

Research to Support the Co-design of a Plastic Packaging Product Stewardship Scheme for New Zealand

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Executive Summary

Background & Objectives

The Ministry for Environment - Manatū Mō Te Taiao has appointed the Packaging Forum and the Food and Grocery Council to lead the co-design of a scheme which will enable better management of plastic packaging, its production, collection, and recycling across New Zealand. The Plastic Packaging Product Stewardship (PPPS) scheme, ultimately aims to implement a system by which producers pay for plastic packaging they use in New Zealand, including the cost of recycling. Valpak were commissioned by PPPS stakeholders to produce a report which provides an update of the amount of plastic packaging placed onto the market across New Zealand, to identify the current recycling rate, and to determine gaps in infrastructure and areas for improvement.

The PPPS project operates under four key tranches of research, with Valpak delivering the first two tranches:

- Tranche 1: Current State & Problem Definition – Identify tonnages of plastic packaging placed onto the market from consumer and non-consumer sources.
- Tranche 2: Current State & Problem Definition – Identify the internal flow of plastic packing after it has been placed onto the market, from collection to processing and destination, either onshore or offshore
- Tranche 3: Review global best practices and recommend scheme options for New Zealand which meet defined industry criteria.
- Tranche 4: Implementation options, including a cost-benefit analysis of options identified in Tranche 3

Scope & Methodology

The scope of the project was limited to any plastic packaging placed onto the New Zealand market in the consumer/retail sector (including grocery and non-grocery packaging) and the non-consumer sector (specifically retail back-of-store and hospitality). Agriculture, construction and demolition, and manufacturing were all considered out-of-scope.

Valpak employed a bottom-up approach which involved the use of both primary and secondary research. Where appropriate the UK Environmental Product Information Centre (EPIC) database was used as a proxy to estimate the amount of plastic packaging placed onto the market by consumers in New Zealand. Tonnages of non-consumer plastic packaging were calculated in a similar manner, using a mixture of scaled-up survey data and Valpak EPIC data.

A mixture of stakeholder surveys and secondary research was used to determine the flow of plastic packaging within New Zealand and its ultimate fate, i.e., collection from local authorities, sorted by material recovery facilities (MRFs) and then reprocessed onshore or exported for recycling.

Findings – Placed On Market (POM)

Total POM (In Scope of Project)

The estimate of plastic packaging POM in 2022 within the sectors in scope of this report is 171,348 tonnes. Packaging POM scenario estimates were also calculated where packaging containing milk, and packaging in the scope of a container return scheme (CRS) are excluded.

Consumer POM

Overall, the total amount of plastic packaging POM in the consumer sector was found to be 140,546 tonnes.

Non-Consumer POM

Overall, the total amount of plastic packaging placed onto the market in the non-consumer sector was estimated as 30,802 tonnes.

Findings – Recycling

Onshore Recycling

The current estimate for plastic packaging reprocessed onshore was estimated to be 28,954 tonnes. Additionally, the known current reprocessing capacity was found to be 36,736 tonnes for all plastic. The total reprocessing capacity for all plastic (including planned and ongoing investments) was 52,636 tonnes.

Plastic Recycling Rate

The total amount of plastic packaging recycled in 2022 was found to be 45,113 tonnes, of which 23,496 was from the consumer sector and 21,616 tonnes were from the non-consumer sector. When compared to the total amount of plastic packaging placed onto the market, this gives a total recycling rate of 17.1%. However, if caps and closures are removed from the total plastics recycled, this reduced the total recycling rate to 15.9%. Valpak recommends the inclusion of caps and closures within collection infrastructure as the associated weight will contribute to any collection targets set as well as creating a more simplistic collection scheme for the public to follow.

Exported for Recycling

The amount of plastic packaging exported for recycling was estimated to be 16,159 tonnes. When combined with current onshore reprocessing tonnages of 28,954 tonnes, this gives a total recycling figure of 45,113 tonnes, which is greater than the estimated current onshore reprocessing capacity of 36,736 tonnes. Due to insufficient onshore capacity, some plastic packaging must be exported for recycling. However, an estimated 15,900 tonnes of new reprocessing capacity are expected to come online soon, suggesting that New Zealand will have to export less plastic overseas, with a greater ability to reprocess onshore.

Data Challenges and Recommendations

This project found significant gaps in the availability of data in several key areas. For the POM section of the project, there were limitations in data collected by producers of packaging. This could be overcome in future by the introduction of a system which obligates producers to collect data and report on the tonnages of packaging that they handle and/or place onto the market, preferably by resin. It is recommended that the Plastic Product Stewardship Scheme for New Zealand includes a mandatory system whereby a competent authority collects accurate data from producers, which can be used for regularly estimating the total POM. This POM estimate can then be coupled with recycling data so that a recycling rate can be identified.

For the collection and recycling section of the project, data was limited from local authorities, MRFs and reprocessing facilities. Much of the required information was considered as commercially sensitive either from MRFs or reprocessors, again which could be overcome by regular confidential reporting to an independent competent authority. Implementation of a mandatory digital waste tracking system would allow New Zealand to ascertain where waste is collected and transported, enabling comparison between districts. Similar systems may be implemented for waste sent to MRFs or exported for recycling.

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Glossary

ANZPAC – Australia, New Zealand, and Pacific Islands Plastics Pact

BoS – Back of Store

CBA – Cost Benefit Analysis

C&D – Construction & Demolition

C&I – Commercial & Industrial

Commingled collections – recycling materials are collected together in a container and are not sorted at the kerbside but are deposited into the same vehicle compartment for sorting at a Materials Recycling Facility (MRF).

Consumer – Goods purchased for personal use. Sectors include the grocery and non-grocery sectors

CRS – Container Return Scheme

DIY – Do it yourself

DRS – Deposit Return Scheme

EA – Environment Agency

EfW – Energy from Waste

EPR – Extended Producer Responsibility

EPIC – Environmental Product Information Centre

EU – European Union

EVOH – Ethylene vinyl alcohol

FGC – Food & Grocery Council

GBP – Great British Pound

Grocery – Food and supplies sold by a grocer/ supermarket.

HDPE – High Density Polyethylene

Hospitality – The business of providing food, drink, etc. to customers of restaurants, bars, etc.

KPI – Key Performance Indicator

LDPE – Low Density Polyethylene

LPB – Liquid Paper Board

MFE – Ministry for the Environment

MRF – Material Recovery Facility

Non-Consumer – Goods mainly used within production¹. Sectors include agriculture, construction & demolition, commercial & industrial, hospitality, manufacturing and other.

Non-Grocery – Retailers such as clothing, homeware, DIY & gardening, health and beauty etc.

NPWD – National Packaging Waste Database

NZ – New Zealand

NZD – New Zealand Dollar

OECD – Organisation for Economic Co-operation and Development

¹ <https://stat.gov.pl/en/metainformation/glossary/terms-used-in-official-statistics/535.term.html#:~:text=Definition%3A,agricultural%20production%20and%20construction%20materials.v>

ONS – Office for National Statistics

OWLS – Online Waste Levy System

PC – Polycarbonate

PET – Polyethylene Terephthalate

PF – Packaging Forum

PLA – Polylactic Acid

POM – Placed on Market

PP – Polypropylene

PPP – Purchasing Power Parity

PPPS – Plastic Packaging Product Stewardship Scheme

PS – Polystyrene

PSO – Product Stewardship Organisation

PTT – Pots, Tubs and Trays

PVC – Polyvinyl Chloride

RFP – Request for Proposal

Separate collections – the recycling materials are either separated by householders into different containers or they are sorted by recycling operatives at the kerbside

SKU – Stock Keeping Unit

t - Tonnes

UK – United Kingdom

UN – United Nations

WDF – WasteDataFlow

1. Introduction

1.1. Background

The Packaging Forum (PF), in partnership with the New Zealand Food & Grocery Council (FGC) has been appointed by the Ministry for the Environment (MFE) to lead the co-design of a plastic packaging product stewardship scheme (PPPS) for New Zealand.

The project is a multi-stakeholder co-design of an accreditation ready plastic packaging scheme(s) for all plastic packaging used for consumer goods at retail or wholesale level, as defined in the Declaration of Priority Products Notice 2020-go4533² and will include recommendations on the implementation of the Product Stewardship Organisation (PSO).

Previous estimates from the ANZPAC Plastic Pact³ estimate that the total tonnes of plastic packaging placed on market (POM) within Aotearoa New Zealand equate to 146,200 tonnes⁴ and the Waste and Resource Recovery Infrastructure and Services Stocktake report⁵ estimated 150,000 tonnes. The packaging industry is the main user of plastic imported, with 60% of the New Zealand plastic industry^{6,7}. A significant amount of plastic is subsequently exported with product. The purpose of this report is to update and ensure that the estimates for tonnage POM are as robust as possible to provide stability within the market which enables the identification of the current recycling rate and allows the setting of challenging but achievable recycling targets. It also gives confidence to the sector that if it invests in collection and recycling infrastructure that the material will be available to capture.

If the project has a robust understanding of plastic packaging flowing on and off the New Zealand market it can design a plastic packaging product stewardship scheme (PPPS) which can best deliver its objectives.

1.2. Objectives

The two-year Waste Minimisation Fund project has the following objectives:

- Develop a Request for Proposal (RFP) procurement process to engage research consultants in Milestones Two to Five.
- Submit a Steering Committee majority (greater than 50%) supported final report on a New Zealand Plastic Packaging Product Stewardship scheme design and its implementation.
- Recommend a not-for-profit Product Stewardship Organisation (PSO) structure responsible for the delivery of the scheme and the scheme design that will be able to meet the requirements of the Waste Minimisation Act, including sections 12,14 and 15.

The PPPS Project Management has identified four key tranches of research which are required to support the process which are briefly summarised as:

Tranche 1: The Current State & Problem Definition –This will include identification of all plastic packaging, available data (tonnes) on plastic consumption, recovery, and processing.

Tranche 2: The Current State & Problem Definition –This will include mapping out how plastic is placed on the market in New Zealand, collected at end of life, separated at a material recovery facility (MRF), and processed.

² <https://gazette.govt.nz/notice/id/2020-go4533>

³ <https://anzpacplasticspact.org.au/resources/>

⁴ https://anzpacplasticspact.org.au/wp-content/uploads/2022/12/2020-ANZPAC_RecyclabilityAssessmentProjectReport_UPDATE_V2.pdf

⁵ <https://environment.govt.nz/assets/publications/Waste/Waste-and-resource-recovery-infrastructure-and-services-stocktake-Project-summary-report.pdf>

⁶ <https://www.scionresearch.com/?a=80606>

⁷ [General Statistics | Plastics New Zealand](#)

Tranche 3: Review of recognised global best practice schemes to recommend scheme options for New Zealand which meet defined gazette and WMF criteria. This will include a desk top review of international Product Stewardship models leveraging research which is publicly available from project stakeholders.

Tranche 4: Implementation options for New Zealand: This will include cost benefit analysis (CBA) of all scheme options identified in Tranche 3 which meet New Zealand criteria.

This report shall focus on answering the queries outlined in tranche 1 and tranche 2.

1.3. Guidance for Setting the Definition of Plastic Packaging

1.3.1. Introduction

This section of the report provides an overview of definitions of packaging from the UK to give guidance on what is included/excluded and why.

The UK has been used as an example due to the research team having access to the details of how the packaging definition was introduced, how it's developed since its inception and how it is going to change to provide an overview of how the system has evolved.

