



Policy Study: Refillables

Evaluation of market
opportunity in the UK

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www.remanufacturing.org.uk





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^a Image attributed to <http://www.wordle.net/>.



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Summary

Approximately 10.7 million tonnes of packaging waste was disposed of in the UK in 2008^b. Although 65% of this packaging waste is diverted from landfill, the arisings still represent a considerable environmental burden. Recently, Government and business have indicated a renewed interest in promoting refillables systems as one approach to reducing the total quantum of packaging waste and associated greenhouse gas emissions.

This report examines the potential of refillable packaging systems, taking into account their historical development, reasons for their demise and current innovations. Whilst focussing on the business to consumer interface, the report draws lessons from developments in business to business refillable systems.

The report's key findings are:

1. The environmental benefit of using refillable rather than single use packaging is not clear cut and there is a lively debate. In particular the packaging industry, which has established itself on the basis of single trip packaging is inherently hostile. Therefore further investigation and research is required.
 2. Traditional refillable packaging systems are maintained by a complex set of habitual behaviours, organisational relationships, infrastructure investments and financial incentives. For example, where the packaging remains valuable and/or where a single entity controls/coordinates the supply chain refillable packaging systems remain.
 3. A return to the formerly prevalent 'business to consumer' refillable packaging model in the UK organised by content producers would be difficult and expensive because of the disruption to existing supply chain business models e.g.
 - a. One way supply chains across multiple geographies;
 - b. The cost of storage space for returned packaging;
 - c. Absence of a refilling infrastructure e.g. centralised facilities to wash containers, refilling lines at manufacturing facilities etc.
 4. New models of 'business to consumer' refillable packaging systems are being developed which could potentially overcome these barriers. For example, establishing self-dispensing points in retail outlets transfers the costs of washing, storage, filling and transportation to the consumer but enables overall coordination to be organised by the retailer - the most economically powerful actor in the supply chain.
 5. Refillable packaging systems based on point of sale models also offer the opportunity to increase customer loyalty in competitive markets. Consumers are potentially locked into using a product again, once they have bought the refillable container.
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1 Introduction

1.1 Introduction to refillables

The concept of returning the primary packaging associated with a product to the manufacturer for refilling is a form of re-use well-known in the UK and around the world. The classic example is milk which has been delivered to British doorsteps in refillable bottles for over 100 years. Similar systems for other beverages such as alcohol and soft drinks where deposits are paid to customers on return of empty containers, are equally long-established. This traditional model of refillables system no longer appears viable in many economies such as the UK and has, with a few exceptions, seen a significant decline in recent decades.

Today, government and business have a renewed interest in promoting refillables systems which are viewed as one approach to reducing packaging waste and greenhouse gas emissions. However, attempts to support the traditional refillables model where the primary packaging must be returned by the customer to the manufacturer for refilling are likely to fail. Instead, efforts may more fruitfully be concentrated in exploring alternative models starting to appear in the UK. Refillables models taking advantage of technological innovations such as internet retailing and in-store dispensing systems^c may hold more promise.

This report examines reasons for the decline in the traditional refillables model in the UK, the appearance of new models, the environmental implications of refillables systems, and how refillables may develop in the future.

1.2 Refillables revisited

The amount of packaging disposed of by UK householders continues to rise at an average rate of 1-2% per year over the past decade^d. This is despite reductions in the weight of packaging per unit product over recent decades, including lightweighting of glass beer and wine bottles by up to 34% in 2007 as part of WRAP's (Waste and Resource Action Programme) GlassRite project^e. Smaller family sizes and a demand for greater convenience are thought to drive the trend. Approximately 10.7 million tonnes of packaging waste was disposed of in the UK in 2008^f. Although 65% of this packaging waste is diverted from landfill, the arisings still represent a considerable environmental burden.

Refillable container systems are being re-evaluated in the UK by both government and businesses as one approach to reducing packaging waste. In

^c Defra Science Projects. Available at:

<http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=14682>

^d Defra 'Making the most of packaging' 2009

^e WRAP case studies: 'Lightweight beer bottles – setting a new bold standard' and 'Lightweight wine bottles – less is more', 2007

^f <http://www.defra.gov.uk/environment/waste/topics/packaging/>



June 2009, the Government published a new cross-departmental strategy entitled *Making the Most of Packaging*^g. It states that “Government will review the scope for promoting refillable and reusable packaging, which offer cost-saving opportunities for businesses, and could reduce waste for them and consumers alike.”

The Government has already commissioned, or part-funded, several studies investigating the feasibility of introducing refillables for food, drinks and other household products. For example, Defra co-funded a two-year project to develop, by the end of 2007, a refillable concept for the Botanics bodywash range sold by The Boots Company. In 2008, WRAP (Waste and Resources Action Programme) published a report^h examining existing refill systems in use around the world and identifying their advantages, disadvantages, commercial potential, and barriers and solutions for take-up. In the same year, WRAP also published a review of refillable glass beverage systems which concluded that changes in consumer patterns and supply chains had led to the decline of the traditional refillables modelⁱ. In 2009 WRAP reported on the potential for trialling self-dispensing of beverages in retail outlets using reusable packaging^j. The body is funding the trials in Asda supermarkets of an in-store self-dispensing unit for fabric conditioner developed by Eziserv Ltd (see section 3.3).

As is clear, much of the current work on refillables is being conducted in partnership with leading retailers increasingly conscious of the environmental impact of their products and services. However, as this report shows, the evidence for the environmental benefits of using refillable rather than single-trip packaging, particularly in terms of reducing greenhouse gas emissions, is equivocal. Life-cycle assessments (LCAs) on refillables are currently lacking, and more research may be needed on a case-by-case basis to justify the claimed environmental advantages of a specific refillables system.

1.3 Refill systems

Refillables systems have been defined and categorized in several ways. In 2006, Loughborough University researchers, funded by Defra, identified 16 different types of system with respect to delivery mechanism and the nature of the business-to-consumer interaction (

^g Defra, the Department for Business, Innovation and Skills and the Devolved Administrations Making the most of packaging. A strategy for a low-carbon economy. June 2009
<http://www.defra.gov.uk/environment/waste/topics/packaging/pdf/full-packaging-strategy.pdf>

^h WRAP (2008), A feasibility study – potential refill solutions for the food and non food retail sectors,
http://www.wrap.org.uk/retail/case_studies_research/a_feasibility_study.html

ⁱ WRAP. 2008. Refillable glass beverage container systems in the UK. Written by Oakdene Hollins Ltd.

^j WRAP (2009) Beverages: Self-Dispensing. Written by Ceres Logistics.



Table 1).



Table 1. Types of refillable systems.

	Type	How it works	Applications
1	Lightweight self-contained refill delivered through dispenser	Customer buys a self-contained refill which they take home and put into their durable dispenser.	Wipes, face creams, razors, cosmetics, fabric conditioner & air fresheners.
2	Lighter weight refill through part reuse	Customer buys a new bottle of product and reuses the spray pump.	Cleaning products.
3	Empty packaging refilled in shop	Customer takes the original packaging back to the store for it to be refilled with the same product.	Shampoo, conditioner, shower gel, bath products and fabric conditioner.
4	Self dispense	Customer takes re-usable container back to the store where they refill it with the same product.	Dry goods, personal care products and cosmetics.
5	Original packaging swapped for new product	Customer returns empty packaging to a unit where they leave it and pick up a new product. The old packaging is refilled for future use by someone else.	Toner cartridges, single use cameras and Calor gas.
6	Door to door delivery, packaging replaced	On demand the customer receives full packaging and leaves empty packaging for supplier to collect, when they are finished. Returned packaging is refilled for other customers.	Milk bottles and vegetable box system.
7	Deposit system	Customer returns empty packaging to supplier for a financial incentive.	Soft drinks and beer bottles.
8	Top up card	Customer pays for a service which is delivered on the production of the payment card.	Downloadable music and payment systems for services such as mobile phones.
9	Creation	Customer buys the constituent parts to make the product themselves. They buy refills to allow them to repeat the process.	Soft drink makers and orange juicers.
10	Door to door delivery, packaging refilled	Customer dispenses quantity required from a delivery van, using special containers and only paying for the quantity taken.	Detergent products.
11	Refilled with different product	Once original packaging has been used it is refilled with a different product.	Toys filled with sweets or durable packaging used to store other products.
12	Dispensed concentrate	Customer buys a dispensing unit. They also purchase refills containing concentrated product which are delivered through the dispenser.	Coffee machines.



