Refillable glass containers in Aotearoa New Zealand

Current context, challenges and opportunities

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GLASS PACKAGING FORUM

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Executive Summary

Refill schemes create a truly circular solution for packaging as a container is used multiple times. While no New Zealand-specific lifecycle analysis has been conducted, numerous studies worldwide have shown reusing glass containers reduces the need for virgin materials and processing, and reduces the waste created, or need for recycling, at the end of life.

Overseas studies have also shown there is a reduction in the carbon footprint of refillable containers compared to recycling the glass. However, this must be carefully measured and is affected by the distance the empty containers must travel to be refilled and how many times they are reused.

There is also a behaviour change benefit through normalising reuse in a society where single use has become standard for many products.

Currently New Zealand has one large-scale refill scheme, the ABC Swappa Crate for beer bottles, and numerous local schemes for products like milk and beer as well as cosmetics. These tend to be brand specific (apart from ABC Swappa Crate), with no inter-brand, product stewardship organisation-run scheme in place.

While refill schemes have seen a decline globally over recent decades, there is a growing appetite among consumers for more refillable options as the demand for sustainable and ethical products increases. This in turn has seen industry begin to look more to refill options.

The Glass Packaging Forum is well positioned to facilitate and support the creation of refill schemes through funding mechanisms, or by acting as an independent facilitator, product stewardship organisation or scheme manager for industry refill schemes.

Current context

Refillable packaging for consumer products is not new in New Zealand, but in recent years the demand for and supply of this option has seen a steady increase.

This has been particularly evident in terms of beverage and milk containers, with a growing number of dairies and breweries establishing local return and refill schemes. A small, but growing number of businesses also offer reusable options for food and coffee.

There has also been a small but growing number of businesses outside of the food and beverage sector offering refill schemes, such as beauty products company Aleph and oral health care business Solid.

However, when it comes to the number of containers avoided through reuse, it is beer which accounts for the vast majority – mostly due to the ABC Swappa Crate scheme, which is the country's largest scale refill scheme, and available throughout the New Zealand.

There is also a growing demand among consumers for more sustainable packaging options. While much of this is directed towards the reduction of plastic, there is a segment which recognises the positive impact viable, circular reuse schemes can have in reducing waste, use of virgin material and carbon emissions.

Other than the ABC Swappa Crate scheme, New Zealand has a number of smaller-scale schemes, the majority operating in localised areas.

International experience

Refill schemes are the first circular solution for glass bottles and other containers, with local and national schemes operating worldwide since the 19th century.

Refill schemes didn't initially exist for environmental reasons but because, before the advent of mass production processes, bottles were expensive to make so bottlers attached a redeemable deposit to them to incentivise their return.

Western European countries, with their dense populations and advanced transport infrastructures, have traditionally led the way on refillable schemes. According to refillables.grrn.org, "In almost every European nation, regardless of the presence or absence of a policy, refillable containers are used to some extent for at least one type of beverage".

However, a 2015 report by Reloop (*reloopplatform.org*) found refillable packaging in Europe was in decline as distributors moved to one-way packaging. As noted by Reloop, "Several countries have implemented policy measures such as taxes on one-way containers to try to maintain the refillable container, but many of these seem to have failed. There remain very few thriving refillable systems, and most of those are industry-specific." By 2015 refillables made up just 21% of the European beverage market, although this likely puts it well ahead of New Zealand, given the size of our largest scheme.

Refillables.grrn.org points out that in France refillable beverage containers "have become almost extinct". This may be changing though and in 2021 French MP's voted in favour of a law meaning large supermarkets must dedicate 20% of their surface space to food refill stations by 2030 (*connexionfrance.com*), although this is not exclusively for beverage containers.

According to (*Statista, 2021*) in Ireland and the United Kingdom refilling has almost disappeared but most beer is sold on tap as draughts.

