Packaging Innovations and Evolution in the Food & Drinks sector

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Product & Packaging Design

Packaging Innovations (EasyFairs)
NEC, 28 February 2013
Courtauld Commitment Phase 2 (2009-2012)

- A voluntary agreement aimed at improving resource efficiency and reducing the carbon and wider environmental impact of the grocery retail sector.

- WRAP is responsible for the agreement and works in partnership with retailers, brand owners and suppliers who support delivery of the targets.

- Supports the aim of the UK Climate Change Act 2008, to reduce greenhouse gas emissions by 34% by 2020 and 80% by 2050.
Courtauld Commitment Phase 2 Signatories

AB InBev
Accolade Wines
Barr Soft Drinks
Arla
Asda Saving You Money Every Day
Associated British Foods plc
Boots
Britvic Soft Drinks
Burton's Biscuit Co
Cafédirect
Carlsberg
Coca-Cola Enterprises
Cott
Dairy Crest
Dale Farm
Danone
Danone Waters
Ferrero
Findus Group
Greencore
Heineken UK
Innocent
Kraft Foods
Kimberly-Clark
M&S
Mars
Miller Brands
Molson Coors
Musgrave Group
Müller
Moy Park
Morrison's
Premier Foods
Robert Wiseman Dairies
Sainsbury's
Warburtons
Waitrose
## Courtauld 2 Packaging: Progress

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>% change 2009 - 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight (million tonnes)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>2.51</td>
<td>2.43</td>
<td>2.38</td>
<td>−5.2%</td>
</tr>
<tr>
<td>Single-use transit</td>
<td>0.64</td>
<td>0.58</td>
<td>0.54</td>
<td>−15.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3.16</td>
<td>3.01</td>
<td>2.93</td>
<td>−7.2%</td>
</tr>
<tr>
<td><strong>GHG emissions (million tonnes CO₂ eq.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.64</td>
<td>5.38</td>
<td>5.17</td>
<td>−8.2%</td>
</tr>
</tbody>
</table>
Primary packaging materials
Courtauld 2 data for 2009 baseline

- Plastic: 37.5%
- Paper/card: 30.4%
- Steel: 18.8%
- Aluminium: 8.6%
- Glass: 4.5%
- Other: 0.2%
The packaging maze ...
What is WRAP doing?

Direct support to Signatories to deliver the WRAP target

Packaging Optimisation Evidence and Tools

Facilitating change within the industry

REID (Resource Efficient Innovations Database)
SWOP (Shelf Weight of Packaging)
Packaging checklists
Optimising packaging to supply chain
Supply chain product damage mapping
Comparative environmental impact of Product & Packaging

Forums Workshops Summits
Shelf weight of Packaging
Variation across categories

Some categories show large variation in packaging weight even though the amount of product is the same (eg 750ml wine bottles).
Opportunities for further reduction

<table>
<thead>
<tr>
<th>Amount of product (ml)</th>
<th>Bottle weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>330</td>
<td>194</td>
</tr>
<tr>
<td>330</td>
<td>204</td>
</tr>
<tr>
<td>330</td>
<td>209</td>
</tr>
<tr>
<td>330</td>
<td>212</td>
</tr>
<tr>
<td>330</td>
<td>215</td>
</tr>
<tr>
<td>330</td>
<td>225</td>
</tr>
<tr>
<td>330</td>
<td>235</td>
</tr>
<tr>
<td>330</td>
<td>242</td>
</tr>
</tbody>
</table>
Shelf Weight Of Packaging (SWOP)
Using the Carbon Ready Reckoner
Worked example

Light-weighting a PET bottle from 19g to 17g and increasing the recycled content from 10% to 25%
**Consumer Unit**

A consumer unit (CU) is the packaging the consumer takes out of the shop.