13	Dispensed product	Customer buys a dispensing unit. They also purchase refills which are delivered through the dispenser.	Personal care products in showers.
14	Concentrate mixed in original packaging	Customer buys a concentrated refill which they dilute with water and mix using the old packaging.	Laundry products.
15	Fill your own packaging	Customers fill their own packaging with product in shop.	The bags for life.
16	Bulk purchase	Customer buys in bulk and refills a sampler package at home.	Cooking ingredients (such as oil, vinegar, peppercorns) and household cleaning products.

Source: Lofthouse, V.A. and Bhamra, T.A. 2006. An investigation into consumer perceptions of refills and refillable packaging, Loughborough University, Loughborough.

The Industry Council for Packaging and the Environment (INCPEN) classifies systems according to where the refilling occurs^k:

- **in-plant refilling** - containers undergo multiple trips, being refilled by the manufacturer at the plant. (e.g. milk, beer and soft drink bottles)
- **home refilling - containers** are refilled at home. (e.g. biscuits, tea and house-hold detergent)

This typology distinguishes between traditional systems where the primary packaging always travels with the product and is returned to the manufacturer for refilling, and newer models where the customer retains the primary packaging. We would add a third category, a variant of 'in-plant refilling', which we would term 'in-store refilling' to include systems which involves self-dispensing in retail outlets, such as the Eziserv model discussed in Section 3.3.

1.4 Structure of the report

Section 2 of this report describes and explains the traditional refillables models in the UK; reviewing where the traditional model survives, the scope for government intervention to support the model, and where the model fails and why.

Section 3 reviews home-dispensing and in-store self-dispensing systems for refillables, a model which is emerging in the UK, and it explores key issues which need to be addressed in order to make these new systems work.

^k European Packaging policy study by Ecolas - Pira – INCPEN comments on reuse – July 2004.



2 Traditional refillables model

2.1 Where traditional models survive

Refillable container systems are long-established for certain products, especially beverages sold in glass containers. For example, Canadian soft drinks were sold in refillable glass in the 1820s^l, a 33cl refillable beer 'Stockholm' bottle was introduced in Sweden in 1886^m and since the 1880s milk has been supplied to UK homes in reusable glass bottles. The high cost of glass and local production and consumption of products favoured the reuse of containers, and systems were developed for the recapturing, washing and refilling of empty containersⁿ

Whilst the most widespread example of refillables in previous years, the traditional beverage system has seen a dramatic decline and often only tends to survive in select circumstance. These systems, however, can be highly valued by customers partaking in the scheme. Non – beverage systems often have a longer period between refill, and may have a number of infrastructural benefits in place to allow the successful continuance of the traditional model.

National supply chains

The traditional refillables model now only survives in the UK in rare situations where manufacturers can ensure a minimum container recapture rate. We have already referred to the 'returnable milk bottle', which whilst in decline, is still in operation in places, particularly in more rural locations.

^l <http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0007539>

^m <http://www.sverigesbryggerier.se/eng/1-emballage/1-glasflaskor.html>

ⁿ Vaughan, P., Cook, M. and Trawick, P. (2007), A Sociology of Re-use: Deconstructing the Milk Bottle. *Sociologia Ruralis*, 47:2, 120-134.



Figure 1: Doorstep milk-delivery – a traditional refillable packaging system



Source: Oakdene Hollins Ltd

The doorstep delivery of milk is known as an ‘open-return’ refillables scheme as no financial incentive is provided for customers to return the bottles due to the direct, closed-loop nature of the interaction between supplier and consumer. By contrast, beer and other beverages such as soft drinks (e.g. lemonade) were typically sold on the basis of that a deposit was repaid to the customer on return of empty containers. Both open and deposit-return systems remain entirely voluntary in the UK.

A second, more recently popular example of ‘open return’ is home delivery vegetable boxes. A number of farms, particularly organic farms, offer home delivery, with empty boxes and packaging swapped for a full box each time. +

In those areas of success, consumers often discuss the ‘community’ aspects and ‘sense of place’ obtained from being involved in such a scheme, as much as the convenience, perception of extra freshness and waste benefits^o.

Another widespread refillable packaging system is the refillable gas canister system. Two different refillable models operate in relation to gas cylinders. One, where a deposit is paid for use of the container and a ‘refill’ agreement signed. When refilling is required, empty canisters are swapped for full ones, the empty returning to a centralised filling station. This is therefore a ‘closed return’ system, underpinned by a financial incentive and enforceable in law. The second model, involves purchasing a container, which the consumer then takes to a filling station and refills. The national infrastructure of LPG filling stations supports this latter

^o Vaughan et al, 2007, A Sociology of Reuse: Deconstructing the Milk Bottle

model. The distinction between the two is in the ownership of the refillable container – is it the consumer or the producer of the content.

Local supply chains

Local and regional supply chains are more likely to support a minimum container recapture rate and therefore underpin the viability of a refillable packaging system. A number of examples are identified in *Refillable glass beverage container systems in the UK* including AG Barr which operates a regional deposit-return scheme for refillables containing soft drinks such as IRN-BRU (Fig 2), and Dayla a wholesaler delivering own-brand lemonade in a standard NASDM bottle within a 40 mile radius of Aylesbury, Buckinghamshire.

Fig 2. The soft drink IRN-BRU is still available in a traditional refillables format in Scotland.



Source: Oakdene Hollins Ltd

Despite the deposit incentive, both companies did however report a declining trip rate as competition from non-refillable bottles increased. The traditional model can also persist where the supplier has an unusually tight control over containers. For example, the brewer Samuel Smith sells bottled beer, cider and soft drinks in refillable bottles for which no deposit is refundable (Figure 3).

Figure 3: Refillable bottles used by the brewer Samuel Smiths in Tadcaster, North Yorkshire



Source: Oakdene Hollins Ltd

The company can however maintain a high capture rate for containers since it owns and runs the 200 pubs where the products are exclusively sold.

Business to Business

The focus of this report is business to consumer refillables systems for which the traditional schemes have largely failed. However, the traditional model still functions well in the business to business (B2B) context, even where supply chains are lengthier. This is because in the B2B relationship, the supplier tends to exercise a tighter control over returnable packaging, and can thus achieve minimum capture rates. Typically, contracts within such schemes bind the supplier and customer relationship.

B2B reusable packaging is designed to be strong enough for reconditioning and reuse. Pallets, sacks, crates and barrels are the main formats used for transporting a wide variety of products, from food to hazardous chemicals. A well-known B2B system is the supply of beer and other drinks to the on-trade in reusable kegs, for which a deposit is payable by the business customer. A recent development is a sofa bag trialled by Home Retail Group (Argos) for the delivery of furniture which if used 15 times could save the retailer an estimated £300,000 per year in packaging costs^p. Similarly, B&Q, in conjunction with WRAP, has developed a Worktop Carrierpac designed for home delivery of kitchen worktops and is sufficiently robust for up to 18 return trips^q.

Various European and International Standards ensuring compatibility across the world, and European legislation in December 2008 extended the derogation on heavy metals in plastic crates and pallets in the Packaging Directive, with the

^p Defra. 2009. Making the Most of Packaging. <http://www.defra.gov.uk/environment/waste/topics/packaging/pdf/full-packaging-strategy.pdf>

^q http://www.wrap.org.uk/retail/case_studies_research/case_study_1.html



option of a review after 5 years which removed the need for the early destruction of pallets and crates, avoiding waste^r. With industrial refillables schemes, product also tends to be supplied in greater volumes than in B2C systems. Packaging tends to be more expensive enabling suppliers to more easily justify the imposition of deposit to ensure the container's safe return.