Guidance can also be found for setting the definition of plastic packaging in Austria^{8,9} and Germany^{10,11}. The UK, Austria and Germany were also selected to provide a range of how prescriptive each country is in setting the scope of plastic packaging within their schemes, with the UK definition considered wide-ranging. Austria takes a pragmatic approach which without undue complexity allows for differentiation between packaging types and recyclability. Germany has a more detailed and extensive prescriptive catalogue of what they include.

This information can help in the setting up and scoping of packaging within a plastic product stewardship scheme for New Zealand to ensure that consideration is given to the wide variety of nuances around packaging. It can also help inform where a new plastic product stewardship scheme could be positioned based on available data and regulatory framework in the target country.

1.3.2. Background to UK Packaging Regulations

The original EC Packaging Directive 94/62/EC was introduced in December 1994 and gave European Commission (EC) states a lead in time to transpose the legislation into their own national regulations. Being an EC Directive rather than regulations, countries are relatively free to introduce their own regulations if the overall recycling targets are met, and some specific rulings were followed. Therefore, there has been significant variance in each country's system and what packaging they focused their efforts on. Most countries focused compliance on a single point rather than the UK's shared obligation.

1.3.3. Packaging Definition

Within the Directive the definition of packaging is:

1. 'Packaging' shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery, and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable' items used for the same purposes shall also be considered to constitute packaging.

'Packaging' consists only of:

(a) sales packaging or primary packaging, i.e., packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase.

⁸ <https://www.ara.at/>

⁹ <https://www.ice.it/it/sites/default/files/inline-files/ARA%20Practical%20Guide.pdf>

¹⁰ <https://www.verpackungsregister.org/en>

¹¹ https://www.verpackungsregister.org/fileadmin/files/Katalog/Guideline_catalogue.pdf

(b) grouped packaging or secondary packaging, i.e., packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics.

(c) transport packaging or tertiary packaging, i.e., packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packaging's in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship, and air containers.

2. 'Packaging waste' shall mean any packaging or packaging material covered by the definition of waste in Directive 75/442/EEC, excluding production residues.

1.3.4. 2023 Regulations: Changes to System and Reporting Requirements

The Extended Producer Responsibility (EPR) Regulations, which are in the process of being introduced into the UK have some significant differences to the current regulations:

- Point of compliance changes to brand holder.
- More detailed data required including new packaging categories.
- Additional charges for packaging that normally ends up in the household waste stream.
- Most beverage packaging likely to be covered by Deposit Return Scheme (DRS) eventually.
- Changes to business size threshold requirements. Due to the lower threshold introduced, businesses affected will need to review their reporting processes to ensure they capture and report the required data.

Point of Compliance Changes

In 2024 the UK is moving the obligations of producers from the current shared responsibility approach where the costs are split across the packaging chain. Although most obligated companies often perform multiple activities, the core activities which attract an obligation are:

- Raw Material Manufacturer (that goes into Packaging)
- Convertor (Packaging Manufacturer)
- Packer Filler
- Seller (Supplier of packaged item to the 'end user')
- Importer (picks up the obligation for the activities completed abroad)

The new EPR legislation changes the point of compliance to the brand owner or importer.

Data Changes

The data requirements for EPR are going to require obligated companies to provide more information regarding the packaging they place on the market including¹²:

- Packaging activity – this is how you supplied the packaging.
- Packaging type – for example, if the packaging is household or non-household.
- Packaging class – whether the packaging is primary, secondary, shipment or tertiary.
- Packaging material and weight.

Information about in which UK nation household packaging is supplied, and in which UK nation packaging is discarded is also required from retailers.

¹² <https://www.gov.uk/guidance/how-to-collect-your-packaging-data-for-extended-producer-responsibility#what-data-you-need-to-collect>

Obligations in Future

It is intended in future that all packaging at least for the first few years is to continue to have a Packaging Recovery Note¹³ (PRN – the mechanism by which money is passed to packaging recyclers to ensure that recycling targets are met) obligation under the new regulations except for packaging covered by DRS once operational (see below). In addition, packaging regarded as household/household-like will also receive a new EPR fee to cover the collection costs from households (currently met by local authorities). While most of the rules and guidance are now in place it is currently a moving situation, therefore there are likely to be some changes in the future.

Deposit Return System (DRS)

Packaging that falls under the DRS for each UK country will fall out of scope of the EPR regulations once they are in operation. Until that point DRS packaging will be covered in the EPR regulations. Currently dates are not finalised for introduction of DRS although it is now planned to start in 2025 across all nations in the UK after several delays.

Thresholds Reduced

Currently only producers with turnovers of £2 million or more and handling 50 tonnes of packaging are obligated under the UK regulations. In the future producers with turnovers of £1 million or more and handling 25 tonnes will be required to register and provide some data, although they won't receive recycling obligations and the associated cost.

New Regulations & Packaging Definition

The introduction of the 'Packaging Waste (Data Reporting) (England) Regulations 2023' requires producers of packaging to collect and report data on the amount and type of packaging that they place on the market in England. This data is required to calculate the fees (which will differ between household and non-household packaging) that producers will be required to pay to cover the cost of managing packaging as part of the Extended Producer Responsibility (EPR) for packaging scheme. Equivalent legislation is also in place in Scotland, Wales and Northern Ireland.

Regulation 6 & 7 of the new regulations lays out the new definitions of packaging included.

Packaging and Packaging Categories¹⁴

6. (1) "Packaging", for the purposes of these Regulations, means all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer, including non-returnable items used for the same purposes, but only where the products are—

- (a) primary packaging, which is packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase.
- (b) secondary packaging, which is packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is supplied as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting the product's characteristics.
- (c) tertiary packaging, which is packaging conceived so as to facilitate handling and transport of a number of sales units or secondary packaging's in order to prevent damage from physical handling and transport damage, and for the purposes of these Regulations, tertiary packaging does not include road, rail, ship and air containers.

¹³ Under the regulations, packaging producers meet their recycling obligations by buying recycling evidence, known as Packaging Waste Recovery Notes (PRNs), or Packaging Waste Export Recovery Notes (PERNs), from accredited reprocessors or exporters (www.letsrecycle.com).

¹⁴ <https://www.legislation.gov.uk/uksi/2023/219/made>

(d) shipment packaging, which is packaging, added in addition to primary packaging, on items which are sold online or by mail order which are either delivered direct to the purchaser or collected by the purchaser from a shop or other collection point after they have been purchased.

(2) The following items are also to be treated as packaging on the basis of the criteria set out below—

(a) items that fulfil the definition in paragraph (1), without prejudice to other functions which the item may perform, unless the item is an integral part of a product and it is necessary to contain, support or preserve that product throughout its lifetime and all elements are intended to be used, consumed or disposed of together.

(b) items designed and intended to be filled at the point of sale and disposable items supplied, filled, or designed and intended to be filled, at the point of sale, provided they fulfil a packaging function described in paragraph (1).

(c) packaging components and ancillary elements integrated into packaging are considered to be part of the packaging into which they are integrated, and ancillary elements hung directly on, or attached to, a product which performs a packaging function are considered to be packaging unless they are an integral part of the product and all elements are intended to be used, consumed or disposed of together.

(3) Schedule 5 to the Packaging (Essential Requirements) Regulations 2015 contains illustrative examples of the rules set out in paragraph (2).

(4) For the purpose of these Regulations, packaging and packaging waste is to be treated, subject to paragraphs (5) and (6), as falling into one of the following packaging categories, depending on the material from which the packaging is made—

- aluminium.
- fibre-based composite materials.
- glass.
- paper or board.
- plastic.
- steel.
- wood; or
- other materials.

(5) Packaging materials composed of a combination of the materials referred to in paragraph (4) are to be treated as made of the material, which is predominant by weight, unless paragraph (6) applies.

(6) Where packaging materials are composed of a combination of different paragraph (4) materials in equal proportions, each material of which the packaging materials are comprised is to be treated separately for the purpose of these Regulations.

Further information regarding the UK's current system as well as guidance on what will be required under the new system as well as how to differentiate between household, household-like and non-household packaging can be found in Appendix I.

1.3.5 Summary

This section of the report provides an overview of definitions of packaging from the UK to give guidance on what is included/excluded and why. However, guidance can also be found for setting the definition of plastic packaging in other countries with Austria and Germany provided as other systems to consider with each of the three approaches varying in how prescriptive the system is for defining packaging. The UK's approach is considered wide ranging with Austria being a little bit more prescriptive and Germany publishing an extensive list of what they consider packaging.

This information can help in the setting up and scoping of packaging within a plastic product stewardship scheme for New Zealand to ensure that consideration is given to the wide variety of nuances around packaging.

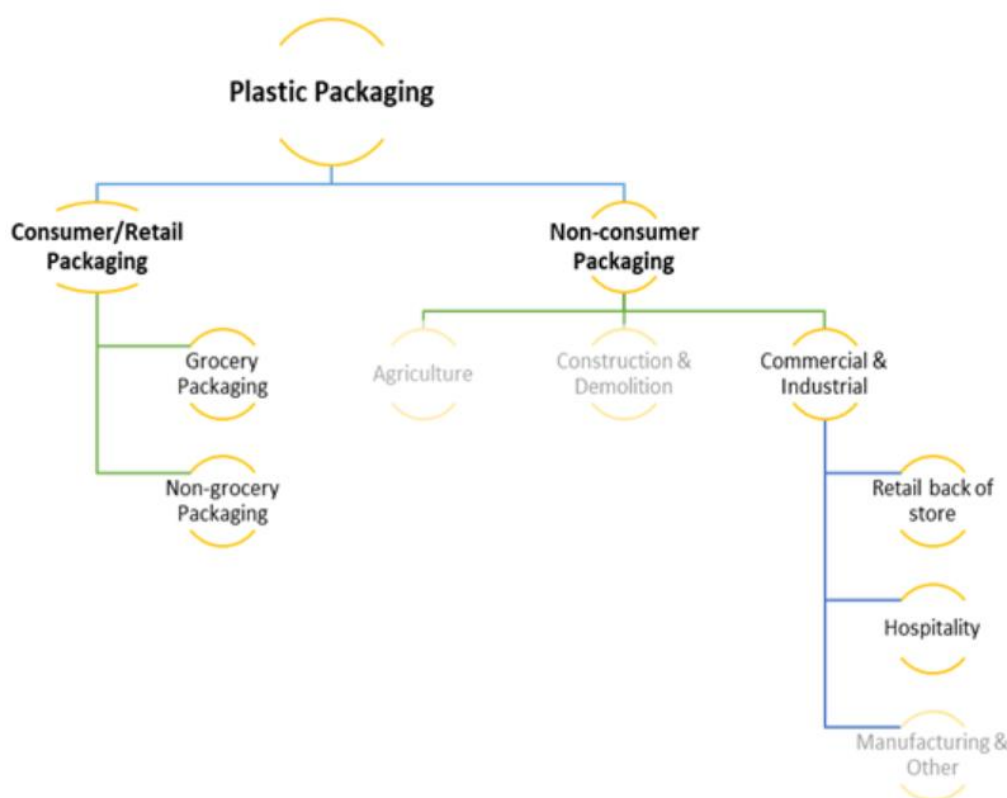
2. Plastic Packaging Placed On Market

2.1. Introduction

This section of the report provides an explanation of the method used to review the plastic packaging POM within New Zealand in 2022. The [gazette](#) definition of plastic packaging specifically excludes beverage containers which would be covered in a Container Return Scheme (CRS). In March 2023, the Government deferred work on a CRS although it remains on the agenda. Further decisions on a CRS for Aotearoa New Zealand will be made by the next Government.

