic and Social Committee (EESC 2013) reported that food waste amounted to 89 million tonnes a year in the EU27. EUROPEN has created a task force to promote the role of packaging innovation, technologies and solutions contributing to a reduction in food waste. Innovations such as modified atmosphere packaging (MAP), hermetic seals, portion sizes for different lifestyles and households, messages for an optimised storage of the food product and colour changing labels to help consumers with use by dates are some of the methods developed.

Therefore this best practice also covers three of these approaches:

- Modified atmosphere packaging
- Optimum portion-size for different lifestyles and households
- Messages on packaging recommending optimised storage of the food product

Eco-design tools

Eco-design tools are used at the initial stage of packaging development and are a means of simulating the environmental performance of the packaging. A number of tools are available for free, such as:

- BEE (environmental assessment of packaging) which is a software that helps to assess the environmental impact of a packaging system for its global life cycle, identify the optimisation opportunities and compare selected alternatives (BEE, 2015).

- Pack4ecodesign which is a tool to check the environmental impact of your packaging, see the optimisation actions possible and simulate their benefits online (Pack4ecodesign, 2015).

Three companies that use different eco-design tools are **Barilla, Nestlé** and **Mondel?z International.**

Barilla

In 1997 the Italian pasta and baked goods manufacturer Barilla began to produce in-house 'Guidelines for Sustainable Packaging Design' which sought to (Barilla, 2014):

- minimise the volume of materials used,
- favour the use of recyclable packaging,
- maximise transport efficiencies (truck saturation),
- use paper packaging from sustainable forests

Then, in 2007, Barilla introduced its 'LCA Packaging Designer', a computer-based tool allowing the comparison of different packaging solutions to select those with the least environmental impact whilst preserving product quality. Thanks to this tool, and other improvement projects, in 2013, Barilla reached the point where 98% of its packaging was technically recyclable (compared to 85% in 2008).

Nestlé

Driven by its corporate objectives to offer products that are better for the environment along their value chain, the Swiss multinational Nestlé also uses bespoke software tools for product and packaging design. EcodEX[1], as the most recent tool[2] is known, facilitates the rapid assessment of the environmental performance of products in the design process, helping fact-based decision-making.

EcodEX evaluates five environmental impact indicators, representative of the food and beverage sector:

- greenhouse gas emissions,
- land use,
- freshwater consumption,
- abiotic depletion
- ecosystems quality.

Developed in conjunction with the Italian information technology company Selerant, the tool allows different scenarios to be compared using accurate data specific to the food and beverage industry and according to methodological guidelines following ISO requirements and the latest initiatives in the field of life cycle assessment.

Typical examples of its use might be:

- assessing the environmental impacts of switching the packaging used for instant coffee from glass jars to pouches,
- ingredient sourcing,
- source reduction of packaging materials
- end of life options available for packaging materials.

Although initially only focusing on packaging (using the PIQET – Packaging Impact Quick Evaluation Tool), since 2012 eco-design has been extended to assessing the impacts of the whole packed food product (using the EcodEX tool). Scenarios take into account every stage of the product's supply chain from raw material production, product manufacturing to transportation, distribution and storage, and consumption up to disposal at end of life. According to Nestlé, almost every single product category has been assessed using eco-design tools during 'innovation or renovation' exercises.

Mondel?z International

Mondel?z International has also employed an eco-design tool for optimising the packaging it uses. The company claims that its proprietary 'Eco-Calculator™' tool creates 'more environmentally conscious packaging' by taking into account:

- the percentage of post-consumer recycled materials in a pack, and
- the amount of energy and greenhouse gas emissions associated with creating and disposing of a pack.

The tool relies on data from the U.S. Environmental Protection Agency, the US Department of Energy and packaging industry groups. Since 2013, Eco-Calculator has been web-based facilitating access to teams around the world and making it faster to update.

