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RURAL LEADERSHIP  
PROGRAMME



The Circular Economy of Glass Packaging for the New Zealand Wine Industry and the Impact of a possible Container Deposit Scheme.

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## Executive Summary

Glass recycling is the perfect example of the circular economy in action, right here in New Zealand.

It is becoming increasingly obvious, that to retain New Zealand's prized clean green image and for our primary sector to remain competitive, a circular economy is an important part of our strategy. The success of a circular economy of glass depends upon intelligent supply chain management to ensure sustainable customer demand.

"A circular economy is a systematic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take-make-waste' linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources"(MacArthur, 2018).

Glass is the most sustainable package on earth and is the best example of the circular economy in action in New Zealand because,

- It is infinitely recyclable and is made purely from raw natural ingredients
- Over a tonne of natural resources are saved for every tonne of glass recycled
- Every tonne of glass recycled saves approximately 670kg of CO2 over virgin materials

Recovery and reuse of glass contributes to a low emissions economy, with the use of recovered glass in manufacturing. This is because recycled glass can be melted at a lower temperature than virgin materials so consequently requires less energy. For every 10% of cullet used in the manufacturing process, O-I can achieve a 5% reduction in greenhouse gas emissions.

On average, a wine bottle is made from 67% recycled content manufactured at O-I New Zealand. The availability of recycled content primarily depends on our country's waste collection infrastructure. The existing voluntary product stewardship scheme for glass containers managed by the Glass Packaging Forum (GPF) is working very effectively, and is on track to meet a recycling rate of 82% by 2024. The GPF is a collaboratively designed circular economy for glass, returning cullet to O-I furnaces through a network of collection hubs, services and community facilities in order to ensure the circular benefits of glass are harnessed again and again.

In the circular economy of glass we refer to closed loop application, where we all play a part in helping a glass bottle is recycled back into a new glass bottle. There are sound economic and environmental incentives for O-I to support the recovery of high value glass and should be well understood the significance O-I have in driving the circular economy. Without a manufacturing plant with a commitment to cutting carbon reduction, using high portions of recycled content, we could not have a circular economy. A majority of the New Zealand wine bottle supply chain of glass starts, and ends at O-I.

It is important to understand the glass recovery supply chain and the role it has within the circular economy design for glass. To date, there are two glass recovery methods;

1. Glass separate recovery - high value cullet

2. Co-mingled glass recovery (problematic to the supply chain) – more complex and lower quality cullet

The cost and time it takes to separate, colour sort, grind and beneficiate the glass from co-mingled collections adds significant complexity and cost to the glass recovery system. Reduced quality glass recovery through co-mingling, can still be used with no environmental degradation for sport turfs, golf bunkers and base course for roads; however cannot ever be returned back to the glass lifecycle and therefore represents a break in the circular economy of glass. To sustain a circular economy, Auckland council should cease co-mingling glass.

The Ministry for the Environment has a consultation process on priority product guidelines (Ministry for the Environment, 2019) which included all beverage packaging, including glass. Before stage one of the consultation had closed, Minister Sage further announced work toward developing a Container Return Scheme (CRS) through a Waste Minimisation Fund application project managed by Auckland and Marlborough District council on 25<sup>th</sup> of September. The list of representatives on the working group, does not include New Zealand's only cullet purchaser.

The basic principle of a Container Deposit Scheme is that the consumer pays a deposit at the point of purchase, and the deposit is refunded when the consumer returns the empty container.

This report highlights the Minister have not considered the market demand for glass and the impact an influx of extra glass would have on the supply chain.

Container deposit schemes are not supported by the New Zealand wine industry, or those involved in the glass recovery process, because they are expensive, are only **one type** of capture system for glass, can create recycling inconvenience for ratepayers, are not circular in nature, and are a particularly challenging solution for the hospitality sector. Marlborough is New Zealand's largest wine region producing 77% of the total wine production. "Wine Marlborough supported the introduction of circular waste reduction policies where they meet the criteria under the Waste Minimisation Act; yet in the case of glass we believe those criteria are not met" is cited in their submission to the proposed priority products and priority stewardship scheme guidelines. "Wine Marlborough recommend continuation of the current voluntary scheme with government support for investing in further infrastructure".

This research concludes that there is little supporting evidence that a container deposit scheme will increase overall glass packaging recycling rates, nor provide the recycle needed to drive a circular economy anywhere in the world.

The countries that have the best glass recovery rates in the world do not operate a container deposit scheme (Lee, Bell, Garcia, Lee, & Harding, 2019) indicating CDS is not the best solution to increase glass recovery rates. Denmark, Sweden and Norway are exemplar countries that have container deposit schemes, which exclude glass.

In order to maintain a circular economy for glass within the New Zealand wine industry, CDS should exclude glass. A circular economy is not possible without strong collaboration with all glass stakeholders and it is evident this has not happened yet with CDS. Should CDS progress, I urge the Ministry for the Environment to better consolidate the glass recovery process with O-I.

New Zealand would benefit from an Extended Producer Responsibility (EPR) scheme around material flow of a specific product; in this instance glass. The findings from my industry survey show the wine industry has expressed a keen interest to make this mandatory. This is expected to fast track GPF glass recovery efficiencies and position us as world leaders in introducing the circular economy within glass.

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## Introduction

This research looks into the circular economy of glass in New Zealand, the impact a container deposit scheme would have on the supply chain of glass and recommended alternative solutions.

Glass is superior to any other packaging material, as it is 100% recyclable and infinitely recyclable with no loss in quality or purity. It is New Zealand's best example of the circular economy in action.

"A circular economy is a systematic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take-make-waste' linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources" (MacArthur, 2018).

Recycled glass can have a positive contribution to New Zealand's efforts to limit climate change, due to production benefits from using recycled glass (known as cullet). This is because recycled glass can be melted at a lower temperature than virgin materials (silica sand and soda ash) so consequently requires less energy. For every 10% of cullet used in the manufacturing process, O-I can achieve a 5% reduction in greenhouse gas emissions (O-I, 2019). In 2018, a total of 125,490 tonnes of glass was diverted from landfill and returned to O-I to be reused in the manufacture of new glass containers.

The glass supply chain ends and starts at O-I New Zealand's only glass jar and bottle manufacturer. O-I work closely with key stakeholders and the Glass Packaging Forum (GPF) to regulate the amount of glass of particular colours, that go to New Zealand's only beneficiation plant to remove contaminants, the glass then goes to O-I to be recycled again. The exception is imported glass.

New Zealand benefits from having a sustainable focused glass manufacturer, O-I, committed to;

- Cutting carbon emissions proven by a Life Cycle Assessment in compliance with ISO 14044 standards
- Increasing the amount of recycled glass in bottles and jars
- Cradle to cradle certified

A majority of glass outside of Auckland, glass is collected separately from other recyclable materials. This colour sorted glass can be transported directly to the beneficiation plant, providing the highest quality cullet for remanufacture.

With the support of a well-respected accredited product stewardship scheme, and collaboration with O-I, the circular economy is harnessing traction and delivering New Zealanders enviable glass recovery rates. These glass recovery rates are getting better and better.

The crack in the system is co-mingled glass recycling with other materials like plastic, paper and food waste that must be separated from other materials, colour sorted and



beneficiated in a different way to glass sorted at the kerbside. This recovery process is more intensive, more complex and less effective than kerbside glass recovery. The cost and time it takes to separate, colour sort, grind and beneficiate the glass from co-mingled collections add significant complexity and cost to the glass recovery system (O-I, 2019).