This report splits the POM into different elements (CRS products excluded from POM and CRS plus milk products excluded from POM) and builds a picture from the bottom to the top. The key sectors explored within this report are consumer/retail, retail back of store and hospitality packaging, as shown in Figure 1.

Figure 1: Plastic Packaging POM - Sector Breakdown¹⁵



The plastic types analysed within this report include:

- 1 – Polyethylene Terephthalate (PET)
- 2 – High Density Polyethylene (HDPE)
- 3 – Un-plasticised Polyvinyl Chloride (PVC-U), Plasticised Polyvinyl Chloride (PVC-P)
- 4 – Low density Polyethylene (LDPE), Linear low-density Polyethylene (LLDPE)
- 5 – Polypropylene (PP)

¹⁵ Packaging POM within the manufacturing and other sector within New Zealand has been estimated at 78,827 tonnes. The tonnage calculated has been based on Valpak extrapolation from UK plastic POM flows quoted within the PackFlow Covid-19 Report

- 6 – Polystyrene (PS), Expanded Polystyrene (EPS)
- 7 – Includes all other resins and multi materials such as laminates.
- Compostable/biodegradable plastics such as Polylactic Acid (PLA)

For the purposes of this report, multilayer resin-coated paperboards, referred to as liquid paper board (LPB) are considered and quantified, plus, compostable / biodegradable plastic (particularly PLA). This report does not include research into the quantities of plastic in combination with other materials such as aluminium or steel cans. It is suggested that these material combinations be best covered through other packaging EPR systems.

There is currently very limited information available on the quantity of plastic-coated paper packaging placed on the market, however this is under review due to the setting of a pulpability standard for fibre packaging.

2.2. Consumer POM Methodology

This section of the report outlines the methodology used to calculate the consumer grocery and non-grocery POM plastic tonnages¹⁶.

2.2.1. Grocery Retail

To estimate the amount of packaging POM by the grocery retail market, aggregated data from the New Zealand Food and Grocery Council (FGC)¹⁷ was used. The data provided by the FGC was collected via surveys of the food and grocery sector within New Zealand. This data was scaled up to represent 100% of the New Zealand food and grocery market and resulted in an estimated plastic POM for the grocery sector in 2022 of 83,308 tonnes¹⁸.

This estimate was cross referenced with Valpak's grocery POM quoted within the PackFlow Covid-19 Report¹⁹ and key stakeholders within the grocery sector in New Zealand. For reference, the UK grocery plastic POM quantities were calculated using compliance declarations by over 90% of the UK Grocery Sector. Valpak's Environmental Product Information Centre (EPIC)²⁰ was assessed to provide data on annual sales, packaging weights and composition breakdown for all relevant products packaged in plastic. This compositional information was taken from a selection of Valpak's supermarket clients representing a cross-section of grocery retailers in the UK. These supermarkets represent 43% of the grocery retail market by sales value for 2019 and the resulting composition of plastic packaging was used to represent an estimate for the UK grocery retail market. This method assumes that the plastic packaging profile of the supermarkets in EPIC is representative of those whose data is not included.

The data gathered within the New Zealand FGC report, when compared with UK grocery data scaled to represent a New Zealand population, differed by 23.5% with New Zealand consuming more plastic than the UK. Using the assumption that the composition of plastic POM within the New Zealand grocery sector is comparative to that POM within the UK, it was considered that the FGC grocery estimates were an accurate representation of the New Zealand grocery market. There are variances in the comparisons within the resin type when compared within the UK, however this is to be expected for several reasons:

- Different products POM with varying formats and resin types.

¹⁶ Please note that aged care product packaging, if purchased for domestic use will be considered consumer. If items are purchased for use within a care home/healthcare setting, then the packaging is considered non-consumer. This logic also applies to animal healthcare packaging with products purchased within a supermarket/pet store etc. being considered domestic and those purchased for use within a veterinary clinic or by a veterinary healthcare professional classified as non-consumer.

¹⁷ <https://www.fgc.org.nz/>

¹⁸ CRS tonnage excluded.

¹⁹ <https://wrap.org.uk/resources/report/packflow-covid-19-reports>

²⁰ The database is based on information collected direct from suppliers as well as information sourced internally, meaning that it holds a wide coverage of information across multiple product ranges. Product specific data collection is completed through site visits, supplier mailings and weighing in-house (purchasing product and collecting used product from staff). All data goes through a comprehensive checking process on receipt and is stored in Valpak's bespoke software Environmental Product Information Centre (EPIC).

- Within the UK several large producers have signed up to “The UK Plastics Pact”²¹ which encourages producers to reduce plastic packaging and increase its recyclability, the measurement of which inherently requires increased granularity of compositional data.

To visualise the flow of plastic packaging POM through to collection and reprocessing, total tonnages of plastic packaging have been provided. To further represent the amount of material consumed and disposed of via the usual waste collection facilities, tonnage POM shall also be provided whereby packaging intended for disposal within the Container Return Scheme (CRS) facilities are excluded.

Any PET, HDPE, PP, recyclable bio-based HDPE and PET and liquid paper board single-use drinks are considered in scope of the CRS²².

Due to uncertainty around the inclusion of milk-based products being included within the CRS, two scenarios will be shown:

- Scenario 1: Where milk products are **NOT** deemed in scope of the CRS and therefore have been **INCLUDED** within the total tonnage.
- Scenario 2: Where milk products **ARE** deemed in scope of the CRS and therefore have been **EXCLUDED** from the total tonnage.

The grocery POM calculated was then reviewed, and if necessary, amended based on recommendations from key stakeholders within the New Zealand grocery sector.

2.2.2. Non-Grocery Retail

Due to a lack of information available within New Zealand on plastic consumed within the non-grocery retail sector, tonnage quoted within the UK PackFlow Covid-19 Report²³ has been used as a proxy.

The methodology for calculating the UK grocery and non-grocery retail POM tonnage included the use of the Office for National Statistics (ONS) retail sales data. This showed that the proportion of grocery spend of total UK retail spend was 43% in 2019²⁴.

However, simply scaling up using market share was not considered robust, since it was likely that packaging usage within both sub-sectors (grocery & non-grocery) differed. Therefore, this difference in plastic packaging used by the grocery sector and other retail sectors was analysed using Valpak membership’s reported data²⁵. Analysis involved the following key stages:

- Identification of grocery and non-grocery retail members.
- Gathering of company reported data and information.
- Calculation of plastic packaging tonnage per £billion turnover for grocery and non-grocery retailers (using Valpak data).

This method assumed that the packaging profile of those retailers within the sample is representative of those not in the sample and that turnover was a suitable scaling factor for packaging usage.

²¹ <https://wrap.org.uk/taking-action/plastic-packaging/initiatives/the-uk-plastics-pact>

²² <https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/container-return-scheme/further-information-on-the-container-return-scheme/#drinks-included-in-the-scheme>

²³ <https://wrap.org.uk/resources/report/packflow-covid-19-reports>

²⁴ <https://www.ons.gov.uk/businessindustryandtrade/retailindustry/datasets/poundsdatatotalretailsales>

²⁵ Valpak membership represents approximately one third of all obligated companies, by obligation. The entire NPWD database was considered for analysis; however, for confidentiality reasons it was not possible to gain access to NPWD to conduct the same analysis on the complete dataset.

In addition to wholesale supply of soft drinks to non-grocery retailers (estimated through EPIC), soft drinks are also supplied to hospitality outlets directly from manufacturers, or indirectly from manufacturers through distribution companies. Valpak were able to establish this estimate by comparing the estimated proportion of units sold of soft drinks in plastic established in EPIC, with the proportion of soft drinks volume sold in plastic²⁶.

As with the grocery sector, data has been presented in two scenarios whereby soft drinks, milk and other items potentially included within the CRS have been removed from the POM tonnages.

To scale the UK POM tonnage to represent New Zealand, the UK POM figures are initially scaled to represent the population of New Zealand. In 2022, New Zealand had a population of 5.1 million²⁷. Due to the UK POM being representative for 2019, the New Zealand population has been compared against the UK population within 2019 which was 66.7 million²⁸ (New Zealand population in 2022 equals 7.6% of the UK population in 2019).

To account for the purchasing power of the different currencies (NZD, GBP) the OECD-calculated purchasing power parity (PPP) has been factored into the scaling calculation. The total consumer non-grocery spend equates to £226bn²⁹ in UK and NZ\$36.3bn within New Zealand. To apply the PPP, the average spend per capita needs to be calculated for both the UK and New Zealand. For New Zealand the average spend per capita equals NZ\$ 6.8k³⁰ and £3.4k³¹ within the UK. This is then divided by the PPP to calculate the relative purchasing power for each country. This analysis suggests that within the non-food retail sector an average New Zealander spends an average of 3% more than an average UK resident in purely financial terms (all converted to a standard unit of US Dollars), but only receives 92.1% of the quantity of products due to the cost of products being slightly higher within New Zealand than in the UK. The calculation takes in to account the population, total spend, and relative purchasing power of the NZD compared to the UK pound.

The UK tonnage scaled by New Zealand population is then multiplied by the ratio of UK non-grocery consumption (using PPP) to New Zealand non-grocery consumption to create a more robust New Zealand POM estimate than spend alone.

DIY

The total weight of primary plastic packaging POM by DIY retailers in the UK was calculated from the data submission from 49.4% of large (obligated) DIY retailers in the UK. To account for those independent DIY retailers in the UK who fall below the threshold for participation in the UK system, Valpak have estimated that there is an additional 14.3% of total plastic placed onto the market by these businesses. This is based on the total level of non-obligated plastic packaging in the UK, calculated by comparing the total obligation (from the national packaging waste database) to the industry-verified estimate of total plastic packaging POM.

The UK tonnage was then scaled to represent the New Zealand population. Again, the purchasing power parity (PPP) has been factored into the scaling calculation. For the purposes of this calculation, currency was converted to a standard unit of US dollars where applicable. The total consumer spend within the DIY sector equates to \$34.4bn³² in UK and \$8.9bn within New Zealand equating to an average spend per capita of NZ\$1.7k³³ and \$516³⁴ within the UK. This is then divided by the PPP to calculate the total consumption of goods (relative to purchasing power) for each country.

²⁶ UK Soft Drinks Report 2020, British Soft Drinks Association

²⁷ <https://www.macrotrends.net/countries/NZL/new-zealand/population#:~:text=The%20population%20of%20New%20Zealand.a%202020.06%25%20increase%20from%202019.>

²⁸ <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/timeseries/ukpop/pop>

²⁹ <https://researchbriefings.files.parliament.uk/documents/CBP-9111/CBP-9111.pdf>

³⁰ <https://retail.kiwi/wp-content/uploads/2020/09/RetailNZReport-RetailingNow.pdf>

³¹ <https://researchbriefings.files.parliament.uk/documents/CBP-9111/CBP-9111.pdf>

³² <https://www.statista.com/outlook/cmo/diy-hardware-store/united-kingdom#:~:text=DIY%20%26%20Hardware%20Store%20%2D%20United%20Kingdom&text=Revenue%20in%20the%20DIY%20%26%20Hardware.US%24767.20bn%20in%202023.>

³³ <https://retail.kiwi/wp-content/uploads/2020/09/RetailNZReport-RetailingNow.pdf>

³⁴ Total UK DIY reported spend per person in the UK in US dollars

Valpak's calculations determine that the ratio of New Zealand DIY spend to UK DIY spend equals 186%. Applying consumption scaling (Based on PPP) above, suggests that within the DIY retail sector an average New Zealander spends over double (an average of 202%) on DIY products more than an average UK resident (all converted to a standard unit of US Dollars) and receives 86% more product than an average resident of the UK.