Germany, with its hugely successful Pfand bottle deposit system attains a 98% return rate for beverage containers (*dw.com*). This system splits containers into a recycled and a refilled steam, with different deposits for each – the former set by Government and the latter by industry. Labelling explains if a bottle is multi-use (mehrweg) or single-use (einweg), while returns are done via a reverse vending machine.

Dw.com reports that refillables make up 42.8% of the market while single-use recycled containers make up 57.2%.

According to bottlebill.org the Netherlands operates a plastic bottle deposit scheme with a 95% return rate and a separate beer bottle refill scheme (return rate unavailable).

Other than kerbside or public place recycling, bottle deposit schemes are the predominant method of collecting glass, though this is predominantly for recycling rather than refill.

In 2020 Reloop (*Global Bottle Deposit Book 2020 An Overview of Deposit Systems for One-Way Beverage Containers, 2020*) reported that 45 bottle deposit schemes worldwide meant over 289 million people could return metal, plastic, glass, and in some cases other materials such as Tetra Pak, for recycling. Of these 41 include glass.

Existing refill schemes in Aotearoa

ABC Swappa Crate

The ABC Swappa Crate scheme is New Zealand's longest running return and refill scheme and accounts for almost all refill beverage bottles in circulation. The scheme has been growing at around 13% per year, but at some 30 million units it's still dwarfed by the estimated 2.3 billion single-use beverage containers used by Kiwi's each year.

Despite this, the ABC Swappa Crate scheme demonstrates what is needed to be successful at a national level: Standardised containers, a deposit to incentivise returns, infrastructure to wash and refill bottles at multiples points around the country, reverse logistics built into an existing supply chain and easily-accessible return points for the public.

Dairy schemes

Milk refill schemes in New Zealand currently make up a very small percentage of the refillables market, when compared with the ABC Swappa Crate scheme (30M units). There are currently over 20 in operation with an online presence and there are likely to be more operating local farm gate refill options. Tasman-based company Village Milk makes equipment, such as milk dispensing machines, and offers consulting services for milk producers to set up farm gate sales.

The majority operate within a city, town or local area either through delivery, in-store refill or return for refill. For example, Origin Earth in Hawke's Bay offers urban deliveries in the region to businesses and homes as well as through the local farmers' market.

There are a small number of exceptions which operate in a wider area, such as Oakland Milk which operates in Nelson, Tasman and Marlborough, and Farm Fresh South which offers a home delivery in Southland and Otago.

Commercial milk producer Synlait introduced a supermarket-based refill scheme, Synlait Swappa Bottle, at two Christchurch New World stores, in 2021. The scheme, which Synlait aims to expand, uses stainless steel bottles which are returned by the customer to be washed and refilled. The bottles are also trackable via a mobile app.

Boutique dairy producer Lewis Road Creamery has also introduced a grocery store-based refill scheme (fill-your-own), in conjunction with the Glass Bottle Milk Co. offering refill stations at six Farro Fresh stores in Auckland.

The two schemes take different approaches in that one requires the containers to be returned so they can be washed and filled, while the other gives customers the ability to refill their own container. They also use different materials in terms of glass and stainless-steel containers.

While the few milk refill schemes in New Zealand cater to a small but growing segment of the population wanting this option, they represent a very small fraction of the total volume of milk sold country wide. According to Fonterra (*It's World Milk Day!, 2018*) 190 two litre milk bottles are sold every minute in New Zealand, making the country the world's third highest per capita consumer of fresh white milk.

It's also worth noting milk sold through a refill scheme is usually at a significantly higher price point than 'budget' milk sold in plastic bottles in supermarkets. This is primarily due to the higher costs associated with offering a localised refill scheme as opposed to large-scale supermarket supply chains.

Schemes such as those launched by Synlait and Lewis Road offer a roadmap to possibly scaling milk refill through supermarkets chains and smaller grocery stores.

