Final report

Efficient use of resources in hot drinks packaging design

A review of hot drinks packaging to understand good practice and to develop a vision for the future that will deliver significant benefits through optimising the use of resources within the supply chain.
WRAP (Waste & Resources Action Programme) helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.
Executive summary

This study provides guidance on understanding opportunities which may exist for optimisation of resources in the hot drinks category. It is aimed at packaging developers, buyers and marketers from brands, retailers and converters within the hot drinks market. The guidance aims to identify benefits to businesses, consumers and the environment, by creating cost savings, improving distribution efficiency and reducing the amount of food and packaging consumers throw away. The good practice identified in this report could also be applied to other grocery sectors to stimulate new thinking and further dialogue.

The study focuses on the largest segments of the category: Black teabags (80 packs), speciality teabags (20-40 packs), instant coffee, roast and ground coffee, speciality coffee e.g. cappuccinos and machine-systems, hot chocolate and malted drinks. Good practice for instant tea products should be taken from the hot chocolate and malted sections. Examples of current packaging were analysed, and interviews were conducted with representatives of the sector.

Hot drinks in the UK play a major role in the consumers’ life and equate to an overall market worth £1,383 million. Across the total sector there is a vast range of packaging materials and formats used, each with their own characteristics. The hot drinks sector generates around 50,000 tonnes of packaging per annum and over 500,000 tonnes of food waste per year (including ‘unavoidable’ food waste made up of tea bags and coffee grounds) - see Section 1.4.

Many opportunities were identified within the sector, reducing both the amount of packaging used and the food waste produced, which will result in tangible benefits for the businesses involved, including a reduction in the use of raw packaging materials, and improved pallet and vehicle loads. These benefits could result in a reduction in raw material and distribution costs, and an overall reduction in resources wasted throughout the supply chain (see Figure A, below).

These opportunities centred on the following good practice techniques:

- **Total system:** Consider primary, secondary and tertiary packaging as a total system, avoiding functional overlap between the packaging levels. Remembering that packaging which remains within the supply chain is more likely to be recovered for recycling than at a household level. See Section 4 ‘Secondary and tertiary packaging’, Section 3 ‘Techniques for designing out resource waste’ and Figure A, below.

- **Waste prevention:** Consider the waste hierarchy: prevent, minimise, reuse, recycle, recover, dispose. Favour techniques at the top of the hierarchy, which eliminate valuable materials from entering the waste stream in the first place, for example component rationalisation, lightweighting, volumetric efficiency. See Section 3 ‘Techniques for designing out resource waste’.

- **Food waste:** Is predominantly caused by used teabags and coffee grounds. This could be addressed by considering portioning, e.g. smaller quantities of tea per teabag (combined with efficient shape of teabag and consumer testing to ensure quality is not compromised) and guidance on both the correct amount of roast and ground coffee to use, alongside ideas on how it can be used in the garden or compost. See Figures 28, 29, 34, and Section 8.1.3.

- **Communication:** Packaging is ideally placed to carry messages to the consumer both graphically and through text, for example, advising on correct packaging disposal or the brand’s stance on related environmental issues, and is discussed in Section 8 ‘Communicating with the consumer’.

These techniques were used to generate concepts which are presented in Section 6 with secondary packaging guidance in Section 7. Figure B shows some examples of these concepts.

The report concludes that there is both a desire and the potential for optimising packaging within the sector through both incremental and radical changes to current packaging formats and that could generate business benefits as well as environmental benefits. A holistic perspective should be maintained; understanding trade-offs between consumer and supply chain packaging and between packaging and food waste. Finally, product suppliers should always be consulted when considering packaging changes, as they have excellent technical knowledge on both product requirements and production capabilities - which may be unique to each manufacturing site.
**Figure A** How primary pack design can affect pallet and distribution efficiencies (see Section 4)

<table>
<thead>
<tr>
<th>Primary: JAR</th>
<th>Primary: JAR</th>
<th>Primary: FLEXI POUCH REFILL</th>
<th>Primary: FLEXI POUCH REFILL</th>
</tr>
</thead>
</table>

- **Size of primary pack**
  - 10 units per tray: 110 x 80 x 140
  - 12 units per tray: 100 x 100 x 150
  - 10 units per case: 60 x 150 x 195
  - 12 units per case: 60 x 150 x 195

- **Number of units per case**
  - 1000 units per pallet
  - 1200 units per pallet
  - 1700 units per pallet
  - 1900 units per pallet

- **Number of units per pallet**
  - 1000 units per pallet
  - 1200 units per pallet
  - 1700 units per pallet
  - 1900 units per pallet

- **Pallet load improvement**
  - 20%
  - 17%
  - 32%

- **Number of units per vehicle**
  - 33,000
  - 39,600
  - 38,720
  - 43,600

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**Figure B** Examples of concepts from Section 6
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Glossary and acronyms

0200 – FEFCO-ESBO style of corrugated case (folding flaps at base with open top)
0201 – FEFCO-ESBO style of corrugated case\(^{36}\) (folding flaps at top and base)
Avoidable food waste – food which could have been eaten if planned, stored or managed better, but instead was thrown away
CO\(_2\) – carbon dioxide
Collation packaging – used to collate multiple items e.g. multipacks. Collation packaging is purchased and taken home by the consumer, e.g. a carton containing 20 cappuccino sachets
Doy pack – a pouch which can stand upright
DQP – dressed quarter pallet (or display quarter pallet)
EVOH – ethylene vinyl alcohol
FBB – folding box board
FFS – form fill seal
HDPE – high density polyethylene
PE – polyethylene
PET – polyethylene terephthalate
PP – polypropylene
Secondary packaging – packaging which is used in supply and distribution of the product, sometimes SRP. Secondary packaging is not taken home by consumer.
Sift-proof – keeps tea dust / powder within the pack to prevent contamination of other products
SRP – shelf ready packaging
VFFS – vertical form fill seal
WLC – white lined chipboard

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Maxine Shields – Twinings
Chris Hall – Typhoo
1.0 Introduction

1.1 Purpose
The aim of this study is to provide tools, examples and information, and to stimulate packaging design innovation in the hot drinks sector, with the purpose of:

- reducing packaging waste;
- reducing product waste; and
- reducing the associated environmental and financial costs associated with that waste.

This will be achieved by:

- Understanding product protection requirements and distribution requirements.
- Undertaking a review of current good practice – primary and secondary
- Development of concepts in conjunction with retailer and manufacturing stakeholders
- Creation of ‘good practice guidelines’ for packaging development

The study does not present fully resolved design solutions. Collaboration across the supply chain will be required to achieve significant reductions in waste, presenting both a challenge and opportunity for the sector.

1.2 Scope of study
The study focuses on the following sub categories within the hot drinks market:

- Coffee: Including instant, roast and ground and speciality coffee (e.g. cappuccino sachets).
- Tea:   Including black tea and speciality tea (including fruit, herbal, green, rooibos, etc).^4
- Other: Including hot chocolate and malted drinks.

1.3 Who should read this document
This study targets packaging developers, buyers and marketers from brands, retailers and converters within the hot drinks sector. However, the tools and examples can be applied to other grocery sectors where the report may also stimulate new thinking and further dialogue on reducing waste.

1.4 Context
Using data collected by DHL in 2007 and 2008, the primary packaging waste associated with the hot drinks sector can be broken down as follows:

- Instant coffee: 42,000 tonnes^1
- Boxed tea: 6,000 tonnes^2
- Other hot drinks: Data not available

These figures, in addition to secondary packaging, suggest that the total packaging generated by the hot drinks sector could be estimated to be at least 50,000 tonnes per annum.

Primary packaging waste is only part of a bigger picture - packaging waste also occurs in the supply chain, and food and drink waste occurs when the product itself is thrown away - either unused or after preparation. Hot and cold drinks account for 1.3 millions tonnes^1^4 of product waste in the UK annually^8. A third of this, 430,000 tonnes per year, is unavoidable and is made up of tea bags and coffee grounds. Two thirds of the total, 870,000 tonnes per year, is avoidable and includes undrunk or unused tea / coffee / hot chocolate / malted drinks and cold drinks. Every tonne of avoidable food and drink waste generates on average the equivalent of 3.8 tonnes of CO2 - not including the emissions associated with in-home preparation for drinks such as heating water^3^4. Although ‘unavoidable’ waste is inedible to the consumer under normal circumstances, producers can take action to

^A Good practice for instant tea products should be taken from the Hot Chocolate and Malted sections.

^B This figure does not include the tap water which is added in the home, e.g. to tea, coffee or to dilute cordials.

^C Estimates of greenhouse gas emissions associated with food and drink waste are: food - 4.2, drinks - 1.5 (tonnes CO2 equivalent / tonne of waste)^1^4 - however the estimate for drinks does not include emissions from preparation in the home, which for hot drinks may be significant due to the heating of water; therefore if in-home preparation for drinks were included in the calculations, this factor may be higher than 1.5. UK households throw away 8.3 million tonnes of food and drink each year^9.

^D In landfill, food waste can break down anaerobically and generate methane, which is over twenty times more powerful than carbon dioxide as a greenhouse gas.
eliminate this waste even if the consumer cannot, e.g. by reducing the amount of tea in each teabag, or providing dosage guidance on ground coffee. Annual tea and coffee food waste can be broken down as follows:\(^4\):

- **Coffee:** 60,000 tonnes of unavoidable waste\(^5\). Avoidable waste is not statistically significant.
- **Tea:** Total waste 450,000 tonnes\(^6\), of which 86,000 tonnes is avoidable\(^6\)

Packaging fulfils important functional and statutory requirements; therefore care must be taken when optimising packaging that product integrity is not compromised.

### 1.5 Drivers for resource optimisation and waste reduction

Drivers for packaging and food waste reductions include:

- **Financial incentives:**
  - Packaging initiatives such as lightweighting and volumetric efficiency can reduce material, storage and transportation costs, and the cost associated with Packaging Recovery Note (PRN) obligations. Reducing product waste within the supply chain prevents financial loss from unsold product.

- **Legislative:**

- **Voluntary agreements:**
  - The Courtauld Commitment, which has been signed up to by all the major UK supermarkets as well as brands and manufacturers, with objectives to reduce packaging and food waste.
  - Food and Drink Federations 5 fold environmental ambition.

Further detail is available in Appendix 1.

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\(^4\) Unavoidable waste is used coffee grounds. Avoidable waste would be ground or granular coffee thrown out or poured away unused or not having been drunk

\(^5\) Includes used tea bags (unavoidable)

\(^6\) Includes teabags which are thrown away unused, or tea which is thrown away prepared but undrunk, including a small amount of milk and sugar within the estimates (avoidable).
2.0 Sector overview

2.1 Market

Figure 1 Chart showing break down of hot drink categories by value (£million) and volume

2.2 Trends

- Coffee:
  - Roast and ground – share is growing
  - Sustainable increasing – including fair trade
  - Convenience – provided by new in home coffee systems
  - Premiumisation – due to shop and café culture
- Tea:
  - Growth in specialty tea
  - Hot chocolate and malted
  - Hot chocolate – growing
  - Malted – in decline

2.3 Packaging Overview

Based on data collected in 2007, the lightest coffee jar on the market in the UK weighed 224g whilst the heaviest weighed 289.9g. This shows that, even within the 100g instant coffee sector, there is a variance in packaging weight of 23% - even greater variance exists in packaging weight for tea sold in 80 teabags.

Much work has been done over the years to optimise packaging for hot drinks, and formats analysed as part of this study show a general trend towards reduced packaging, but increased variance within the categories (see Table 1).

Table 1 Shows variance in packaging weights between lightest and heaviest. UK Packaging Benchmarking data (left), samples analysed during this study (right).

<table>
<thead>
<tr>
<th>UK Packaging Benchmarking Data</th>
<th>Lightest</th>
<th>Heaviest</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tea - 80s (2008)</td>
<td>12g</td>
<td>53g</td>
<td>77%</td>
</tr>
<tr>
<td>Tea - 20s (2008)</td>
<td>15g</td>
<td>50g</td>
<td>70%</td>
</tr>
<tr>
<td>Coffee (2007)</td>
<td>224g</td>
<td>290g</td>
<td>23%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sampled</th>
<th>Lightest</th>
<th>Heaviest</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black tea (80s)</td>
<td>9g</td>
<td>40g</td>
<td>78%</td>
</tr>
<tr>
<td>Speciality tea (20s)</td>
<td>14.5g</td>
<td>32g</td>
<td>55%</td>
</tr>
<tr>
<td>Instant coffee (100g)</td>
<td>210g</td>
<td>306g</td>
<td>31%</td>
</tr>
<tr>
<td>Roast and ground (227g)</td>
<td>8g</td>
<td>11g</td>
<td>27%</td>
</tr>
<tr>
<td>Speciality (per single serving)</td>
<td>2.8g</td>
<td>31.3g</td>
<td>91%</td>
</tr>
<tr>
<td>Machine (per single serving)</td>
<td>0.6g</td>
<td>12g</td>
<td>95%</td>
</tr>
<tr>
<td>Hot chocolate &amp; malted drinks</td>
<td>45g</td>
<td>385g</td>
<td>88%</td>
</tr>
</tbody>
</table>

This dramatic variance illustrates the opportunity for producers to move towards best practice within the sector.

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\(^g\) Comprising: 212g glass, 10.3g plastic, 1.9g paper, 0.2g aluminium

\(^h\) Comprising: 284.6g glass, 3.5g plastic and 1.8g paper
2.4 Product Protection

Product protection requirements vary between product types.