To understand the split of plastic material type within the DIY sector, further analysis to the material composition POM was carried out using compositional data owned by Valpak relating to the UK DIY sector. The calculated total tonnage, associated with DIY was first removed from the New Zealand total POM and the format and resin composition (based on an average expectation of 'non-grocery' packaging). Using Valpak member data, a percentage was calculated on the split of both material type and packaging format unique to DIY. This percentage was then applied to the calculated total tonnage associated with New Zealand DIY and added back into the total New Zealand non-grocery POM. This calculation estimated a POM composition within the non-grocery sector that is representative to New Zealand's consumer habits whereby a higher proportion of non-grocery purchasing is made up of DIY products than within the UK.

2.2.3. Milk Consumption

As previously stated, due to uncertainty around the inclusion of milk-based products within the CRS, two scenarios have been calculated: one where milk products are not deemed in scope of the CRS (and therefore within a PPPS), and the other where milk products are deemed in scope of the CRS.

Due to limited information being available for the weight of packaging around milk products within New Zealand, UK POM tonnage has been used as a proxy³⁵. This proxy is supported by the total tonnes associated with milk containers collected via kerbside collections (recycling and residual) equalling 9,618 tonnes³⁶ and the Valpak estimate of total tonnes POM for milk within New Zealand equalling 9,054kt (6% difference).

Of the total milk consumed within the consumer sector, 92% is generated from the grocery sector, 5% from the non-grocery sector and 4% delivered direct to consumer.³⁷

Total milk POM within New Zealand has been calculated by scaling UK data to represent the New Zealand population (8%) and multiplying by the consumption rate. The consumption rate of milk within the New Zealand is reported to be 4% higher than that in the UK³⁸.

Weights of HDPE and LPB bottles/cartons POM have been confirmed by key stakeholders within New Zealand. Comparisons of like-for-like items within Valpak's EPIC data base showed that HDPE milk bottles were ~22% heavier and LPB cartons ~23% heavier within New Zealand than in the UK. These heavier weights are to be expected due to several large retailers being members of "The UK Plastics Pact" and working to make milk bottle packaging more light weight.

Scaling factors have been applied to the estimated New Zealand total milk consumption tonnage for both HDPE and LPB to consider differing packaging composition of milk bottles within New Zealand to those POM in UK.

³⁵ UK POM tonnage being used as a proxy was tested and supported by industry stakeholders.

³⁶ [the-truth-about-plastic-recycling-report.pdf \(gohealthy.co.nz\)](https://www.gohealthy.co.nz/the-truth-about-plastic-recycling-report.pdf)

³⁷ <https://wrap.org.uk/resources/report/packflow-covid-19-reports>

³⁸

<https://projectblue.blob.core.windows.net/media/Default/What%20we%20do/Exports/AHDB%20New%20Zealand%20Dairy%20Sector%20Insights.pdf>

2.3. Consumer POM Composition

This section of the report outlines the estimated plastic packaging POM within New Zealand for the consumer (grocery, non-grocery) sector.

As stated within the methodology, three POM scenarios have been provided:

- Scenario 1: Total tonnage POM including packaging in scope of the CRS.
- Scenario 2: Where milk products are **NOT** deemed in scope of the CRS and therefore have been **INCLUDED** within the total tonnage.
- Scenario 3: Where milk products **ARE** deemed in scope of the CRS and therefore have been **EXCLUDED** from the total tonnage.

2.3.1. Total Consumer POM

The estimated composition of the consumer plastic packaging in New Zealand (including associated CRS packaging in shown in Table 1).

Table 1: Consumer Plastic Packaging by Format and Resin 2022 (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	6:EPS	7:Other	PE	LPB	Compostable /biodegrad-able	Total
Bottle	31,525	31,045	11	10	646	92	-	53	16	-	-	61,764
Film	410	2,149	89	15,267	3,185	262	-	1,707	125	-	-	23,194
Other rigid	1,038	6,090	574	1,565	11,837	1,644	120	15,187	21	-	311	38,386
PTT	1,038	195	10	2	1,034	4,492	-	4	4	-	-	12,806
Carton	-	-	-	-	-	-	-	-	-	4,396	-	4,396
Total	38,404	39,480	682	16,844	16,702	6,490	120	16,951	166	4,396	311	140,546

The category 'Other Rigid' includes elements of packaging such as caps and lids, toothpaste tubes, egg boxes, blister packs and clothes hangers. This category may also include packaging that is considered a pot, tub, or tray (PTT) due to the different format type classification within the New Zealand data supplied for grocery.

Common types of resins included with the 'Other' classification include polycarbonate (PC) and polylactic acid (PLA)³⁹. However, due to the "Other" resin type classification for "Other Rigid" packaging formats being 15,187 tonnes (the majority originating from the grocery sector with 15,121 tonnes) it is likely that the "Other" resin type category has been used as a catchall when the resin type and packaging format is unknown or does not fit in to the other packaging formats provided. The "other" resin category includes some "in combination" materials such as multi-layer pouches.

The resin type EPS, predominantly used for the protection of goods, is more widely used within the non-grocery sector, however this level of information was not available outside of the grocery sector for this report.

PE is predominantly used for films and EPE for the protection of goods, for example between flat pack furniture whilst in transit. The level of granularity needed to show the EPE resin type was not available, however the contribution to the overall POM tonnage would be minimal.

The total plastic flow within the consumer sector in 2022 was estimated at 140,546 tonnes.

³⁹ <https://www.plastics.org.nz/images/documents/PDFs/pnz-id-code-web-2009-1.pdf>

2.3.2. Consumer Grocery POM

The breakdown of plastic packaging within the consumer grocery POM consists of packaging around goods that would be purchased within a supermarket e.g., food/drink stuffs.

Milk Excluded from the CRS

The estimated composition of the consumer grocery plastic packaging in New Zealand whereby milk is excluded from the CRS and included in the PPPS is shown below:

Table 2: Consumer Grocery Plastic Packaging by Format and Resin 2022 (Milk packaging included, CRS Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	6:EPS	7:Other	PE	LPB	Compostable /biodegradable	Total
Bottle ⁴⁰	1,635	22,861	-	-	-	-	-	-	-	-	-	22,861
Film	-	1,967	-	13,063	2,352	-	-	-	-	-	-	17,382
Other rigid	-	4,891	521	764	9,435	1,449	120	15,121	-	-	311	32,612
PTT	4,832	-	-	-	-	-	-	-	-	-	-	6,467
Carton	-	-	-	-	-	-	-	-	-	1,839	-	1,839
Total	6,467	29,720	521	13,827	11,787	1,449	120	15,121	-	1,839	311	81,161

Milk Included Within the CRS

The estimated composition of the consumer grocery plastic packaging in New Zealand whereby milk is included within CRS and excluded from the PPPS is shown below.

Table 3: Consumer Grocery Plastic Packaging by Format and Resin 2022 (Milk and CRS Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	6:EPS	7:Other	PE	LPB	Compostable /biodegradable	Total
Bottle	1,635	15,641	-	-	-	-	-	-	-	-	-	15,641
Film	-	1,967	-	13,063	2,352	-	-	-	-	-	-	17,382
Other rigid	-	4,891	521	764	9,435	1,449	120	15,121	-	-	311	32,612
PTT	4,832	-	-	-	-	-	-	-	-	-	-	6,467
Carton	-	-	-	-	-	-	-	-	-	383	-	383
Total	6,467	22,500	521	13,827	11,787	1,449	120	15,121	-	383	311	72,484

⁴⁰ Data provided by New Zealand FGC outlined specifically drinks bottles as a format. Non-drinks bottles were included within the "PET Containers" category and no data was provided as to the split between bottles and PTT. Using analysis of UK POM Valpak have assigned 25.28% of the PET containers to bottles (e.g., cooking oil and some shampoo bottles) and 74.72% to non-bottles (e.g., peanut butter and some moisturiser pots).

The total plastic flow within the consumer grocery sector in 2022 was estimated at 81,161 tonnes when milk is excluded from the CRS and included in the PPPS and 72,484 tonnes in the instance where milk is included within the CRS and excluded from the PPPS.

The dominant resin in consumer grocery is HDPE with an average of 34% of the total consumer grocery POM. Of the HDPE resin, bottles are the predominant packaging type with an average of 73%. HDPE bottles are used for items such as cleaning products e.g., bleach, detergents, and shampoos.

2.3.3. Consumer Non-Grocery POM

The breakdown of plastic packaging within the consumer non-grocery POM consists of packaging around items such as toys, clothing and DIY. A certain quantity of drinks is sold through non-grocery retailers, although far less than is sold through supermarket groceries. Milk is also sold direct to consumers from farms and through doorstep delivery⁴¹. Allowances have been made for these non-grocery drinks sales in the non-grocery composition.

Milk Excluded from the CRS

The estimated composition of the consumer non-grocery plastic packaging in New Zealand whereby milk is excluded from the CRS and included in the PPPS is shown below:

Table 4: Consumer Non-Grocery Plastic Packaging by Format and Resin 2022 (Milk packaging included, CRS Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Total
Bottle	4,704	8,053	10	10	638	92	41	16	-	13,564
Film	406	180	88	2,174	821	262	1,700	124	-	5,755
Other rigid	1,027	1,182	52	789	2,368	195	65	21	-	5,700
PTT	590	194	10	2	1,024	4,488	4	4	-	6,315
Carton	-	-	-	-	-	-	-	-	206	206
Total	6,727	9,610	160	2,975	4,851	5,037	1,810	164	206	31,540

Within Table 4 there is tonnage classified as "PE". In consumer non-grocery and non-consumer sectors, where UK data has been used as a proxy and the supplier has not stipulated whether the PE is high-density or low-density, it is recorded as PE. It could be reasonable to assume that this may be assigned in line with the proportion of LDPE and HDPE by packaging format.

Milk Included Within the CRS

The estimated composition of the consumer non-grocery plastic packaging in New Zealand whereby milk is included within the CRS and excluded from the PPPS is shown below.

⁴¹ Milk supplied through these routes is outside of traditional grocery and non-grocery retail and therefore would not be captured by the grocery calculations or non-grocery calculations and must instead be calculated separately – UK figures have been used as a proxy and scaled accordingly.

Table 5: Consumer Non-Grocery Plastic Packaging by Format and Resin 2022 (Milk and CRS Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Total
Bottle	4,693	7,844	10	10	636	92	41	16	-	13,342
Film	405	180	88	2,169	819	262	1,699	123	-	5,745
Other rigid	1,025	1,180	52	787	2,363	195	65	21	-	5,688
PTT	589	194	10	2	1,022	4,487	4	4	-	6,311
Carton	-	-	-	-	-	-	-	-	43	43
Total	6,712	9,397	160	2,968	4,840	5,036	1,809	164	43	31,129

The total plastic flow within the consumer non-grocery sector in 2022 was estimated at 31,540 tonnes when milk is excluded from the CRS and included in the PPPS and 31,129 tonnes in the instance where milk is included within the CRS and excluded from the PPPS (411 tonnes difference).

Again, the dominant resin in consumer non-grocery is HDPE with an average of 30% of the total non-grocery POM. Of the HDPE resin bottles are the predominant packaging type with an average of 84%. The next predominant resin is PET with an average of 21% and with bottles being the predominant packaging type (69%).

2.4. Non-Consumer POM Methodology

This section of the report outlines the methodology used to calculate the non-consumer hospitality and packaging disposed of back of store within the consumer sector.

2.4.1. Back of Store

Due to a lack of information available within New Zealand on plastic packaging disposed of back of store within the consumer grocery and non-grocery sector, UK data has been used as a proxy. Most of this packaging is plastic film (used around pallets, roll cages and cases of product, for example the film around a tray of 24 cans of soft drink), with a very small minority (up to a maximum of 10% by weight) made up of PP and HDPE trays (for case of products such as 12 pots of cream).