Other beverage schemes

Beer and spirits

Other than ABC Swappa Crate, various small/craft breweries, tap rooms and liquor stores also offer refill schemes to customers. These generally operate on the basis of customers returning their empty containers (flagons or growlers) to the brewery or tap room to be refilled on site.

An example of this is on Regional Brewery which offers a 'fill-your-own' service whereby customers bring their own flagon to be refilled. While this accounts for a small percentage of their total sales through all outlets, at their own taproom, it makes up just over half of the volume sold.

At least one company, The Bond Store Gin and Vodka distillery, runs a refill scheme for its commercial customers, taking back its spirits bottles to be washed and refilled up to 10 times. The reasonably limited reuse figure is due to damage to labels on the bottles making them unfit for use, at which point they are recycled.

Northland restaurant and bar Schnappa Rock is an example of one venue looking to do away with almost all its glass beer bottles by moving to a keg system supplied by local breweries.

A more 'at scale' example is national liquor retailer Liquorland which offers an in-store fill-your-own option for some brands of beer at 27 stores. Customers can take their own containers or buy a reusable glass growler.

Coffee

Coffee is another growing segment of the broader refillables market, with options for customers to use their own reusable coffee cups or make use of returnable options. Again Again is one of the most successful examples of a returnable coffee cup scheme in New Zealand with 163 participating cafés around New Zealand. The company expanded to offer reusable takeaway containers from January 2020.

There are also a small number of reusable cup schemes operating from a limited number of cafés around the country.

While these schemes don't currently use or impact container glass, their operating model has potential to be adapted for beverages in reusable glass.

Soft drinks

According to Blumhardt (2020), there are a number of small-scale companies using reusable glass bottles, often found at farmers' markets, including, MamaZing kombucha (nationwide), Ronia & Pippi non-dairy mylks (Dunedin), The Brothers Coldpress juice (Wellington).

Non beverage schemes

Refill schemes are not confined to the beverage industry with examples in the food, beauty, cleaning products and oral health sectors too.

These schemes are limited in scale in terms of number of containers reused but are another indicator of a growing desire among consumers for circular economy options. These schemes operate in a similar way to beverage refill schemes where customers can return empty containers to be cleaned and refilled, or bring their own containers.

The largest scale example of this is Ecostore, which offers refill stations at 97 stockists around New Zealand for cleaning products. However, these use plastic containers as opposed to glass.

Pic's Peanut Butter is an example of a company which, while operating a large-scale production line supplying supermarkets around the country, is limited to a refill scheme at the Nelson Farmers' Market using 1L jars. While the company is investigating ways of expanding the scheme it notes transport logistics as the biggest hurdle.

New Zealand-owned Aleph Beauty runs a refill for its glass makeup jars through 40 stockists nationwide. The company also incentivises customers to return their empty containers.

Oral health company Solid runs a national take back scheme, through 30 stockists, for its glass toothpaste tablet and powder containers. The company claims reuse of up to 30 times per container.

Challenges

Impact of transport

The distance a container must travel to be washed and refilled is a key factor in creating a sustainable refill scheme.

Transporting empty bottles over long distances to centralised wash plants can impact carbon mitigation gained by reusing them. Extended travel also increases the risk of damage to the containers.

In a review of 32 life cycle analyses, Coelho et al (2020) found that the while there is a steep reduction in the carbon impact in the first few cycles, it then reaches a plateau. This is due to initial production impacts being spread across the entire lifespan of the reusable bottle, but transport impacts being present in every trip.

A cost-benefit-analysis study conducted in 2001 by consulting firms RDC-Environment and Pira International for the European Commission (EC) (*Reduce, Reuse, Refill! – Dedicated to Promoting Refillable Beverage Containers*, n.d.) found travel distances for refillables can be more environmentally friendly than single-use bottles, under the specific scenarios they explored.

For example, they found that a 330ml glass bottle reused for 4 trips of less than 3,000 km had a lower carbon impact than a single trip glass 330ml bottle where the recycling rate was 42 percent.