Lightweighting

Lightweighting is the process by which the mass of packaging material used per unit product is reduced without compromising the packaging's function (or the product's safety or quality). It is a long established means of reducing the environmental impact of packaging. According to FoodDrinkEurope, between 1990 and 2011:

- the weight of a 1.5 litre plastic water bottle has been reduced by 40%,
- the average thickness of foil used for chocolate and coffee by 30%,
- 33cl cans by 55%, and,
- glass by up to 60%.

Bulk packaging

The term 'bulk packaging' in the context of this best practice refers to the unit size of raw material packaging being delivered to the food manufacturer. The UK manufacturer of pasties and other baked goods, **Ginsters**, is a frontrunner in raw material packaging minimisation, with a focus on bulk procurement of raw materials. Examples include the following (Ginsters, 2014, pers. comm):

- Switching to using bulk re-usable containers with a 1 tonne capacity for margarine rather than smaller consignments in cardboard cartons.
- Procuring flour in tankers rather than 25 kg sacks. The flour is pumped straight into a 70 tonne capacity flour silo.

- Delivery of potatoes from a local farm to the factory in a large truck fitted with a conveyor belt which enables the potatoes to be conveyed directly into the plant without any packaging
- Sourcing liquid egg, milk and cream in 500-1000 litre collapsible metal or plastic stillages Pallecons (supplied by CEVA Logistics). The Pallecon has a minimum capacity of 500 litres. The milk comes in a disposable bag, but the traditional method would have been to source milk in 6-10 litre bottles generating significantly more waste.
- Procurement of beef stock in 1000 litre IBCs (intermediate bulk containers) rather than the traditional 5 litre containers.

Refills

For decades, refillable packaging has been commonplace in Europe, especially for beverage containers such as soft drinks, milk and beer. Such refillable packaging can be used several times; therefore companies need to establish a collection system together with a washing and sanitisating facility in order to be able to reuse the containers. In these cases, among the aspects to consider include the labelling and the ink used on the refills which should ensure an easy recycling process for the containers, making sure that once processed they can be easily removed. A more recent development is the use of lightweight refills. For example, the instant coffee maker, **Kenco**, is notable for its introduction of 'Eco Refills' made from foil, which allow customers to re-use the same container at home. The Kenco Eco Refills use 81% less energy than glass to manufacture. Refills appear to have been a success, in 2013 it was reported that sales of instant coffee refill packs had grown 54% on the previous year (Convenience Store, 2013).

Returnable packaging

This best practice focuses on returnable secondary and tertiary packaging. For example, the Swedish 'Eurocrate' system was introduced in the mid-1990s with funding from the EU's LIFE programme, where single-trip wooden packaging for food and drink products was replaced with reusable plastic pallets and crates.

Packaging using recycled material

Optimising the quantity of recycled material used in packaging can have a significant environmental benefit. For example, Berryman (2014) reports that every 1,000 tonnes of recycled glass that is used to produce new glass containers saves:

- 345,000 kWh of energy
- 314 tonnes of CO_2
- 1,200 tonnes of raw materials

The European Aluminium Association states that (European Aluminium Association 2013):

'*As the energy required to recycle aluminium is about 5% of that needed for primary production, the environmental benefits of recycling are obvious'*.

Novelis has developed aluminium sheet with 90 % recycled content enabling beverage can manufacturers to have a product made of 70% recycled material. Novelis estimates that current market levels of recycled content in aluminium beverage cans is around 40-50% (Food Production Daily 2013). **Nestlé** reports that in 2011 it used 27 % recycled material in its packaging (Nestlé 2014, pers. comm). Similarly, **Danone** claims that 25 % of all its packaging is produced from recycled materials, and it is aiming to achieve a rate of 25 % recycled material in the PET bottles it uses as packaging by 2020 – this is an ambitious target given the technical difficulties in the closed loop recycling of PET packaging. At the end

of 2013, the proportion of recycled PET in packaging used within the Danone Waters division (including brands such as Volvic, Evian and Bonafont) stood at 9% (Danone, 2013).

When using recycled materials for packaging, food safety must be ensured by choosing suitable options for food and beverage products.