A good example of a B2B refillables system functioning well despite a lengthy and complex supply chain is provided by Nectar which has been distributing soft drinks, beers, liqueurs and other beverages to businesses around the UK for over twenty years. Drinks are sourced worldwide, including from European countries like Germany with container deposit legislation. Whilst some Nectar products are imported by third parties, many are directly collected from source by Nectar, using its own logistics network. Nectar returns the refillable bottles and kegs to the country of origin - an unusual example of products being consumed in the UK while their containers are refilled abroad.

2.2 Decline of the traditional model

In recent decades, this traditional refillables model has declined in the UK. For example, between 1974 and 2006, the market share of refillable milk bottles in the UK dropped from 94% to 9.7%^s. Similarly, the use of returnable beer bottles dropped from 31% of the market in 1962 to just 0.1% in 2007 (though this does not include draught beer in refillable kegs which still held over 50% of the market in 2007^t), and between 1977 and 1987 the volume of soft drinks sold in refillable containers in the UK fell from 60% to just 3%^u. Today, single-trip packaging dominates the UK beverage market.

2.3 Reasons for the decline

According to studies such as *Refillable glass beverage container systems in the UK* published by WRAP in 2008^v, the interplay of several factors is responsible for the demise of the traditional refillables model; the relative importance of each depends on the product in question:

- consumer behavioural change;
- supply chain change;
- the rise of the supermarket;

^r Making the most of packaging. A strategy for a low-carbon economy. June 2009
<http://www.defra.gov.uk/environment/waste/topics/packaging/pdf/full-packaging-strategy.pdf>

^s Dairy UK and INCPEN

^t British Beer and Pub Association – Statistics Handbook, 2008

^u www.incpen.org/pages/userdata/incp/mandatdepsept2006.pdf

^v WRAP. 2008. Refillable glass beverage container systems in the UK. Written by Oakdene Hollins Ltd.



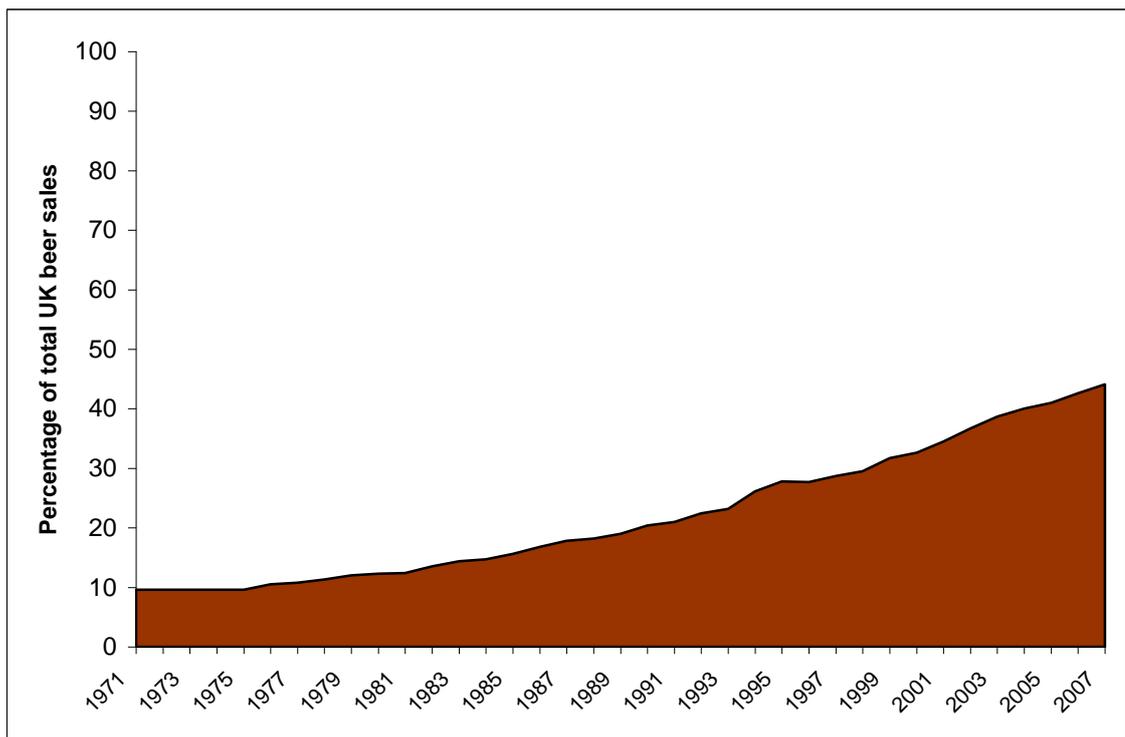
- aesthetics and branding;

Consumer behavioural change

Changes in consumption behaviour are most visible in the alcoholic beverage sector. Beer, wine and other drinks were largely sold via the on-trade, i.e. in pubs, clubs, hotels, restaurants and wine bars. Establishments retained the containers, returning them to be washed and refilled via the traditional dray system. The process was made even more straightforward where the establishment was owned by the drinks manufacturer.

This closed loop has largely now been lost with the rise in home-drinking. Today, far more alcohol is now purchased via the off-trade, i.e. from specialist off-licences, grocers, supermarkets and other shops. Fig 4 shows that off-trade sales of beer in the UK rose from less than 10% in 1971 to almost 50% in 2007.

Fig 4: Growth in UK beer sales through the off-trade.

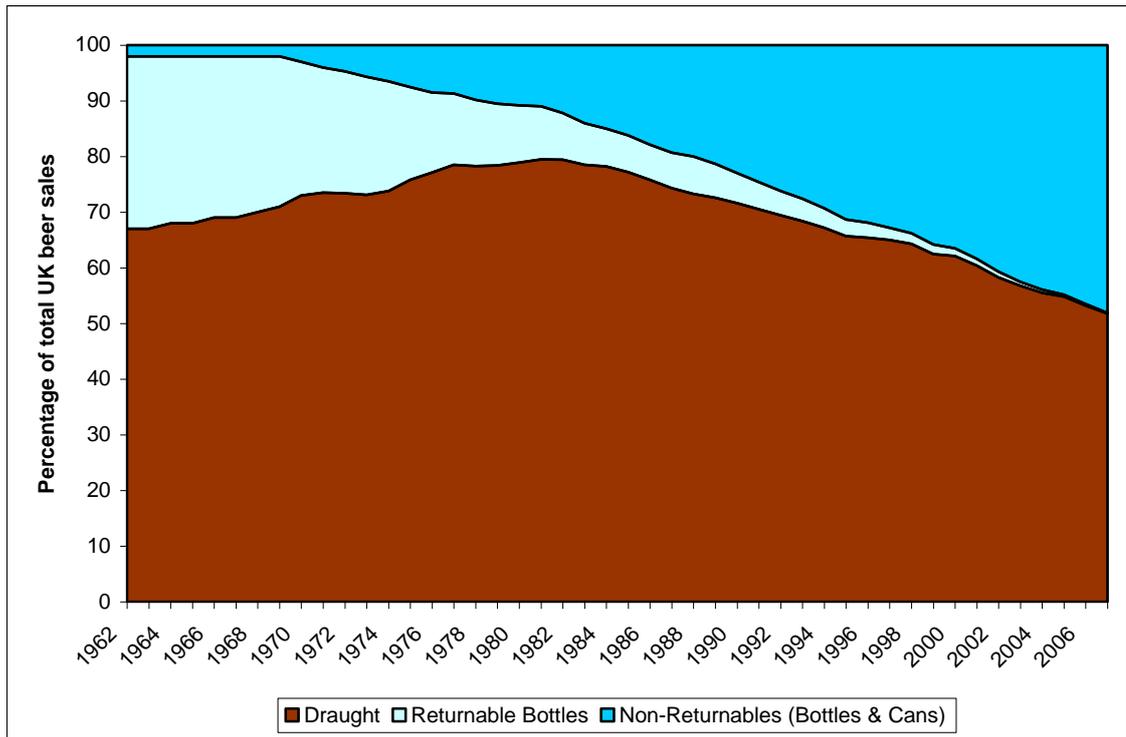


Source: British Beer and Pub Association

The use of single-trip packaging has dramatically increased; in 1962 only 2% of UK beer was sold in non-returnable packaging (bottles and cans), rising to 48% by 2007 (Fig 5).



Fig 5: UK beer sales by packaging type.