What is needed in New Zealand to support the circular economy of glass is;

- 1) Continuation of partnership building and working with key industry and supply chain players such as local government to increase glass recovery efficiencies
- 2) Further investment in projects and infrastructure to increase glass recovery and quality in glass recovered, to ensure the longevity of cullet

Since, Minister Sage announced on 25<sup>th</sup> of September that work would start to develop a Container Return Scheme through a Waste Minimisation Application (WMA) application project managed by Auckland council; a council delivering arguably the lowest quality cullet in the country.

I encourage the Government to better understand the glass recovery supply chain, O-I's critical role in being New Zealand's only on-shore market for cullet, or the profound impact GPF have done to drive the circular economy of glass to date.

### **Terminology**

- **Glass waste:** Post- consumer glass; predominantly glass containers
- **Glass cullet:** Glass which has been recovered, sorted and crushed and is suitable for recycling through glass manufacturing
- **Glass fines:** Glass fines: Glass material that is below a certain size that hails from the beneficiation plant and that requires an additional process to recover the value of the glass for use in the furnace.
- **Co-mingled collection:**  
Glass that has been collected for recycling with other waste materials such as plastic, paper, cardboard.
- **CDS, CRS, DRS, CDL:**  
Container Deposit Scheme, Container Return Scheme, Deposit Return Scheme, Container Deposit Legislation.  
*A deposit-refund system is the surcharge on the price of potentially polluting products. When pollution is avoided by returning the products or their residuals, a refund of the surcharge is granted (OECD, 2001).*

## Aims and Objectives

The aim of this report is to answer five key questions relating to the circularity of glass within the New Zealand wine industry:

- 1) What is the circular economy and how can this model can be applied to glass?
- 2) The consultation of the Proposed Priority Product stewardship scheme guidelines and the political pressures in regards to glass recycling.
- 3) What are unintended consequences of the container return schemes?
- 4) What are the other options for CRS?
- 5) How well understood the concept of product stewardship is amongst NZ wine producers and their appetite for glass packaging regulation?

I aim to use this research to drive the awareness around the sustainability and the minimal environmental impact local made glass has. I aim to discourage imported wine bottles and communicate to producers the repercussions for our industry by using imported glass, involving the break in circularity and the strain that has on our recycling and waste infrastructure in NZ.

## Methodology

The methodology used for this research was to examine the supply chain of glass as a recovery product as a whole. I did this by interviewing, 32 wine producers, O-I, New Zealand Winegrowers advocacy team, New Zealand Winegrowers board members, Sustainable Winegrowers New Zealand, the largest wine bottle filling businesses, A Master of Wine, Packaging Forum and Glass Packaging Forum members and MPI. I reviewed various consultation submissions put forward to the Ministry for the Environment to better understand the specific roll we each play in this consultation.

There are two parts to this analysis.

- 1) A report titled 'Recycling DRS in Scotland' was released in September 2019 . This become the research foundation against which I compare and contrast the glass recovery system deployed in New Zealand. The research was done by Oakdene Hollins – Research and Consulting (Lee, Bell, Garcia, Lee, & Harding, 2019).
- 2) I conducted semi structured interviews with industry producers (wineries), industry stakeholders and leaders. This was to examine the willingness of the industry to support GPF and a recommendation of the implementation of an extended producer responsibility programme.

## Industry Survey Methodology

A ten question survey was used to gain an understanding of

- How well understood the concept of product stewardship is
- The awareness of the proposed priority stewardship consultation
- How aware producers were of the volunteer product stewardship scheme
- How prepared they are for enforced regulation
- To better understand how willing they would be to extend their sustainability efforts to endorse a form of product stewardship regulation specifically for glass packaging.

Care was taken to interview 32 producers in senior logistics and finance positions, within a cross section of the industry; small, medium and large producers, **organic**, conventional and across most regions. The reason for this was to unravel whether there were niche themes.

The research hypothesis is that

- Organic producers would have better product stewardship initiatives within their business
- Larger producers were more aware and proactive of the consultation and politics
- Each region may have unique challenges with the glass recycling infrastructure available to them
- Depending on the size of the enterprise would be reflective of their interest to be involved with the GPF volunteer scheme.

**Table 1: Wine producers interviewed**

Auckland/ Northland	Hawkes Bay	Martinborough	Marlborough	Nelson	Waipara	Central Otago
Moi	Ant McKenzie Wines	<b>Escarpment</b>	<b>Villa Maria</b>	Neudorf	<b>Greystone</b>	Vinpro
The Landing	Mission Estate	Drummond Farm	Pernod Ricard			Wild Irishman
Pleasant Valley	Te Mata Estate		Indevin			
Marsden Estate	Elephant Hill		Hunter's Wines			
Yakatu Wines	Trinity Hill		<b>Dog Point</b>			
	Sacred Hill		Nautilus			
	Paratua		<b>Loveblock</b>			
	Smith and Sheth		<b>Misty Cove</b>			
	<b>Element Wines</b>		Bladen Wines			
	<b>Super Natural</b>					
	Saorsa					

## New Zealand Wine Industry Background

The New Zealand wine industry has the second highest valued wine on the export market (NZ Wine 2018), and boasts an enviable reputation for our sustainability credentials globally. Wine is now New Zealand's sixth largest export product worth \$1.83 billion enjoyed in over 100 countries. It is estimated about two billion glasses of our wine are drunk overseas every year (NZ Wine, 2018). Although New Zealand produces less than 1% of the world's wine, it generally commands the highest average price for a country, or second to

France (NZ Wine, 2018). The wine industry accounts for more than 7300 direct jobs and generates more than 13,000 other jobs in supporting industries (NZ Wine, 2019).

Sustainability has long been one of the foundations underpinning the international success for our industry and is well engrained in the culture of our producers.

### Sustainable Winegrowers

Sustainable Winegrowing New Zealand Continual Improvement (SWNZ CI) is an industry driven initiative that has been developed to cement New Zealand's position as the world leader in sustainability (NZ Wine , 2019).

Sustainable Winegrowing New Zealand (SWNZ) is widely recognized as having world-leading sustainability programs and was one of the first to be established in the international wine industry in 1997. Today 98% of the industry is produced under this certification, with 7% also operating under recognized certified organic programs (NZ Wine, 2019).

Sustainable Winegrowing New Zealand, SWNZ was developed to.

- Provide a 'best practice' model of environmentally friendly practices in the vineyard and winery
- Guarantee better quality assurance from vineyard through to bottle
- Create a framework for viticulture and winemaking practices that protect the environment efficiently and economically while producing premium wine and grapes
- Provide a format of continual improvement to ensure vineyards and wineries operate with a goal of improving their operational practices
- Act as a vehicle for technology transfer enabling companies to be informed of new technology and its application
- Provide an audit structure that has integrity and rigour to comply with market expectation (NZ Wine, 2019)

## Circular Economy

The circular economy is a model where producers keep resources in use as long as possible, extract the maximum value, and regenerate and recover materials at the end of the products life (World Economic Forum, 2019). The current linear model where we *take* resources from the ground, *make* products which we use, and when they no longer serve us we throw them away. It is becoming more obvious that the existing linear take – make – waste economic model founded by the industrial revolution is unsustainable (Gawel , 2019). The linear economy needs to change, toward the circular economy of Reduce, Reuse and Recycle.

**Figure: 1.1 Models of the linear economy compared to the circular**



Source: Ministry for the Environment

“The circular economy is a compelling, prosperous business new way to guide decisions around managing our resources and achieving growth within our planetary boundaries. It is a new lens by which we can view production and consumption to create new growth economies where everything that is made, can be unmade, just as it does in the natural world” (X Labs , 2019). The circular economy involves everyone.