BioPlastics

Bio-based plastics, where part or all of it comes from renewable sources, are focussed on reducing the dependency on fossil fuel-based resources. Businesses that have introduced such packaging include the following:

PepsiCo has developed the world's first 100% plant-based, renewably sourced PET bottle and the world's first fully compostable bag for its snack brand 'SunChips' and planned to use potato peelings for its 'Walkers' packets from 2012.

Coca-Cola claims greenhouse gas savings of 30,000 tonnes CO_2eq through the introduction of bottles containing PET plastic derived from plant material. A wider potential benefit of the initiative was to stimulate the plant waste market to develop polymers from other sources (WRAP 2013).

Danone is also piloting the use of new bio-plastic packaging produced from sugar cane, sugar cane waste and corn, which do not compete with food production. The packaging is being trialled in the Volvic, Actimel, Activia, Danonino and Stonyfield brands (Danone, 2013).

Lebensbaum, an organic tea, coffee and spices producer, uses a compostable packaging film made of 100% GMO-free bioplastic (wood based cellulose, sourced largely from sustainably managed forests (>90% FSC or PEFC) (Lebensbaum, 2015 pers. comm.),

Bioplastics can improve the environmental performance of packaging, however, in some situations this might not be the case. Bioplastics have lower GHG emissions and non-renewable energy use per kg of material compared to their fossil fuel based counterparts. However, the agro-based indicators (eutrophication, water use, ecotoxicity) are worse for bioplastics (Nestlé, 2015). In addition, the comparison between traditional fossil fuel based plastic and bioplastics should take into account material quantities that provide a similar performance and not the comparison per kg, which is not conclusive (Nestlé, 2015 pers. comm.).

Therefore, the choice of the type of bioplastic and the amount used should be carefully assessed in order to ensure an improved environmental performance.

Modified atmosphere packaging

In 2013, the European Economic and Social Committee (EESC 2013) reported that food waste amounted to 89 million tonnes a year in the EU27. EUROPEN has created a task force to promote the role of packaging innovation, technologies and solutions contributing to a reduction in food waste. Innovations such as modified atmosphere packaging (MAP), hermetic seals, different portion sizes for different lifestyles and households and colour changing labels to help consumers with use by dates are some of the methods being developed.

Table 2 shows an example of the extended shelf life that can result from a move to MAP. It can be seen that in many cases the shelf life can be more than doubled.

The Vacuum Skin Packaging (VSP) of high value products, such as red meat, is particularly popular in the UK and Swedish company MicVac has developed a new vacuum packaging technology that allows cooked ready meals to be stored in chilled form for 30-45 days, depending on their content (Euroasia Industry 2011).

The Swiss company Freshpoint is working with Ciba/BASF on the development, marketing and worldwide sales of the company's time temperature indicators. They have produced a range of labels that can be applied directly to a food product's packaging, such as the CoolVu TTI, which displays the total temperature history of the product to which it is attached (Euroasia Industry 2011).

Table 2: Typical shelf life in air and using modified atmosphere packaging (BOC 2012)

Food Type	Typical shelf life in air	Typical shelf life in MAP
Raw red meat	2-4 days	5-8 days
Raw light poultry	4-7 days	16-21 days
Raw dark poultry	3-5 days	7-14 days
Sausages	2-4 days	2-5 weeks
Sliced cooked meat	2-4 days	2-5 weeks
Raw fish	2-3 days	5-9 days
Cooked fish	2-4 days	3-4 weeks
Hard cheese	2-3 weeks	4-10 weeks
Soft cheese	4-14 days	1-3 weeks
Cakes	Several weeks	Up to 1 year
Bread	Some days	2 weeks
Pre-baked bread	5 days	20 days
Fresh cut salad mix	2-5 days	5-10 days
Fresh pasta	1-2 weeks	3-4 weeks
Pizza	7-10 days	2-4 weeks
Pies	3-5 days	2-3 weeks
Sandwiches	2-3 days	7-10 days
Ready meals	2-5 days	7-20 days
Dried foods	4-8 months	1-2 years

Optimum portion-size for different lifestyles and households

Food and beverage manufacturers can adapt the size of packaging of their products to better cater for different lifestyles and households. Indeed, an important source of food waste is leftovers from products sold in quantities bigger than needed. If products are sold instead in sizes that better match the needs of different categories of consumers, this source of food waste can be reduced. Some food and beverage manufacturers are considering these aspects when designing or choosing their packaging. When optimising the portion-size, the environmental impact of increased amount of packaging for small-portions must be taken into consideration.