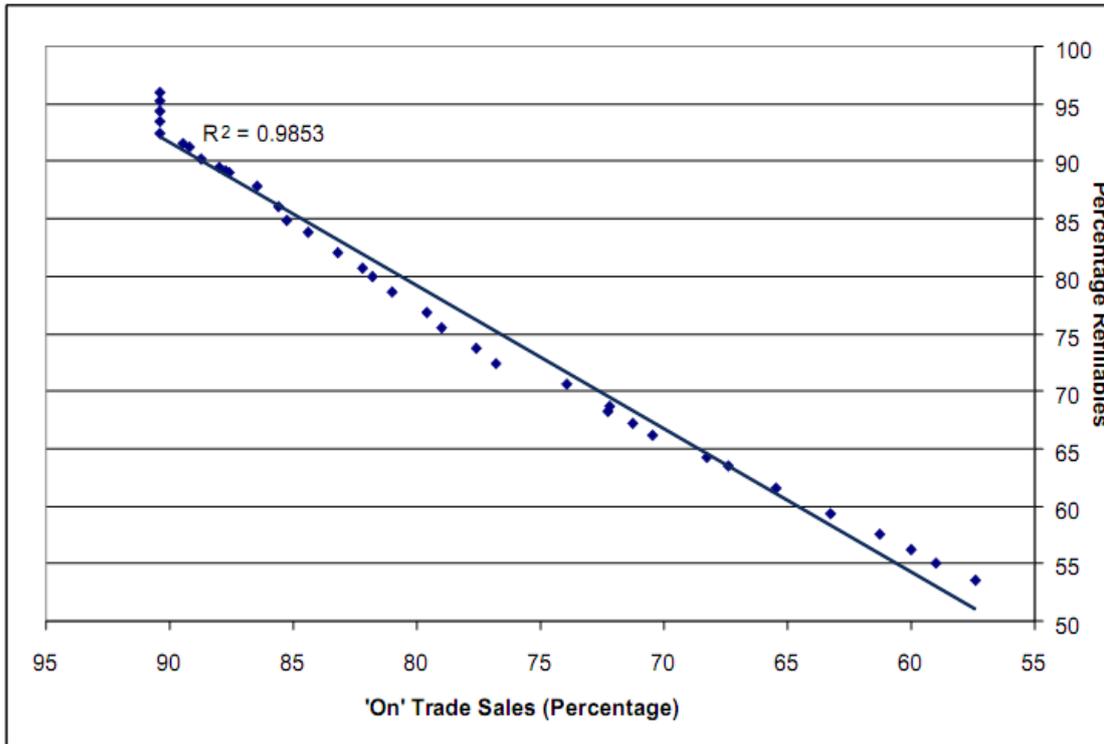


Source: British Beer and Pub Association

The control which drinks manufacturers previously had over their containers has diminished, a problem exacerbated by a decline in vertical integration; most pubs now source beverages from a wide range of national and overseas suppliers. The ease with which drinks manufacturers can recapture containers from outlets has been lost, and along with it compatibility of the traditional refillables model. The 2008 WRAP study *Refillable glass beverage container systems in the UK* reports a significant positive correlation between the declines of the on-trade and the use of refillables in the beer sector (Fig 6)



Fig 6: Correlation between the decline in on trade beer sales and use of refillables in the UK between 1971 and 2006.



Source: WRAP. 2008. Refillable glass beverage container systems in the UK. Written by Oakdene Hollins Ltd.

A similarly profound change in consumption pattern has occurred in the UK soft drinks sector. Previously, carbonated soft drinks such as Coca Cola were sold in glass bottles for which a successful deposit-return system operated. The drinks were chiefly consumed at home. Recent decades have seen a shift towards the away-from-home consumption of soft drinks largely due to a change of lifestyle, making a heavy refillable bottle an inconvenience. This change in consumer preference coincided with, and was stimulated by, the development of robust but lightweight single-trip containers made from aluminium and PET (polyethylene terephthalate) plastic. Between 1980 and 1989, the market share of glass refillable bottles in the carbonated soft drinks sector fell from 45.5% to 10.4%, while the industry doubled its overall sales^w. The introduction and widespread use of new packaging materials has, more generally, led to the disappearance of traditional refillables systems. As mentioned in Section 1, the latter were originally developed partly for economic reasons due to the high cost of glass. Today, alternatives such as PET and HDPE (high density polyethylene) plastic are cheap enough to be produced in a single-trip format. Manufacturers adopting such packaging were then able to make substantial savings by dismantling the infrastructure associated with collecting, washing and refilling empty containers.

^w Carbonated drinks: a report on the supply by manufacturers of carbonated drinks in the UK. www.competition-commission.org.uk/rep_pub/reports/1991/fulltext/309c3.pdf.



Supply chain change

Supply chains have been transformed across many sectors in the UK; in the process, the viability of the traditional refillables model has been eroded. As smaller companies are absorbed by multinational corporations, so local distribution centres have been closed and supply chains lengthened. Third-party distributors are regularly used. Returning containers hundreds, or perhaps thousands, of miles to the supplier would be complex, expensive, and may not even be environmentally justifiable. This explains why wine consumed in the UK, the vast majority of which is imported^x, has almost never been supplied in refillables^y. Similarly, much of the lager consumed in the UK is brewed in large-scale, centralised facilities with complex distribution channels involving wholesalers, importers and third party distributors. Again, return of containers for refilling is not feasible. The fact that lager grew from 1% of the UK beer market in 1971 to 73.6% in 2006^z, contributed to the decline in the use of refillables in the beer sector discussed in the previous section. Manufacturers have switched to one-way packaging made of cheaper materials such as PET to overcome the loss of previously recovered containers. In order to off-set the increased environmental and economic costs of the shift to non-refillables, many companies also now lightweight their packaging^{aa}.

The rise of the supermarket

While supply chains have lengthened and become more complex, so supermarkets have come to dominate the UK's retail environment. The business model adopted by these large retailers does not lend itself to the traditional refillable container system. A 2003 study by the Scottish Institute of Sustainable Technology^{bb} found no supermarkets operating schemes involving the reuse of primary packaging. The report found resistance among retailers to participation in refillable packaging systems due to "Health & Safety and Hygiene Regulations, the logistical complexities of a multidirectional supply chain, the price of new packaging and customer behaviour." Supermarkets are suggested as a primary reason for the decline in traditional door-step milk deliveries, because consumers could purchase milk more cheaply and in a variety of convenient packaging sizes as part of a weekly shop^{cc}.

In some jurisdictions operating state-run Deposit Return Systems (see Section 2.4), Reverse Vending Machines (RVMs) have been introduced at supermarkets to overcome some of these problems. Consumers can place used containers in the RVM and the deposit is automatically refunded, thus reducing the burden on the retailer of handling used containers. In Germany, customers can return

x England produces 1.4 million bottles of wine per year while imports account for 1.1 billion bottles. Key Note, Wine Report November 2007.

y The Whole Foods Market is a rare example of a wine UK company using reusable containers. According to the website: www.packagingnews.co.uk (Refill and reuse to reduce costs 01 September 2007), the firm sells wine in unbranded refillable packaging through its London shops. In addition, Pebblebed Vineyards of Topsham, Devon is planning a refillable system (Richard Lee, MBA research, Exeter University. Project guided by Global Action Plan and part funded by Pebblebed Winery and Envision and supported by Devon County Council.)

z BBPA – Statistics Handbook 2007.

aa According to the Diageo Corporate Citizenship Report 2005, the beer bottles exported from Jamaica "contain 20g less glass than those sold in Jamaica to minimise the energy required to manufacture, transport and recycle them"

bb Darlow, T., 2003. Waste Plans: Report on Categorisation and Pilot Studies. Scottish Institute of Sustainable Technology: Edinburgh. p. 1-65. Available at: http://www.sistech.co.uk/media/EEPFinalReport_V2_.pdf

cc WRAP. 2008. Refillable glass beverage container systems in the UK. Written by Oakdene Hollins Ltd.



containers (e.g. beer bottles), by the crate-load and are paid a monetary deposit or perhaps a credit for spending in the supermarket. RVMs are also currently used in some New York supermarkets for capturing containers for recycling rather than reuse (Figure 7).