It's important to note that some of their assumptions and calculations may not apply to New Zealand, as there may be different modes of transport, and furnaces may be fuelled differently etc. The analysis was also made under the following assumptions:

- The return rate for the refillable bottles is 100 percent.
- All bottle losses occur during washing and refilling.
- The round-trip distance from the warehouse to the store is 100km.
- Consumers recycle their commingled bottles and other containers only at drop-off centres - industry bears all of the costs of recycling.
- The portion of single trip bottles that are not recycled is split equally between landfilling and incineration.

The environmental impact could be further mitigated if there was a shorter distance to wash and refill plants, but New Zealand's filling operations are currently concentrated in Auckland. This is partly due to access to ports for export quantities and economies of scale in a small population such as New Zealand's.

Capital investment

Wash plants are a vital piece of equipment needed to scale a refill scheme beyond the fill-your-own model. Crates to protect the product during transport are also necessary, both of which come with a high cost.

Smaller players often find the capital outlay too big of an obstacle. One Regional Brewery owner notes that they would like to offer a swappable option to their fill-your-own offering but the cost of investing in the necessary equipment is too high.

They also note the ongoing costs in terms of labour, energy and chemicals to run the wash plant as well as the impact on production planning as challenges. However, they do not see these as insurmountable challenges. They are unlikely to be an isolated example.

Export focus

With a relatively small consumer base in New Zealand, many beverage producers, particularly the bigger players, are focused on the export market.

This is especially the case for wine producers which, as one of the country's biggest export industries, exported 286 million litres in 2020 (*New Zealand Wine Growers Annual Report 2020*, 2020) valued at $1.92 billion, compared with 113 million litres available for consumption

domestically (*Alcohol Available for Consumption: Year Ended December 2020*, 2021) valued at around $500 million.

By comparison exports only account for around 10% of beer production (*New Zealand's Beer Industry Worth $2.3 Billion*, 2019).

There is therefore a reduced impetus for a refill scheme in this sector.

Additionally, much wine is aged in bottles, achieving some of its character from bottle age. Reuse would likely only be suitable for wines intended for short term consumption. However, given the size of the local market there is still significant potential for positive environmental impacts from refill schemes for wine.

A refill system focused on wine created by Green Bottle is planning to launch during 2022.

There is also an example of a small, boutique winery, Fugitive, which only uses refillable packaging for its products. The winery, which is producing its first vintage this year, plans to only sell its wine from refillable kegs, avoiding glass packaging all together.

Resistance to standardisation

Standardised bottles are key to streamlining a national refill scheme as they facilitate more efficient transport, washing and refilling. Bottles which can be used across brands and returned to any wash plant in the scheme reduce transport costs, reduce the chance of damage and decrease carbon emissions.

A standardised bottle can also be regulated in order to adhere to a design which makes it more durable, meaning it can be reused more times. The design would also extend to its recyclability once it can no longer be reused.

It's important to not though that the shape and colour of bottles are key marketing devices for many brands, particularly in the craft brewing market. This is therefore a significant challenge for achieving standardisation of bottles.

Quality control

While fill-your-own refill schemes are generally the simplest to run at small scale, requiring no equipment for washing or transport infrastructure for returning empty containers, they can create quality issues.

These are primarily around the unstable nature of beer, and the reliance on customers to adequately clean their containers to prevent contamination. Oxygen causes beer to stale, and in a 2019 article on *craftbeer.com* regarding refill beer, the site suggests a short shelf life for beer in refill bottle: "Beer is more like a loaf of bread than a bottle of wine or whiskey".

However, this is not a universal issue. The Beer Spot in Auckland, which operates 'fill-your-own' refill services at five sites, uses specialist taps which purge the oxygen and fill the beer under pressure, meaning the shelf life is longer.