- Black tea has a shelf life of two years if kept dry. Small particles of tea – or dust – must be contained within the pack, known as “sift-proof”.
- Speciality tea requires a moisture and odour barrier, and some blends may require a light barrier to prevent discolouration, due to their sensitive ingredients and flavours.
- Instant and speciality coffees require protection from moisture, oxygen and taint and odour.
- Roast and ground coffee requires moisture, oxygen, and taint and odour barriers. If the product is packed immediately after grinding, it continues to emit CO₂ and will require venting.
- Hot chocolate and malted drinks need oxygen, moisture, and taint and odour barriers.

2.5 Consumer behaviour

Although consumer behavioural research was not carried out as part of this project, learned knowledge suggests that hot drinks are often, but not exclusively, decanted in to caddies and kept near to the kettle, with the exception of roast and ground coffee which may be stored in the fridge or freezer.
3.0 Techniques for designing out resource waste

The following structural design techniques can be used to optimise packaging and reduce food waste in the breakfast cereal sector and are ordered in relation to their impact on the waste hierarchy:

Techniques may affect more than one point on the hierarchy. Techniques that prevent resources from entering the waste cycle in the first place are preferable to those that only enable recycling. These techniques are developed into concepts in Sections 6 and 7.

3.1 Techniques

3.1.1 Waste prevention

- **Total packaging system reduction**: Rationalising material use by considering primary, secondary and tertiary packaging as a system (including shelf ready packaging). (Discussed in detail in Section 4.0)

- **Lightweighting**: Reducing packaging weight across all materials, using production improvements, finite element analysis and improved quality checking procedures. WRAP has a number of reports\(^7, 8, 9\) on these techniques. (See Section 3.3) Lightweighting can be applied to both primary and secondary packaging. May also include:
  - **Format selection**: Switching packaging formats to reduce overall waste.
  - **Material selection**: Selecting materials which are fit for purpose, and optimising material use.

- **Volumetric efficiency**: Enabling units to be packed more compactly, thereby getting more onto a pallet, into a vehicle and onto shelves, generating significant cost and CO\(_2\) savings. This includes headspace. (See Section 3.4)

- **Performance specifications**: Basing specification on performance rather than material composition ensures that packaging is fit for purpose and not over specified. Performance specifications should be developed in conjunction with suppliers to take advantage of their expertise. (See Figure 31)

- **In-store merchandising fitments**: Can be used to display and communicate product information, enabling primary packaging to be reduced where appropriate (see Figure 31 and Section 7, Concept I).

- **Self-dispensing**: Offering loose products to the consumer, who can choose the quantity to buy and pack directly into their own re-usable containers (see Section 3.6 and Concepts 3, 15, 18).

- **Material technology**: Using new technologies to reduce food waste, for example:
  - antimicrobials have been used in food containers, but not yet in food packaging\(^10\);
  - developing smart packaging materials that absorb oxygen, detect pathogens, alert consumers to spoiled food, etc. Many are expected to be commercially available within a few years\(^11\).

- **Portioning**: See Figures 28, 29, and Concepts 22, 26, 27. Increase in packaging must generate a greater reduction in food waste.
3.1.2 Reuse

- **Primary packaging elements:** Reusing packaging for its original purpose, with no reprocessing:
  - In the past, returnable primary packaging used to be more prevalent – for example the doorstep delivery system for milk\(^{12}\) and refillable beer and soft drink bottles\(^{13}\); and
  - Reusable packaging creates opportunity to enhance the brand experience, for example through a desirable and robust reusable pack.

- **Secondary and tertiary packaging elements:**
  - Use of reusable secondary and tertiary packaging is increasing, e.g. pallets, roll-cages, beer kegs, crates, and trays for bread, vegetables and other products\(^{14}\) (see Section 4.3).
  - In-store merchandising fixtures may be used to enhance the shopping and brand experience, whilst providing opportunity for primary packaging to be optimised (see Figure 31).

- **Alternative reuse:** Providing primary packaging with an alternative and ongoing reuse for consumers:
  - For example, a dessert packed in a glass ramekin – however, consumers tend to have a limited requirement for such items.

3.1.3 Recycling

- **Recycled content:** This is a complex area where overall carbon impact should be assessed regarding recycled content and the strength-to-weight ratio of the material. See Section 3.5.

- **Design for recycling:** Creating packaging from materials which have a high recycling recovery rate\(^{15}\) and where possible, from a single material.
  - When multiple materials are required, ensuring they are easy to separate for recycling.
  - The Packaging Recycling Action Group (PRAG) have published generic guidelines on design for recyclability, which is available for download via the WRAP website\(^{16}\).

3.2 Techniques summary

- Consider the waste hierarchy.
- Favour techniques that eliminate packaging or food from entering the waste stream.
- Techniques can be implemented with or without noticeable visible change to the consumer.
- Waste reduction should be viewed as a total system, with the same techniques being applied to primary, secondary and tertiary packaging, remembering that packaging remaining within the supply chain is more likely to be recovered or recycled than that going in to household waste. Use of in-store fitments as part of this system, for example point of sale displays or self-dispensing areas – can create opportunities for packaging waste reduction.

The following sections detail some of the above techniques, and demonstrate ways to reduce waste from common formats. They were informed by sampling existing packaging and by interviews with retailers, brands and converters in the sector during January 2009.

- **Lightweighting**
  - Carton joint reduction
  - Seal reduction on bags and pouches
  - Jar lightweighting

- **Volumetric efficiency**

- **Material choice, weight and recycled content of cartons and liner bags**

- **Self-dispensing**
3.3 Lightweighting

3.3.1 Carton joint reduction

There are many different styles of carton used in the hot drinks sector, including those with end flaps. Reducing the overlapping flap size reduces primary pack material use by reducing the blank size. This could reduce cost if the change results in greater sheet usage at the converter\(^1\) which may require cooperation from other brands to ensure that the sheet size is optimised at the converter. Examples of such optimisation can be seen in the breakfast cereals sector, for example Weetabix Minis, where a flap reduction from 40mm to 20mm eliminated 4g of material per carton, equating to around 103 tonnes of cartonboard per year\(^17\).

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**Figure 3** Joint overlap. The box on the left shows a large overlapping section (40mm) compared to the one on the right (20mm)

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3.3.2 Seal reduction on bags and pouches

It is possible to reduce some of the material used in bags by reducing the size of the seal at either end.

Historically, excessive reduction has resulted in an increase of seal failures\(^1\). However, a new sealing approach – the ‘Integrity seal system,’ has been developed by Ceetek in partnership with WRAP and International Food Partners (IFP), and is capable of reducing the standard seal size of 15mm down to 1.5mm wide\(^18\). This technology has been used successfully by Marks & Spencer for salad packaging, generating a 10-15% packaging material reduction\(^19\).

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**Figure 4** Marks & Spencer salad package, which uses Ceetek’s ‘Integrity Seal System’\(^18\)

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3.3.3 Lightweighting glass jars\(^20\)

- Research into consumer perception of lightweighted containers shows that lightweighting by up to 15% does not affect the consumers’ perception of value or quality.
- Round / cylindrical jars are the most materially efficient format. This is demonstrated in glass by ASDA’s own label coffee; the lightest glass jar in this study (See Appendix 5).
- Glass lightweighting can be done in conjunction with tool renewal to avoid new tooling costs. Aim for jars which challenge current lightest in class (see Appendix 5).
- Custom containers can be lightweighted by addressing excess material use at neck, shoulder and base of the container, using techniques such as finite element analysis to understand how the container will perform in use, in order to maintain performance properties.

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\(^1\) Cost price reductions will be limited to how many more cartons can be cut from each sheet, if any. Resulting trim waste would remain with the supplier / converter and be reprocessed.

\(^1\) Information obtained through interviews with industry experts; February 2009.
‘Press and blow’ and ‘solid blank’ production techniques can be used to control the wall thickness of glass jars and is ideal for use in jar lightweighting exercises.

Understand the issues surrounding the lightweighting of generic containers by reading recent research.

Lightweighting can also be applied to lids. Is a screw-cap required or could a snap-on lid be used?

Further information on lightweighting glass containers is available on the WRAP website.

3.4 Volumetric efficiency

Reducing the overall size of a pack not only eliminates material, but can also generate significant financial and environmental benefits through more efficient palletisation, storage and transport. Reshaping the primary packaging for maximum volume efficiency could improve pallet load quantities by up to 32%; dramatically improving vehicle loads (see Sections 3.1.1 and 4.4, Figure 14).

In other sectors, volume efficiency has been a key driver for packaging reduction. For example, in early 2009 Kellogg’s trialled a new shape of cereal box with retailers in Detroit, USA. The new box contains the same amount of product, yet has allowed them to make an 8% reduction in material.

Figure 5 The carton for the individual sachet drink on the left is taller than the sachets themselves, creating headspace in the carton, whereas the carton on the right is sized to fit the sachets well.

Headspace – common in powdered products but also seen in cartons where the size of the carton exceeds its contents – is often caused by the product settling after packing and during transportation, and by the use of packaging which has not been sized to fit the individual product.

Opportunities to reduce headspace exist, such as specifying containers to fit their contents (see Section 4.2, Image 12), increasing product weight to fit the container, and using vibration to speed up the settling process followed by a second fill. Although these may incur capital expenditure and changes to the processing line, this may be offset by the cost savings associated with improved storage and distribution efficiency.

3.5 Material choice, weight and recycled content

The weight, recycled content and source (e.g. accredited forests) of materials should be considered holistically, as each can affect another. When optimising primary packaging, remember that secondary packaging can be modified to compensate (see Section 4.0, ‘Secondary and tertiary packaging’ and Figure 31).

Whether using virgin or recycled materials, maintaining good communications with material suppliers is critical to understanding what opportunities are available. Developing a packaging performance specification is an ideal way of doing this which focuses on performance requirements rather than material specification; considering the likely conditions the packaging will have to perform under (for example stacking strength, climatic conditions, product interaction, etc) and ensuring it is fit for purpose.

Cartons

Recycled paper, cartonboard and corrugated packaging can be weaker than board made from virgin fibres, and so recycled boards tend to be heavier than virgin equivalents in order to achieve the same strength. However, high quality, lightweight, recycled board grades are available.

Care must be taken when specifying cartonboard that is to be used in direct food contact as some recycled fibre may not be suitable for use in direct food contact. The European Paper and Board Food Packaging Chain have developed a voluntary industry guideline on the use of paper and board in direct food contact, which is available from their website. Cartons are widely collected through kerbside recycling schemes.

**Bags and pouches**

Pouches for roast and ground coffee are typically made from a flexible laminate material. The thinnest packs currently available are 60-70 microns (see Appendix 6). Some teas are packed in metallised pouches within a carton, whereas others are packed directly in to the carton with a lightweight overwrap, offering a potential saving of 3g per pack. Sachets for individual drinks can weigh as little as 1g each, made from laminates 50-80 microns thick. Flexible materials are not currently widely collected through kerbside recycling schemes.

When specifying flexible pouches, machine capabilities and product/pack integrity should always be considered. Too great a reduction in down-gauging can slow down production and compromise shelf life as thinner materials are more prone to snapping and stretching during processing, and may be more prone to bursting, loss of integrity (pin-holing) and loss of barrier properties, resulting in reduced shelf life.

**Jars**

Jars, whether glass or plastic, can be optimised to use minimal material through controlling the wall thickness and through the design and shape of the container and lids (see Section 3.3.3 'Jar lightweighting').

Wide-mouth PET and HDPE jars are classed along with bottles as "widely recycled" and are collected through many kerbside recycling schemes.

**Recycled content**

Sourcing recycled content increases demand for the material and encourages collection from the waste stream. Glass packaging with a high recycled content requires significantly less energy to produce than that with no recycled content. Any application of recycled plastics that come into contact with food must gain approval from the European Food Safety Agency to ensure any risks of contamination or chemical degradation have been resolved.

Specifying recycled content in materials may affect the visual appearance of the material, for example through slight colour changes. These changes could either be incorporated in to the design of the packaging, or could be hidden by decoration, for example, through the use of full shrink-sleeve labels (see Figure 6).

*Figure 6* This HDPE jar has a full shrink sleeve label which hides the colour of the plastic – therefore any colour variations resulting from the inclusion of recycled content would not affect brand image.

**Biopolymers**

Biodegradable polymers, such as PLA (polylactic acid or polylactide) have been used. Some issues complicate the use of biopolymers, including risk of contamination to recycling streams. Detailed information on the implication of biopolymers in packaging can be found on the WRAP website, from which the following excerpt is taken:

"The principal risks arise at end of life. Instead of being composted, biopolymers may find their way into the recyclables stream, which would increase the cost of recycling or prevent it completely. Alternatively biopolymers could be added to the residual waste stream and increase the biodegradable waste sent to landfill... increasing the amounts of methane gases generated."

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1 Information obtained through interviews with industry experts; February 2009.
3.6 Self-dispensing

Self-dispensing offers consumers the opportunity to choose ‘loose’ product in minimal or refillable packaging (see Section 3.1.1). Although well established in the United States, Canada, Australia and New Zealand, in the UK self-dispensing is typically limited to fresh produce. However, an increasing number of small, independent or premium retailers in the UK are beginning to using high quality self-dispense fixtures.

**Figure 7** Example of in-store self dispensing fitment for a variety of cereals and dried goods

Self-service retailing offers the following benefits:

- potential savings for the consumer, retailer and producer;
- space efficiency;
- reduced stock handling – gravity-fed hoppers ensure automatic first-in-first-out stock rotation;
- improved distribution; and
- reduced packaging.