Fig 7: Reverse vending machine in Austria



Source: Oakdene Hollins Ltd

However, although resistant to the traditional schemes, many leading retailers, under pressure from consumers over issues such as product miles and embedded carbon, are now implementing local sourcing policies^{dd} which may favour refillables, and several leading supermarket chains are exploring novel refillables models such as in-store self-dispensing of detergents and milk.

Aesthetics & Branding

The appearance and branding of packaging, something constrained by the traditional refillables model, is now an important feature of the retail environment. Packaging manufacturers and retailers have argued that frequent reuse of packaging lead to scuffs and marking on containers which can harm sales and the longevity of the packaging limits the scope for rebranding and product differentiation.

^{dd} Tesco expects to sell £1billion worth of local products, including fruit and vegetables, meat, dairy and drinks by 2011 (Tara Garnett, Food Climate Research Network, cited in WRAP. 2008. Refillable glass beverage container systems in the UK.)

Conversely, there is also some evidence that signs of reuse can also reinforce participation by consumers in refillable packaging systems^{ee} Much like the ‘sense of community’ felt for milk bottle doorstep deliveries, receiving a slightly ‘tatty’ beer bottle can bring about a sense of nostalgia as well as allowing the feeling of ‘doing something good’.

2.4 State-intervention to support the traditional model

The UK government has, to date, never directly promoted the traditional refillables model, although the Producer Responsibility Regulations for packaging arguably does indirectly support reuse because it stipulates that packaging counts against a producer’s obligation only the first time it is put on the market. Producers purchasing re-usable packaging thus have only to pay towards its recovery and recycling once^{ff}.

In several advanced economies, however, the state has intervened to support the traditional refillables model with mixed success. Table 2 summarizes policy instruments introduced in recent years. In many cases, promoting refillables was rarely the sole policy aim of such instruments - tackling litter or simply boosting recycling rates were also often key objectives.

^{ee} Vaughan et al 2007

^{ff} Making the most of packaging. A strategy for a low-carbon economy. June 2009 <http://www.defra.gov.uk/environment/waste/topics/packaging/pdf/full-packaging-strategy.pdf> This is recognised and promoted by the



Table 2: Five forms of state-intervention to promote the traditional refillables model

Instrument	Description	Examples	Outcomes	Learning
Deposit Refund Systems (DRS)	Statutory deposit typically set on both refillable and single-trip packaging. Level set differentially to incentivise use of refillables.	Denmark (2002–), Germany (2003 –), Portugal, Sweden, Austria, Canadian provinces (Ontario & Quebec).	Successful in Denmark where 100% of refillables returned in 2006 ^{gg} , but in Germany, Sweden and Portugal refillables slumping in some or all categories.	DRSs maintain existing refillables infrastructure, but expensive to run and cannot force manufacturers to switch back to refillables.
Eco-taxes	Single-trip containers are taxed to a greater extent than refillables	Belgium, Finland, Hungary.	Countries faced legal action at EU level, and forced to reduce differential in tax ^{hh} .	New eco-tax based on embedded CO ₂ planned by Netherlands is promising – although administration may be burdensome ⁱⁱ .
Bans	Single-trip packaging outlawed.	Denmark (1982-2002), Prince Edward Island in Canada (1973-2007)	Danish ban rescinded due to free trade considerations; PEI ban initially successful then became unworkable. ^{jj}	Bans difficult to maintain in globalised market.
Agreements	A voluntary covenant between government and industry not to substitute refillables with single-trip packaging unless environmentally justified.	Netherlands (1997 – Present)	Successful. In 2006, refillable glass used in 50% of all beer sales ^{kk} . Refillables widely used in soft drinks sector. However, due to free trade rules later versions of agreement have relaxed certain requirements.	The business case for signing up to such commitments may be difficult to prove.
Quotas	An industry or individual company is required to supply a specified percentage of the packaged volume in refillable containers	Germany (1991-1998)	Failed. By 1998 market share of refillables fell below quota (72%) set in 1991 ^{ll} .	Intervention failed due to lack of mechanism to incentivize or enforce. Quotas also target producers rather than the more powerful retailers.

The need to protect the free market has been a frequent barrier encountered by such initiatives – and in some cases EU member states have faced legal action of alleged breaches of European competition law. This is because the traditional

gg www.dansk-retursystem.dk

hh Lambert De Wijngaert, Belgium Brewers, Personal Communication cited in WRAP. 2008. Refillable glass beverage container systems in the UK.

ii Good product, bad product? Making the case for product levies. Green Alliance 2008.

jj PEI Premier Pat Binns cited in: <http://www.governmentofpei.ca/news/getrelease.php3?number=5154>

kk Joke Schar (BBM), Personal Communication cited in WRAP. 2008. Refillable glass beverage container systems in the UK.

ll Perchards (2007). Study on factual implementation of a national take-back system in Germany



refillables model is rarely viable for companies importing goods from a long distance due to the complexity of reverse-logistics. Thus, policies promoting refillables by default can favour local businesses.

Critics of such policies also point to the high costs required to set up and maintain infrastructure. INCPEN claims that establishing a UK DRS for containers alone, just 10% of all packaging waste, could cost up to £7billion to establish against a total government and industry spend of £155million in 2005 to recycle 60% of all packaging waste. The body suggests that if the deposit incentive was set at too high a level to cover these costs, fraud then becomes a risk^{mm}. Substantial investment would be needed for industry to re-establish washing and re-filling facilities of the kind phased out in recent decades. *Refillable glass beverage container systems in the UK* estimates that the minimum capital cost of converting a one-way glass bottle plant to a refillables plant is £2 million. This would be for a small-scale plant serving a local market. The costs are far higher for large, centralised facilities. For example, the 2008 WRAP study estimates that an 1,000 units per minute refillable glass line would cost of £6 - £7 million. The investment required to convert all the UK soft drinks sector's production facilities and supply chain to refillables is put at over £4bn according to the British Soft Drinks Associationⁿⁿ.

In addition, as discussed below, the promotion of the traditional refillables system may not necessarily be the best environmental option.

2.5 Section conclusion

Traditional refillables schemes, whereby primary packaging is returned to the manufacturer for refilling, still function well in B2B contexts – and sometimes across lengthy supply chains. This is because contractual relationships ensure minimum container recapture rates. However, in business to consumer situations, the traditional model has been superseded by single-trip packaging systems in almost all cases. Financial incentives or statutory instruments are unlikely to be able to change this in an advanced economy such as the UK. Instead, attention should be focused on alternative models, discussed in the following chapter, which are starting to emerge, largely without government intervention.

^{mm} INCPEN. May 2008. Mandatory deposits on packaging
<http://www.incpen.org/pages/data/MANDATORY%20DEPOSITS%20May%202008.pdf>
ⁿⁿ ACP Presentation by Paul Smith, Coca Cola Enterprises (2004).



3 New refillables models

3.1 Introduction

The traditional refillables model was introduced to solve an economic problem, the high cost of packaging usually glass. As packaging costs have declined, this model has largely disappeared. However, new systems are being introduced which promise to retain the environmental benefits of refillables, while remaining economically viable. These can broadly be divided into models where the product is dispensed by the consumer at home, or in the store. In both cases, the key difference from the traditional model is that after initial purchase the primary packaging stays with the consumer, rather than being recaptured by the supplier for refill. The burdens of storing, handling, transporting, washing and refilling reusable packaging are largely removed from the retailer and manufacturer.

Such approaches solve the problem of declining trip rates, while enjoying the twin benefits of reduced primary packaging and a large scale, highly efficient, centralised manufacturing system for the product itself. The product is typically delivered straight to the store in bulk by-passing distribution centres which reduces material handling and vehicle movements and, often, the need for secondary packaging.