To determine the annual quantity of plastic packaging discarded by grocery retailers at back of store in the UK retailers were surveyed during June/July 2020, with data collected representing over 50% of the UK grocery retail market. The collected data was sense checked by a key stakeholder reprocessor within the UK. Data was then scaled up to UK level for grocery.

The grocery back of store tonnage was then scaled up to include the non-grocery retail back of store plastic packaging. However, simply scaling up using market share was not considered robust enough, since it was likely that packaging usage within both sub-sectors differed. Therefore, this difference in plastic packaging used by the grocery sector and other retail sectors was analysed using Valpak membership's reported data⁴². Analysis involved the following key stages:

- Identification of grocery and non-grocery retail members.

⁴² Valpak membership represents approximately one third of all obligated companies, by obligation. The entire NPWD database was considered for analysis; however, for confidentiality reasons it was not possible to gain access to NPWD to conduct the same analysis on the complete dataset.

- Gathering of company reported data and information.
- Calculation of plastic packaging tonnage per £billion turnover for grocery and non-grocery retailers (using Valpak data).

The method used assumes the packaging profile of those retailers within the sample is representative of those not in the sample.

To provide an indicative breakdown by resin type, Valpak/Verde internal knowledge was used, resulting in a film split of 90% LDPE, 5% PP and 5% HDPE. For rigids, a simple 50:50 split was applied between the two most likely resins of PET and PP⁴³.

To scale the UK POM tonnage to represent New Zealand, the UK POM figures for both the grocery and non-grocery back of store were scaled to represent the population of New Zealand as described within section 2.2.2.

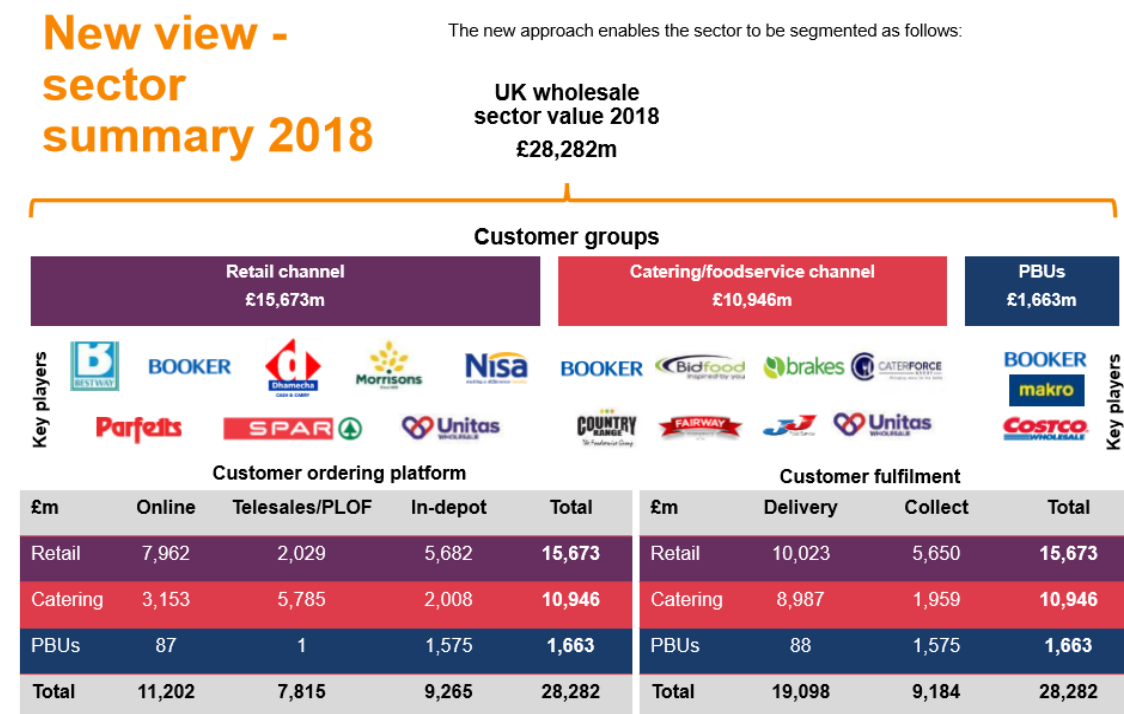
Estimated tonnages were provided to key stakeholders within New Zealand to confirm the accuracy of POM tonnage. Any feedback provided by stakeholders have been incorporated into the data calculations.

2.4.2. Hospitality

Hospitality plastic packaging is plastic packaging that is primarily ‘household-type’ but includes both primary and secondary packaging and is consumed in pubs, cafés, hospitals etc. and tertiary packaging removed within wholesale and distribution centres. The household-type packaging is generally similar in type to that consumed at home but may not be collected by a local authority for recycling or disposal and includes some non-household type packaging such as large tubs and buckets used for items such as oils and sauces.

Due to a lack of information available within New Zealand on plastic consumed within the hospitality sector, tonnage quoted within the UK PackFlow Covid-19 Report⁴⁴ has been used as a proxy – see Figure 2.

Figure 2: Overview of the Foodservice, Catering and Hospitality Sector



⁴³ No further data was available to provide a split between PP and PET, therefore 50:50 was used.

⁴⁴ <https://wrap.org.uk/resources/report/packflow-covid-19-reports>

To calculate the plastic packaging consumed within the hospitality sector, Valpak EPIC data relating to 33% of the cash and carry and delivered foodservice industry⁴⁵ was used. Market share information for the companies included in the sample were used to scale up the resulting tonnage to represent the whole foodservice, catering, and hospitality sector⁴⁶.

In addition to foodservice, hospitality and catering suppliers, soft drinks are also supplied to hospitality outlets directly from manufacturers, or indirectly from manufacturers through distribution companies. Due to direct sales not being captured within the EPIC data base, Valpak were able to establish this estimate by comparing the estimated proportion of units sold of soft drinks in plastic established in EPIC, with the proportion of soft drinks volume sold in plastic⁴⁷.

To scale the UK POM tonnage to represent New Zealand, the UK POM figures are initially scaled to represent the population of New Zealand. The methodology for scaling to New Zealand population is outlined within section 2.2.2.

The total expenditure within the hospitality sector in New Zealand was then considered (in comparison to that in the UK and, in order to account for the purchasing power of the different currencies (NZD, GBP), the PPP has been factored into the scaling calculation. The total non-consumer hospitality spend equates to £59.3bn⁴⁸ in the UK across the total population. Within New Zealand, the average spend per capita equals NZ\$ 2.5k⁴⁹ and £0.9k within the UK. Applying published PPP factors⁵⁰ determines that the ratio of UK hospitality consumption to New Zealand hospitality equals 122.7% (average consumption within the hospitality sector is 22% higher in New Zealand than in the UK per capita). This higher level of hospitality consumption is further supported by New Zealand having 25% more tourists per resident than the UK⁵¹.

2.4.3. Milk Consumption

As previously stated in section 2.2.3, due to uncertainty around the inclusion of milk being incorporated within the CRS, two scenarios have been calculated. One where milk products are not deemed in scope of the CRS and the other where milk products are deemed in scope of the CRS.

Due to limited information being available for the weight of packaging around milk products within New Zealand, UK POM has been used as a proxy. Please see section 2.2.3 for the scaling methodology used to account for variations in milk packaging weights in New Zealand and the UK.

Total milk POM within New Zealand has been calculated by scaling UK data to represent the New Zealand population (8%) and multiplying by the relative consumption rate. The relative consumption rate of milk within the New Zealand in the hospitality sector is 3% higher than that in the UK⁵².

⁴⁵ Valpak's EPIC database holds sales data and packaging weights information for clients signed up for the fully managed service.

⁴⁶ <https://retailanalysis.jgd.com/presentations/presentation-viewer/t/uk-grocery--foodservice-wholesaling-2019-sector-performance--statistics/i/9027>

⁴⁷ UK Soft Drinks Report 2020, British Soft Drinks Association

⁴⁸ <https://researchbriefings.files.parliament.uk/documents/CBP-9111/CBP-9111.pdf>

⁴⁹ <https://www.1news.co.nz/2022/12/05/nz-hospitality-industry-bounces-back-after-two-slow-years/>

⁵⁰ <https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm>

⁵¹ <https://www.mbie.govt.nz/immigration-and-tourism/tourism-research-and-data/international-tourism-forecasts/previous-international-tourism-forecasts/2016-2022/#:~:text=Visitor%20arrivals%20to%20New%20Zealand,%2C%20up%2065.5%25%20from%202015>

⁵² <https://projectblue.blob.core.windows.net/media/Default/What%20we%20do/Exports/AHDB%20New%20Zealand%20Dairy%20Sector%20In%20sights.pdf>

2.5. Hospitality POM Composition

The estimated composition of the consumer grocery/non-grocery back of store and non-consumer hospitality plastic packaging in New Zealand (including associated CRS packaging) is shown in the below table:

Table 6: Non-Consumer (Hospitality & BoS) Plastic Packaging by Format and Resin 2022 (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Total
Bottle	8,814	4,787	-	-	43	-	-	-	-	13,645
Film	421	426	1	8,863	891	56	629	417	-	11,702
Other rigid	158	520	35	38	299	9	9	16	-	1,084
PTT	589	1,583	59	94	1,115	134	26	86	-	3,687
Carton	-	-	-	-	-	-	-	-	684	684
Total	9,983	7,316	94	8,995	2,348	199	664	520	684	30,802

The total estimated quantity POM within the consumer grocery/non-grocery back of store and non-consumer hospitality sector (including CRS packaging) is 30,802 tonnes.

Within Table 6 there is tonnage classified as "PE". In the hospitality sector, where UK data has been used as a proxy and the supplier has not stipulated whether the PE is high-density or low-density, it is recorded as PE. As with the consumer non-grocery sector, it could be reasonable to assume that this may be assigned this in line with the proportion of LDPE and HDPE by packaging format.

2.5.1. Back of Store POM

The breakdown of plastic packaging discarded by grocery and non-grocery retailers back of store can be seen in Table 7.

Table 7: Plastic Packaging Back of Store Consumption for Consumer Grocery and Non-Grocery Sectors by Format and Resin 2022 (t)

Packaging Format	HDPE	LDPE	PET	PP	Total
Bottle	-	-	-	-	-
Film	374	6,736	-	374	7,485
Other	-	-	-	-	-
Rigids	-	-	49	49	97
Total	374	6,736	49	423	7,582

The total plastic disposed of back of store in 2022 was estimated at 7,582 tonnes. The estimates of stretch wrap POM within the grocery sector (5,293 tonnes) have been confirmed by key stakeholders within New Zealand as being an accurate representation.

2.5.2. Non-Consumer Hospitality POM

Table 8 illustrates the film and rigid tonnages consumed within the non-consumer hospitality sector, broken down by resin as per Valpak's EPIC hospitality dataset and adjusted to represent the New Zealand market.

Milk Excluded from the CRS

The estimated composition of the non-consumer hospitality plastic packaging in New Zealand whereby milk is excluded from the CRS and included in the PPPS is shown below:

Table 8: Non-Consumer Hospitality Plastic Packaging by Format and Resin 2022 (Milk Packaging Included, CRS Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Total
Bottle	2,525	4,624	-	-	42	-	-	-	-	7,192
Film	121	49	1	2,069	503	54	611	406	-	3,813
Other rigid	45	498	34	37	291	9	8	15	-	938
PTT	155	1,519	57	91	1,038	130	26	84	-	3,100
Carton	-	-	-	-	-	-	-	-	265	265
Total	2,846	6,691	92	2,197	1,874	194	645	506	265	15,309

The total plastic flow within the non-consumer hospitality sector in 2022 was estimated at 15,309 tonnes when milk is excluded from the CRS. The predominant plastic type is HDPE with 44%. The dominant packaging type for HDPE is bottles at 69% of which 94% is associated with milk.