The WRAP study ‘Self-Dispensing Systems – Commercial Feasibility Study’ indicates that consumers prefer the simplicity of bin and scoop self-dispensing systems, value the ability to select just the quantity they require, and appreciate the reduction in packaging, although they were concerned about hygiene. For retailers, whilst there are benefits in space efficiency and stock handling, there are some concerns regarding consumer brand perception. Self-dispense systems can be perceived as ‘messy’, with risk of cross-contamination. Product liability, whilst clearly residing with the brand/converter for pre-packaged goods, becomes uncertain when supplying loose.

Self-dispensing is a big step, and some retailers are currently seeking direction to determine which categories would be best suited to this merchandising technique. As a long term approach to packaging reduction, larger grocers may trial self-dispensing in some categories before rolling it out more widely, for example; fabric conditioners in some ASDA stores. Currently the advantages of self-dispensing systems are most clearly seen at the high end of the market, from boutique stores in London such as ‘Unpackaged’ to the food halls of Kensington’s Whole Foods Market.

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**M** Information obtained through interviews with industry experts; February 2009.

4.0 Secondary and tertiary packaging

Primary, secondary and tertiary packaging work together and should be considered as a total packaging system in order to reduce waste.

4.1 Balancing primary and secondary packaging weight

"It is a generally held view that the weight of primary and secondary packaging is inversely correlated in order to provide ample protection to the product, at a minimum weight"29.

For example, standalone bags and flexible pouches are non load-bearing, and require robust transit packaging (e.g. Figure 8), whereas a carton or jar which is load-bearing, can use minimal secondary packaging such as shrink wrap or a skeletal outer (Figures 9 and 10). Some specially designed primary packs eliminate the secondary packaging altogether (Figure 11).

When optimising the balance between primary and secondary packaging, consider collection and recycling. Supply chain waste is more likely to be recovered than domestic waste, with very high recovery rates for packaging waste at distribution centres and back of store30, compared to only 34.5% of household waste being recovered30.

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Figure 8 Secondary packaging for flexible primary packs – typically a fully enclosed outer

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Figure 9 Partially load-bearing primary packs such as cartons are packed in a variety of secondary packaging styles, e.g. fully enclosed case (far left), wraparound case (centre left), tray and shrink (centre right), lightweight tray and shrink (far right, top), and cartonboard U-board with shrink (far right, bottom).

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Information obtained through interviews with industry experts; February 2009.
4.2 Ensuring all levels of packaging work together to provide maximum strength

4.3 Reusable transit packaging

Returnable transit packaging (RTP) is common in the fast moving bakery, fresh produce and dairy categories (Figure 13). When well-applied, RTP can prevent product damage and divert material from both supply chain and domestic waste streams, and can even be used directly at point of sale, reducing labour in store (See Figure 31).

When developing single-trip or reusable transit packaging, factors such as raw material use, energy in manufacture and reconditioning, trip rates, transportation distances, pool size, vehicle utilisation, initial investment, cost benefit, product damage, hygiene, brand value and customer convenience should be considered.

During 2009 WRAP undertook research that reviewed existing life cycle analyses (LCAs) that covered reusable packaging to examine the benefits of these systems, and factors that need to be considered when deciding whether the adopt reusable packaging. This work will be available on the WRAP website after publication in early 2010.
4.4 Palletisation

Standard ‘best practice’ in palletisation avoids overfill (which can result in product damage) and underfill or voids (which result in inefficiency). According to research, average volume efficiencies are around 50%.

Improving pallet volume efficiencies can significantly reduce the costs associated with product storage and distribution. This can be done with or without a noticeable visible change to the primary pack. Figure 14 below illustrates how optimising secondary packaging alone can improve pallet loads by 20%, introducing a refill pouch could improve pallet loads by 17%, and combining both could result in a pallet load increase by 32%, when compared to the original jar. See Section 3.4 ‘Volumetric efficiency’. Please note, further improvements could be made by reducing headspace in packs, especially for powdered products.

**Figure 14** Changes to secondary packaging layout can generate significant storage and distribution benefits (indicative calculations based on pallet envelope of 1200x1000x2400 with 22 pallets per vehicle)

A number of options exist for securing a loaded pallet, which include strapping, stretch films, sleeves, adhesives, or by using stackable crates or pallet boxes.

A recent audit of a household brand’s distribution centre found that with simple modifications to existing equipment, stretch film could be reduced by 30%. Dramatic reduction or elimination altogether is possible with special non-residue adhesives, such as ‘Lock n Pop’ (Figure 8), an adhesive that temporarily bonds cartons or sacks together to prevent pallet movement.
4.5 Distribution
Products leave the relative safety of a well packed pallet at the distribution centre, when they are picked to order and placed in a mixed load, typically into a roll cage or tote, before being trunked to store. The secondary packaging must work in conjunction with the retailer’s specific distribution style to ensure product is protected, collated and easily identifiable.

4.6 Retail environment
Space on shelf is limited so volume efficiency is important, in order to get high density of products per metre. The images below show examples in the retail environment where products have been stacked vertically, relying on the strength of the primary and secondary packaging working together. Secondary packaging should also enable retail staff to quickly and efficiently replenish products on shelf.

4.7 Secondary and tertiary packaging summary
- Avoid functional overlaps between primary and secondary packaging.
- Supply chain packaging is more likely to be recovered for recycling than domestic waste.
- Improved volumetric efficiency in palletisation can generate significant environmental and cost benefits.
- 30% stretch wrap reduction is possible using pallet wrapping technologies and elimination of stretch wrap can be achieved if pallet adhesives are used; however such technologies should always be tested thoroughly to ensure that they are adequate for the particular needs of a business and its supply chain.
- A research project on reusable transit packaging will be published by WRAP towards the end of 2009.
5.0 Current Practice

5.1 Primary Packs
The hot drinks sector uses a range of traditional packaging formats for each product type, although breakout formats can be seen within categories, especially for premium products. A comprehensive review of each sub category can be found in Appendices 2 – 8.

5.1.1 Black Tea
- Traditionally packed in cartons, in one of the following formats:
  - Tea bags are collated in 40s in foil vertical form-fill-seal flow wrap pouches within the carton.
  - The carton is acetate wrapped.
- Newer / breakout formats include flexible packs, e.g.
  - Tetley – tea bags are stacked in such a way that they provide pack strength.
  - Typhoo – flexible bag, with tea bags contained within two foil flow wrap pouches.

Figure 18 Typical carton (Tesco, left) and examples of flexible packaging Typhoo (centre) and Tetley (right)

Recycled material 34g    Foil laminate 12g       Paper / polymer laminate 9g

A marketplace review of packaging formats for black tea can be found in Appendix 2. In summary, packaging weight ranged from 9g (flexible paper/PE bag) to 40g (carton with biodegradable flow wrap pouches) per 80 teabags.

5.1.2 Speciality Tea
A variety of primary pack formats are available in this category – which is open to novel packaging – including spiral wound composite cans (Tetley’s Blackberry Bounce) and a doy pack for ASDA’s Extra Special, featuring a reclosable zip. However, most are packed into a carton, with either an overwrap or teabags packed into individual sachets.

Figure 19 Tetley (20s), Twinings (20s), Tick Tock (40s) and ASDA Extra Special (25s)

Composite can 32g  Bespoke carton 21g   Carton & overwrap 18.5g        Doy pack 10g

A marketplace review of packaging formats for speciality tea can be found in Appendix 3. In summary, packaging weight ranged from 10g to 32g (0.4g - 1.7g per serving).

5.1.3 Instant Coffee
Instant coffee is typically packed in a glass jar with a heat induction heat seal and injection moulded lid. Jar and lid shapes and graphic design are used to create brand differentiation, although the most materially efficient shape for a glass jar is cylindrical (e.g. ASDA’s Mellow Roast) – any deviation from this adds weight to the pack. Lightweighting glass containers by up to 15% is accepted by consumers without an expectation of cost or quality reduction (see Section 3.3.3). The variety of lids currently used also illustrates opportunity for pack weight reduction.
A review of packaging formats currently available for instant coffee can be found in Appendix 5. In summary, packaging weight ranged from 210g to 306g per 100g coffee.

### 5.1.4 Roast and Ground Coffee

Coffee emits carbon dioxide after the roasting and grinding process. If packed immediately after grinding, the packaging must enable the CO₂ to escape, which current practices show is typically done using a built-in vent. If the coffee is no longer “live” it can be packed in a vacuum brick. Current packaging for roast and ground coffee is mostly flexible packaging – either vacuumed or with a vent – in a range of gauges.

### 5.1.5 Speciality Coffee

Speciality coffee was considered alongside single servings and coffee-machine systems. Although large containers of speciality coffee are available, the most common formats currently found in supermarkets are smaller packs, typically containing single-serving sachets – although some formats come in heavier, ready-to-serve cups. Some cappuccinos came with a chocolate shaker, adding weight when compared to non-cappuccino varieties.

Many existing sachets have “head space” above the settled powder, and most cartons showed opportunity for optimisation by having head space above the sachets themselves. For packaging to work at its best, primary, collation and secondary packaging must work together to provide optimum strength (see Figure 12).

Growth in this sector seems to be as a result of the popularity of specialist coffee shops and speciality coffees – including cappuccino, latte and mochas – are readily available in supermarkets.

### Figure 20


*306g (Lid 17g)  299g (Lid 69g)  228g (Lid 9g)  210g (Lid 11g)*

A review of packaging formats currently available for roast and ground coffee can be found in Appendix 6. In summary, packaging weight ranged from 8g to 187g per 227-250g coffee.

### Figure 21

illy’s metal can, Percol’s vented pouch and Lavazza’s vacuum brick.

*3 piece tin 187g                  Vented flexible 8g                  Vacuum laminate 8g*

A review of packaging formats currently available for roast and ground coffee can be found in Appendix 6. In summary, packaging weight ranged from 8g to 187g per 227-250g coffee.

### Figure 22

Nescafé’s single serving cups and Skinny Cappuccino, Kenco’s 3-in-1 coffee sachets, Douwe Egbert’s lightweight coffee bag for use with Senseo machines.

*31.3g per serving     7.3g per serving  2.8g per serving   0.6g per serving*
A review of packaging formats currently available for speciality, machine and single serve coffees can be found in Appendix 7. In summary, packaging weight ranged from 2.8g to 7.3g of packaging per serving for sachet drinks, whilst machine system and single serve coffees showed a more dramatic range from 0.6g to 31.3g of packaging per serving.

### 5.1.6 Hot Chocolate and Malted

A dynamic sector with product offering based on the ‘me time’ or relaxing nature of the product. Common formats, containing from individual servings up to 500g of product, include glass jars, plastic jars and individual sachets. These formats meet both in-home and out-of-home consumer requirements.

![Figure 23](image)

Figure 23 A range of packaging formats for hot chocolate and malted drinks, ranging from square and round glass jars, HDPE and polypropylene jars, and a single serve sachet.

A review of packaging formats currently available for hot chocolate and malted drinks can be found in Appendix 8. In summary, packaging weight ranged from 45g to 456g per 200–500g of product, with single serve sachets weighing between 1g and 5.25g per serving.

### 5.2 Current practice – secondary packaging

Secondary packaging in current use demonstrates the principles outlined in Section 4 ‘Secondary and tertiary packaging’, with minimal secondary packaging for those products in robust primary packs.

#### 5.2.1 Secondary packaging for load-bearing primary packs

Rigid containers such as jars were found to be typically packed into a corrugated tray with shrink wrap.

![Figure 24](image)

Figure 24 Current secondary packaging examples for malted drinks, hot chocolate and instant coffee.

<table>
<thead>
<tr>
<th>Secondary packaging weight:</th>
<th>Total weight per unit – secondary and primary packaging:</th>
</tr>
</thead>
<tbody>
<tr>
<td>53g / 8 units (6.6g per unit)</td>
<td>66.6g</td>
</tr>
<tr>
<td>71g / 12 units (5.9g per unit)</td>
<td>434.9g</td>
</tr>
<tr>
<td>35g / 6 units (5.8g per unit)</td>
<td>304.8g</td>
</tr>
</tbody>
</table>

Cartons, which are partially load-bearing, are currently typically packed into full cases or a modified 0201 style case\(^{16}\), with some examples in speciality tea where cartons are packed into a lightweight tray with shrink wrap (Twinings, Morrison’s).
Figure 25 Current secondary packaging examples for tea.

Secondary packaging weight:
- 330g / 24 units (13.8g per unit)
- 95g / 12 units (7.9g per unit)
- 31g / 6 units (5.2g per unit)

Total weight per unit - secondary and primary packaging:
- 47.8g
- 32.9g
- 19.2g

5.2.2 Secondary packaging for non load-bearing primary packs
Flexible primary formats were found to be typically packed into B-flute corrugated trays.

Figure 26 Current secondary packaging examples non load-bearing primary packs

Secondary packaging weight:
- 154g / 6 units (25.6g per unit)
- 153g / 6 units (25.5g per unit)
- 104g / 6 units (17g per unit)

Total weight per unit - secondary and primary packaging:
- 37.6g
- 36.1g
- 27g
5.2.3 Other formats

Figure 27 Other secondary packaging formats

Carton primary pack with carton U-board and shrink sleeve with tear perforations

Carton primary pack with wraparound corrugated outer

Carton primary pack with thermoformed PET tray

5.2.4 Summary

The overview of current secondary packaging styles above shows that, in principle, load-bearing primary packs required less secondary packaging than non load-bearing primary packs. Additionally, it is shown that there is a lot of variance both between categories and within categories, demonstrating opportunities for overall packaging reduction.
6.0 Concepts

Some hot drinks have physical similarities with cross-category products, for example, instant tea and hot chocolate, or loose tea and ground coffee. Therefore, concepts have not been split into product categories, in order to encourage cross-category inspiration, as each concept may be applicable to more than one product.