3.2 Home dispensing

In recent years, a wide range of goods, particularly non-food items such as personal hygiene products and household cleaners, have started to be sold in refillable primary packaging. But in contrast to the traditional refillables model, the reusable packaging remains with the customer who tops up the primary packaging (or dispenser) at home. The product itself is distributed to - and bought from - the retailer in single-trip packaging. Many examples of these home-dispensing products, increasingly seen in the UK and abroad, are reviewed in 2008 WRAP report entitled *A feasibility study – potential refill solutions for the food and non food retail sectors*^{oo}. Typical of this type of alternative refillables mode are the Olay Daily Facials cleansing wipes produced by Procter & Gamble. Customers initially purchase a high-quality reusable plastic pot, which can be refilled using lighter flexible plastic packaging. P&G also sell a reusable tub for its Kandoo toilet wipes for children. The tub which retails for £2.99 is a 'child-friendly size' and resembles a toilet seat, while the refill packs are £1.99 for a pack of wipes^{pp}.

A more recent introduction to this market is the Kenco 'Eco Refill' freeze dried coffee packs. These pouches are marketed as an environmentally beneficial option with 97% less packaging by weight, and half the non-recyclable packaging

^{oo} WRAP (2008), *A feasibility study – potential refill solutions for the food and non food retail sectors*, http://www.wrap.org.uk/retail/case_studies_research/a_feasibility_study.html

^{pp} Refill and reuse to reduce costs Paul Gander, Packaging News, 01 September 2007 <http://www.packagingnews.co.uk/news/736175/Refill-reuse-reduce-costs/>



than the usual glass jar. Customers simply buy the 200g refill pack and decant into an empty jar at home. Again, this avoids customers having to remember to bring old containers back to the site of retail, there is no requirement of an empty container before purchase of refill, and manufacturers can retain their branding, as no generic jar is required.

However, few beverages, the original focus of the traditional refillables model, are offered to householders as home dispensing refillables. However, in 2007 Waitrose and Calon Wen, a Welsh organic milk co-operative, began trialling a refillable milk container in the UK. In the system, customers initially purchase a rigid plastic jug which then supports one litre low-density polythene (LDPE) 'eco paks' containing the milk. Tesco followed suit in April 2008, adopting the Calon Wen system in 43 Welsh stores. Although they are single-trip packaging, the eco paks, which are produced by Glopak, use 75% less packaging than conventional poly-bottles. 'Milk out of a bag' is already well-established in continental Europe, and Sainsbury's had tested it as early as 2001, but Calon Wen was the first supplier to mainstream the system in the UK⁹⁹.

Fig 8 The eco pak, containing refills for a reusable milk jug



Source: Oakdene Hollins Ltd

The concept of pouches to package beverages is growing, and with 'premium' products being offered in this way, the consumer perception may be improved. Arniston Bay produces both the Chenin Blanc Chardonnay and the Pinotage Rose in 1.5l pouches as alternative options to glass bottles.

3.3 In-store self-dispensing systems (ISSDS)

In-store self-dispensing systems (ISSDS) are less common than home dispensing but have a longer track record in the UK. For example, a system introduced by The Body Shop described below dates back to the 1970s. Again, the problems associated with returning primary packaging to the manufacturer for refilling are

⁹⁹ <http://www.packagingnews.co.uk/news/804029/Calon-Wen-sells-milk-in-bag-Tesco/>

circumvented, because the customer retains this packaging for refilling in-store. Table 3 summarizes some niche examples.

Table 3: Small scale examples of in-store self-dispensing systems in the UK

Company	Location	Product	Primary Packaging	Financial Incentive	Outcomes
Various micro-breweries check	Sporadic locations nationwide	Beer check	Rigid plastic containers supplied by company or the customer check.	Variable – discount may be offered	Not known
Ecover	Sporadic locations nationwide – a niche market	Household detergents	Rigid plastic containers supplied by company	Variable – discount may be offered	Not recorded
Unpackaged	London	Dry goods	Resealable plastic bags supplied by company or the customer	Yes	60% return rate ^{rr}
Whole Foods Market	London	Cereal, Olive oil, Wine	Various containers supplied by company	Variable	Unwilling to provide
Vom Fass & Selfridges	London & Newcastle	Wine, spirits, vinegar	Glass supplied by company	Yes	Not recorded
Roots	Bicester	Olive oil	Glass supplied by company or customer	Yes - £1.49 saving if refilling	Not known

The first ISSDS to develop into a national scheme was introduced by The Body Shop. When the first shop was opened in 1976, twenty-five toiletries products were offered in five bottle sizes which the customers could wash out and return to the shop for refilling^{ss}. But despite the incentive of a 10% reduction if customers returned containers for refilling, uptake declined as the company expanded. By the 1990s, less than 1% of customers brought their bottles back for refilling^{tt}, and the scheme was discontinued in 2002^{uu} with refills abandoned in favour of recyclable PET containers. Lack of convenience and low incentive levels have been identified as the key problems^{vv},

^{rr} Refill and reuse to reduce costs Paul Gander, Packaging News, 01 September 2007 <http://www.packagingnews.co.uk/news/736175/Refill-reuse-reduce-costs/>
^{ss} Compass Online Website. 1997. http://www.tsujiru.net/compass/compass_1996/reg/suzuki_noriko.htm 1996-1997 . The Truth about The Body Shop
^{tt} Cosmetics Business Website . 2006. COMPANY REPORT The Body Shop - Body and soul. 20 October, 2006. <http://www.cosmeticsbusiness.com/story.asp?storycode=476>
^{uu} Incpen (May 2008), Mandatory Deposits on Packaging, <http://www.incpen.org/pages/data/MANDATORY%20DEPOSITS%20May%202008.pdf>, p.3.
^{vv} Packaging News Website. 2007. Refill and reuse to reduce costs, 01 September 2007. <http://www.packagingnews.co.uk/news/736175/Refill-reuse-reduce-costs/>



However, consumers may simply not have been ready for system. This high profile failure has not dissuaded a competitor, the Boots Company, from exploring a more advanced ISSDS for its Botanics toiletries range^{www}. During a 2007 study co-funded through Defra, consumer preferences for various pack designs were assessed and barriers to adoption identified. It was concluded that Boots ISSDS might succeed, especially if concentrates were offered with ingredients which could be mixed and matched in-store^{xx}. However, a number of concerns arising from the research have pushed the focus more strongly onto at home refilling. Customers purchasing concentrates in pouches, can then decanter concentrate and water into rigid bottles away from store. Boots were cautious about potential contamination issues with ISSDS - through customers' ineffectively cleaning non purpose containers – causing any poor reflection on brand products. The very simple concern of mess at the dispense system was also highlighted, though this is likely to be something that may be overcome with more advanced designs.

A similar initiative trialled by the supermarket chain Asda, with WRAP funding, is an ISSDS for fabric conditioner. A customer-facing unit, designed and manufactured by Eziserv Ltd, has been developed to sit on a supermarket shelf and allow shoppers to fill reusable plastic pouches (Fig 10). A prototype tested in 2001 required filling using containers which had to be moved by staff into the store, but with the new version the product is piped to the shelf from intermediate bulk containers (IBC) located at the back of the store. The new approach promises to more convenient, less labour intensive and messy. Trial outcomes will be published in 2010.

^{www} Defra research project: "Refillable Packaging Systems" (project code WR0113)
<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=14682&FromSearch=Y&Publisher=1&SearchText=WR01&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

^{xx} Refill and reuse to reduce costs Paul Gander, Packaging News, 01 September 2007
<http://www.packagingnews.co.uk/news/736175/Refill-reuse-reduce-costs/>



Figure 10: The Eziserv in-store self-dispensing unit for refilling containers with fabric conditioner.



Source: Eziserv Ltd

As with home dispensing, ISSDS are rarely if ever offered for the refilling of beverage containers. Investigating the gap in the market, a WRAP's 2009 report *Beverages: Self-Dispensing*^{yy} identifies barriers for refilling bottled water, soft drinks, milk and alcohol containers in-store. Market fragmentation for products is a problem, with Coca-Cola the only brand selling in sufficiently high volumes that a switch to self-filling could be justified in terms of packaging reduction. Fruit-based concentrates were deemed the most promising product type for a trial, as legal issues might preclude in-store self-dispensing of alcohol and loss of gas would be a problem for carbonated drinks. This is not true in all cases, however, and small scale 'manned' self service for alcohol is possible, with Vom Fass offering just that. Customers can purchase spirits and liquors, as well as oils and vinegars, in refillable bottles, and are charged for content only. A number of outlets are in the UK, but they tend to be small and easily monitored for abuse of the system, unlike a supermarket would be.