Milk Included Within the CRS

The estimated composition of the non-consumer hospitality plastic packaging in New Zealand whereby milk is included within CRS and excluded from the PPPS is shown below:

Table 9: Non-Consumer Hospitality Plastic Packaging by Format and Resin 2022 (Milk and CRS Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Total
Bottle	2,525	276	-	-	42	-	-	-	-	2,844
Film	121	49	1	2,069	503	54	611	406	-	3,813
Other rigid	45	498	34	37	291	9	8	15	-	938
PTT	155	1,519	57	91	1,038	130	26	84	-	3,100
Carton	-	-	-	-	-	-	-	-	139	139
Total	2,846	2,343	92	2,197	1,874	194	645	506	139	10,836

The total plastic flow within the non-consumer hospitality sector in 2022 was estimated at 10,836 tonnes in the instance where milk is included within the CRS and excluded from the PPPS. The predominant plastic type is PET with 26%. The dominant packaging type for PET is bottles at 89%.

2.6. Any Plastic Resin Code in Combination with Any Non-Plastic Material

It is the case that in most, if not all, legislative and voluntary producer responsibility and reporting systems, packaging material type is declared and measured as the predominant material by weight. There are some common examples of 'multi-material' packaging types where the unit would be reported as plastic, and other examples where 'multi-material' packaging is reported as something other than plastic. For example:

- Packaging typically reported as plastic (but is in combination with a non-plastic material) includes:
 - Flexible pouches, that can often contain multiple resin types and an aluminium layer.
 - Seals (not lids) for HDPE milk bottles, which can often contain both paper and aluminium as well as being predominantly plastic.
 - Bags that are given a metalized finish by the application of a very thin layer of aluminium (for example some bags for component parts for electricals, as well as potato chip packets).

In these instances, all packaging of this type will be included in the total plastic POM for New Zealand (UK verification in the case of grocery packaging) as they are included in the relevant definitions within the UK / Europe on which the analysis is based.

- Packaging that includes a plastic layer (lamination) but that is not included in producer responsibility systems as 'plastic', as it is not the predominant material by weight, includes:
 - Liquid Paper Board (LPB) / Food & Beverage Cartons, which are included in this analysis as a separate stream of material placed onto the market.
 - Other paper products for which plastic forms a moisture barrier, such as coffee cups and (cardboard) sandwich skillets and chips tubes (including but certainly not limited to those sold under the 'Pringles' brand).
 - Aluminium drinks cans, for which a very thin plastic layer is applied as a barrier.

Although in European systems these packaging types are considered to belong to the material groups of the predominant constituent (by weight), some jurisdictions have introduced additional categories (for which increased levies, or higher modulated fees, apply) to be able to identify and address the issues that such materials may cause in the waste management system. These levies are typically aligned to the recyclability of the item. So, for example, the thin plastic layer in an aluminium drinks can is not considered to hinder recycling in any way, and therefore is not typically subcategorised (or subject to increased levies) from other aluminium packaging, whereas in the case of paper products (and, for that matter, mixed resin laminated plastic packaging) there are clear guidelines on what is, and is not, considered as being recyclable.

2.6.1. Impact of Paper/Plastic Composite (Laminates) on Recyclability

The CEPI (Confederation of European Paper Industries) have guidelines on how combining paper with other materials affects the recyclability of the item through paper mills. In broad terms across Europe, paper items are considered 'recyclable' so long as the non-target material (plastic) makes up no more than 10% of the total weight of the item and only on one side (allowing for water to wash the fibres in the pulping process). However, it should be noted that this is not the case for fibre processing in New Zealand where more stringent accessibility criteria apply, and for other markets where export requirements will be defined by local acceptance tolerances.

2.6.2. Plastic as a Minority Component of Packaging Made from Other Materials

Plastic has less impact on the recyclability of materials other than paper - this is particularly the case for aluminium as stated. There aren't any wide scale instances of plastics being used in combination with Glass and Steel outside of labels (which wash / burn off in the treatment and recycling process) and other components which are broadly assumed to be separable (for example, a plastic insert that serves as a seal on a steel lid for a glass jar).

2.6.3. Plastic POM (Excluding Paper/Plastic Laminates)

Including such plastic/fibre composite material in the total plastic packaging POM figure would lead to significant inconsistencies when comparing recycling rates both between countries and when considering what might be achievable within New Zealand.

2.6.4. Plastic/Fibre Composite

To provide a sense of scale relating to the use of plastic/fibre composite material, Valpak have produced an indicative quantification of the likely weight of material placed onto the market in New Zealand. Based on UK data and scaled by population, it is believed that c. 5,404 tonnes of fibre composite packaging (excluding LPB beverage cartons) is likely to be placed onto the consumer market in New Zealand annually. Of this total material, it is expected that c. 2,312 tonnes are consumed within the home, and c. 3,092 tonnes outside of the home (on the go). As would likely be expected, it is anticipated that plastic fibre composite makes up only 2% of all paper/cardboard packaging arising in households, and 13% of paper/cardboard packaging arising away from the household (consistent with the use of such materials in takeaway and other 'food on the go' applications).

2.6.4. Plastic in combination with other materials

There are some packaging types whereby plastic is a majority component in combination with other materials – for example blister packs with a paper or aluminium backing. In this instance, the weight of the plastic is included in the total weight of plastic, but the backing is not included within this analysis. In the example of plastic blister packs, these are included in 'PVC other rigid' category.

2.7. Plastic Country Comparison

The following analysis investigates how New Zealand compares to other countries in terms of plastic packaging per head of population, looking at both:

- All plastic packaging placed on the market, AND
- only that packaging that is in scope of the proposed PPPS⁵³

For all packaging the total plastic packaging POM for NZ is:

- All plastic packaging: 171,348t / **32.20 kg per person** (including drinks bottles and milk bottles)
- All household, hospitality, and retail back of store packaging (PPPS scope): 135,592t / **25.48 kg per person** (including drinks bottles and milk bottles)

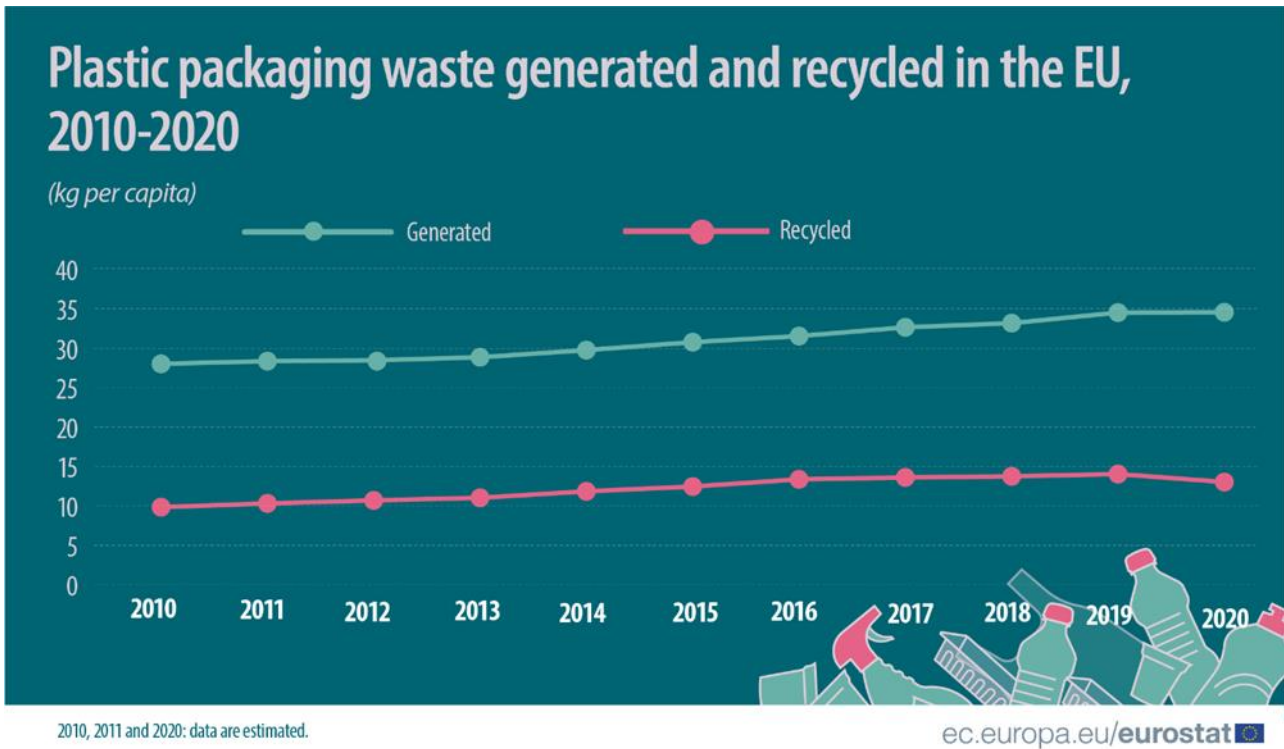
2.7.1. EU Comparison

The EU Eurostat website⁵⁴ describes the total plastic packaging per head of population across the EU to be c.35 kg per person, compared to 32.2kg per person calculated for New Zealand.

⁵³ Some assumptions have been made as to the packaging that is in scope of potential schemes.

⁵⁴ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Packaging_waste_statistics

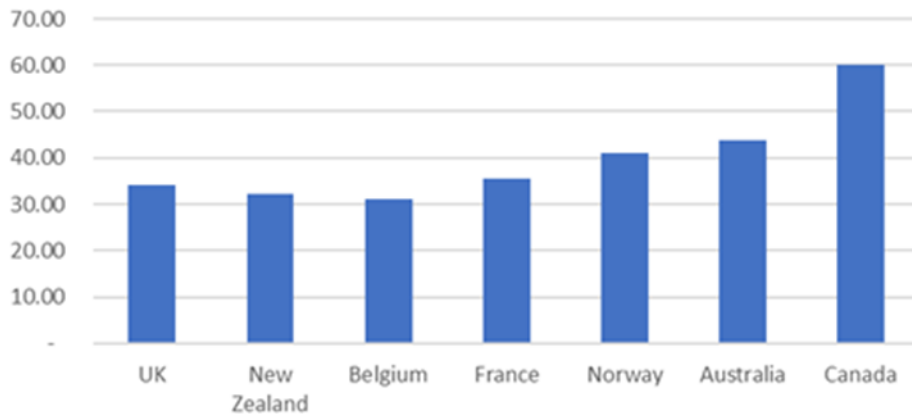
Figure 3: Plastic Packaging Waste Generated and Recycled in the EU 2010-2020⁵⁵



2.7.2. Individual Countries – Total Plastic Packaging Per Person

The below figures illustrate the findings from investigation into specific countries⁵⁶. The figures show the total plastic packaging in terms of kg per person (comparable to NZ at 32.20 kg per person).