See Section 7 for concepts and information on secondary packaging formats.

6.1 General guidance

6.1.1 All categories

- Over-specifying materials and packaging generates financial and environmental waste. For example:
  - Understand the supply chain and ask whether the product realistically needs that long shelf life? If not, material reductions could be made.
  - Understand what barrier properties are required to appropriately protect the product (fit for purpose) without being over-specified.
  - Work with suppliers to develop a performance-based specification which will sufficiently protect the product at lowest materials use and cost.

- Where packaging materials come in to direct contact with foodstuffs, ensure all materials are suitable for food contact.

- If a foiled appearance is required for branding purposes, consider whether this can be achieved using lightweight, metallised films or print effects rather than heavier laminate materials.

6.1.2 Black tea

- If internal metallised pouches are only required to aid transit of teabags within factory, from production to carton, consider replacing with a reusable system.

- Consider a lightweight overwrap to replace internal pouches, or a sift-proof<sup>A</sup> carton design.

- Metallised pouches themselves may provide sufficient barrier properties, in which case they can be collated using minimal materials, e.g. sleeve, flow-wrap or adhesive label.

- Optimise carton and pouch design to remove material, for example:
  - By reducing flap overlap of cartons (Section 3.3.1) and seal size of flexibles (Section 3.3.2).

- Minimise headspace by sizing outer packaging to fit inner components snugly.

6.1.3 Speciality tea

- Consider a recloseable pack to prevent moisture ingress or loss of volatiles, e.g. self adhesive label, bead seal or wire tie for flexible packs, or tack in flaps for cartons.

- Review minimising the sachet materials, e.g. is foil required or could a metallised film, EVOH barrier, paper/polyethylene, or even a simple paper envelope be used instead?

- If individual sachets are being used, the outer (collation) packaging may not need any barrier properties at all, in which case it can be optimised.

- This category is open to innovation and novel pack formats.

6.1.4 Instant coffee

- Round / cylindrical jars are the most materially efficient format. Differentiation can be created by graphics, label style and shape, sleeves and collars, and the shape of the lid (see Concept 20).

- Glass lightweighting can be done in conjunction with tool renewal to avoid new tooling costs. Aim for jars which challenge current lightest in class (ASDA’s 199g glass jar for 100g coffee – see Appendix 5).

- Lightweighting can also be applied to lids. Is a screw-cap required or could a snap-on lid be used?

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<sup>A</sup> A sift-proof carton is one which keeps all tea dust or powder within the pack to prevent contamination of other products.
Refills can be introduced to make the standard jar reusable – refill quantity should be designed to fit the existing container size.

See Section 3.3.3 ‘Jar lightweighting’

6.1.5 Roast and ground coffee

- Reducing headspace in the pack, e.g. through introduction of a vibration unit prior to sealing. Less headspace means less material.
- Reducing film thickness as far as possible without compromising safety of product – remembering that secondary packaging will protect the product through the supply chain. Current packs for ‘live’ coffee use 70-120 micron films whereas vacuum bricks currently use films as low as 40 microns. Consider films of 40-60 microns.
- EVOH can be used as a lightweight barrier in place of thicker or heavier materials.
- Direct print onto the film, eliminating the paper overwrap.
- Consider reclose devices to prevent spoiling or spilling – e.g. a self-adhesive sticker or wire tie. Only incorporate this feature if confident that it will reduce food waste, as it may increase packaging weight.

6.1.6 Speciality, single serve and machine coffee

- Where cartons are used, ensure they are sized to fit internal components tightly and compactly. With boxed sachets, reduce headspace both in sachet itself and in the carton.
- Ensure there is no functional overlap between sachet and carton, e.g. barrier properties.
- Sachets can be manufactured from a laminate as thin as 40 microns if EVOH or metallised films are used.

6.1.7 Hot chocolate and malted drinks

- See Section 6.1.4 ‘Instant coffee’ and 3.3.3 ‘Jar lightweighting’.

6.1.8 Secondary and shelf-ready packaging

- See Section 4 for in-depth guidance on secondary packaging.
- Overarching principle is to avoid functional overlap between the different levels of packaging, i.e. if the primary pack is robust and strong, secondary packaging should be minimal as there is no need for additional strength.
- Secondary packaging can be split into two types, based on the primary packs they contain: load bearing or non-load bearing primary packaging.
  - For load bearing primary packaging (e.g. glass jars, plastic jars, some cartons):
    - Base secondary packaging around shrink or tray and shrink format.
    - Optimise tray wall height to ensure product stability whilst optimising material use.
    - Could a ‘U-board’ or base pad be used instead of a tray? (Figure 9 and Section 7 Concept C)
    - Could cartonboard be used instead of corrugated?
  - For non-load bearing primary packs (e.g. flexible pouches):
    - Secondary packaging should provide stacking strength whilst using minimal materials – e.g. wraparound case (Figure 27 and Section 7 Concept F).

When reviewing the following concepts, please note that:

- Development of any of the following concepts would require trialling to assess suitability for specific products.
- Weight reductions show primary pack only and do not include any secondary packaging.
- Secondary packaging options are suggested for each concept, but are not exhaustive.
- On pack recycling label (OPRL) symbols appear as an indication of potential recyclability only – any packs developed must be checked once finalised. See OPRL website.15
Current good practice examples use minimal packaging materials.

Tetley teabags are packed directly into a flexible bag, with teabags oriented to provide stacking strength. Typhoo teabags are flow-wrapped in 40s, then collated in a lightweight flow-wrap. Punjana teabags are packed into a cartonboard U-board and then flow-wrapped.

**Estimate weight:**
9–16g depending on style

**Comparison to lightest in category:**
Teabags: Same
Waste arising from used teabags

Data in Section 1.4 shows that most of the waste associated with tea is food waste – that is used tea and teabags – rather than packaging waste. In landfill, this type of biodegradable waste can break down anaerobically and generate methane, which is over twenty times more powerful than carbon dioxide as a greenhouse gas.

Waste arising from used teabags could be addressed by:

1. Using the most efficient teabag style - taking into consideration the amount of material used in the bag itself, the volumetric efficiency of the bag when packed, and how the shape of the bag affects how much tea is required.

2. Optimising the amount of tea in each teabag to ensure that as little as possible is thrown away after use.
   - Introduce a ‘one-cup’ variety using less tea
   - Use less tea, combined with optimum teabag shape, to brew desired strength of tea
   - Allow consumers to ‘split’ the teabag in half if required – allowing them to customise the strength of their brew. Ideal for teapots. See Figure 29.

3. Providing guidance on the packaging about alternative disposal methods for used teabags, e.g. composting.
Applying a vacuum to the pouch of teabags could reduce both packing volume and packaging materials.

**Estimate weight:**
7g

**Comparison to lightest in category:**
Teabags: 20% lighter

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An in-store dispensing system that dispenses teabags in multiples of 80 into a paper bag (provided).

Printed stickers with barcodes can be used to seal bag and provide cashier information.

The unit could be tied in to existing loyalty card schemes to create an incentive and to ensure the self-dispensing system is not abused.

Suitable for high volume lines.

**Estimate weight:**
5g

**Comparison to lightest in category:**
Teabags: 44% lighter
Two foil flow-wrap PE bags, containing 40 teabags each, are collated in a clear or decorated PE flow-wrap.

**Estimate weight:**
Foil flow-wrap: 2g (x2=4g)
Collation flow-wrap: 3g

**Comparison to lightest in category:**
Teabags: 20% lighter

---

Two foil flow-wrap PE bags, containing 40 teabags each, are held in a cartonboard printed tray with adhesive.

**Estimate weight:**
Foil flow-wrap: 2g (x2=4g)
Carton tray: 5g

**Comparison to lightest in category:**
Teabags: Same
**Figure 29 Half tea-bag**

**Half-tea bag**
The concept below is a modification of a current Tetley’s teabag. The concept uses 0.18g of paper with 2.06g of tea, and can be used whole, or can be split in half, e.g. for those who prefer to drink tea from cups rather than mugs, who prefer a weaker brew, or who use a teapot.

If split, only 0.09g of paper and 1.03g of tea would be used per half-teabag, significantly reducing food waste.

**Figure 30 Hybrid bag and box solutions**

**Hybrid bag and box solutions**
When carton and pouch are considered together, dramatic material reduction can be achieved, stripping back to the essentials while maintaining the key functional properties of each element. ‘Wally’s Food Company’ use a card gable for printing and maximum product visibility (centre). ‘Spicentice’ (right) use a card wrap instead of a full carton.

Structural requirements can be transferred to appropriately designed secondary packaging.

**Figure 31 Re-usable transit packaging**

**Re-usable transit packaging (see Section 4.3)**

Stand alone flexible packaging pouch can be packed in to load-bearing, reusable secondary cases which are also used at point of sale. Pouch and case size can be optimised to fit pallet and shelf dimensions.
Two foil flow-wrap PE bags, containing 40 teabags each, are held together by a paper label wrap.

**Estimate weight:**
Foil flow-wrap: 2g (x2=4g)
Paper wrap: 4g

**Comparison to lightest in category:**
Teabags: 11% lighter

---

Two foil flow-wrap PE bags, containing 40 teabags each, are held together by two printed sticky labels.

**Estimate weight:**
Foil flow-wrap: 2g (x2=4g)
Label: 0.5g (x2=1g)

**Comparison to lightest in category:**
Teabags: 44% lighter
If high volume teabag lines were sold in quantities of 80s only, rather than stocking 160s and 240s, retailers and producers would benefit from rationalised production and lines.

The retail space opened up in store could be used to sell a refill caddy (see Concept 13).

The same bulk discounts could still be offered to consumers by programming tills and registers to apply a bulk discount when 160 or 240 teabags are purchased.

The higher volume and simplified offer would open up bulk secondary packaging options such as dressed-quarter pallets (DQPs) which could go straight to shop floor – further reducing packaging waste.

Suitable for high volume lines.

---

**Figure 32 Rationalisation of teabag sizes**

- Containing only 40 teabags, this foil flow-wrap has a large decorative reseal sticker.

  This concept would be suitable for products with a delicate fragrance, such as speciality teas.

**Estimate weight:**
- Foil flow-wrap: 2g
- Label: 3g

**Comparison to lightest in category:**
- Teabags: 50% lighter (40 teabags)
This doy pack, as used on ASDA’s Extra Special range (left), could be used for teabags or sachet drinks.

The pack could be made in either lightweight polymers (8g), or from a paper / polyethylene laminate (10g).

**Estimate weight:**
8g

**Comparison to lightest in category:**
Speciality tea: 20% lighter

---

A paper / PE bag with metal tab for re-closing, containing 40 jumble-packed tea bags.

**Estimate weight:**
Bag: 6g
Metal tab: 4g

**Comparison to lightest in category:**
Speciality tea: Same
A laminate construction pack with top opening and reseal sticker. Image in top right is Amcor’s FlexCan®

<table>
<thead>
<tr>
<th>Estimate weight:</th>
<th>Comparison to lightest in category:</th>
</tr>
</thead>
<tbody>
<tr>
<td>9g</td>
<td>Teabags: Same</td>
</tr>
<tr>
<td></td>
<td>Speciality tea: 10% lighter</td>
</tr>
</tbody>
</table>

Reducing head space in flexible bags is possible with new equipment such as vibrating conveyors. Between 15% and 25% of material could be saved.

Applies to loose filled (not vacuum packed) products only.

<table>
<thead>
<tr>
<th>Estimate weight:</th>
<th>Comparison to lightest in category:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4g</td>
<td>Roast and ground coffee: 20% lighter</td>
</tr>
</tbody>
</table>

http://www.amcor.com/businesses/healthcare/personal_care/amcor_afhc_personal_standup.html
Initial purchase is sold in a 40 micron flexible bag within a branded caddy. The following, refill purchases are sold in the flexible bag only. Note, a price differentiation between the two formats would encourage consumers to buy-in to the refill system.

<table>
<thead>
<tr>
<th>Estimate weight:</th>
<th>Comparison to lightest in category:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caddy: 100g</td>
<td>Instant coffee: 1 purchase: 50% lighter</td>
</tr>
<tr>
<td>Bag: 5g</td>
<td>10 purchases: 93% lighter</td>
</tr>
<tr>
<td>After 1 purchase: 105g</td>
<td>Hot chocolate: 1 purchase: 233% heavier</td>
</tr>
<tr>
<td>After 10 purchases: 150g</td>
<td>10 purchases: 66% lighter</td>
</tr>
</tbody>
</table>

*Figure 33* Examples of caddies currently in the market place for instant coffee (Japan), roast and ground (New Zealand), hot chocolate (UK) and tea (UK)

Like printer cartridges and water filters, coffee pods could be engineered to be recoverable. A retail store may have collection points where consumers can bring their used cartridges. These would be collected, coffee grounds would be recovered for industrial composting and energy creation, and the cartridges themselves could be reconditioned for re-use, much like a printer cartridge. The manufacturer may choose to invest any money saved into community or environmental schemes, or price reductions, to encourage consumers to return their used cartridges.