The WRAP report suggests that an ISSDS for milk may also be a possibility in the UK due to the relatively simple supply chain, although ensuring hygiene was a challenge. Since the report was published an ISSDS for milk has come to light in retail outlets in Italy (Fig 11).

^{yy} WRAP (2009) *Beverages: Self-Dispensing*. Written by Ceres Logistics.

Figure 11: An example of the vending machine for self-dispensing milk in Italy.



Source: Oakdene Hollins Ltd

The vending machine combines the purchase of empty bottles (shown on the left of the vending machine) with the dispensing system (Figure 12).

Figure 12: An example of the dispensing system used for self-dispensing milk in Italy.



Source: Oakdene Hollins Ltd

Given that UK retailers are starting to adopt the milk out of a bag system (discussed in Section 3.2), it is not clear whether the alternative of in-store self-dispensing for milk will attract interest.

3.4 At home versus ISSDs

Both of the modern modes of refilling offer potential environmental and financial benefits. Which system is 'better' from a packaging perspective depends to some extent on the product involved. In terms of resource used, ISSDs offer a complete refill system, with no further packaging required until the refillable container is no longer useable. At home systems are bought in single trip packaging, and therefore offer reduced packaging each purchase, but may improve uptake rates due to convenience of not having to remember to bring empty containers back to the store to fill.

In terms of convenience in store, no additional time is required if purchasing 'pouches' to decant at home, and (particularly for non-luxury items) this may be considered preferable to the consumer. In the Boots Company example, concerns over mess at the refill station dissuading customers from using the system are avoided. Conversely, the additional advertising available with the ISSD dispenser may play a role in improving sales, though without further trial details, it is difficult to determine whether this will occur.

If considering a large retail centre, such as a superstore, pouch systems may provide the best option as there is far more opportunity over a large number of products and brands, whereas a single site will be limited to a small number of dispensers. Retailers may find ISSDs most attractive for own brand products, with branded products developing pouch systems independently. Making New Models Work

Although new refillables models appear more suited than their traditional counterparts to today's UK economy, success is not guaranteed. New systems need to appeal to consumers, and address practical and environmental issues, some of which have been set out above.

Consumer perception

Any new refillables system requires consumer buy-in. For example, if the system is inconvenient or messy, then customers will not participate – even where financial incentives are offered. A 2006 report^{zz} written by Loughborough University as part of the Defra-funded Boots project identified a range of aspects which need consideration when designing a new refillables system (Table 4).

^{zz} Lofthouse, V.A. and Bhamra, T.A. (2006) An investigation into consumer perceptions of refills and refillable packaging, Loughborough University, Loughborough.



Table 4: Aspects of refillables systems and consumer perception.

Attributes for a positive experience	Attributes for a negative experience
Good product quality	Expensive refills in giveaway parent pack
Convenient delivery	Inconvenience / requiring additional planning
Good value	Take up more space
Less packaging and or product waste	Hassle of maintenance
Easy to use	Increased waste
Clean and hygienic	Poor product quality
Takes us less space	Bad delivery
Light to transport	Bad quality packaging
No mess	'Fiddly' to refill
Cheap	Concerns over how long refill will be available for
Quick to use/refill	Incompatibility between systems
Incentives / rewards for use	
Suitability for purpose	

Source: Lofthouse, V.A. and Bhamra, T.A. (2006) An investigation into consumer perceptions of refills and refillable packaging, Loughborough University, Loughborough.

Such studies are useful, however, their findings should be treated with caution as what people say and what they do in practice may not always align. An earlier report^{aaa} suggested that a rise in recycling behaviour among consumers may work against the refillables model since people felt they were already contributing enough. On the other hand evidence exists that consumers are prepared to embrace environmental initiatives. For example, the decision by retailer Marks & Spencer from February 2008 to charge 5p for single use food carrier bags has cut bag usage by 83% from 464 million to 77 million bags within 12 months^{bbb}.

aaa Thorgersen J (1998) Spillover processes in the development of a sustainable consumption pattern, Journal of Economic Psychology Volume 20, Issue 1, February 1999, Pages 53-81

bbb Marks & Spencer Plan A Press Release. 4 June 2009 - M&S reports on progress half way through its eco-plan, Plan A.



Practical and Design Issues

In order for refillables to succeed, good design is vital. The primary packaging must be sufficiently robust to withstand repeated re-use by the customer, and should also be easy to use, store and transport^{ccc}. Customer-facing packaging must offer manufacturers the scope to redesign and rebrand where necessary.

Figure 13: Refill pack for a soap dispenser



Source: Oakdene Hollins Ltd

The packaging may also be used to communicate marketing and environmental information to the consumer. For example, a refill pack for the Cussons Carex hand-soap dispenser state purchased in May 2009 states: “By buying a Carex Refill, not only is it better value but it also uses 40% less plastic than a standard pack resulting in less packaging waste...**based on plastic weight per ml compared with a standard 250ml pump pack”.

<http://corporate.marksandspencer.com/file.axd?pointerid=639f4dfb638f4486a7fde1bad338b99c&versionid=8d9290771d8e4240a52cec15a613b16d>

^{ccc} Lofthouse, V.A. and Bhamra, T.A. (2006) An investigation into consumer perceptions of refills and refillable packaging, Loughborough University, Loughborough.

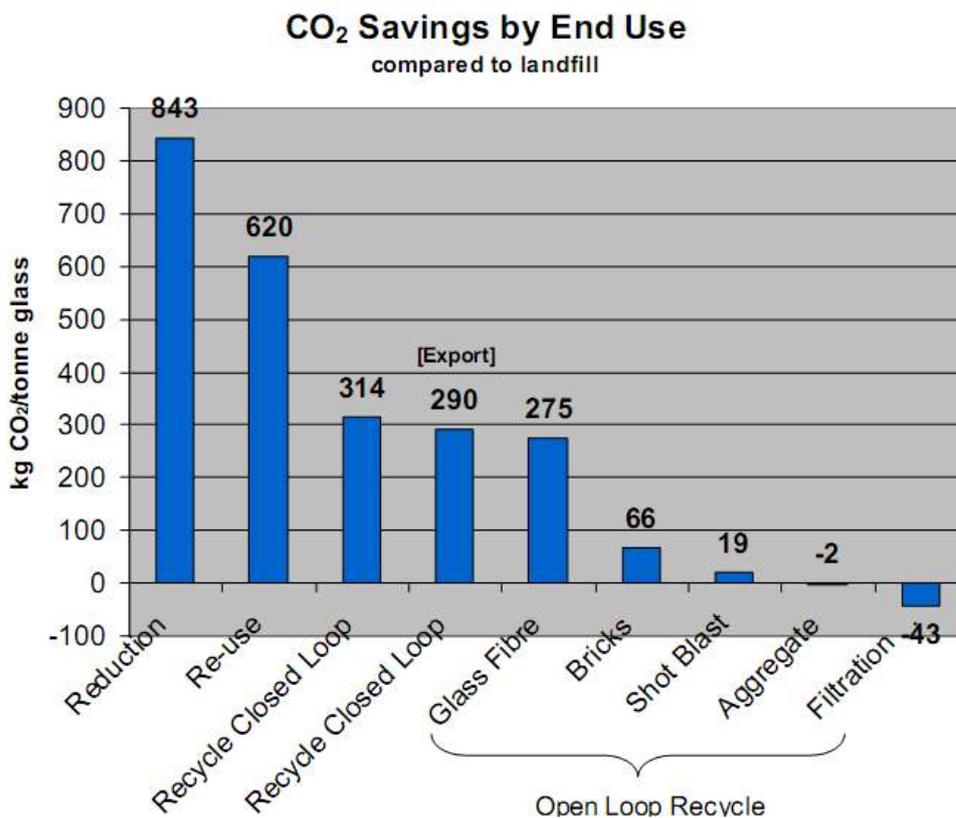


Environmental issues

New refillables models are being introduced for their perceived environmental advantages. However, as discussed above, refillables were originally introduced in the UK and around the world for economic reasons. Although superficially appearing to offer reduced packaging or greenhouse gas emissions, these environmental benefits may not be true in all, or even most cases. Conclusive LCA evidence is absent both for traditional and new refillables models.