A recent report revealed that Auckland alone could unlock \$8.8 billion in additional economic activity and reduce carbon emissions by 2,700ktCO<sub>2</sub>e by 2030 if it were to transition into a circular economy (Griffin, 2019).

A circular economy is an industrial system that is restorative or regenerative by intention and design (World Economic Forum, 2019). Nothing that is made in the circular economy becomes waste, moving away from our current linear ‘take – make – dispose’ economy. The World Economic Forum predicts the circular economy is a trillion dollar industry forming plenty of opportunities for innovation, job creation and economic development.

Underpinned by a transition to renewable resources, the circular economy model builds economic, natural and social capital based on three principles.

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems (MacArthur, 2019)

The main actions businesses and individuals can deploy leading towards a circular economy are the 3R principles of reduce, reuse, recycle (Valente & Atkinson, 2018).

Designing out waste and pollution and keeping products and materials in use involves buy in from everyone and everything: businesses, government, councils, individuals, our products and the way we do our jobs (Australian Government , 2018).

Some countries, such as Denmark, have introduced a circular economy fee as an extension to their recycling extended producer responsibility initiatives, penalising producers that place hard-to-recycle packaging material onto the market. However, most of the glass that is included within the extended producer responsibility is predominantly classified as 'widely recyclable' and hence the circular economy only applies to a very small number of containers included within the scheme (Lee, Bell, Garcia, Lee, & Harding, 2019).

### Product Stewardship

Product stewardship is the first step to a circular economy. Product stewardship is when people and business take responsibility for the lifecycle impacts of their products, either voluntarily or in response to regulatory tools (Gawel, 2019).

In a linear economy, the people who design and sell products generally do not pay for the disposal costs and environmental harm when their products become waste, nor in most cases do their direct customers. These costs become funded by the wider community and future generations (Landi, Germani , & Marconi, 2019).

In a circular economy, the full life-cycle cost and legal signals directly inform product design and resource cycling (MacArthur , Ellen, 2019).

In New Zealand 97% of New Zealanders have access to recycling services. In most residential kerbside collection programmes, glass is collected separately and carefully. This allows O-I Glass to use very high volumes of recycled glass into the manufacture of glass containers (O-I, n.d.). Kerbside colour sorting is imperative to ensure a sustainable circular economy.

### The Glass Packaging Forum

The Glass Packaging Forum (GPF) was established in 2006 to actively promote the environmental benefits of glass packaging and manage the accredited GPF Product Stewardship Scheme. GPF have over 100 member companies who pay levies to the forum related to the volume of glass they put into the New Zealand marketplace. GPF have been active contributors to the United Nations Sustainable Development Goals (SDGs), a commitment New Zealand signed up to in 2015 agreeing to contribute to achievement of Global Goals through a combination of domestic actions and international leadership on global policy issues (Glass Packaging Forum , 2019 )

SDGs also known as the Global Goals, were adopted as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (UNDP, 2019).

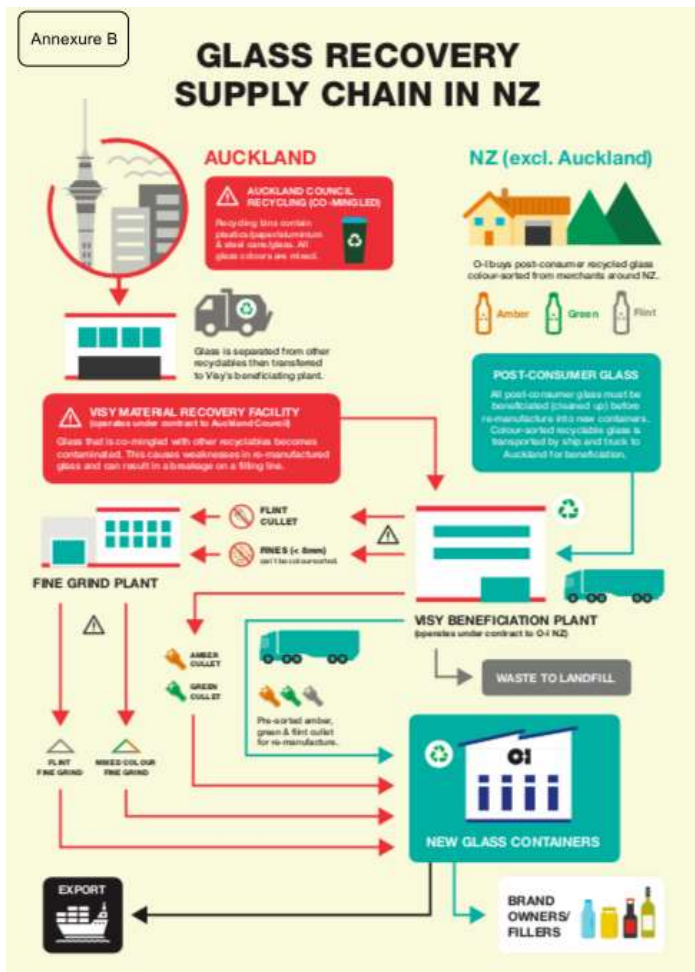
This voluntary product stewardship is working and successful, and without regulation has resulted in 67% (on average) recycled content of glass made here in New Zealand (O-I, n.d.). This is significantly higher than Australia, 51%; this is largely due to many kerbside recycling collection systems in Australia offering co-mingled bins. This results with more contamination in the glass and is therefore a lower quality cullet. The scheme has a target total glass capture of 82% by 2024 (Glass Packaging Forum , 2019 ).

## Glass Supply Chain

Understanding the glass supply chain is important when considering the impact of a container deposit scheme.

New Zealand has existing constraints in the glass recovery supply chain and issues with co-mingled glass. There is a need for significant investment in an upgraded beneficiation plant and storage facilities, should the supply of recovered glass suddenly increase. There is a concern a sudden influx of glass from a mandatory scheme would overwhelm the glass supply chain. New Zealand's only beneficiation plant is almost at capacity and unless Auckland stops co-mingling their glass, it is probable this plant will not be able to handle the additional glass. If Auckland were to colour sort on the kerbside, it would improve the efficiencies of the glass recovery, offer possibly the fastest increase in quality cullet, speed up the glass recovery process and take of the strain on the beneficiation / sorting plants.

### Figure 1.2



Source: (O-I New Zealand , 2019)

Figure 1.2 shows the various steps involved with glass recovery and identifies the differences in process between colour sorted glass in comparison to co-mingled. The right-hand side, NZ (excl. Auckland), shows supply chain excellence. The left-hand side featuring Auckland's recovery, shows supply chain complication and where an influx of glass is likely to cause problems.

### Right-hand side process

For colour sorted glass, there are only two steps that must occur before the use of cullet can be used in new products and demonstrates supply chain efficiencies. In most areas outside of Auckland, glass is collected separately from other recyclable materials.

### **Beneficiation**

From here the glass can be taken directly to the Vsy Beneficiation Plant in Onehunga, which is the only beneficiation plant in New Zealand. All glass to be recycled for remanufacture must be beneficiated where lids, labels and neck shrouds are removed. The beneficiation process also crushes glass to a uniform size for O-I.

Not all glass can be beneficiated to a state useful for manufacture for new product. For example; some mixed cullet cannot be reused, or if there are remnants or MOG (materials other than glass) such as plastic, food, paper etc., the cullet becomes too contaminated to be reused, and therefore requires a new purpose.