Cross contamination from customers not adequately washing their containers is a food safety concern. This has been negated in some instances such as Countdown supermarket's bring-your-own container scheme for deli, meat and seafood in July 2019 required staff to sanitise customer's BYO containers (*countdown.co.nz*).

Fill-your-own schemes have been impacted in some instances by Covid 19, as businesses seek to minimise opportunities for virus transmission.

Labelling

Labelling on beverages plays a vital role in terms of a producers ability to market their product and meet regulations such as food safety. Refillable containers must therefore be relabeled once they have passed through the wash plant and are refilled.

Industry has largely moved away from water-soluble adhesives, paper and foil labels in favour of solvent-based adhesives and plastic labels. This presents yet another challenge in ensuring the bottle is able to be refilled. The design and easy removal of labels must therefore be a consideration for refill schemes and industry at large to address the issue of contamination.

Non-beverage glass

Refill schemes for non-beverage products face different challenges, primarily in the added difficulty around sanitising returned containers.

Products with high oil content or which have an inherently adhesive nature are more challenging to sanitise and require a more intensive cleaning process than beverage containers. This would require specialist wash plant equipment.

As noted by Hannah Blumhardt in her discussion document for Greenpeace New Zealand (*Blumhardt, 2020*) Government's Waste Disposal Levy could be utilised for investment in sterilisation plants and washing facilities for reusable packaging, such as glass jars, for food products.

Opportunities

Industry collaboration and standardisation

While packaging design is often seen as a unique branding opportunity, there is potential for industry collaboration and standardisation to enhance the environmental reputation of brands as this grows in importance to their target markets.

The Beer Spot have been able to engage with their suppliers to facilitate this with their fill-your-own scheme. There is the opportunity for those who offer contract brewing to enable a swap system in a standardised bottle for their customers. A reverse logistics system would need to be established.

On a larger scale, Coca-Cola already participates in universal PET bottle schemes in some countries and has participated in a trial with Loop in France, which showed brand preference can hold its own in reusable containers. Loop offers a system for the collection and cleaning of reusable containers for a range of brands. In the trial Coca Cola found that its three products in reusable glass were in

the top 10 selling products overall and were in about one-third of all shopping baskets. They are also extending reusable containers into their hospitality customers (*The Coca Cola Company, 2020*).

In Europe CoZie have developed a brand agnostic dispensing system of reusable glass containers for cosmetics and skin care that fills to the nearest milliliter. CoZie collect, wash and distribute the containers back to brand owners and use technology to track containers being returned (*Ellen McArthur Foundation 2020*).

Subscription swap models

Subscription services for meal kits have become very popular, and a number of operations already have reverse logistics in place for taking packaging back.

Such a model could also work for swap systems for beverages, either as part of an existing offering, or as a competitive advantage for a new entrant to the market.

No Ugly, which produce glass packaged wellness tonics, already have a subscription offering which includes a swap service within a limited geographical area.

Consumer 'fill-your-own' refill models

The fill-you-own refill model is a fairly simply and low-cost method for offering a refill service to customers. This model is limited in scale though. For example, fill-you-own accounts for 5% of one Regional Brewery's total sales - and over half of their taproom sales - and 13% of The Beer Spot sales.

Despite this there is potential for improvement. The Beer Spot was awarded a $29,000 grant from the Glass Packaging Forum to upgrade its refill taps, with the aim of upping their use.

There is also potential for investment in bottle refill equipment which improves beverage shelf life.

These schemes can still be significant in increasing bottle refill uptake in two ways. Firstly, with 218 breweries New Zealand has a significant number of breweries per capita ratio – higher than the UK, US and Australia, as of 2019 - (*beveragedaily.com*). This high access to breweries has the potential to make fill-your-own schemes more impactful.

Secondly, New Zealand's population density profile means independent breweries located in geographically isolated areas (*ratebeer.com*) of centres with small population bases can provide a refill option where a bottle swap service may not be viable.

Use of technology

Refill schemes have their roots in decades-old technology, but modern enhancements can provide a number of improvements.