A 1998 study by the Danish Environmental Protection Agency entitled *A Life Cycle Analysis Assessment of Packaging Systems for Beer & Soft Drinks* found that reusing rather than landfilling container glass saves approximately 620 kg CO₂ per tonne of glass, double the maximum possible savings from recycling (Fig 14)

Figure 14: CO₂ savings for end use of glass



Source: WRAP. 2008. Refillable glass beverage container systems in the UK. Written by Oakdene Hollins Ltd. All data with the exception of the reuse figure is taken from Glass Recycling: Life Cycle Carbon Dioxide Emission, Enviros Consulting Ltd, 2003. Reuse data taken from Life Cycle Analysis Assessment of Packaging Systems for Beer & Soft Drinks, Danish Environmental Protection Agency, 1998. Note: Transportation impacts have been included in the data and 'reduction' refers to the full embedded CO₂ value of the glass.

However, environmental benefits of traditional refillables systems are likely to be reduced or lost altogether when, as is the case in the UK, the container recapture rates are low, supply chains are long, and the local recycling levels are high. An 2005 EC study showed that greenhouse gas emissions associated with glass refillables exceeded those emitted by single-trip packaging when transport distances were over 100km and the container recapture rates were low. The

report^{ddd} found that no type of packaging was clearly always better or always worse for the environment, irrespective of the assumptions used (Fig 15).

Fig 15: The impact of transport distance and capture rate on the environmental viability of refillables vs single-trip packaging systems

Capture Rate	High	Refillables better than Single-trip	Inconclusive	Inconclusive
	Low	Inconclusive	Inconclusive	Single-trip better than Refillables
		Low (below 100km)	Medium (100km-1,000km)	High (above 1,000km)
Transport Distance				

Source: Adapted from Ecolas – Pira (2005) Study on the implementation of Directive 94/62/EC on Packaging and Packaging Waste and options to strengthen prevention and re-use of packaging, final report 03/07884.

Among the new refillables systems, claims are frequently made by retailers and manufacturers as to the environmental benefits of their schemes. For example, Waitrose states that the eco-pak developed with Calon Wen uses 75% less plastic than a one litre milk polybottle equivalent, and as discussed above, similar claims are made for hand-soap dispenser refills. On the other hand Tesco has decided not to adopt reusable packaging because, the retailer argues, the latter would require strengthening potentially creating “a worse situation for the environment” unless the packaging was “reused a certain number of times.”^{eee}

The relative benefits of the different reusable formats used are also in question. Ecover, which offers refillable rigid plastic bottles for its toiletries products, is reported to have decided against the use of flexible pouches, such as found in other systems because “the materials used for these [pouches] is more damaging to the environment [than]... the plastic used in our standard bottles”^{fff}

However, LCA evidence proving the universal environmental benefits of new refillable models is missing. A new protocol (Publicly Available Specification 2050) for calculating the carbon footprint of a product or service may address the problem.

ddd Ecolas – Pira (2005) Study on the implementation of Directive 94/62/EC on Packaging and Packaging Waste and options to strengthen prevention and re-use of packaging, final report 03/07884.

eee http://www.tesco.com/greenerliving/what_we_are_doing/greener_packaging/faqs/default.page?

fff Packaging News Website. 2007. Refill and reuse to reduce costs, 01 September 2007. <http://www.packagingnews.co.uk/news/736175/Refill-reuse-reduce-costs/>



Business Case

In previous years, due to resource costs and community infrastructure, the cost effectiveness of refillables was clear. With changes in consumer behaviour and technological advances in packaging, the benefits of refillables are not always so easily determined, and systems often have to be assessed on a case by case basis for viability. The most obvious benefit of refillable systems is the reduced cost of manufacture of packaging; however this is dependant largely on the trippage rate of the container. Much like the environmental issues discussed in the previous section, the more trips a container makes, the more savings are seen over one way packaging. Haulage rates are also a variable, with low return rates potentially resulting in further trips for the heavier packaging, but high return rates generally reducing transport costs significantly.

For most refill systems, the retailer requires reduced shelf space to store the equivalent quantity of stock. Industry estimates put this at about £700 per m² saved. This however then needs to be weighed against the initial cost of setup and the maintenance of any dispensers, but providing customer uptake is sufficient, the benefits to the retailer of this system are perceived to be high. For a better understanding of the financial 'break even point' of ISSDs, the results of store trials being carried out currently will prove invaluable.

In terms of set up cost, this again varies depending on the sort of refill system in place. With pouch systems, where customers fill containers at home, there is a minimal cost to the manufacturer. Product distribution does not change, and costs incurred during the design and production of the new packaging tends to be soon offset by savings in the lower resource use of pouches than durable, rigid containers. However, this system still involves creation of some waste. ISSDs are a higher initial capital cost, whilst the more traditional model of in-plant refilling tends to have the greatest costs, due to the responsibility of the container staying with the producer, therefore facilities are required for all maintenance needed (e.g. washing, storage, refilling and sometimes relabeling). A 2007 WRAP report placed average costs of investment in a new small to medium sized refillable production line runs at approximately £6-7 million⁹⁹⁹. The modern refill models are therefore favoured in a financial aspect as well as a logistical sense.

The 'green pound' is also a strong incentive for stores wishing to host ISSDs. Being such a prominent marketing opportunity, stores can highlight their 'green' credentials and may create an increase in sales as consumers become more environmentally conscientious in their purchases.

⁹⁹⁹ WRAP. 2008. Refillable glass beverage container systems in the UK. Written by Oakdene Hollins Ltd



3.5 Section conclusion

Interest is growing in new refillable packaging systems, but in order to achieve a wider take-up by both retailers and the public of such models, evidence is needed to prove both the environmental benefits of these systems, as well as the business case. A criticism of any form of refillables model, levelled by INCPEN among others, is that diverting packaging away from established recycling infrastructure may undermine the commercial viability of the latter. This is one of several assertions which need testing.

Once the case has been made, then further work is needed to boost consumer awareness of the benefits of refillables. Innovations in packaging, such as on-packaging communication of embedded carbon proposed for the Eziserv system should further stimulate interest.



4 Conclusions

Where refillable packaging systems survive in the UK, they are underpinned by economic factors rather than any government subsidy. These key factors are:

- Producer managed supply chains, which control the circulation of the refillable packaging, thereby ensuring high capture rates and multiple trips.
- Elements of the packaging being regarded as valuable e.g. a gas canister, lighter or shaver, dispensing top for hand soaps
- Protection of valuable contents. Refillable packaging tends to be stronger and heavier.
- The proximity of filling to consumption, so that transport costs are reduced.
- Outsourcing of the filling function to the consumer.
- An opportunity to demonstrate 'green' credentials, which may underpin the 'branding' strategy.

We have highlighted a number of newly developed systems involving in-store and home dispensing, which offer manufacturers and retailers the opportunity to reduce packaging of consumer products. However, further research is required into the actual packaging reductions achieved and any consequent negative environmental effects both in terms of substitution of materials and the need for greater transportation distances.





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About the CRR:

- The Centre for Remanufacturing and Reuse (CRR) was established in 2006 to support and promote, where appropriate, the activities of product remanufacturing and reuse.
- The CRR is funded by Defra (the UK Government's Department for the Environment, Food & Rural Affairs).
- Remanufacturing is the process of bringing End-of-Life products back to life by repairing, refurbishing, upgrading and/or replacing parts. Remanufactured products are provided with a warranty matching that of a new product, ensuring customer confidence.
- The CRR's website www.remanufacturing.org.uk provides comprehensive and free interactive information, including:
 - Who is remanufacturing
 - What products can be remanufactured
 - How to remanufacture
 - The benefits of remanufacturing
- The CRR is managed by Oakdene Hollins Ltd, a clean technology and resource management consultancy based in Aylesbury, Buckinghamshire. www.oakdenehollins.co.uk
- The CRR believes that product remanufacturing and reuse (r&r):
 - is vital to the conservation of resources including materials and energy
 - presents benefits to both the environment and businesses
 - boosts skills, employment and economic activity in the UK.