## **Left-hand side process**

### **Step 1: Co-mingled collection**

Co-mingled glass outside of Auckland has to pass through a Material Recovery Facility and undergo further processing if the glass is to meet the specification of an alternate market for cullet such as aggregate on the road. This demonstrates a break in the circular economy of glass, because this glass is not used for re-manufacture.

### **Step 2: Separating and sorting**

To separate co-mingled materials collected by Auckland council, the Visy Materials Recovery Facility, systematically separates glass from other materials, using machines, and then beneficiated. Beneficiation is a process where items associated with sorted glass are removed to stop contamination. These include, bottle tops, sleeves and labels.

Glass is then colour sorted using optical sorting technology. This process has its limitations because some glass is too small to identify and results in around 25% waste compared to manually sorting at the kerbside. Co-mingled glass is also processed at a much slower rate placing capacity constraints on the Visy beneficiation plant and significantly increasing beneficiation costs.

### **Step 3: Fine grinding and beneficiation**

After colour sorting, the flint glass from Auckland must be sent to the fine-grind plant to eliminate any contamination by heat resistant glass which cannot be detected in the beneficiation plant.

The colour-mixed glass (approximately 25%) that is under 8mm from Auckland must be sent to the fine grind plant also, because this material cannot be colour sorted with the current technology at Visy's Beneficiation Plant. This colour mixed fine ground glass, cannot be easily used in glass manufacture and can offer only a limited proportion of cullet for re-manufacture of glass. The need to fine grind this material adds cost and complexity.

The glass available for recycling currently exceeds the capacity of the recycling industry. The capacity constraints cannot be alleviated by exporting glass for repossessing as stakeholders note that the cost of transportation makes this economically unviable. Further investment into driving the demand for cullet is sorely needed.

## **Glass recapture process**

A lot of glass is collected from New Zealand households via kerbside collection provided by local councils. Container glass is also collected directly from hospitality businesses and a small portion is collected from public recycling bins and community recycling centers.

The Glass Packaging Forum provides financial assistance, in the form of grants, to provide the infrastructure to improve glass recovery, facilitate glass recycling and fund research into alternative uses for glass. To date over \$3.2 million has been invested into projects that

improve glass recycling outcomes throughout the North and South Island. This funding has been crucial in improving both the quality and quantity of glass available for recycling.

### O-I New Zealand

O-I is New Zealand’s only glass bottle and jar manufacturer and has been operating from its Penrose site in Auckland since 1922. O-I has successfully reduced energy usage, cut carbon emissions and increased the amount of recycled glass used in the manufacturing process. The average recycled content for glass containers manufactured at O-I New Zealand is 67%.

Glass is an easily recycled material in that it can be re-melted, and reformed into articles with the same characteristics as the original characteristics ‘closed- loop’ recycling. Glass cullet is the biggest material input into glass bottles in New Zealand (O-I, 2019)

Glass is the world’s most sustainable package and is New Zealand’s best example of the circular economy in action. “The beauty of glass is that glass is the only circular resource in packaging. One glass wine bottle will make one wine bottle over and over infinitely, given the glass is recycled into high value cullet” says Penny Garland, Sustainability Manager at O-I, NZ.

1kg of recycled glass replaces 1.2kg of virgin raw materials. Every 10% of recycled glass reduces carbon emissions by 5%. Every 10% of recycled glass used generates an energy saving of approximately 3% (O-I, 2019).

The manufacturing process of glass in New Zealand adopts best practice to support the circular economy in adopting certified Cradle to Cradle™ and Life Cycle Assessment in compliance with ISO-14044 standards.

O-I where a majority of New Zealand wine bottles are sourced, are certified Cradle to Cradle™. This is a globally recognized measure of safer, more sustainable products made for the circular economy (C2C Certified, 2019).

**Table2: O-I Cradle to Cradle™ scorecard:**

Material health	Gold
Material reutilisation	Gold
Renewable energy and carbon management	Gold
Water stewardship	Bronze
Social fairness	Bronze

O-I also uses the Life Cycle Assessment (LCA) to measure the environmental impact of production processes, in compliance with ISO-14044 standards. The report shows a downward trend in carbon dioxide emissions for all regions since 2010, resulting in a 24% reduction in absolute emissions over the period.

## Political Pressure

The Government is pushing the proposed priority and priority product stewardship scheme guidelines consultation, without fully understanding the uniqueness of the glass supply chain. The consultation is essentially looking at the regulation of packaging in both beverage form and single use consumer goods. Beverages include 50ml and less than 4L capacity, so includes wine bottles. One possible outcome is the implementation of a container deposit scheme (CDS) which would see a deposit of 0.20c per bottle (Kiwi Bottle Drive , 2019).

Packaging has not previously been proposed by the Government as a priority product under the WMA and it is concerning that glass, has been included into this packaging segment, where (Ministry For the Environment , 2019) claim 'local authorities have advocated for increased packaging control including a container deposit scheme, to reduce waste management burden on communities and improve the quality of materials, economic return and local employment opportunities'. There is little evidence I was able to find to support these claims.

Associate Minister Eugenie Sage claim "recovery rates are only between 42 and 58%" (O'Dwyer, 2019 ). It hasn't been acknowledged that glass is an exception with significantly higher rates. Furthermore, the GPF are on track to reach 82% by 2024 without CRS.

Associate Minister for the Environment Eugenie Sage announced in September that work is under way to design a container return scheme. The Ministry for the Environment received a joint Waste Minimisation Fund application for the design and development of a nationwide CRS, from the Auckland Council and Marlborough District Council; a project supported by Government funding of nearly \$1m (\$966,000) from the Waste Minimisation Fund.

There appear to be competing priorities with both Auckland and Marlborough councils driving this project as CDS would relieve financial pressure on councils that are already required to pay for recycling infrastructure and systems. The 'Cost Benefit Analysis of a Container Deposit Scheme' (WasteMINZ, 2017) reports councils would save up to \$20.9 million annually in recycling, litter and landfill costs if they deployed a container deposit scheme.

A submission New Zealand winegrowers put forward to the Ministry claim our industry produces 50 million litres of wine for the domestic market (NZ Wine, 2019). This equates to 66,66,667 bottles and at a cost of 0.20c has an economic impact of \$13.3 million dollars annually in our domestic market.

As a producer it upsets me that our wine industry are looking to front the costs, to support an initiative managed by Auckland council, who haven't been at the forefront of driving the circular economy.