---

**13** Suitable for

- TEA
  - BAGS
  - LOOSE
  - SPECIALTY
- COFFEE
  - INSTANT
  - ROAST & GROUND
  - SPECIALTY
- CHOC & MALTED
  - LOOSE
  - SACHETS
- SECONDARY PACK
  - F/H/I

---

*Examples taken from:* [http://www.wrap.org.uk/retail/tools_for_change/international_packaging_study/index.html](http://www.wrap.org.uk/retail/tools_for_change/international_packaging_study/index.html)
A pack of roast and ground coffee is portioned in three sections, ensuring that the unused coffee is kept absolutely fresh to ensure customer satisfaction, and to reduce food waste associated with unused roast and ground coffee or leaf tea.

Also suitable as a refill for powdered drinks which are moisture or odour sensitive e.g. hot chocolate and instant coffee.

**Estimate weight:**
Bag: 8.8g

**Comparison to lightest in category:**
Roast and ground coffee: 10% heavier
Hot chocolate and malted: 80% lighter

---

An in-store grinding and dispensing system that grinds coffee beans on-site, thereby ensuring freshness and reducing the requirements of the packaging. Consumers dispense directly into a purchasable reusable caddy – or minimal packaging can be provided at the unit.

Printed stickers with barcodes can be used to seal bag and provide cashier information.

The unit could be tied in to existing loyalty card schemes to create an incentive and to ensure the self-dispensing system is not abused.

Suitable for high volume lines.

**Estimate weight:**
Caddy: 50g

**Comparison to lightest in category:**
After 10 purchases: 38% lighter
### Estimate weight:
- Container: 12g
- Lid: 4g

### Comparison to lightest in category:
- Instant coffee: 92% lighter

---

**Pressure formed aluminium shaped container. Thin wall sections improve volumetric efficiency of pack. Could be developed in to “fridge pack” with potential premium implications, e.g. roast and ground coffee.**

---

### Estimate weight:
- Pouch: 15g

### Comparison to lightest in category:
- Instant coffee: 93% lighter

---

**A spout formed in to the seal means this flexible pouch could be used to decant from, rather than simply to refill a caddy. Incorporating a single spoon measuring system increases convenience. A ‘zip’ could be incorporated for reclosure.**
The consumer takes a simple bag from the dispensing stand and fills it from the dispenser. A printed sticker (with barcode) is also dispensed to seal the bag ready for scanning. The consumer can then refill their own caddy at home. Ideal for high volume lines.

**Estimate weight:**
Bag: 3g

**Comparison to lightest in category:**
Instant coffee: 99% lighter

### Suitable for

<table>
<thead>
<tr>
<th>18</th>
<th>Suitable for</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TEA</td>
<td>TEA BAGS</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOOSE</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPECIALITY</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>COFFEE</td>
<td>INSTANT</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ROAST &amp; GROUND</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPECIALITY</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>CHOC &amp; MALTED</td>
<td>LOOSE</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SACHETS</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**SECONDARY PACK**
Bespoke bulk container

---

A lightweighted round jar with a wide neck is the most materially efficient shape.

Lightweight the jar as far as possible and consider reducing the closure, e.g. a snap on minimal lid.

A shrink sleeve can be used to secure lid and provide overall decoration.

**Estimate weights**

| Jar: 193g (glass) | 35g (plastic) |
| Lid: 9g |

**Comparison to lightest in category:**

Instant coffee: 4% lighter
A standard lightweight jar can be used with a variety of labels, sleeves, caps and graphics, in order to create differentiation.

**Estimate weight:**
- Jar: 193g (glass) / 35g (plastic)
- Lid: 9-12g
- Sleeve/label: 2-12g

**Total:** 46 - 217g

PET, PP or HDPE are lightweight materials and can be used to produce thin walled jars, but do not have the same barrier properties as glass. The smaller product footprint may enable more units to be packed per vehicle, pallet and shelf, which could reduce business costs (see Section 4.4). Example shows Poulain Grand Arôme HDPE jar containing 1kg hot chocolate and weighing only 82.5g (including lid).

**Estimate weight:**
- Jar: 40g
- Lid: 10g

**Comparison to lightest in category:**
- Instant coffee: 76% lighter
Efficient use of resources in hot drinks packaging design

Product is packed in a pot with a foil heat seal. Reusable lid with pouring spout is used to pierce foil and dispense product. Could be developed with optional dosing mechanism (right). Only packaging for repeat purchases is lightweight pot.

**Estimate weight:**
- Pot: 25g
- Lid: 40g
- After 1 purchase: 65g
- After 10 purchases: 290g

**Comparison to lightest in category:**
- Instant coffee: 1 purchase: 69% lighter
- 10 purchases: 86% lighter
- Hot chocolate: 1 purchase: 44% heavier
- 10 purchases: 36% lighter

---

Product is packed into a 40 micron film liner, inside a rolled carton tub, closed with PET thermoformed lid. Liner could be recloseable, e.g. zip, tie, adhesive tab, etc. Must be trialled to check moisture and odour barriers are sufficient for product.

**Estimate weight:**
- Carton: 9g
- Bag + Lid: 9g

**Comparison to lightest in category:**
- Speciality coffee: 36% lighter
- Hot chocolate: 60% lighter

---

5 Image courtesy of [http://reviews.crateandbarrel.com/7258/29942/reviews.htm](http://reviews.crateandbarrel.com/7258/29942/reviews.htm)
24 Suitable for

TEA
- TEA BAGS
- LOOSE
- SPECIALITY

COFFEE
- INSTANT
- ROAST & GROUND
- SPECIALITY
- LOOSE
- SACHETS

CHOC & MALTED
- SECONDARY PACK

Comparison to lightest in category:
- Hot chocolate: 56% lighter
- Speciality coffee: 29% lighter

A flexible bag contains the product and is held inside a carton.

The confectionary connotations of this type of carton (e.g. Cadbury Roses, right) would be ideal for hot chocolate, malted drinks and speciality coffees.

**Estimate weights**
- Carton: 16g
- Bag: 4g

Comparison to lightest in category:
- Hot chocolate: 56% lighter
- Speciality coffee: 29% lighter

25 Suitable for

TEA
- TEA BAGS
- LOOSE
- SPECIALITY

COFFEE
- INSTANT
- ROAST & GROUND
- SPECIALITY
- LOOSE
- SACHETS

CHOC & MALTED
- SECONDARY PACK

Comparison to lightest in category:
- Hot chocolate: 38% lighter

A lightweight polystyrene or paperboard tub and lid with seal.

This format is already used for prepare-at-home single serve hot chocolate (right). The format has hot drinks connotations and is reminiscent of take-away hot drinks cups.

**Estimate weight:**
- 28g

Comparison to lightest in category:
- Hot chocolate: 38% lighter
**Estimate weight:**
Pouch: 28g

**Comparison to lightest in category:**
Hot chocolate: 20% lighter
Instant coffee: 80% lighter

---

**Estimate weight:**
Wrappers: 6g (8 servings)

**Comparison to lightest in category:**
Hot chocolate: 30% lighter
Speciality coffee: 40% lighter
A lightweight carton with an overwrap and removable slot at front, creating a home dispenser for sachet drinks or individual teabags. This is not lighter than ASDA’s speciality tea packed in a doy pack (10g) but does show a saving against the lightest boxed speciality tea (Tesco Soothing), through optimising the material, carton design, flap overlap, etc.

**Estimate weight:**
- Carton: 13g
- Overwrap: 0.5g

**Comparison to lightest in category:**
Boxed speciality tea: 7% lighter

---

An in-store, refillable dispenser enabling the consumer to select the amount of sachets they wish to purchase. This retains the majority of waste in the supply chain, with the consumer only disposing of the sachets themselves.

**Estimate weight:**
- Sachet: 0.5g each
By eliminating head space in cartons containing sachet drinks, around 20% in packaging material could be saved. Kenco has already optimised the headspace both in the sachets and the carton of their “3 in 1” sachet drink (right), which is the lightest in class.

**Estimate weight:**
- Carton: 18g
- Sachets: 1g each

**Comparison to lightest in category:**
- Speciality coffee: Same

A flexible pack with reseal sticker, containing sachets or individual tea bags.

The pack could be made in either lightweight polymers (3g), or from a paper / polyethylene laminate (5g).

**Estimate weights**
- Flexible pack: 5g
- Sachets: 1g each (x10=10g)

**Comparison to lightest in category:**
- Speciality coffee: 46% lighter
Sachets are contained in a lightweight net bag with tag. Ideal for individually wrapped tea bags and sachet drinks.

The format could play on a “citrus” theme, e.g. for speciality teas containing citrus flavours.

Estimate weight:
Bag + Label: 3g
Sachets: 0.5 - 1g each

Comparison to lightest in category:
Speciality coffee: 54% lighter

A strip of perforated sachets are rolled in to a bundle and secured with a small adhesive label.

These could be jumble packed in to a large outer, or packed vertically in a single layer, where the rolled formation would give good vertical stacking strength.

Estimate weight:
Label: 2g
Sachets: 0.5 - 1g each

Comparison to lightest in category:
Hot chocolate: 70-80% lighter
Speciality coffee: 0-30% lighter
### 7.0 Secondary packaging concepts

#### Table 2 Secondary packaging formats and properties

<table>
<thead>
<tr>
<th>Image</th>
<th>Examples</th>
<th>Description</th>
<th>Suitable for</th>
<th>Estimate weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Examples: Yorkshire tea &amp; Vittel water</td>
<td>Shrink or film only. Lightweight. Product visibility.</td>
<td>Load bearing and partially load bearing primary packs with stable shapes (i.e. those which won’t tip over under shrink)</td>
<td>5g</td>
</tr>
<tr>
<td>B</td>
<td>Coca Cola</td>
<td>Layer pad with shrink wrap. Lightweight whilst adding support at base and assisting transfer to shelf.</td>
<td>Load bearing and partially load bearing primary packs with stable shapes (i.e. those which won’t tip over under shrink)</td>
<td>18g</td>
</tr>
<tr>
<td>C</td>
<td>Dolce Gusto</td>
<td>U-board base with shrink wrap. Lightweight whilst adding support at base and assisting transfer to shelf.</td>
<td>Load bearing and partially load bearing primary packs with stable shapes (i.e. those which won’t tip over under shrink)</td>
<td>25g</td>
</tr>
</tbody>
</table>

* Estimate weights assume each secondary pack contains six units
<table>
<thead>
<tr>
<th>Image</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Twinings, Morrisons, Douwe Egberts</td>
</tr>
<tr>
<td></td>
<td><img src="image1" alt="Image Example" /></td>
</tr>
<tr>
<td>Description:</td>
<td>Tray and shrink. Lighter than a full case. Tray goes direct on shelf as SRP.</td>
</tr>
<tr>
<td>Suitable for:</td>
<td>Load bearing and partially load bearing primary packs with stable shapes (i.e. those which won’t tip over under shrink).</td>
</tr>
<tr>
<td>Estimate weight*:</td>
<td>35g</td>
</tr>
<tr>
<td>E</td>
<td>Carton with cap and tray and flexible pouch with cap and tray</td>
</tr>
<tr>
<td></td>
<td><img src="image2" alt="Image Example" /></td>
</tr>
<tr>
<td>Description:</td>
<td>Cap, tray and shrink. Cap prevents unstable shapes from tipping together and prevents crush damage from the pressure of shrink process. Tray goes direct on shelf as SRP.</td>
</tr>
<tr>
<td>Suitable for:</td>
<td>Load bearing and partially load bearing primary packs, including those with unstable shapes, which are not dimensionally stable. Frequently, a cap is used unnecessarily, i.e. when tray and shrink alone would be sufficient.</td>
</tr>
<tr>
<td>Estimate weight*:</td>
<td>70g</td>
</tr>
<tr>
<td>F</td>
<td>Shreddies</td>
</tr>
<tr>
<td></td>
<td><img src="image3" alt="Image Example" /></td>
</tr>
<tr>
<td>Description:</td>
<td>Wraparound case. Typically modified with perforations so base can be placed directly onto shelf. Provides strength and formation for vertical stacking, whilst using less material than a full 0201 case.</td>
</tr>
<tr>
<td>Suitable for:</td>
<td>Non load-bearing or partially load bearing primary packs, including those which are not dimensionally stable under shrink.</td>
</tr>
<tr>
<td>Estimate weight*:</td>
<td>105g</td>
</tr>
</tbody>
</table>

* Estimate weights assume each secondary pack contains six units
<table>
<thead>
<tr>
<th>Image</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G</strong></td>
<td><strong>Description:</strong> 0200 case or deep sided tray without shrink wrap (vertical fluting). Can be modified for use as SRP. Standard format which provides structure to non-robust primary packs. Removal of top flaps may increase decanting speed at warehouse or store. <strong>Suitable for:</strong> Stable items in a known supply chain environment, including load-bearing and non load-bearing primary packs. Care must be taken in pallet stacking patterns. <strong>Estimate weight</strong>: 115g</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td><strong>Description:</strong> 0201 case or 0201 case with modifications. Standard format which provides structure to non-robust primary packs. High material use. <strong>Suitable for:</strong> Non load-bearing primary packs. <strong>Estimate weight</strong>: 160g</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td><strong>Description:</strong> Returnable transit packaging (RTP), display/dressed quarter pallets (DQP) and bulk pallet shippers. All reduce the packaging to product ratio. <strong>Suitable for:</strong> RTP suitable for high volume applications with established backhaul route. DQP suitable for fast moving lines – high quality printed frontage or pallet sleeve could be reused at point of sale and replenished with unprinted trays. Pallet Shippers remain in the warehouse and are suitable for items which are single-picked to store.</td>
</tr>
</tbody>
</table>

* Estimate weights assume each secondary pack contains six units
<table>
<thead>
<tr>
<th>Image</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>ASDA decaffeinated green tea, Co-op tomato puree</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Shaped or formed tray, usually with shrink wrap, e.g. thermoformed PET or shaped corrugated trays with die cut base / insert.</td>
</tr>
<tr>
<td></td>
<td>Suitable for: Lightweight, irregularly shaped primary packs which would otherwise be difficult to orient on shelf.</td>
</tr>
<tr>
<td></td>
<td><strong>Estimate weight</strong>: 12 - 40g</td>
</tr>
<tr>
<td>K</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Bespoke solutions</td>
</tr>
<tr>
<td></td>
<td>Suitable for: Using the geometric features of the primary pack to collate multiples</td>
</tr>
</tbody>
</table>

* Estimate weights assume each secondary pack contains six units
8.0 Communicating with the consumer

Currently, consumers are aware of the issues surrounding packaging but are not as familiar with the implications of food waste. There is often little understanding of packaging’s role in preserving food and its role in protecting the embedded carbon within the product (the carbon cost of growing / manufacturing / transporting it). WRAP’s “Love Food, Hate Waste” campaign aims to raise consumer awareness of the food waste issue. It encourages consumers to adapt their habits by offering simple tips on how to maximise the use of the food they buy, and encourages brands and retailers to ‘add their voice’ to the campaign.