Messages on packaging for optimised storage of the food product

Food and beverage manufacturers can include on the packaging of their products guidelines on how best to store them closed or once opened, in order to reduce their spoilage and consequently reduce food waste generation.

In addition, packaging can also include an indication on the optimum time for cooking in order to avoid over cooking and consequently reduce the energy consumption.

[1] EcodEX stands for 'Ecodesign for Sustainable Product Development and Introduction'

[2] Before EcodEX, Nestlé used a different tool called 'PIQET.' Developed in 2008 with an Australian company, PIQET was completely phased out at the end of 2014 (Personal communication, Nestlé, Switzerland)

Environmental benefits

According to Nestlé, almost every single one of their product categories has been assessed using ecodesign tools during 'innovation or renovation' exercises. Up to 2013, Nestlé had undertaken 15,500 different scenarios using EcodEX, PIQET and other ecodesign approaches, saving more than half a million tonnes of packaging (and saving EUR 830 million in packaging costs). In 2013 alone, 66,594 tonnes of packaging material were cut using eco-design tools saving around EUR 131 million (Nestlé, 2014). EcodEX is now available for other companies to use by accessing the Selerant website (http://www.selerant.com/main/en-us/solutions/ecodesign.aspx)

Examples of environmental savings from **Mondel?z International e**co-design projects include:

- the conversion of Cadbury Dairy Milk bars in Australia from traditional foil and cardboard packaging to a new, single-layer flow wrap which saved 1,270 tonnes of packaging.
- the re-launching of Jacobs Velvet instant coffee in a lighter-weight glass jar saving 4,536 tonnes of glass.

Overall, between 2010 and 2013, Mondel?z International has eliminated 21,772 tonnes of packaging material from the supply chain – and is close to achieving a goal of cutting 22,680 tonnes of material by 2015 (Mondel?z International, 2013).

Examples of frontrunner work in the area of lightweighting include:

- **Heinz** in 2007 developed a new can end that was 0.18mm thick, a 10% reduction on the previous ends. This reduction saved 1,400 tonnes of steel each year equating to GBP 404000 (IGD, 2007).
- **Vranken-Pommery Monopole** (FT.com 2008) was the first big champagne group to adopt the 835g champagne bottle instead of the standard 900g bottle and reported that it can load 4,000 more bottles on every truck.
- **Kingsland** worked with **Quinn Glass** to reduce the weight of a standard wine bottle to 300g, a reduction of nearly 30%. The three key hurdles that they had to overcome were (Food and drink innovation network 2010):

- the impact resistance needed to be the same as standard bottles
- the glass needed to be evenly distributed in the manufacturing process
- the aesthetics of the bottle had to match the standard bottle to satisfy consumers.

- In the UK, **Cott Beverages** a producer and packager of soft drinks demonstrates a good example of best practice in minimising secondary shrink wrap packaging. Motivated by its involvement in the Courtauld Commitment, in 2012, Cott reduced the LDPE (low density polyethylene) shrink wrap the manufacturer used as secondary packaging around canned beverages from 50 to 38 microns and reduced the shrink wrap gauge from 60-70 microns on PET bottles to 50-55 microns. The project achieved the following environmental benefits (WRAP, 2014):
  - reduction in LPDE film used at two sites by a total of 115 tonnes per year[1]
  - reduction of carbon footprint by 308 tonnes CO_2eq across the whole business (and 61 tonnes CO_2eq on Cott branded products alone)