**Existing Components**

<table>
<thead>
<tr>
<th>Component Name</th>
<th>Existing Material</th>
<th>Current Weight (g)</th>
<th>New Weight (g)</th>
<th>Existing Recycled Content (%)</th>
<th>Increased Recycled Content (%)</th>
<th>Existing CO₂e (Kg CO₂e/CU)</th>
<th>CO₂e Reduction (Kg CO₂e/CU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottle</td>
<td>PET Bottles</td>
<td>19</td>
<td>17</td>
<td>10</td>
<td>25</td>
<td>0.0701</td>
<td>0.0100</td>
</tr>
</tbody>
</table>

Does your product require secondary packaging? ☻ Yes ☥ No
### Pack Comparison

#### Existing Pack
- **Product volume per Pack:** 500.00 (g)
- **Servings per Pack:** 1
- **Number of Packs per Year:** 1,000,000
- **Total CO₂e Per Year:** 98,607.96 (kg)
- **Total CO₂e Per Pack:** 0.0986 (kg)
- **Total CO₂e Per Serving:** 0.0986 (kg)

#### New Pack
- **Product volume per Pack:** 500.00 (g)
- **Servings per Pack:** 1
- **Number of Packs per Year:** 1,000,000
- **Total CO₂e Per Year:** 88,557.53 (kg)
- **Total CO₂e Per Pack:** 0.0886 (kg)
- **Total CO₂e Per Serving:** 0.0886 (kg)
Resource Efficient Innovations Database (REID)

The aim of REID is to showcase resource efficient technologies such as machinery, tooling, materials and design from across the world.

It can help businesses across the retail supply chain to be more resource efficient, which can save them money and reduce their impact on the environment.

www.wrap.org.uk/reid
Light-weight 2 litre PET drinks container
A 2 litre PET drinks container has been repeatedly developed in order to achieve a very light-weight design with excellent consumer and recycling benefits.

Innovative barrier technology
Oxygen barrier technology for use in plastic drinks bottles

Light-weight closure for carbonated soft drinks
An improved closure for short-height carbonated soft drinks bottles delivers material savings compared to existing designs.

Oxygen scavenging system uses a highly reactive oxygen absorbing compound
An oxygen scavenging system using a highly reactive oxygen absorbing compound

Innovative bottle production
New “Roll ‘n’ Blow” method of producing thermoformed bottles saves materials and energy
WRAP PET Bottle Categorisation Tool

“www.wrap.org.uk/content/pet-bottle-categorisation-tool”

- Categorise according to recyclability
- Tool can simulate what category certain elements are before putting onto market
- Potential to set targets for sales % in cats A, B, C
# Recyclability Categorisation – rPET