Figure 4: Total Plastic Packaging per Country (kg per person)



⁵⁵ Packaging waste statistics - Statistics Explained (europa.eu)

⁵⁶ 1.9 million tonnes of packaging waste in 2020 | Statbel (fgov.be)

<https://www.ecologie.gouv.fr/sites/default/files/Download%20the%20summary%20of%20the%20report.pdf>

<https://norsus.no/wp-content/uploads/Task-1.2-Plastic-packaging-Loss-Mapping-OR2820-1.pdf>

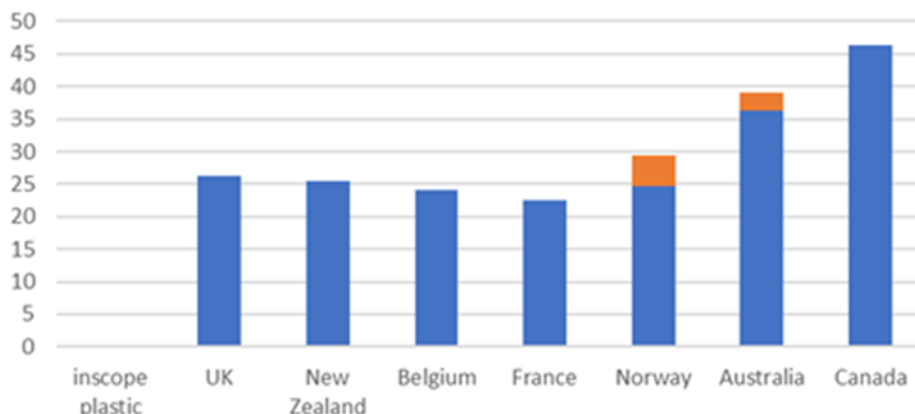
<https://documents.packagingcovenant.org.au/public-documents/Australian%20Packaging%20Consumption%20And%20Recycling%20Data%202019-20>

<https://www.statcan.gc.ca/o1/en/plus/3797-message-bottle-plastic-packaging-waste>

2.7.3. Individual Countries – HH, Hospitality and Retail BoS Plastic Packaging Per Person

Estimates of the packaging under consideration within the PPPS, are shown below, with NZ at **25.48 kg per person**⁵⁷:

Figure 5: Total HH, Hospitality and Retail BoS Plastic Packaging in kg Per Person



2.7.4. Summary

Plastic generated kilograms per person shown within these data sets indicate that the total plastic POM for New Zealand is within the range that would be expected based on comparison with other countries.

2.8. Summary of Plastic Packaging POM

This project’s estimate of plastic packaging POM in New Zealand in 2022 is 135,592 tonnes when milk is excluded from the CRS and included in the PPPS and 122,034 tonnes when Milk is included within the CRS and excluded from the PPPS.

This is made up of a combination of both data collected within New Zealand (grocery) and UK data (non-grocery, back of store and hospitality) scaled to represent New Zealand when New Zealand specific data was not available. The scaling methods consider the population, total spend, and relative purchasing power of the NZD compared to the UK pound.

The estimate of plastic packaging POM in the consumer grocery sector in 2022 is 81,161 tonnes when milk is excluded from the CRS and included in the PPPS and 72,484 tonnes when Milk is included within the CRS and excluded from the PPPS.

The data for the grocery tonnage provided by the FGC was collected via surveys of the food and grocery sector within New Zealand. This data was scaled up to represent 100% of the New Zealand food and grocery market.

The estimate of plastic packaging POM in the consumer non-grocery sector in 2022 is 31,540 tonnes when milk is excluded from the CRS and included in the PPPS and 31,129 tonnes when Milk is included within the CRS and excluded from the PPPS.

The consumer non-grocery sector has been based on tonnages POM within the UK, as reported within the UK PackFlow Covid-19 Report⁵⁸. This data has been scaled to represent the New Zealand market by taking in to account the population, total spend, and relative purchasing power of the NZD compared to the UK pound.

⁵⁷ For Norway and Australia, a minimum and maximum (shown in red) were calculated based on available data and suitable estimates

⁵⁸ <https://wrap.org.uk/resources/report/packflow-covid-19-reports>

Consumer purchasing habits have also been accounted for in the instance of the DIY sector where the average New Zealander spends 202% more than an average UK resident.

The estimate of plastic packaging POM at the back of store within the consumer grocery and non-grocery sector in 2022 is 7,582 tonnes.

For the back of store POM, the UK figures reported within the PackFlow Covid-19 Report⁵⁹ were used as a proxy. To provide an indicative breakdown by resin type, Valpak/Verde internal knowledge was used, resulting in a film split of 90% LDPE, 5% PP and 5% HDPE. For the small volumes of rigid plastics arising at the back of stores, a simple 50:50 split was applied between the two most likely resins of PET and PP⁶⁰.

To scale the UK POM tonnage to represent New Zealand, the UK POM figures for both the grocery and non-grocery back of store were scaled to represent the population of New Zealand.

The estimate of plastic packaging POM in the non-consumer hospitality sector in 2022 is 15,309 tonnes when milk is excluded from the CRS and included in the PPPS and 10,836 tonnes when Milk is included within the CRS and excluded from the PPPS.

Again, due to a lack of available data within New Zealand, UK tonnages have been used as proxy. This data has been scaled to represent the New Zealand market by considering the population, total spend, and relative purchasing power of the NZD compared to the UK pound. The total POM for all sectors (consumer grocery, non-grocery, back of store and hospitality) including CRS material and milk has been estimated at 171,348 tonnes. The packaging type and material breakdown can be seen in Table 10.

Table 10: Total Plastic POM within the Consumer Grocery, Non-Grocery, Back of Store and Non-Consumer Hospitality Sector within New Zealand in 2022 (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Compostable /biodegradable	Total
Bottle	40,339	35,833	11	10	689	92	53	17	-	-	75,409
Film	832	2,575	89	24,130	4,075	318	2,336	542	-	-	34,897
Other rigid	1,196	6,610	608	1,603	12,136	1,774	15,196	37	-	311	39,470
PTT	6,019	1,779	69	96	2,150	4,626	30	90	-	-	16,493
Carton	-	-	-	-	-	-	-	-	5,080	-	5,080
Total	48,387	46,796	777	25,839	19,050	6,809	17,614	686	5,080	311	171,348

Table 11 illustrates the POM tonnes for all sectors (consumer grocery, non-grocery, back of store and hospitality) whereby packaging associated with CRS and milk are excluded.

⁵⁹ <https://wrap.org.uk/resources/report/packflow-covid-19-reports>

⁶⁰ No further data was available to provide a split between PP and PET, therefore 50:50 was used.

Table 11: Total Plastic POM within the Consumer Grocery, Non-Grocery, Back of Store and Non-Consumer Hospitality Sector within New Zealand in 2022 (CRS and Milk Packaging Removed) (t)

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	7:Other	PE	LPB	Compostable /biodegradable	Total
Bottle	8,853	23,761	10	10	678	92	41	16	-	-	31,828
Film	526	2,571	88	24,037	4,048	316	2,311	529	-	-	34,425
Other rigid	1,119	6,569	607	1,589	12,138	1,773	15,194	36	-	311	39,336
PTT	5,576	1,713	67	93	2,060	4,618	30	88	-	-	15,879
Carton	-	-	-	-	-	-	-	-	565	-	565
Total	16,074	34,614	772	25,728	18,924	6,799	17,575	669	565	311	122,032

To improve the granularity of data collected, Valpak recommend the compulsory reporting of materials POM across all sectors handling HH/HH-like packaging. The frequency of this reporting is suggested to be every 6 months in line with advancing expectations placed on obligated businesses in Europe⁶¹.

The indicative total amount of all plastic packaging POM within New Zealand in 2022 (CRS & Milk included, across sectors included within the scope of PPPS and other sectors, for example plastic packaging used in agriculture and commercial and industrial settings) has been estimated at **263,231 tonnes** (see section 6.5).

The total plastic packaging POM for all sectors has been calculated by using the POM estimates for the sectors in scope of this report (consumer grocery, non-grocery, non-consumer BoS and hospitality) and UK data as a proxy for the sectors outside of the scope of this project (C&D, Agriculture, C&I manufacturing & other). The total tonnage estimated for each sector can be found in Table 33 in Appendix III.

⁶¹ <https://www.gov.uk/guidance/packaging-waste-prepare-for-extended-producer-responsibility#what-you-may-need-to-do>

3. Additional Insight

3.1. Household-like Plastic Packaging (Packaging Intended for Use by Citizens Rather Than Business/Industry)

Valpak have undertaken analysis on UK packaging POM to define material that is likely to be disposed of in household waste collections (be that as recycling or as residual waste).

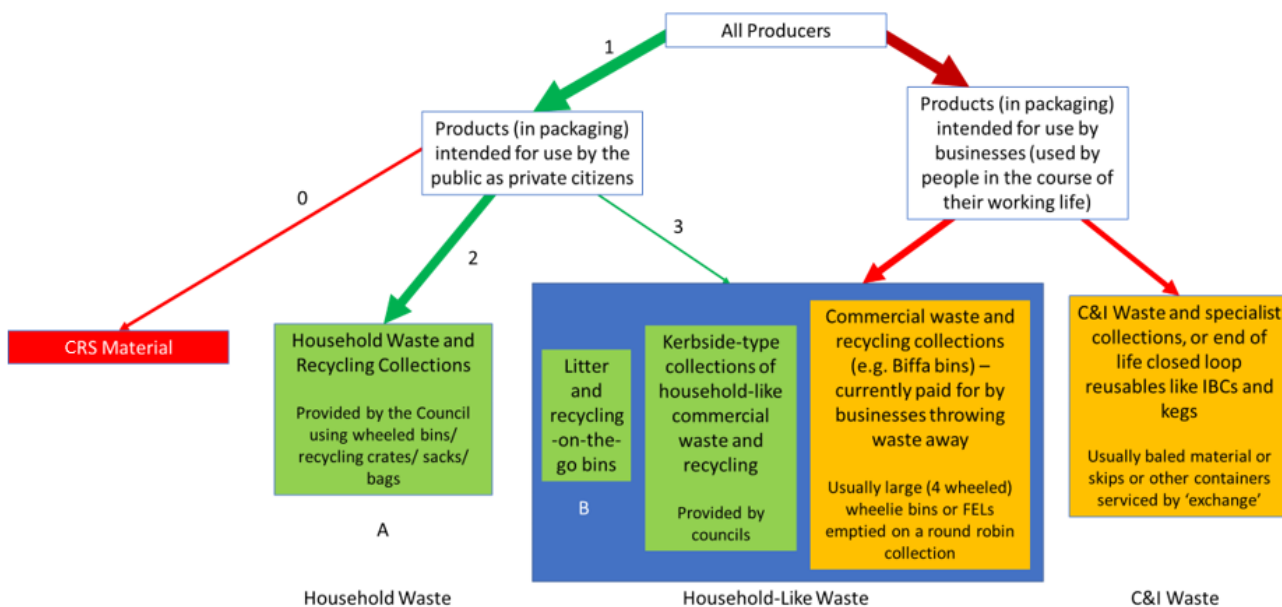
The Household-type Plastic Packaging disposal analysis considers material included within the New Zealand definition of plastic packaging from retail and hospitality but excludes retail back of store for which consumption is assumed to be within commercial waste streams. Within the analysis there is a baseline position and then 2 overarching scenarios:

- Baseline – All plastic packaging including CRS and milk
 - All plastic packaging, excluding CRS
 - All plastic packaging, excluding CRS and Milk

The system diagram for splitting Household-type Plastic Packaging from all plastic is shown in Figure 6 below, where:

- Arrow 0 represents the material that is likely to be included in the CRS systems (relevant for scenario 2)
- Arrow 1 represents all remaining packaging that is or may be intended for household use.
- Arrow 2 represents the proportion of packaging identified in arrow 1 that ends up in the household bin.
- Arrow 3 represents the proportion of packaging identified in arrow 1 that ends up in a household-like commercial waste bin or in litter.