Some resource optimisation techniques can be implemented without being noticed by the consumer; leaving the decision with the brand owner as to whether or not to make an environmental statement about the change. However, packaging recycling and food waste reduction relies upon the behaviours of the consumer, and so a partnership must be created. This involves a greater level of communication to ensure that consumers understand how to play their part.

8.1 On-pack communication and consumer behaviour

Mintel suggests that, as packaging already plays a role in communication, it is well placed to become the principal tool in communicating environmental messages, yet must do so without being over prescriptive or patronising the consumer.

8.1.1 Communicating changes in packaging

If a company wants to highlight, promote, or explain a packaging change, this can be done through advertising, in store messaging – at shelf, aisle or merchandising display unit level, or on-pack messaging. On-pack messaging can be applied to both primary and shelf-ready packaging. Short run messaging can be achieved without costly artwork changes by using stickers, flashes, or SRP to communicate the message. Alternatively, the graphic design of the primary pack design may be used to communicate the change. The examples below show how product recognition can be achieved despite a dramatic format change, through clever use of graphics.

Kenco’s Eco Refill uses the outline of a jar shape and printed coffee granules to give the impression of a glass jar and aid in consumer recognition. Supersal window cleaner in a refill pouch clearly displays the outline of a trigger pack, helping consumers to recognise the product (Figure 35).

8.1.2 Disposal of packaging

Consumers are environmentally concerned and accept recycling as a social responsibility (three quarters claim to care how much packaging there is on food and drink), however packaging recyclability is not a key behavioural or purchase driver.

To date, communication of packaging recyclability has been confusing, with the inconsistent use of a variety of symbols. New UK-wide packaging symbols from the On-Pack Recycling Label scheme were launched in 2009 to help consumers to differentiate between packaging types that are ‘widely recycled’, ‘check local recycling’ and ‘not currently recycled’.

“Research shows that consumers are often frustrated that they don’t know what packaging can and cannot be recycled and are looking for much clearer on-pack guidance to improve their understanding. The On-Pack Recycling Label scheme aims to deliver a simpler, UK-wide, consistent, recycling message to help consumers recycle more material, more often.”

Figure 35 Kenco’s Eco Refill and Supersal window cleaner

As seen on the International Packaging Study database:
http://www.wrap.org.uk/retail/tools_for_change/international_packaging_study/
To quote the Mintel ‘Food Packaging - Market Intelligence report’, “In future, defining and labelling packaging in the UK should not just be a case of ensuring materials fit certain criteria, but of educating consumers to understand and undertake correct disposal habits.”

8.1.3 Disposal of food and drink waste
As a large proportion of the food waste associated with drinks is from used tea bags and coffee grounds, on-pack messaging advising consumers of the disposal options may be appropriate. For example, both coffee grounds and teabags can be used in the garden, not only for composting but for home remedies; many websites claim that coffee and tea can be used in the garden to add nitrogen, deter slugs, snails and unwanted cats, to encourage worms, and as a soil conditioner for roses and acid-loving plants. The Starbucks website\(^\text{U}\) even has a page dedicated to using coffee grounds in the garden, and provides free used coffee grinds for gardeners to take away from their North American stores.

9.0 Summary

Around £1,383 million worth of hot drinks are sold in the UK annually, using in the region of 50,000 tonnes of packaging and generating over 500,000 tonnes of food waste each year; both of which have financial implications and environmental costs.

Packaging materials have embedded environmental and financial costs. Reducing material usage therefore reduces the associated cost of the material. Recovering the value of these materials after use, through recycling or reuse, ensures that these embedded costs are not lost to landfill.

This report provides details of numerous design optimisation techniques, and presents concepts to inspire the development of efficient primary, secondary and tertiary packaging, throughout the category, through the adoption of best practice, incremental changes, and more revolutionary innovation.

It is recommended that stakeholders across manufacturing and retail consider the following:

- Take advantage of continued opportunities to reduce packaging material entering the waste stream, and the associated cost savings from optimisation, material reduction, volumetric efficiencies and other industry good practice.
- Target the top causes of both packaging and food waste.
- Maintain a holistic perspective on waste reduction; understanding trade-offs between consumer and supply-chain packaging and between packaging and food waste.
- Engage with consumers through relevant communication, and assist them in achieving their personal desire to reduce waste.

Although revolutionary changes could require significant investment and collaboration across the industry, addressing customer and consumer demand will provide business opportunity for companies in the hot drinks sector and position them for the future in a changing climate.
Appendix 1

Legislative drivers – further information on Section 1.5

The European Union framework, *Packaging and Packaging Waste Directive 94/62/EC*, was adopted at the end of 1994 and subsequently amended by Directive 2004/12/EC. In the UK, the following two laws have implemented it:

- **Producer Responsibility Obligations (Packaging Waste) Regulations 2008.** Most EU countries have adopted a ‘Green Dot’ system to implement the Directive’s recovery and recycling targets. The UK has taken a ‘shared approach’ where companies in all parts of the supply chain, from raw material suppliers through to retailers take a share of the financial obligation to meet the targets through the PRN system; and

- **Packaging (Essential Requirements) Regulations 2003 (amended 2006).** These Regulations require companies to ensure that their packaging is designed to be fit for purpose and is the minimum weight and volume needed for safety, hygiene and consumer acceptability. The packaging may be reusable and it must be capable of being recovered through at least one of material recycling, incineration with energy recovery or composting and biodegradation.

The Government set out the UK vision for sustainable waste management in *Waste Strategy for England 2007* on 24 May 2007. This sets a new target to reduce the amount of household waste not reused, recycled or composted from 22.3 million tonnes in 2000 to 12.2 million tonnes in 2020, with an interim target of 15.9 million tonnes by 2010. It also sets higher targets for recycling and composting of household waste – at least 40% by 2010, 45% by 2015 and 50% by 2020.

The *Climate Change Act 2008* introduces the world’s first long-term, legally binding framework to tackle the dangers of climate change. It requires a reduction in greenhouse gas emissions of at least 80% by 2050 and 26% by 2020, against a 1990 baseline. In 2009, the government will issue guidance on the way companies should report their greenhouse gas emissions. The act has also given powers to introduce pilot financial incentive schemes in England for household waste.

More details on DEFRA’s Packaging Strategy 2009 can be found at: [http://www.defra.gov.uk/environment/waste/topics/packaging/strategy.htm](http://www.defra.gov.uk/environment/waste/topics/packaging/strategy.htm)
Appendix 2

80 teabags - current practice

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
</table>
| Twinings - Everyday | Carton outer with two biodegradable laminate flow wraps | Foil bags: Biodegradable laminate: 5g  
Carton: 45% recycled carton board: 35g  
**Total weight: 40g** | No secondary packaging information available. |
| Tesco | Recycled skillet carton with 2 x foil bags | Foil bags:  
Foil PE laminate: 2 x 2g  
Carton: 300 µ recycled uncoated board: 30g  
**Total weight: 34g** | One piece corrugated case. Perforated and printed for use as SRP. 24 units. Total weight: 330g. Per unit: 13.75g |
| PG tips | Bespoke carton with hinged lid and internal top flap with tear out panel. Overwrapped. | Acetate film: 2g  
Carton: 400 µ FBB carton board: 30g  
**Total weight: 32g** | Printed carton tray and shrink wrap. |
| teadirect - decaffeinated fair-trade tea ASDA - English breakfast tea bags | Skillet carton with tear tape and 2 foil bags | Foil bags:  
Foil PE laminate: 2 x 2g  
Carton: 420 µ FBB carton board: 27g  
**Total weight: 31g** | No secondary packaging information available. |
| Morrisons - Organic Fairtrade ASDA - Gold Teabags Co-operative - Organic Fairtrade teabags Sainsbury’s - Red Label Fairtrade tea | Overwrapped caddy style carton with hinged lid and internal top flap with tear out panel | Overwrap:  
Acetate film: 2.7g  
Carton: FBB carton: 28g  
**Total weight: 30.5g** | Morrisons, ADA, Co-op: Polyethylene shrink wrap only.  
Sainsbury’s: One piece corrugate tray with shrink wrap |
<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Diplomat</em> – <em>Gold Label</em></td>
<td>Skillet carton with tear tape and 2 foil bags</td>
<td>Foil bags: Foil PE laminate: 2 x 2g</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carton: 350µ FBB carton board: 24g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 28g</strong></td>
<td></td>
</tr>
<tr>
<td><em>Tesco Value</em></td>
<td>Tray style carton with hinge lid. Overwrapped.</td>
<td>Overwrap: Acetate film: 1g</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carton: 380µ FBB carton board: 25g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 26g</strong></td>
<td></td>
</tr>
<tr>
<td>*Thompsons Family Teas – <em>Punjana</em></td>
<td>Foil laminate stabilo style bag with internal U-board.</td>
<td>Flexible outer: 90µ foil PE laminate: 7g</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internal U-board: 500 micron FBB carton board: 9g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 16g</strong></td>
<td></td>
</tr>
<tr>
<td><em>Typhoo – decaf</em></td>
<td>Flow-wrap style bag with 2 internal foil bags and reseal label. Teabags are stacked and flow-wrapped.</td>
<td>Foil bags: 30µ film: 2 x 2g</td>
<td>One piece corrugated tray. Perforated and printed for use as SRP. 12 units. Total weight: 327g Per unit: 27.25g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexible outer: 70µ PE Foil PE laminate: 8g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 12g</strong></td>
<td></td>
</tr>
<tr>
<td><em>Tetley</em></td>
<td>Pre made bag with teabags stacked internally for strength. Bag has a reseal label.</td>
<td>Flexible outer: 100µ PE Paper PE: 9g</td>
<td>2 x corrugated tray, each printed for use as SRP. Each containing 12 units. Trays are stacked and held together using 1 x deep hood and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 9g</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Lightest Carton:** 24g  
**Lightest Overwrap:** 1g  
**Lightest Foil Bags:** 2 x 2g  
**Lightest Flow-wrap Bag:** 7g  