<table>
<thead>
<tr>
<th>Category</th>
<th>Colourants</th>
<th>Barrier coatings &amp; layers</th>
<th>Closures</th>
<th>Closure liners and seals</th>
<th>Labels</th>
<th>Sleeves</th>
<th>Adhesives</th>
<th>Base Cups</th>
<th>Other components &amp; bottle size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category A</strong></td>
<td>Clear / no colour / natural; Colour light blue/green or other light colours and tints only</td>
<td>No barrier/coating layers; Plasma coatings e.g. Chemical Vapour Deposition; SiO$_x$ Monox/Monobar; Other blended additives/processing aids; Other PET based carriers</td>
<td>HDPE/ LDPE/ PP</td>
<td>No closure liners; HDPE, PP, PP+EVA/EV0H; PE+EVA/EV0H; EVA or EV0H if it floats i.e. density &lt;1g/cm$^3$</td>
<td>No label; HDPE / MDPE / LDPE / LLDPE / PP / OPP / EPS / PET</td>
<td>No Sleeve; PE / PP / OPP / EPS / foamed PET sleeves with density &lt;1g/cm$^3$ and showing at least 40% of the bottle. Other films of density &lt;1g/cm$^3$</td>
<td>No adhesive; Water soluble in 60 -80 °C Plastic wrap, minimum glue e.g. lap join</td>
<td>No base cup</td>
<td>No other components Diameter &gt; 50mm, length &gt;100mm</td>
</tr>
<tr>
<td><strong>Category B</strong></td>
<td>Colour - Strong tints dark blue/green/brown</td>
<td>PEN barrier layer (if &lt;3% total bottle weight) Amasorb barrier layer (if &lt;3% total bottle weight)</td>
<td>Foamed PET; Paper; Silicone ‘swimming’ valves (density &lt;1g/cm$^3$); Any other closures which float after granulation</td>
<td>Foamed PET; Paper; Silicone ‘swimming’ valves (density &lt;1g/cm$^3$); Any other closures which float after granulation</td>
<td>Paper labels</td>
<td>PET sleeves; Full body shrink sleeves showing &lt;40% of bottle; Full body shrink sleeves – fully colour printed</td>
<td>Strong adhesives with paper labels Around 50% of adhesive not removable</td>
<td>HDPE / PP / clear PET</td>
<td>Diameter 40 – 50mm, length &lt; 100mm</td>
</tr>
<tr>
<td><strong>Category C</strong></td>
<td>Dark or solid colours; Opaque white and others; Opaque black; Metallic colours; and use of fillers.</td>
<td>EVOH / Amasorb / MXD6 Any nylon based barrier layers</td>
<td>Metals / PS / PVC; Any other materials density &gt;1g/cm$^3$</td>
<td>Metal / PVC / EVA / Silicone / Neck foils of density &gt;1g/cm$^3$ Any other material of density &gt;1g/cm$^3$</td>
<td>Pressure sensitive; Self-adhesive labels; PVC / PS / Metallised labels (ie metal foil labels, not labels with metal inking)</td>
<td>Contains any PVC Contains any Polystyrene (PS) Any other materials of density &gt;1g/cm$^3$</td>
<td>Water insoluble (even at elevated temperatures and/or pH); Any non-removable glues</td>
<td>Coloured PET and other plastics density &gt;1g/cm$^3$</td>
<td>Any polymer with density &gt;1g/cm$^3$ PVC / PLA / PS / PETG Diameter &lt; 30mm, length &lt; 100mm</td>
</tr>
</tbody>
</table>
PET bottles scenario tool

- highlights opportunities to improve.
- companies have an incentive to increase the recyclability so that the amount and quality of rPET is maximised.
### Steel

<table>
<thead>
<tr>
<th>Format</th>
<th>Split of steel packaging flow onto UK market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cans</td>
<td>92%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
</tr>
</tbody>
</table>

### Aluminium

<table>
<thead>
<tr>
<th>Format</th>
<th>Split of aluminium packaging flow onto UK market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosols</td>
<td>3%</td>
</tr>
<tr>
<td>Cans</td>
<td>61%</td>
</tr>
<tr>
<td>Closures / lids</td>
<td>3%</td>
</tr>
<tr>
<td>Composites</td>
<td>9%</td>
</tr>
<tr>
<td>Foil containers / trays</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
<tr>
<td>Tubes</td>
<td>2%</td>
</tr>
<tr>
<td>Wrappers / foil</td>
<td>4%</td>
</tr>
</tbody>
</table>
A database that indicates what is the lightest, middle and heaviest weight packaging used for food and drink products found on the UK supermarket shelf between 2006 and 2008.

Moving to UK Packaging Benchmark has many advantages including minimising the use of valuable resources, reducing costs and reducing energy consumption.

| CATEGORY | | |
|----------|------------------|
| All      |                |
| SUB-CATEGORY | Choose |
| MATERIAL | | |
| All      | | |
| PACKAGING TYPE | | |
| All      | | |

**UK Packaging Benchmark**

Your search found 5 examples

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>SUB-CATEGORY</th>
<th>MATERIAL</th>
<th>PACKAGING TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soups and sauces</td>
<td>Choose</td>
<td>Steel</td>
<td>Can</td>
</tr>
<tr>
<td>2008: Baked Beans (Steel Can)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008: Tuna (Steel Can)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006: Tomatoes (Steel Can)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008: Soup (Steel Can)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007: Pet food (Steel Can)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Example from the benchmarking database**