## Container Deposit Schemes

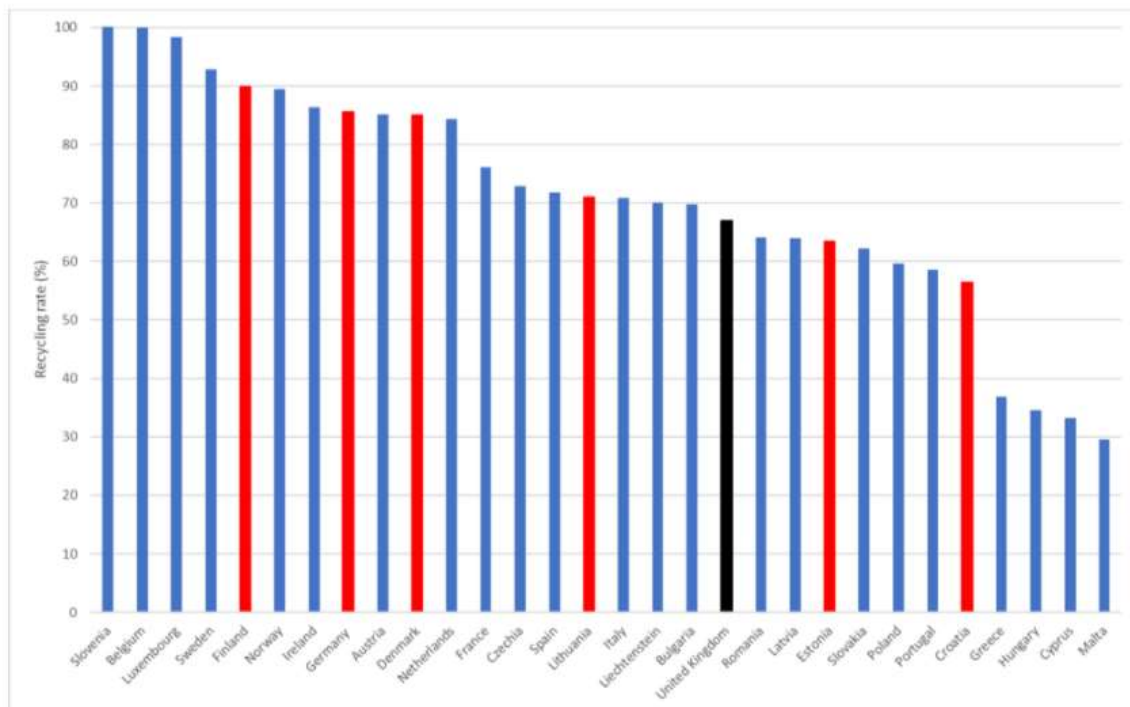
Container deposit scheme is defined as '*A deposit-refund system is the surcharge on the price of potentially polluting products. When pollution is avoided by returning the products*

or their residuals, a refund of the surcharge is granted'. OECD, Glossary of Statistical Terms. (OECD, 2001).

Container deposit schemes are a refund system by which the purchaser of the container holds the deposit until it is passed onto the next stakeholder in the chain who is later compensated for returning that waste. To enable the refund, legislation allows beverage manufactures (suppliers) to sell beverages inclusive of the additional deposit, with the purpose of 'paying back' this deposit to the collector when the container is returned (Container Deposit Systems , 2019).

There is little supporting evidence available to suggest that the container deposit schemes will improve glass recovery rates, or see a reduction in littering.

**Figure 1.3 The glass packaging recycling rates across Europe**



Source: Eurostat. Key Red= Operates a CDS for one-way glass (single use); Blue – does not operate a CDS.

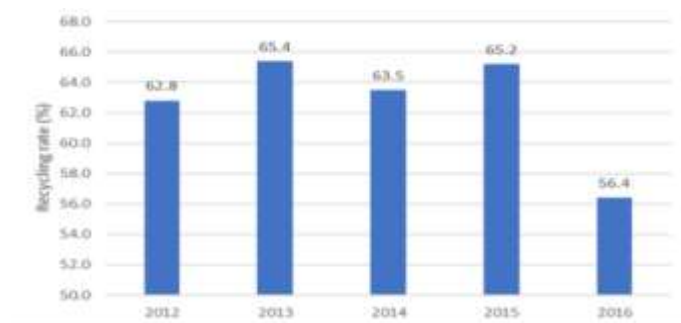
Figure 1.3 shows the best glass recovery top four countries in the world do not operate under a container deposit schemes, instead deploy extended producer responsibility initiatives. Spain and Finland are countries that have experienced an influx of glass recovery under the introduction of EPR.

## Countries that have deployed container deposit schemes

### Croatia

In 2006, Croatia, a CDS sees fee of €0.06 on all containers irrespective of size or material. Figure 1.4 shows under a container deposit scheme, glass recycling has plummeted. PET is now the market leader for packaged beer and the Croatian Brewers association reports the popularity for packaged beer in PET is because it is generally because of the lower price point.

**Figure 1.4 The glass packaging recycling rates in Croatia.**



### Denmark

Denmark is the one country in the European Union that does not operate an EPR scheme for packaging. The collection of waste is the responsibility of municipalities. The municipalities are expected to provide collection schemes for recyclable glass, metal and plastic packaging (Lee, Bell, Garcia, Lee, & Harding, 2019). The CDS in Denmark operates under a variable deposit depending on material size and packaging format (Dansurk Retursystem, 2019).

For glass, Dansk Retursystem reports that *'In relation to glass, we have not achieved the same efficiency. Although we have introduced special solutions where the counting takes place in the shops, we cannot crush glass in the shops. Therefore, glass is expensive to transport, and it also requires extra safety equipment at our factories. The charge on glass therefore rises based on the actual cost of handling the material, and since glass only accounts for about 7% of the market, the costs are distributed on fewer packages'* (Dansurk Retursystem, 2019).

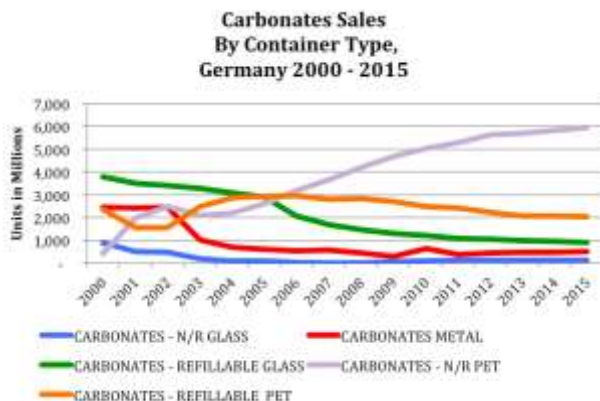
Wine and spirit bottles are excluded since they are not considered an environmental problem.

### Estonia

The glass packaging rate in Estonia has also plummeted under a container deposit scheme. The introduction of CDS have resulted with increased bottle size increases for beer, a trend also observed in Croatia. All glass packaging for beer in Estonia is in refillable glass bottles. In Estonia 86.7% of revenue is generated through unredeemed deposits in 2017 (Lee, Bell, Garcia, Lee, & Harding, 2019).

## Germany

Figure 1.5 Carbonate sales by container type



Source: Recycling DRS in Scotland.

The graph above illustrates that Germany has experienced a steady and continual decline in glass packaging. An increasing number of these bottles are being replaced with PET plastic. This shows that before the implementation of CRS in 2000 there was more glass than PET (Reloop, 2015). It is obvious the CRS has killed the market for glass, and it has still not recovered (Lee, Bell, Garcia, Lee, & Harding, 2019).

## Finland

A CDS for glass was introduced to Finland in 2012, after PET (introduced 2008) and cans (introduced 1996). RINKI, the operator of Finland's EPR scheme, reports that since 2015 the glass packaging recycling rate for non-deposit glass has increased significantly from 33% in 2015 to 94% in 2017.

The reason for the rapid increase in recycling rate was the introduction of EPR, which came into effect May 2015 and obliged producers to establish a minimum of 1850 collection points (Lee, Bell, Garcia, Lee, & Harding, 2019).

A review of the DRS and EPR schemes operating in Finland highlights the significant cost differences. RINKI reports that in Finland the EPR glass recycling fee (2018) stands at 112 euro per tonne. The Finnish CDS are much higher between 205- 617.4 euro per tonne. This is expected to be due to relatively high cost of CDS infrastructure.

## Summary

There is little supporting evidence available to suggest that the container deposit schemes will improve glass recovery rates, or see a reduction in littering. It would be more ambitious to emulate are the countries with the highest glass recovery rates if we have hope to have world leading glass recovery rates.