*Efficient use of resources in hot drinks packaging design*
Appendix 3

Speciality tea – current practice

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetley – Blackberry Bounce 20 pack</td>
<td>Foil lined carton tub with metal base, foil seal and injection moulded plastic lid.</td>
<td>Tub: Composite body, polypropylene lid, tin base, with foil/PE seal</td>
<td>Gravity feed printed carton SRP unit with tear out panel for access.</td>
</tr>
</tbody>
</table>
| Good Earth – Organic Cool Mint 18 pack | Parallel tuck in end carton with tea bags in foil sachets | Carton: 440µ WLC carton board: 22g  
Sachets: 40µ paper/foil/PE sachets: 18 x 0.5g | No secondary packaging information available. |
| Tesco Finest – Earl Grey 50 pack | Skillet carton with insert and internal foil bag. | Carton: 410µ FBB carton: 23g  
Inner bag: 20µ foil/PE: 2g | One piece unprinted corrugated wraparound case. Perforated to create open fronted SRP tray. 12 units. Total weight: 95g  
Per unit: 7.9g |
| Twinings – Digestif 20 pack | Carton tray overwrapped and containing individual sachets. | Carton: 370µ FBB carton board: 13g  
Sachets: 40µ paper/PE sachets: 20 x 0.5g  
Overwrap: 0.5g | Printed cartonboard tray and shrink wrap. 4 units. |
| Twinings 20 pack | Bespoke carton tray with internal panel and concora tear panel for a hinged lid. | Carton: 420µ FBB carton board: 21g | Printed cartonboard tray and shrink wrap. 4 units. |
| Lipton – Tchaé 25 pack | Carton tub with internal panel and tear tape lid. Individual sachets. | Tub: 480µ FBB carton board: 9g  
Sachets: Paper/PE sachets: 25 x 0.5g | No secondary packaging information available. |
<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetley – Peppermint Punch</td>
<td>Hinged carton board tray with acetate overwrap.</td>
<td>Carton: 370μ, FBB carton: 18g&lt;br&gt;Overwrap: 0.5g&lt;br&gt;&lt;strong&gt;Total weight: 18.5g&lt;/strong&gt;&lt;br&gt;(Per serving: 0.46g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Tick Tock – Rooibos Green Tea</td>
<td>Reverse tuck in end carton with overwrap</td>
<td>Carton: 430μ, FBB carton board: 18g&lt;br&gt;Overwrap: 0.5g&lt;br&gt;&lt;strong&gt;Total weight: 18.5g&lt;/strong&gt;&lt;br&gt;(Per serving: 0.46g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Diplomat – Peppermint Herbal Tea</td>
<td>Carton tray format with overwrap</td>
<td>Carton: 370μ, FBB carton board: 16g&lt;br&gt;Overwrap: 1g&lt;br&gt;&lt;strong&gt;Total weight: 17g&lt;/strong&gt;&lt;br&gt;(Per serving: 0.425g)</td>
<td>Cartonboard tray and shrink wrap. Printed for use as SRP.</td>
</tr>
<tr>
<td>Clipper – Decaff Green Tea</td>
<td>Skillet carton with overwrap</td>
<td>Carton: 390μ, FBB carton board: 15g&lt;br&gt;Overwrap: 0.5g&lt;br&gt;&lt;strong&gt;Total weight: 15.5g&lt;/strong&gt;&lt;br&gt;(Per serving: 0.6g)</td>
<td>Open front corrugated tray and shrink wrap. Unprinted.</td>
</tr>
<tr>
<td>Tesco – Soothing</td>
<td>Skillet carton with overwrap</td>
<td>Carton: 370μ, FBB carton board: 14g&lt;br&gt;Overwrap: 0.5g&lt;br&gt;&lt;strong&gt;Total weight: 14.5g&lt;/strong&gt;&lt;br&gt;(Per serving: 0.73g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Morrisons – Mint green tea</td>
<td>Skillet carton with internal foil bag</td>
<td>Carton: 400μ, FBB carton board. 13g&lt;br&gt;Foil PE bag 1g&lt;br&gt;Total weight: 14g&lt;br&gt;(Per serving: 0.7g)</td>
<td>Unprinted white lined tray with fold-over lock-in tabbed sides. 6 units. Total weight: 31g Per unit: 5.2g</td>
</tr>
<tr>
<td>ASDA - Extra Special</td>
<td>Doy pack style pouch with reseal minigrip</td>
<td>Pouch: 100μ PP/foil/PE film with polypropylene ‘minigrip’: 10g&lt;br&gt;&lt;strong&gt;Total weight: 10g&lt;/strong&gt;&lt;br&gt;(Per serving: 0.4g)</td>
<td>Load bearing 0201 corrugated carton. Perforated and printed for use as SRP.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lightest 40 carton</th>
<th>16g</th>
<th>370 micron</th>
<th>Diplomat Peppermint Herbal Tea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightest 20 carton</td>
<td>13g</td>
<td>400 micron</td>
<td>Morrisons Mint green tea</td>
</tr>
<tr>
<td>Lowest container</td>
<td>9g</td>
<td>480 micron</td>
<td>Lipton Tchaé (25 teabags)</td>
</tr>
<tr>
<td>Lowest weight per serving</td>
<td>0.4g</td>
<td></td>
<td>Extra Special (25 teabags)</td>
</tr>
</tbody>
</table>
### Instant tea - current practice

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact. Wide range of pack sizes and serving size prevents comparison between products.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
</table>
| Lift – instant Lemon flavour tea 150g (21 servings) | Glass jar with injection moulded lid and paper wrap around label. | Jar: Glass: 259g  
Lid: Polypropylene: 8g  
**Total weight: 267g**  
(Per 10g of product: 17.8g)  
(Per serving: 12.7g) | Printed corrugated tray and shrink wrap. |
| Typhoo – QT 150g (60 servings) | Glass jar with injection moulded lid and paper wrap around label. | Jar: Glass: 270g  
Lid: Polypropylene: 9g  
**Total weight: 279g**  
(Per 10g of product: 18.6g)  
(Per serving: 4.7g) | Printed corrugated tray and shrink wrap. |
| PG tips – pure tea granules 40g (80 servings) | Glass jar with injection moulded lid and paper wrap around label. | Jar: Glass: 236g  
Lid: Polypropylene: 18g  
**Total weight: 254g**  
(Per 10g product: 63.5g)  
(Per serving: 3.2g) | Printed corrugated tray and shrink wrap. |
### Appendix 5

**Instant coffee 100g - current practice**

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lid: Polypropylene: 17g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 306g</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lid: Polypropylene: 17g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 306g</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lid: Glass with polypropylene insert: 69g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 299g</strong></td>
<td>Per unit: 5.8g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lid: Polypropylene: 25g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 293g</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lid: Polypropylene: 11g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 286g</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lid: Polypropylene: 16g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 279g</strong></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Packaging description</td>
<td>Materials and weight</td>
<td>Distribution packaging</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------</td>
<td>-------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Cafédirect - Fair-trade</td>
<td>Glass jar with injection moulded</td>
<td>Jar: Glass: 266g, Lid: Polypropylene: 12g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td>Decaffeinated</td>
<td>lid. Front and back paper labels.</td>
<td>Total weight: 278g</td>
<td></td>
</tr>
<tr>
<td>Nescafé – Original</td>
<td>Glass jar with injection moulded</td>
<td>Jar: Glass: 265g, Lid: Polypropylene: 11g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>lid. Front and back paper labels.</td>
<td>Total weight: 276g</td>
<td></td>
</tr>
<tr>
<td>Kenco – Rappor</td>
<td>Glass jar with injection moulded</td>
<td>Jar: Glass: 261g, Lid: Polypropylene: 14g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>lid. Paper wrap around label.</td>
<td>Total weight: 275g</td>
<td></td>
</tr>
<tr>
<td>Morrisons – Gold Decaffeinated</td>
<td>Glass jar with injection moulded</td>
<td>Jar: Glass: 253g, Lid: Polypropylene: 11g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>lid. Front and back paper labels.</td>
<td>Total weight: 264g</td>
<td></td>
</tr>
<tr>
<td>ASDA Smart Price – Instant</td>
<td>Glass jar with injection moulded</td>
<td>Jar: Glass: 223g, Lid: Polypropylene: 12g</td>
<td>Printed and unprinted corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td>Coffee Granules</td>
<td>lid. Paper wrap around label.</td>
<td>Total weight: 235g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tesco Finest – Brazilian</td>
<td>Glass jar with injection moulded</td>
<td>Jar: Glass: 220g, Lid: Polypropylene: 11g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>lid. Shrink sleeve label.</td>
<td>Total weight: 231g</td>
<td>Per unit: 6.8g</td>
</tr>
<tr>
<td>Name</td>
<td>Packaging description</td>
<td>Materials and weight</td>
<td>Distribution packaging</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------------------</td>
<td>----------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label.</td>
<td>Lid: Polypropylene: 9g</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total weight: 229g</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maxwell House</strong></td>
<td>Glass jar with injection moulded lid.</td>
<td>Jar: Glass: 217g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label.</td>
<td>Lid: Polypropylene: 12g</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total weight: 229g</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Morrisons – Full Roast</strong></td>
<td>Glass jar with injection moulded lid.</td>
<td>Jar: Glass: 219g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label.</td>
<td>Lid: Polypropylene: 9g</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total weight: 228g</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Clipper – Organic &amp; ASDA – Organics</strong></td>
<td>Glass jar with injection moulded lid.</td>
<td>Jar: Glass: 211g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label.</td>
<td>Lid: Polypropylene: 10g</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total weight: 221g</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tucano</strong></td>
<td>Glass jar with injection moulded lid.</td>
<td>Jar: Glass: 206g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label.</td>
<td>Lid: Polypropylene: 11g</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total weight: 217g</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Co-operative – Fairtrade gold roast</strong></td>
<td>Glass jar with injection moulded lid and heat seal</td>
<td>Jar: Glass: 212g</td>
<td>Corrugated tray and shrink wrap</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label</td>
<td>Lid: Polypropylene: 10.3g</td>
<td>containing 6 units (47g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**Total weight: 224.3g</td>
<td></td>
</tr>
<tr>
<td><strong>ASDA – Mellow Roast</strong></td>
<td>Glass jar with injection moulded lid.</td>
<td>Jar: Glass: 199g</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td></td>
<td>Paper wrap around label.</td>
<td>Lid: Polypropylene: 11g</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total weight: 210g</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lightest jar</strong></td>
<td>199g</td>
<td>ASDA Mellow Roast</td>
<td></td>
</tr>
<tr>
<td><strong>Lightest lid</strong></td>
<td>9g</td>
<td>Morrisons Full Roast / Tesco Fair Trade / Selected Colombian</td>
<td></td>
</tr>
<tr>
<td><strong>Lightest secondary packaging</strong></td>
<td>35g</td>
<td>Douwe Egberts - Decaffeinated (6 units)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6

Roast and ground coffee – current practice

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact. Most – but not all – of the packs sampled contained 227g coffee.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>illy 250g</td>
<td>Pressurised tin with peel-seal and twist-on tin plate lid.</td>
<td>Can: Tin plate: 100g Lid: Tin plate: 87g <strong>Total weight: 187g</strong> <em>(Per 10g of product: 7.48g)</em></td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td>ASDA – Extra Special 57g</td>
<td>Vertical form-fill-seal (VFFS) flow-wrap.</td>
<td>Pouch: 150μ PE/foil/PE: 4g <strong>Total weight: 4g</strong> <em>(Per 10g of product: 0.7g)</em></td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td>Cafédirect – Machu Picchu Peru 227g</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 100μ PE/foil/PE: 11g <strong>Total weight: 11g</strong> <em>(Per 10g of product: 0.48g)</em></td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td>Morrisons – Roasted Ground Coffee 227g</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 90μ PE/foil/PE: 11g <strong>Total weight: 11g</strong> <em>(Per 10g of product: 0.48g)</em></td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td>Tesco – Fair Trade 227g</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 80μ PP/foil/PE: 10g <strong>Total weight: 10g</strong> <em>(Per 10g of product: 0.44g)</em></td>
<td>Load bearing printed corrugated case with perforations. 6 units. Total weight: 104g Per unit: 17.3g</td>
</tr>
<tr>
<td>J Sainsbury – Taste the Difference Javan 227g</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet</td>
<td>Pouch: 100μ PET/Foil/PE: 10g <strong>Total Weight: 10g</strong> <em>(Per 10g of product: 0.44g)</em></td>
<td>PET SRP tray in load bearing printed corrugate case</td>
</tr>
<tr>
<td>Name</td>
<td>Packaging description</td>
<td>Materials and weight</td>
<td>Distribution packaging</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Taylors of Harrogate - Fairtrade Organic</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 70μm PP/foil/PE: 10g</td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 10g (Per 10g of product: 0.44g)</td>
<td></td>
</tr>
<tr>
<td>Specially Selected – Brazilian</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 100μm PE/foil/PE: 10g</td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 10g (Per 10g of product: 0.4g)</td>
<td></td>
</tr>
<tr>
<td>ASDA - Roast &amp; Ground Coffee</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 80μm PE/foil/PE: 9g</td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 9g (Per 10g of product: 0.39g)</td>
<td></td>
</tr>
<tr>
<td>Percol - Fairtrade &amp; Organic Guatemala</td>
<td>Block bottom vertical form-fill-seal (VFFS) foil sachet.</td>
<td>Pouch: 90μm PE/foil/PE: 8g</td>
<td>Load bearing printed corrugated case with perforations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 8g (Per 10g of product: 0.35g)</td>
<td></td>
</tr>
<tr>
<td>Co-operative - Fairtrade original Roast &amp; Ground Coffee</td>
<td>Pouch with vent valve</td>
<td>Pouch: Composite material</td>
<td>Cardboard case containing 6 units (187g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Valve: HDPE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Label: Paper</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 8g (Per 10g of product: 0.35g)</td>
<td></td>
</tr>
<tr>
<td>Douwe Egberts – Real Coffee</td>
<td>Flow-wrapped vacuum brick in a paper wrap, with label.</td>
<td>Vacuum brick: 60μm foil/PE: 6g</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wrap: 40μm paper: 2g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 8g (Per 10g of product: 0.35g)</td>
<td></td>
</tr>
<tr>
<td>Lavazza - Qualita Rossa</td>
<td>Flow-wrapped vacuum brick.</td>
<td>Vacuum brick: 150μm foil/PE: 8g</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total weight: 8g (Per 10g of product: 0.32g)</td>
<td></td>
</tr>
</tbody>
</table>

**Lightest pouch (per 10g)**

<table>
<thead>
<tr>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.32g / 10g</td>
<td>Lavazza – Qualita Rossa (vacuum)</td>
</tr>
<tr>
<td>0.35g / 10g</td>
<td>Percol Guatemala</td>
</tr>
<tr>
<td>0.6g</td>
<td>Douwe Egberts (+ paper wrap)</td>
</tr>
</tbody>
</table>
## Appendix 7