**Baked Beans (Steel Can)**

*UK Packaging Benchmark product analysis – 2008*

Specific data assumptions for this Baked Beans report

<table>
<thead>
<tr>
<th>Product size</th>
<th>Lightest class item weight (grams)</th>
<th>Middle class item weight (grams)</th>
<th>Heaviest class item weight (grams)</th>
<th>% difference between lightest &amp; middle classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>200–220g</td>
<td>37</td>
<td>40</td>
<td>41</td>
<td>10</td>
</tr>
<tr>
<td>Paper</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Alu</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>36</td>
<td>39</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Plastic</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>400–420g</td>
<td>50</td>
<td>52</td>
<td>53</td>
<td>4</td>
</tr>
<tr>
<td>Paper</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Percentage of total tonnage by category in sample:

- 200-220g: 67%
- 400-420g: 26%
- 415-420 x 4: 7%
Consider the pallet, as well as the pack.

Modular packaging provides the most optimum palletisation scheme. Some modular packaging dimensions are shown in the table below. These dimensions are modular for both UK pallets (1200 x 1000mm) & EURO pallets (1200 x 800mm)

<table>
<thead>
<tr>
<th>Package size [mm]</th>
<th>600 x 100</th>
<th>600 x 133</th>
<th>600 x 200</th>
<th>600 x 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 x 100</td>
<td>300 x 133</td>
<td>300 x 200</td>
<td>300 x 400</td>
<td></td>
</tr>
<tr>
<td>200 x 100</td>
<td>200 x 133</td>
<td>200 x 200</td>
<td>200 x 400</td>
<td></td>
</tr>
<tr>
<td>150 x 100</td>
<td>150 x 133</td>
<td>150 x 200</td>
<td>150 x 400</td>
<td></td>
</tr>
<tr>
<td>120 x 100</td>
<td>120 x 133</td>
<td>120 x 200</td>
<td>120 x 400</td>
<td></td>
</tr>
</tbody>
</table>

An example of optimised pallet scheme is shown below using the following modular dimensions: 300 x 200mm

In this example, the pallet area coverage for both UK and EURO pallets is 100%
On-Pack Recycling Label (OPRL)

Helping consumers to recycle more

First scheme in the world to label packaging by what is actually collected for recycling, rather than what is hypothetically recyclable

The definitions of the labels are as follows:

**widely recycled**
used when 65% or more of local authorities have kerbside collection facilities for that packaging type in their area.

**check local recycling**
used when 15% – 65% of local authorities have kerbside collection facilities for that packaging type in their area.

**not currently recycled**
used when less than 15% of local authorities have kerbside collection facilities for that packaging type in their area.

Web: www.oprl.org.uk
WRAP Approach

Collections
- Ensuring supply of quality material for recycling

Infrastructure
- Establishing the capacity to sort, recycle & reprocess
- Supporting recycling enterprises

Markets
- Building demand for & confidence in recycled polymers
Entering a period of significant CO$_2$e reduction

From the UK Climate Change Committee “Fourth carbon budget”
Historical perspective
Indicative packaging for some common products

Source: INCPEN & various
Trends in the market

- Shorter runs and more customisation
- Continued evolution of the private label
- Structural innovation:
  - shape and visual hierarchy
  - flexibility
- Materials substitution
- Integration of branding positioning and sustainability messages
- Innovative value-added retail solutions
- Rapid prototyping of packaged product & SC system
- Compression of the design approval process
New sources of innovation

- Light-Weighting
- Product Damage Prevention
- DfR & Recycled Content
Courtauld 3 Commitment (2013-2015)

WRAP has worked closely with CC2 signatories and the UK governments, to develop initial targets for the Courtauld 3 Commitment. The targets are still under consideration, and will be announced in spring 2013 when the new commitment is launched.

The grocery sector has made significant progress under Courtauld 1 & 2 to reduce food, packaging and supply chain waste in the UK and the third phase targets will continue to build on achievements to date.
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www.wrap.org.uk