A 128 page report 'Recycling Deposit Return System DRS in Scotland' released September 2019 concludes there is no guarantee that the Recycling DRS will increase overall glass packaging recycling rates nor provide the recyclate needed to make a circular economy in Scotland. Many glass packaging products covered by the current extended producer responsibility scheme would fall outside the proposed recycling DRS scheme. This is also

true for New Zealand, where glass jars from jams and condiments, olive oil etc do not have a place in the container deposit scheme. The risk of loosening the existing infrastructure, to make room for CDS is justified in the examples above.

Furthermore, the cost to consumers is substantial and the measure will have unintended consequences (Lee, Bell, Garcia, Lee, & Harding, 2019).

## The unintended consequences of Container Return Schemes

### **Higher Cost to Consumer/ producer**

Due to very strong retailer power in New Zealand (particularly with just two competing supermarket chains, which sell most of the domestic wine), wineries are not at all confident that they would be able to pass on the cost of a CDS to consumers.

The fees associated with the CDS will inevitably mean price increases for wine. Should this cost not be passed on to the customer, the wine producer will need to absorb the deposit. The consequences will mean job losses, increased offshore competitive advantage for producers that are advantaged by production subsidies and higher carbon footprints.

One wine producer I interviewed said 0.20c would bankrupt her business, the margins in wine are too tight to absorb these fees. CDS should not be considered a policy mechanism that forces producers to pay for the full recovery of glass and the downstream management of the products they place on the market, i.e. the 'producer pays' principle. This is not unique to the proposed scheme in Scotland since the same is the case in Norway (Lee, Bell, Garcia, Lee, & Harding, 2019).

### **Councils conflict of interest**

A report 'Cost Benefit Analysis of a Container Deposit Scheme' indicates a CDS would relieve financial pressure on councils that are currently required to pay for recycling infrastructure and systems. A New Zealand report released (WasteMINZ, 2017) December found that councils would save up to \$20.9 million annually in recycling, litter and landfill costs. In 2012, resource recovery and waste management experts, MRA consulting, commissioned by the Office of Local Government NSW, set out to investigate the impacts, including cost and benefits, of a CDS would have on kerbside recycling and councils. The findings demonstrate similar results to those found in New Zealand. Councils would benefit by receiving a proportion of the revenue from unredeemed deposits. As a result, NSW councils would cut their overall recycling costs by 19-47% using a container deposit scheme. The report also states the additional revenue stream from eligible containers through kerbside recycling could be worth around \$100 million per annum for councils and MRSs. The Office of Local Government indicates on its website that the proportion of eligible containers processed through kerbside is a significant revenue stream.

### **Reduction in recycling of non- Container Deposit Scheme glass**

The countries with the best glass recovery rates, all depend on glass recycling infrastructure such as kerbside bins, recycling depots etc.

Glass unsuited for the CDS (jam jars, condiments, olive oil, etc.) will still depend on kerbside recycling, and this presents a contamination risk to all kerbside recycling and recycling infrastructure services. Should a council choose to reduce the level of recycling investment due to the introduction of CDS; this glass stream is likely to go to landfill.

Colour sorted kerbside glass recovery plays a critical role for attaining high quality cullet that doesn't fit into the CDS such as glass jars and bottles for food – often clear glass, a highly demanded product for cullet.

In Australia, where they have CDS established in Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Victoria; yet still only achieve a glass recovery rate of 56%. (Australian Government , 2018).

In New South Wales, CDS is currently only recovering around 30% of eligible containers, the remaining 70% still goes through the kerbside recycling or garbage bin (Waste Management Review, 2019). There is a risk New Zealand's glass recovery could decrease our glass recycling rates under a CDS, as seen in Croatia and Estonia.

It should also be considered what the future for the Glass Packaging Forum looks like, because producers cannot be expected to pay for CDS and a voluntary product stewardship scheme.

### **Losing the Glass Packaging Forum**

Interview participants were not interested in being involved with both a product stewardship scheme **and** the CDS. A decision will need to be made, which is the preferred solution, and if it isn't EPR, what is the future of the Glass Packaging Forum?

Following a restructure in 2017 of the GPF accredited voluntary glass packaging product stewardship scheme, has a targeted recycling rate of 82% by 2024. The continued approach of investing in sensible infrastructure is on track to achieve this target. An example of smart investment was into the Tauranga Council kerbside glass recycling collection (GPF funded \$165,000) toward this. The results show recycled glass tonnage rise from an estimated 3500 tonnes to over 7000 tonnes in its first year of operation.

It is suggested that the Minister considers whether the existing voluntary scheme is delivering the same, or better outcomes than that which could be achieved by regulation through a CDS. Alternatively, what additional voluntary, or mandated investment would be required to improve the existing scheme to achieve the 82% target faster than 2024, or to achieve a higher target?

### **Disadvantage to Hospitality Sector**

The inclusion of glass under a CDS scheme would be a nuisance to the hospitality sector given such high volumes of glass packaging waste are generated. Typically, hospitality spaces have limited space, are busy and have limited time.



The manual nature of the return process is unlikely to see a justified visit off premise, to a CDS station to remove waste.

In Denmark, wine and beer bottles are excluded from the CDS because they aren't considered an environmental problem.

### **Less sustainable and circular packaging alternatives are used**

The evidence from existing recycling CDS shows that the handling, management and cost of glass is far higher than PET or cans and is therefore reflected in the material level producer fees. Denmark represent the highest extremes with the producer fees being 14 times higher for glass than for aluminum cans (Lee, Bell, Garcia, Lee, & Harding, 2019).

Germany, see figure 1.5, have experienced a continual decline in glass and increase in PET plastic under the management of a CDS.

Alternative packaging formats including cask wine are gaining a foothold in the wine market and there is a risk CDS could accelerate this trend. High glass recovery costs for glass under the CDS risks New Zealand moving to cheaper packaging alternatives, and creating more waste that's more difficult to re-use or recycle.

### **Increase bottle size**

One-way producers have handled the additional costs of deposits is increasing the size of the bottle. In Croatia 25cl bottles represented over 80 million units in 2006, now represents around five million units. 33cl beer bottles are now more popular and represent the biggest part of the market of around 10 million units and 50cl bottles are getting progressively more popular and are now almost as popular as the 25cl bottles (Lee, Bell, Garcia, Lee, & Harding, 2019).

Increasing bottle size could impose further questions around the social responsibility of safe consumption of alcohol.

### **Summary**

The unintended consequences of deploying a CDS as an additional recycling system, should be carefully considered in order to attain world leading glass recovery rates. It is apparent collecting glass isn't the problem, the market capability and demand for the cullet is.

The consultation demonstrates producers and consumers who are potentially impacted by regulation, weren't consulted; yet the un-intended consequences listed above express real challenges to those expected to pay for this.

I urge the Ministry for the Environment to set up a consultation framework that enables membership organisations impacted by potential priority products, to participate at the appropriate levels.

## What are the other options?

To compete amongst the best countries for glass recycling, we should be looking in what systems they have in place. The top four performing nations for glass recovery are

- Slovenia
- Belgium
- Luxembourg
- Sweden

These countries do not operate a CDS, instead deploy an EPR scheme over **all glass packaging**. All four listed examples achieve over 90% glass recovery rates.

### Extended Producer Responsibility

Extended producer responsibility (EPR) schemes, covered by the EU Packaging Directive means obligated producers must pay fees to cover the end of life costs of their packaging (i.e. its collection, recycling and disposal). Every time an obligated producer puts a packaged product on the market, it must pay the fee.