### Speciality, single serve and machine systems coffee - current practice

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nescaféd individual cups</td>
<td>3 x carton cups with a paper PE sleeve and foil insert, 3 x lids and shrink sleeve</td>
<td>Cup including sleeve: Carton board, paper PE, foil: 29g (x 3 = 87g)</td>
<td>Shrink wrapped cartonboard tray with cut-outs to hold product in place. Printed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lid: Thermoformed polypropylene: 2g (x 3 = 6g)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shrink Sleeve: 1g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total weight: 94g</strong> (Per serving: 31.3g)</td>
<td></td>
</tr>
<tr>
<td>Tesco Finest - Colombian Supremo - 10 individual filter coffees</td>
<td>Skillet carton with a foil bag containing 10 injection moulded tub filters and 2 thermoformed lids</td>
<td>Carton: 470μ WLC carton board: 33g Bag: 80μ foil/PE flow wrap: 1g Tub: Polypropylene: 10g (x 10 = 100g) Lid: Polypropylene: 5g (x 2 = 10g) <strong>Total weight: 144g</strong> (Per serving: 14.4g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Nescaféd - Cappuccino for Dolce Gusto machine 8 servings (includes 8 x milk)</td>
<td>Skillet carton containing injection moulded tubs with a foil seal.</td>
<td>Carton: 500μ FBB carton board: 32g Injection moulded tubs: Polypropylene: 4g (x16 = 64g) <strong>Total weight: 96g</strong> (Per serving: 12g)</td>
<td>Corrugated u-shaped sleeve with perforated shrink film. 3 units.</td>
</tr>
<tr>
<td>Nescaféd - Cappuccino Skinny</td>
<td>Skillet carton with sachets and an injection moulded tub for chocolate.</td>
<td>Carton: 400μ WLC carton board: 29g Sachet: 50μ paper/foil/PE: 4g (x 10 = 40g) Tub: Polypropylene: 4g <strong>Total weight: 73g</strong> (Per serving: 7.3g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Nescaféd – Gold Blend individual servings 8 servings</td>
<td>Foil flow wrap containing 8 injection moulded cups and 2 thermoformed lids.</td>
<td>Bag: Foil/PE flow wrap: 6g Cup: Polypropylene: 6g (x 8 = 48g) Lid: Polypropylene: 2g (x 2 = 4g) <strong>Total weight: 58g</strong> (Per serving: 7.3g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Name</td>
<td>Packaging description</td>
<td>Materials and weight</td>
<td>Distribution packaging</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Kenco – for Tassimo machine | Bag containing two cartons – featuring gravity feed dispenser – each containing 8 thermoform tubs. | Bag: 140µ paper/foil/PE: 8g  
Carton: 440µ FBB carton board: 16g (x2 = 32g)  
Tub with film seal:  PVC: 4g (x16 = 64g) | No secondary packaging information available.                                          |
| Alcafe – Latte coffee sachets | Hinged skillet carton containing foil flow-wraps.                                      | Carton: 450µ FBB carton board: 38g  
Sachets: 40µ foil/PE: 2g (x11 = 22g) | No secondary packaging information available.                                          |
| Tesco – Cappuccino  | Hinged skillet carton with internal panel containing foil flow-wraps and an injection moulded unit for chocolate. | Carton: 450µ WLC carton board: 34g  
Sachets: 50µ foil/PE: 1g (x10 = 10g)  
Chocolate unit: Polypropylene moulded: 9g | No secondary packaging information available.                                          |
| ASDA – decaf cappuccino | Hinged skillet carton with internal panel containing foil flow wraps and injection moulded container for chocolate. | Carton: 410µ FBB carton board: 34g  
Sachets: 50µ foil/PE: 1g (x10 = 10g)  
Container: Injection moulded polypropylene: 9g | No secondary packaging information available.                                          |
| Maxwell House - Cappuccino Original | Skillet carton containing foil flow wraps.                                         | Carton: 450µ FBB carton board: 28g  
Sachets: 80µ foil/PE: 2g (x10 = 20g) | Corrugated hood and printed tray.                                                      |
| Sainsbury’s – Premium one cup coffee | Skillet carton containing foil flow wraps.                         | Carton: 450µ FBB carton board: 28g  
Sachets: 60µ foil/PE: 2g (x10 = 20g) | Corrugate tray and PE overwrap                                                        |
<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
</table>
| Morrisons – Instant Mocha     | Skillet carton containing foil flow-wraps.                                              | Carton: 470μ FBB carton board: 27g  
Sachets: 60μ foil/PE: 2g (x10 = 20g)  
**Total weight: 47g**  
(Per serving: 4.7g) | No secondary packaging information available.                                            |
| Kenco – Cappio                | Hinged skillet carton containing foil flow-wraps.                                        | Carton: 500μ FBB carton board: 29g  
Sachets: 80μ foil/PE: 1g (x8 = 8g)  
**Total weight: 37g**  
(Per serving: 4.6g) | Corrugated hood and printed tray.                                                       |
| ASDA – latte                  | Skillet carton containing foil flow-wraps.                                              | Carton: 450μ WLC carton board: 39g  
Sachets: 50μ foil/PE: 1g (x20 = 20g)  
**Total weight: 59g**  
(Per serving: 2.95g) | No secondary packaging information available.                                            |
| Kenco – 3 in 1 smooth white   | Tray format carton containing foil flow-wraps.                                          | Carton: 470μ FBB carton board: 18g  
Sachets: 80μ foil/PE: 1g (x10 = 10g)  
**Total weight: 28g**  
(Per serving: 2.8g) | Corrugated hood and printed tray.                                                       |
| Douwe Egberts – for Senseo    | Bag containing 18 coffee pods.                                                           | Bag: 80μ paper/foil/PE: 7g  
Pods: 70μ paper/PE pods: 0.2g (x18 = 3.6g)  
**Total weight: 10.6g**  
(Per serving: 0.6g) | One piece corrugated case.  
Perforated and printed for use as SRP. 6 units. Total weight: 153g  
Per unit: 25.5g |

**Lightest carton:** 18g  
**Lightest bag:** 6g  
**Lightest sachet:** 1g  
**Lightest machine system:** 0.6g / serving
## Appendix 8

### Hot chocolate and malted drinks - current practice

Note: samples were purchased and weighed in January 2009. Weights are not intended to indicate overall environmental impact.

<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot Drinks Co 400g</td>
<td>Glass jar with injection moulded lid and paper wrap around label.</td>
<td>Jar: Glass: 439g&lt;br&gt;Lid: Polypropylene: 17g&lt;br&gt;&lt;b&gt;Total weight: 456g&lt;/b&gt;&lt;br&gt;(Per 10g of product: 11.4g)</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td>Tesco - Hot chocolate drink &amp; ASDA instant malt drink 400g</td>
<td>Glass jar with injection moulded lid and paper wrap around label.</td>
<td>Jar: Glass: 416g&lt;br&gt;Lid: Polypropylene: 13g&lt;br&gt;&lt;b&gt;Total weight: 429g&lt;/b&gt;&lt;br&gt;(Per 10g of product: 10.75g)</td>
<td>Printed corrugated tray and shrink wrap. 12 units. Total weight: 71g Per unit: 5.9g</td>
</tr>
<tr>
<td>Green &amp; Black's - hot chocolate 300g</td>
<td>Glass jar with injection moulded lid and paper wrap around label.</td>
<td>Jar: Glass: 370g&lt;br&gt;Lid: Polypropylene: 15g&lt;br&gt;&lt;b&gt;Total weight: 385g&lt;/b&gt;&lt;br&gt;(Per 10g of product: 12.8g)</td>
<td>Printed corrugated tray and shrink wrap.</td>
</tr>
<tr>
<td>Co-operative - Instant Hot Chocolate Drink 400g</td>
<td>Glass jar with lid and heat seal</td>
<td>Jar: Glass: 360g&lt;br&gt;Lid: Polypropylene: 14g&lt;br&gt;&lt;b&gt;Total weight: 378.7g&lt;/b&gt;&lt;br&gt;(Per 10g of product: 9.5g)</td>
<td>Corrugated tray and shrinkwrap containing 6 units (62.3g)</td>
</tr>
<tr>
<td>Twinings - Chocolate Indulgence 220g</td>
<td>Two-piece can with bag containing product. Can is much larger than bag of product.</td>
<td>Can: Pressed tin base: 88g&lt;br&gt;Lid: Pressed tin: 19g&lt;br&gt;Bag: Foil/PE: 5g&lt;br&gt;&lt;b&gt;Total weight: 112g&lt;/b&gt;&lt;br&gt;(Per 10g of product: 5.09g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Poulain - Grand Arôme 1kg</td>
<td>Blow moulded HDPE jar with integral indented handle, security seal and press-on lid.</td>
<td>Jar: HDPE: 73.1g&lt;br&gt;Lid: HDPE: 8.25g&lt;br&gt;Seal: 1.1g&lt;br&gt;&lt;b&gt;Total weight: 82.5g&lt;/b&gt;&lt;br&gt;(Per 10g of product: 0.825g)</td>
<td>No secondary packaging information available.</td>
</tr>
<tr>
<td>Name</td>
<td>Packaging description</td>
<td>Materials and weight</td>
<td>Distribution packaging</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
| Horlicks – light 500g        | Blown jar with snap-on injection moulded hinged lid and shrink sleeve.                 | Jar: Polypropylene: 51g  
Lid: Polypropylene: 18g  
**Total weight: 69g**  
(Per 10g of product: 1.38g) | Printed corrugated tray and shrink wrap.                                              |
| Ovaltine – light 300g        | Blown jar with twist on injection moulded lid with foil seal and shrink sleeve.        | Jar: Polypropylene: 43g  
Lid: Polypropylene: 20g  
**Total weight: 63g**  
(Per 10g of product: 2.1g) | Printed corrugated tray and shrink wrap.                                              |
| Horlicks – Original 300g     | Blown jar with snap-on injection moulded hinged lid and shrink sleeve.                 | Jar: Polypropylene: 42g  
Lid: Polypropylene: 18g  
**Total weight: 60g**  
(Per 10g of product: 2g)   | Printed corrugated tray and shrink wrap.                                              |
| Cadbury – Highlights 220g    | Blown jar with twist on injection moulded lid with foil seal and shrink sleeve.        | Jar: Polypropylene: 48g  
Lid: Polypropylene: 11g  
**Total weight: 59g**  
(Per 10g of product: 2.7g) | Printed corrugated tray and shrink wrap.                                              |
| Tesco – Drinking chocolate 500g | Injection moulded lid, foil lined carton with crimped on tin base and foil seal. | Container: Composite carton board/foil/PE with tin base and foil seal: 47g  
Lid: Polypropylene: 11g  
**Total weight: 58g**  
(Per 10g of product: 1.2g) | Printed corrugated tray and shrink wrap.                                              |
| Nestlé Coffee-mate – Latte Creations Skinny Cow instant indulgent hot chocolate 200g | Blown jar with twist-on injection moulded lid with foil seal and shrink sleeve. | Jar: HDPE: 41g  
Lid: Polypropylene: 14g  
**Total weight: 55g**  
(Per 10g of product: 2.75g) | Printed corrugated tray and shrink wrap.                                              |
| Cadbury – Highlights (individual servings) 8 servings | Individual pre-filled cups with 2 lids in a foil flow-wrap. | Bag: Foil/PE flow-wrap: 5g  
Cup: Polypropylene: 5g (x8 = 40g)  
Lid: Polypropylene: 2g (x2 = 4g)  
**Total weight: 49g**  
(Per serving: 6.1g) | No secondary packaging information available.                                            |
<table>
<thead>
<tr>
<th>Name</th>
<th>Packaging description</th>
<th>Materials and weight</th>
<th>Distribution packaging</th>
</tr>
</thead>
</table>
| Freshers 400g | Blown jar with twist on injection moulded lid with foil seal and shrink sleeve. | Jar: HDPE: 38g  
Lid: Polypropylene: 11g  
**Total weight: 49g**  
(Per 10g of product: 1.2g) | Printed corrugated tray and shrink wrap. |
| Horlicks – Extra Light 220g | Blown jar with twist on injection moulded lid with foil seal and shrink sleeve. | Jar: HDPE: 38g  
Lid: Polypropylene: 10g  
**Total weight: 48g**  
(Per 10g of product: 2.18g) | Printed corrugated tray and shrink wrap. |
| Galaxy 240g | Blown jar with twist on injection moulded lid with foil seal and shrink sleeve. | Jar: Polypropylene: 35g  
Lid: Polypropylene: 10g  
**Total weight: 45g**  
(Per 10g of product: 1.88g) | Printed corrugated tray and shrink wrap. |
| ASDA – Frothy hot chocolate drink (individual servings) 8 servings | Skillet carton outer with internal panel and hinged lid. Contains individual sachets.  
8 x 20g servings | Carton: 500μ FBB carton board: 34g  
Sachet: 100μ foil/PE: 1g (x8 = 8g)  
**Total weight: 42g**  
(Per serving: 5.25g) | No secondary packaging information available. |
| Cadbury – Hot chocolate sachet 2 servings | 2 perforated linked sachets.  
2 x 56g serving | Sachet: 140μ paper/foil/PE: 2g (x2 = 4g)  
**Total weight: 4g**  
(Per serving: 2g) | Printed carton SRP unit with perforations. |
| Horlicks – Light sachet 1 serving | Individual laminate sachet  
1 x 32g serving | Sachet: 60μ PE/foil/PE: 2g  
**Total weight: 2g**  
(Per serving: 2g) | No secondary packaging information available. |
| Options – Belgian choc sachet 1 serving | Individual laminate sachet  
1 x 11g serving | Sachet: 40μ PE/foil/PE: 1g  
**Total weight: 1g**  
(Per serving: 1g) | Bespoke angled SRP carton. Printed and perforated with removable top panel. |

**Lightest jar (200-250g):** 35g Galaxy  
**Lightest jar (400g):** 38g Freshers  
**Lightest lid:** 8g Poulain – Grand Arôme  
**Lightest per serving:** 1g Options – Belgian choc individual sachet
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