Advanced wash plants can clean containers more quickly, more thoroughly and with less energy and water. Modern refill taps, such as those used by The Beer Spot, can refill fill-your-own bottles in a similar way to bottling lines meaning the product lasts longer.

Cellphone technology also has a role to play by helping consumers easily find their nearest refill options and manage their incentives. One example is Again Again which is developing a mobile app which acts as a "library" for reusable containers for coffee and takeaway food.

Again Again (*againagain.co*) says the app will streamline the process of borrowing containers, making it simpler and easier for customers and businesses. The app will not only give the location of participating businesses but record the status of borrowed containers and the dollar value of accrued incentives.

Combined with standardisation of containers, this technology could easily be utilised for glass packaged beverages.

Brand owned reuse schemes

Some brands, especially those which have a high level of control over their supply chain logistics may be able to develop their own brand-exclusive reuse schemes. In some target markets, this could be a strong competitive advantage.

A number of food box companies take back their packaging for recycling and at least one has seen not only a strong customer response, but also an improvement in the perception of their brand as an employer. (*Woop, Packaging Forum webinar, September 2021*).

The GPF's Role

Thought leadership and refill champion

It's vital to be part of all conversations within Aotearoa New Zealand related to the reuse of container glass. It can share information and research, spark robust debate and be the bridge between industry commercial realties and those who seek to improve the uptake of refillables.

Lifecycle analysis for refillables and one trip in the NZ context

A representative of Synlait, on the launch of their refill scheme for milk in stainless steel called glass, "a bit of an environmental crime scene" (Stuff.co.nz, 2021). In contrast, groups such as the Zero Waste Network believe glass refill schemes are key to carbon reduction. Yet there is no definitive analysis of environmental impacts in New Zealand.

As noted by Blumhardt (2020) establishing a baseline for our country on what environmental impacts are created by single-trip glass containers as opposed to refillable glass containers is vital to informed decision making.

While lifecycle analyses done overseas give an indication of what benefits can be derived from using refill over single-trip, or vice versa, the unique geography, transport infrastructure (road, rail, ferry) and population density of New Zealand warrants a study specific to Aotearoa.

The GPF has the opportunity on its own or in partnership with other organisations to commission a full lifecycle analysis looking at all environmental impacts of reusable and single-trip glass in a New Zealand-specific context. This could be combined with a cradle-to-cradle lifecycle analysis of all packaging types in a New Zealand context.

Funding – business cases, financial modelling, trials

The GPF is in a position to more proactively seek out partners with innovative projects in need of funding. While the funding it has available is limited, we can also partner with other funders for larger scale projects.

Facilitating industry collaboration

One of the GPF's primary roles is that of an independent party within the wider glass packaging and recycling sectors.

As such it works to facilitate collaboration which fosters improved sustainability outcomes for container glass. The current dominance of recycling as the primary method for achieving container glass circularity has meant much of the GPF's efforts have to date been focused on improving the glass recycling supply chain. However, the growing interest and desire by consumers – and as a result business – for refill schemes means the GPF has increased its efforts in supporting these.

Viable, scalable and successful sustainable solutions are almost always reliant on collaboration, and as New Zealand's largest container glass recycling member organisation it is vital the GPF takes the lead.

Act as a product stewardship organisation or scheme manager for industry refill schemes

As the manager of the country's only accredited, voluntary product stewardship scheme for container glass, the GPF is uniquely positioned and skilled to act as a product stewardship organisation, or scheme manager for industry refill schemes.

While container glass refill and recycling operate in different ways, the core objective (create, maintain and grow a viable circular solution for glass) is the same.

The underlying pillars for success are also the same – effective scheme design and execution, industry buy-in, collaboration and innovation, transport efficiency, and public awareness and education.

With the GPF considering alternative options for the stewardship of glass packaging; the inclusion of refillables would be a timely addition.

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