- The Scottish soft drinks manufacturer **A G Barr** is among many UK retailers and manufacturers motivated to improve packaging as a result of signing up to the WRAP-sponsored Courtauld Commitment. A G Barr cut the carbon impact of its 2l, 500ml and 250ml bottles by 1,869 tCO_2eq in 2010, saving 505 tonnes of plastic through the installation of sophisticated bottle blowing and filling technology. The 500ml and 250ml bottles alone saved 316 tonnes of plastic, and are amongst the lightest within the carbonated soft drinks market. The cost saving from reduced plastic requirements may also have been a motivating factor for A G Barr, although this needed to be offset against the capital investment in new equipment (Product Sustainability Forum, 2013a).
- The French manufacturer **Danone** has targeted reduction of packaging at source as 'a number-one priority wherever possible', optimising the weight of packaging across the board, while maintaining product quality and the service provided to consumers. Recent technical innovations include removing the cardboard from yogurts sold in multi-packs and cutting the weight of bottles. For example, the Danone Waters China subsidiary cut the weight of the large 600 mL format bottles used for the ‘Mizone’ brand by more than 25% between 2004 and 2012. Between 2010 and 2013 alone, the Mizone brand has saved more than 8,500 tons of PET (Danone, 2013).
- By 2004, The Swedish ‘Eurocrate’ system had 1,753,000 crates in circulation resulting in annual packaging waste savings of over 28,000 tonnes (Defra, 2011). Other estimated savings included reductions in:

- lorry journeys of 260,000 km/yr (equal to 180 tonnes of carbon dioxide)
- energy consumption by 52 million KWh/yr
- the volume of damaged goods by at least 20%

transportation costs by 25%

[1] 1 tonne of LPDE = 2.681 tonnes of CO_2eq

Side effects

For many food products, a minimum amount of packaging is essential for protecting the contents during transportation throughout the supply chain including at the consumer stage. If packaging is eliminated altogether then physical and microbial damage to the product may occur resulting in food waste. For example, FoodDrinkEurope (2012) reports that cucumbers with just 1.5 grams of wrapping have been found to maintain freshness for 11 days longer than those that are unpackaged.

While use of renewable materials such as bioplastics may improve product sustainability, unintended negative environmental consequences should be considered including the local impacts of growing the raw material (e.g.

sugarcane) (Product Sustainability Forum, 2013a). Some food and drinks manufacturers active in bioplastics, e.g. **Danone** , **Coca-Cola**, **Heinz**, **Nestlé**, **Unilever**, have formed the Bioplastic Feedstock Alliance with the World Wildlife Fund to encourage the responsible development of bioplastics.

Similarly, new composite lightweight materials may be lighter – and thus consume less resources in their manufacture - but they may also be less recyclable at the end of life or more energy intensive to produce. This downside may offset any environmental benefits achieved from lightweighting; beer bottles made from PET/nylon are a well-known example of this.

The environmental performance indicator measuring performance in terms of the environmental impact or packaging weight per unit of production (e.g. kg of packaging per kg of product) can discourage smaller product formats from being developed. However, smaller formats can be useful to avoid overbuying by consumers and/or to avoid consumers having to throw away part of a product, especially with products with a short open life. The whole life cycle impact should be considered which trades off the additional impact of packaging against the reduced food waste generated.

Applicability

This best practice is applicable to all food and beverage manufacturers. The use of refillables, and reusable and returnable transit packaging systems has been shown to work best in short, simple and localised supply chains where the return rate can be maximised. An example of this is the successful refillables schemes operated by small breweries in Germany (and enforced in national law) using deposit return systems (DRS). However, this approach does not work for complex or fragmented supply chains, for example, where production is centralised in a small number of plants.

While procurement of bulk raw materials reduces transit packaging waste, the approach is not applicable to all ingredients. For instance, due to the size constraints of processing machines at its facility, the UK pie and pasty maker **Ginsters** referenced above, is unable to procure cheese in portion sizes larger than 20kg slabs. In addition, bulk supply lends itself best to ingredients which are either processed by the receiving manufacturer in high volumes or which have a longer life and thus are unlikely to expire before use.

A key constraint for lightweighting packaging can be consumer perception. For example, the aforementioned Kingsland / Quinn glass lightweighting project had to overcome the consumer mind-set that heavier bottles equated to better quality wine.