In New Zealand the Glass Packaging Forum was designed in response to looming glass stock piles and lack of infrastructure and system to manage the stewardship of glass, and manages the accredited GPF product stewardship scheme. There are more than 100 member companies who pay levies on a cost per tonne of glass, as it moves through the supply chain. There is every possibility that this voluntary scheme becomes mandatory, very easily, without the expense imposed to producers within the container deposit scheme.

It is possible an extended producer responsibility, or mandatory accredited product stewardship scheme, could offer customers domestically and internationally confidence that we encourage sustainable best practice, protect future generations and practise NZ's wider marketing asset '100% Pure'.

"Extended producer responsibility or stewardship is one tool available under the Waste Minimisation Act to help design waste out of our economy and shift the costs of minimising harm, away from nature, councils and the wider community and onto product designers, producers and users. Product stewardship, voluntary or regulated, means participants take responsibility for life-cycle impacts of products. Participants include producers, brand owners, importers, retailers, consumers, collectors, and re-processors (Sage, 2019).

Spain has experienced a rapid growth in glass recapture from 36% in 2002, to 70.4% in 2015. This is due to packaging and packaging waste legislation that introduced the EPR Scheme administered by not for profit organization Ecovidrio (Lee, Bell, Garcia, Lee, & Harding, 2019). Ecovidrio uses a model based on citizen collaboration and public cooperation between the companies adhered to in the system and the local entities that have competence in waste management. In addition to the integrated management of the single-use glass container, in line with the circular economy model, the EPR develops a broad activity of social awareness and prevention of littering. The Spanish EPR scheme is similar to others operated across Europe, where packaging companies finance the scheme based on the weight of material they place on the market (Lee, Bell, Garcia, Lee, & Harding, 2019).

The New Zealand wine industry benefits from an accredited voluntary product stewardship scheme managed by the Glass Packaging Forum (GPF). This research surveys wine producers and asks whether they know who they are and or whether they would support this product stewardship scheme. See results section.

EPR schemes have been traditionally implemented to channel producer funding, into investment in End of Life (EoL) waste management infrastructure. Spain and the EPR scheme for non-DRS in Finland are examples where the reason for the rapid increase in the recycling rates was the introduction of the EPR. The top four performing countries (Slovenia, Belgium, Luxembourg and Sweden) do not operate a recycling DRS for glass, but instead operate an EPR scheme to cover all glass packaging. All achieve over 90% as shown in figure 1.3.

### Market Based Instruments

Market-based instruments (MBIs) are becoming a popular approach with policymakers in the OECD to address environmental issues and achieve environmental objectives by encouraging targeted changes in business practices and consumer behaviors (MFE, 2019).

MBI's are fundamentally policy measures their influence outcomes through their effect on costs and profits. In the hands of policymakers, they can affect the operation of established markets or create new ones. They are commonly referred to as 'economic' instruments because they attribute value to assets and directly affect decisions based on considerations of price and income (MFE, 2019).

The range of MBI's include, but are not limited to;

- Taxes and fees (applied to specific priority waste products)
- Subsidies (to support certain products/desirable alternatives and possible research and development)
- EPR schemes (particularly those that include a fee modulation- GPF are doing this already via product stewardship levies), and container return schemes (Watkins, Schweitzer , & Börkey, 2019).

## Findings

32 wine producers, O-I, New Zealand Winegrowers board members, Sustainable Winegrowers New Zealand, the largest wine bottle filling businesses (Wine Works), A Master of Wine, New Zealand Winegrowers Advocacy team, Packaging Forum and Glass Packaging Forum members and MPI were interviewed. I reviewed various consultation submissions put forward to the Ministry to better understand the specific role we each play in this consultation.

### The Glass Packaging Forum

78% of all participants in the study were not aware of the glass packaging forum. The five businesses that had heard of them were in the top quartile for winery size that have benefited from robust business structure. The wine producers that I interviewed that knew who the GPF were, were involved and paying into the scheme but exited because they felt they didn't have a competitive advantage over those that weren't contributing. They expressed an element of frustration that it was voluntary. Those participants said they would be happy to pay the levies again, if it was an even playing field and everyone had to contribute.

One of my survey questions was "The glass Packaging Forum is an accredited voluntary product stewardship scheme actively working to increase glass recycling rates throughout NZ. This is achieved by members paying a \$1.30 per tonne levy on all glass imported, manufacture or filled for domestic use- to fund glass recovery infrastructure. Is this a model you would support? 81.2% agreed.

65.6% of respondents found producers used only New Zealand made glass and 18.75% say they use a mixture of NZ and imported glass. An interesting observation was that the majority of organic wine producers interviewed, did not buy NZ made glass- mostly imported from China. This surprised me because I expected organic producers to be more conscious about the product lifecycle.

28% of participants had no understanding of product stewardship.

81.2% agreed. One participant said yes but the dollar per tonne doesn't make any sense to me, I'd prefer a per bottle costing so can easily add that into our budgets. It's apparent we need to communicate the work GPF do more widely within the New Zealand wine industry.

Five producers said they would need more information or weren't the only stakeholder to make the final decision. It is well understood now that margins are already really tight and additional expenses need to be signed off from many consulted stakeholders including company CEO, CFO and shareholders.

### Awareness of the consultation process

It is apparent the Government wasn't planning on consulting the industry expected to finance the CRS.

93.7% of producers were unaware of the Government consultation on the Proposed Priority Product and Priority Product Stewardship Scheme Guidelines.

The two that did know about the consultation process had official sustainability job roles that wouldn't be found in medium and small businesses. These managers who were actively involved with preparing submissions against glass becoming a priority product, presumed the rest of the industry knew what was going on.

#### Regulated packaging and producer interest in a Container Deposit Scheme

I explained that one possible outcome of the current consultation process is the implementation of a container return scheme which would see a fee of \$0.20 per bottle and asked if they had considered the impact of the Government regulating packaging.

78% said no. The ones who said yes, were the largest producers, actively involved in the consultation. Of those who said yes, were fully aware of the consultation and the impact regulation could have on their business. One interviewee claimed "the thing that concerns us, is that the cost could outweigh the benefits. "The unintended consequences of a 0.20c deposit could drive demand for imported cheaper wine that is produced with subsidies, have higher carbon footprints- making competition even harder within the domestic market" said another producer. This highlights that any per-bottle CRS tax needs to apply equally to imported bottles.

62.5% of the respondents indicate that 0.20c per bottle is an excessive cost to the industry and questioned whether this really was a deposit which could be passed on to the consumer. It's unreasonable for the Government to assume that producers can pass any cost on to wholesale purchasers. In reality most wine is sold to supermarkets who have significant market power. The additional costs could be imposed on the retailer (like GST), as it will be very hard for the producers to increase their wholesale prices to recover the cost.

"I don't think CDS is a great idea, what do they know about recycling? We recycle all the glass in the winery so our consumers should do this too. We already pay enough taxes. Would prefer to support GPF than government." Another said "20c is very expensive, the average price of a bottle is about 60c, making the deposit a third of the value of the bottle."

Another explained "I think that would be an excessive cost for producers already doing the right thing, and would be difficult to justify without the system being more robust. We need to improve education for consumers before posing a tax on producers because if we are paying this money, we need results. "

A significant wine producer in Marlborough said "I cannot afford 20c I would be bankrupt."

"This will increase wine prices. If there is a system in place that works, we are better off working with that."

### Appetite for regulation or Extended Producer Responsibility

I asked the industry if 'Considering the GPF voluntary PS scheme is already diverting 62% of glass packaging from landfill do you believe there is a need for a more regulatory approach for glass packaging?'