Economics

EUROPEN estimates that food and drink producers pay estimated annual fees of up to EUR 3.1 billion to Extended Producer Responsibility (EPR) schemes in Europe and this is reflected in an overall recovery rate of 76% and recycling rate of 63% (EUROPEN, 2013).

The cost implications of redesigning packaging are critical. Certain innovations such as the lightweighting of packaging while offering financial savings on raw material use in the long run will require substantial upfront capital investment in new equipment. For instance, in the UK, the soft drinks manufacturer **A G Barr** cut the carbon impact of its plastic bottle packaging by lightweighting it with new blowing and filling equipment (Product Sustainability Forum, 2013a). For glass lightweighting, manufacturers may have to move from a ‘blow + blow’ process to a ‘press + blow’ process which provides better glass distribution (i.e. more uniform wall thickness) but represents a significant capital investment.

More evidence of the financial benefits of lightweighting comes from **Heinz.** The company recently worked with its can end supplier Impress and steel supplier Corus to reduce the thickness of ‘Easy Open’ can ends by 10% to 0.18mm thick (Heinz’s previous ends were already the thinnest available). As a result of the trial, 1,400 tonnes less steel was used annually saving Heinz GBP 404000/yr. Part of the cost savings came from the fact that 18% more of the redesigned cans could fit on each pallet during distribution. In addition, each lorry load of filled cans with the new end weighs 83kg less, meaning improved fuel efficiency. If the whole UK canning industry switched to the thinner ends an estimated 28.8 million kWh in energy could be saved, equating to 2,340 tonnes of CO_2 emissions per year (IGD, 2007).

Driving forces for implementation

Packaging Europe reports that in the 1980s and 1990s, sustainability was generally speaking a supply chain push issue as manufacturers responded to regulatory changes such as the introduction of the European Packaging Waste Directives. Packaging Europe states that regulatory issues are still significant drivers but now with greater pressure from both consumers and regulators (Packaging Europe 2013).

EUROPEN stresses that the key driver is cost and states (Food Production Daily 2013):

"Whatever we do in terms of prevention, in reducing packaging through the whole value chain, is reducing, on the one hand, the cost factor; and on the other hand, the CO_2 footprint which is indirectly a cost factor".

According to WRAP, the key business drivers for addressing packaging sustainability include the increasing cost of raw materials and concerns over security of supply (Product Sustainability Forum. 2013b). Often larger companies will make public voluntary commitments, externally or internally formulated, on packaging as part of a CSR strategy. For instance, the US confectionery manufacturer **Mars** stated an ambition to increase the recycled content in its packaging by 10% by 2015.

The competition between the different packaging materials is also a key driver especially when comparing the environmental merits of glass, plastic and metal cans in the beverage sector. EUROPEN highlights the fact that each material has its own individual environmental characteristics (EUROPEN, 2013b):

- For glass: one tonne of recycled glass saves 1.2 tonnes of raw materials and avoids 700kg of CO_2 emissions; for each 10% of recycled glass, the energy saving is 30%.
- Plastic: while over 50% of all European goods are packaged in plastic, it accounts for only 17% of all packaging by weight.
- Corrugated board packaging: currently has a recycled content in Europe of 85%
- Aluminium and steel: 70% of rigid metal packaging was recycled in Europe in 2010, saving between 70 and 95% of the original energy used to produce it

Beverage cartons: In 2012, 88% of the main raw materials used to produce the cartons in Europe is sourced from responsibly managed sources.

Reference organisations

Examples of businesses that use eco-design tools for the development of their packaging:

- Barilla,
- Mondel?z International
- Nestlé

Examples of food and beverage manufacturers with effective packaging lightweighting initiatives:

- A G Barr

- Cott Beverages
- Danone
- Heinz
- Kingsland
- Vranken-Pommery Monopole

Business with interesting practices for bulk packaging

- Ginsters

Examples of businesses active in the uptake of bio plastics:

- Coca-Cola
- Danone

PepsiCo

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