68.7% of the industry believed New Zealand should be doing more. They were keen to embrace supporting the existing process that the GPF have already put in place and were impressed when I explained the GPF were on target to reach a 82% glass recovery rate by 2024. Of the 28% who said they didn't think there was a need for a more regulatory approach to glass packaging, over half of the respondents expressed a preference in supporting the existing scheme so regulation was unnecessary. Many producers who demonstrated trust and faith in the work the Glass Packaging Forum have put in place already. One producer noted that, "I would support the existing system, and think improving this would be better well spent than reinventing the wheel and implementing a new system".

It is evident, that producers need more information about GPF, what they do, and how to get involved, in order to endorse product stewardship as an entire industry.

Those who said yes, we did need regulation because 62% is not good enough and wanted to see a system to increase glass recovery rates. Perhaps this validates an appetite for an extended producer responsibility.

"Yes. Given I didn't even know about this forum, if they advertised themselves, and approached industry bodies, and get them to approach everyone else- might find its a better uptake".- Hawkes Bay.

There was an indication that those believing the volunteer scheme should be made fairer and that perhaps the solution to increasing glass recovery rates was to make the product stewardship for glass mandatory. The problems identified were that those who were involved were piggy backing 'freeloaders' giving an unfair competitive advantage to those not contributing. "Yes. If it was enforced and everyone had to do it, that would make it fairer" said one person who was a paying member of the GPF product stewardship scheme. "No one wants to be regulated, but in order to get everyone involved for this it needs to be fair" said a producer who wasn't aware of the GPF.

There were concerns from both members and non-members that those that who weren't willing to endorse product stewardship would undermine the commitment of the rest of the industry and therefore should be regulated. If everyone was committed to product stewardship as the first step in creating a circular economy, it is likely to improve recovery rates offering more opportunities for producers to measure and leverage the impact for the entire wine industry.

The last question was whether producers would be willing to consider integrating packaging into the Sustainable Winegrowing New Zealand (SWNZ) scorecards. The thinking was that if producers were willing to support product stewardship, how could we integrate this easily for them. 98% of winegrowers are members of SWNZ submit winery and vineyard

scorecards annually to demonstrate sustainability compliance within the standards. 'Voluntary questions in the scorecard relate to sustainable practices that members can adopt if they want to further demonstrate their commitment to sustainability. These members will benefit with additional personalised reporting with industry benchmark data.

The results showed 90.6% said it was a good idea to include packaging into the SWNZ scorecards. One producer said "Yes. We are encouraged to use less water and more efficient ways of power, minimise diesel, etc so why shouldn't we be encouraged to look into more sustainable ways of packaging wines"- Hawkes Bay.

Another said "Absolutely, why not. It will create extra work. If packaging is regulated through SWNZ, then it makes everyone try harder, the wider ripple effect will be amazing for the industry. In saying that - they need to provide the education with best practices, so this is all feasible".

Two of the participants weren't SWNZ members. They are organic producers belonging to BioGrow certification, so couldn't comment but said industry assets and best practice whitepapers would be useful so they could understand what best practice looks like beyond production so they can integrate that into their packaging and marketing departments.

## Conclusions

New Zealand's winegrowers are possibly in the best position to encourage a glass based circular economy for glass by endorsing product stewardship in glass packaging. This is because our wine producers have a well-established sustainability culture embedded in their businesses. This report shows their passion and willingness to embrace product stewardship and improve the glass circular economy with the support of a mandatory EPR.

Glass is New Zealand's best example of the circular economy in action. Glass has a successfully managed EPR in place. 85% of the glass beverage industry have belonged to the accredited product stewardship scheme for glass. These members have been paying a levy on their beverage packaging since 2004 when no levy has been applied to plastic beverage packaging during the corresponding period.

Glass is the only circular resource in packaging made from only natural materials, can be recycled infinitely without any form of degradation. Recycled glass reduces the dependency on virgin materials as 1kg of recycled glass replaces 1.2kg of virgin raw materials. This incentivises glass recapture by all parties within the economy.

The countries with the highest glass recovery rates do not operate under CDS. Many glass packaging products covered by the current EPR scheme would fall outside the proposed recycling CDS scheme. Furthermore, the cost to consumers is substantial. New Zealand sold 52.8 million litres of wine in a Key Performance Indicator report dated April 2018 (NZ Wine , 2019). From these numbers, the financial impact is estimated to be around \$13.3 million dollars annually.

If this cost of deposits cannot be passed on to the consumer, they will have to be absorbed as a business expense and this is likely to result in job losses, major cost cutting in other

operations, and put unnecessary strain on an industry with proven sustainable proactiveness. If the cost of the deposits can be passed on to the consumer, this will mean wine prices will increase consequently decreasing our competitive advantage. There is a threat that CDS will give a competitive advantage to imported wine typically produced with subsidies, with higher carbon foot print; making it harder to compete.

The countries that do operate under CDS have seen glass as a packaging form decrease, and increase of plastics (particularly PET) increase. This research concludes that the current model for glass recovery in New Zealand is aligned with the top four countries which are Slovenia, Belgium, Luxembourg and Sweden (Lee, Bell, Garcia, Lee, & Harding, 2019).

An EPR opens an opportunity for NZ winegrowers, GPF and O-I to strengthen the sustainability attribution of glass globally, to pioneer with ingenuity a best practice extended producer responsibility (EPR) scheme, alleviating threatening misconceptions that we cannot compete sustainably due to our distance to key markets.

Half the world's population are now under the age of 30, demanding more sustainable packaging choices. Glass meets those consumer needs because it is infinitely recyclable without any form of degradation, is healthy and is inert and does not cause environmental harm.

Deeper study and analysis is necessary into the opportunity of EPR and I have recommended be integrated with our existing GPF voluntary product stewardship. There is a possibility for Sustainable Winegrowers to integrate this EPR into the sustainable winegrowers scorecards.

It is evident that the glass recovery process in New Zealand is complex and dependent on great management and trusted relationships. This has been the foundation to developing a strong national supply chain for the processing and recycling of glass. It makes little sense to me that this work has not been better supported by the Ministry for the Environment.



## Recommendations

Glass to be excluded from the proposed CDS scheme.

I recommend against, disrupting the circular economy of glass in New Zealand with a container deposit scheme. A CDS for glass is likely to have perverse outcomes on materials commodity management and significantly increased cost to consumers.

### Mandatory Extended Producer Responsibility

I recommend the implementation of evolving the accredited voluntary product stewardship for glass for an increased voluntary investment into a mandatory EPR for glass. The framework already exists and would cost effectively solve all points listed in Section 9 Declaration of priority products extracted from The Waste Minimisation Act 2008. For example, MfE could say to the industry 'we need you to double your investment into the EPR, or we will introduce a CRS', there's a good chance that investment would happen.

### Government Support and Council Recycling Consistency

I recommend consistent council recycling responsibility and process throughout New Zealand. Tauranga City Council, a great example of a council doing the right thing.

Auckland, Christchurch and Lower Hutt councils still provide co-mingled collection services. Co-mingled kerbside collections have the single most detrimental impact to the ability to recycle and should stop.

### Supporting collaboration and existing efforts

This research highlights New Zealand winegrowers, O-I New Zealand and the Glass Packaging Forum's commitment to sustainability best practice and I recommend the Ministry for the Environment

We need organisations like these to accelerate the circular economy. A collaborative approach is imperative to ensure longevity and the best environmental and economic outcomes.

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