Figure 6: System Diagram for the 'PPPS Packaging' Scenario



3.1.1. Mapping Product Categories to Waste Disposal – Phase 1

The process of mapping retail packaging (not wholesale, unless to hospitality for product resale, or commercial supply) POM to household and household-like waste streams was to first assign a ruleset based on likely disposal location against each of the 2,655 EPIC product categories. These categories were as follows:

- 100% likely disposed of in households (default)
 - These are product categories that are deemed to always be consumed in the home.
- 92.15% disposed of in households
 - This acknowledged that there are some products that are distinctly household in nature, but for which it would not be surprising to see such items in a commercial general waste or recycling bin.
 - 92.15% is used as a proxy as this is the proportion of households to commercial properties, excluding those properties at which there are unlikely to be any employees, such as residential or other buildings registered as businesses due to hosting advertising.
 - This assumption is based on UK ONS data⁶² ⁶³.
- Estimates of split where products are deemed to be consumed away from the household as a matter of course, applying an arbitrary split of:
 - 50% HH, 50% HH-L default.
 - 25% HH, 75% HH-L by exception.
 - 75% HH, 25% HH-L by exception.

These percentages were subject to a sensitivity analysis to define which product categories (and associated assumptions as to point of disposal) had the highest impact on the final split of POM between household and household-like disposal. Categories with the highest impact were included in the consumer engagement exercise detailed below, generating increased levels of accuracy as to the likely disposal point.

3.1.2. Mapping Product Categories to Waste Disposal – Phase2, Consumer Engagement

Valpak identified 23 key product types which were the most sensitive in defining the outcome of the HH and HH-L waste stream split. Just over 2000 UK consumers, selected across all age ranges, demographics and nations within the UK were surveyed for each product type. The question asked of respondents was of the type: “Think about the last time you finished <the product>, where was that <description of relevant packaging> thrown away?”⁶⁴. Questions posed in relation to:

- Small Milk
- Medium Milk
- Large Milk
- Tinned Food
- Multipack Ice Cream
- Large Soft Drink

⁶²

www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/datasets/householdsbyhouseholdsizeofenglandandukconstituentcountries

⁶³ www.gov.uk/government/statistics/non-domestic-rating-stock-of-properties-2020

⁶⁴ For example: Think about the last time you finished a 1-pint bottle of milk, where was that bottle thrown away?

- Large Snacking (Not Singles)
- Deodorant
- Ready Meal
- Cereal
- Spread
- Fruit Packs
- Soft Drink Multipack
- Single Soft Drink
- Snack Multipack
- Single Snack
- Pot Noodle
- Smoking
- Supermarket Sandwich
- Fast Food (Non-Supermarket)
- Takeaway
- Wine
- Beer/Cider

The Response options given were as follows (where required, the language was adapted to best suit the product in question):

- In the bin at my home (into recycling or general waste)
- In the bin at my work (into recycling or general waste)
- Into a litter bin in a public space
- Somewhere else
- I/We don't use this type of product, or I can't remember the last time I/we used this product

Data quality checks were then completed to verify responses.

3.1.3. Results

The conclusions reached in relation to the consumption location (be that a Valpak assumption or data from a consumer survey relating to key packaging items) are detailed in Table 12, Table 13 and Table 14 below. Cells highlighted in green are where proportion of plastic in total makes up more than 5% of the total POM. Those highlighted in yellow make up between 2.5 and 5% of the total footprint and those in red less than 2.5% of the total footprint.

For all plastics, it is calculated that 78% of packaging is consumed in the household. This increases to 81% when film and CRS materials are excluded. To demonstrate the impact of removing plastic PET drinks bottles from the calculation, the total weight of PET bottles (all contents) consumed in the household is 65% when drinks are included, which increases to 78% when they are excluded. This is because plastic drinks bottles have

a higher-than-average (compared to other products delivered in plastic packaging) propensity to be consumed away from the household.

Table 12: UK Baseline Proportion of Material Consumed Within the Household - All Plastic

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	LPB	Total
Bottle	65%	83%	N/A	N/A	91%	N/A	N/A	73%
Other Rigid	65%	100%	82%	95%	88%	32%	N/A	82%
Film	82%	80%	87%	88%	74%	75%	N/A	83%
PTT	78%	87%	86%	66%	85%	68%	N/A	79%
Cartons	N/A	N/A	N/A	N/A	N/A	N/A	86%	86%
Total	70%	85%	85%	89%	82%	59%	86%	78%

Table 13: Proportion of Material Consumed Within the Household - All Plastic Excluding CRS Packaging

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	LPB	Total
Bottle	78%	83%	N/A	N/A	91%	N/A	N/A	82%
Other Rigid	65%	100%	82%	95%	88%	32%	N/A	82%
Film	82%	80%	87%	88%	74%	75%	N/A	83%
PTT	78%	87%	86%	66%	85%	68%	N/A	79%
Cartons	N/A	N/A	N/A	N/A	N/A	N/A	86%	86%
Total	78%	85%	85%	89%	82%	59%	86%	82%

Table 14: Proportion of Material Consumed Within the Household - All Plastic Excluding CRS Materials and Milk

Packaging Format	1:PET	2:HDPE	3:PVC	4:LDPE	5:PP	6:PS	LPB	Total
Bottle	78%	N/A	N/A	N/A	91%	N/A	N/A	80%
Other Rigid	65%	100%	82%	95%	88%	32%	N/A	82%
Film	82%	80%	87%	88%	74%	75%	N/A	83%
PTT	78%	87%	86%	66%	85%	68%	N/A	79%
Cartons	N/A	N/A	N/A	N/A	N/A	N/A	86%	86%
Total	78%	93%	85%	89%	82%	59%	86%	81%

3.2. Use of Complex Laminates and Non-Collected Materials

As a part of this project, Valpak have undertaken an analysis of the UK plastic packaging materials placed onto the market to give an indication of the proportion of the total that is recyclable, due to the packaging being:

- A single resin material or Liquid beverage cartons.
- A collected resin type:
 - PE (LDPE and HDPE)
 - PET
 - PP

3.2.1. Scenario 1 – All Household and Household Like Materials Excluding Retail Back of Store

This scenario considers all packaging that is designed for use by the consumer through retail and hospitality, including drinks containers (included in a CRS) and milk. The table below (Table 15) shows the proportion of the total plastic footprint split by format type and by recyclability (defined as being constructed of a single, collected, resin – excluding some barrier layers such as EVOH). The final column indicates the proportion of the format type that is multi material / not collected / not recyclable.

Table 15: Proportion of All Household Packaging that is Recyclable / Not Recyclable

Packaging Format	Single Collected Resin	Multi Material/ Not Collected/ Not Recyclable	% Of Packaging Format That Is Multi Material/ Not Collected/ Not Recyclable
Carrier Bags	0.2%	0.0%	0.0%
Flexible Films	14.5%	6.6%	31.4%
Liquid Beverage Cartons	2.7%	0.0%	0.0%
Other (inc. tubes)	0.0%	12.2%	100.0%
PTT	16.9%	2.7%	13.7%
Rigid Bottles	44.0%	0.3%	0.6%
Total	78.2%	21.8%	

As an example, what this means is that 16.9% of plastic POM is pots, tubs and trays that are single resin and collected for recycling and can get recycled in the waste management process. Furthermore, 2.7% of plastic POM is pots, tubs and trays that are either not single resin and/or (or 'therefore are') multi-material, not collected and/or not recyclable. Within the category of 'pots tubs and trays', it is believed that 13.7% (2.7% out of 16.9%) are multi-material, not collected and/or not recyclable.

It should be noted that, in the analysis, Liquid Beverage Cartons are assumed to be recyclable. This is based on the Alliance for Beverage Cartons and the Environment (ACE⁶⁵) assertion of recyclability, however it should be noted that, even in instances where such packaging is deemed to be 'recycled' (for example it is sent to a specialist plant or accepted within a mixed fibre grade), it is not usually the case that the plastic element is recycled as the target within such processes is the fibre.

⁶⁵ <https://www.beveragecarton.eu/>

3.2.2. Scenario 2 – Household and Household Like Materials Excluding Drinks Containers and Retail Back of Store

This scenario repeats the analysis in scenario 1 but excludes drinks containers likely to be included in a CRS (but still includes milk).

Table 16: Proportion of Household Packaging Excluding CRS Material that is Recyclable / Not Recyclable.

Packaging Format	Single Collected Resin	Multi Material/ Not Collected/ Not Recyclable	% Of Packaging Format That Is Multi Material/ Not Collected / Not Recyclable
Carrier Bags	0.2%	0.0%	0.0%
Flexible Films	17.7%	8.1%	31.4%
Liquid Beverage Cartons	3.3%	0.0%	0.0%
Other (inc. Tubes)	0.0%	14.9%	100.0%
PTT	20.8%	3.3%	13.7%
Rigid Bottles	31.4%	0.2%	0.6%
Total	73.5%	26.5%	

Given that drinks bottles have a higher propensity to be recycled than most, if not all, other plastic packaging, the total proportion of packaging that is a single collected resin is lower in this scenario when these bottles are removed from the analysis.

3.2.3. Retail Back of Store

Retail Back of Store material is all (or extremely close to all) recyclable, in that it is made up predominantly of LDPE film and a small proportion of plastic shelf ready packaging (single resin trays).

3.3. Caps and Closures

Within New Zealand, a standardised consistent kerbside collection service for recycled waste in urban areas commences in February 2024. This [standard materials for kerbside collections notice](#) excludes all lids, caps, and tops (excluding tethered) including larger lids, triggers, or pumps from the collections⁶⁶.

Using the assumption that the composition of packaging placed on to the market is similar within the UK and New Zealand, Valpak have undertaken analysis on the UK packaging POM to calculate the percentage that caps, and closures make of the total plastic tonnage POM within the consumer and hospitality sector.

3.3.1. Methodology

Product SKUs stored within the EPIC database have been broken down to a product component level and annual purchases/sales for products having a cap or closure have been identified.

Consumer Grocery Retail

Using market share information from Kantar World Panel for the supermarkets, the sample represented 43% of the UK grocery retail market by sales value between 2012 and 2021.

⁶⁶ <https://environment.govt.nz/assets/Publications/Files/recommendations-for-standardisation-of-kerbside-collections-in-Aotearoa.pdf>

Once the data was extracted and checked, the resulting quantity of caps and closures were scaled up based on market share to represent the full UK grocery retail sector. This method assumes that the profile of packaging of the supermarkets in the EPIC database is representative of those retailers not included in the sample.

Non-Grocery Retail

Simply scaling up using market share was not considered robust, since it was likely that packaging usage within the non-grocery sector differed to the grocery sector. The same scaling method outlined in section 2.2.2 has been used.

The method used assumes the packaging profile of those retailers within the sample is representative of those not in the sample and that turnover is a suitable scaling factor for packaging usage.

Hospitality

As with the grocery and non-grocery sectors, the methodology used for scaling the hospitality sector has been explained within section 2.4.4.

3.3.2. Results

The results show the percentage that caps and closures makeup of the total POM tonnages for the scenarios where milk products are excluded from the CRS and where milk products are included within the CRS

Milk Excluded from the CRS

The estimated weight associated with caps and closures POM whereby milk products are excluded from the CRS and therefore included within the POM estimates can be seen in Table 17.

Table 17: % Weight Associated with Caps and Closures of the Total POM (CRS Packaging Removed) (t)

Market Sector	Caps and Closures as % of Weight of Total Plastic POM	Caps and Closures (t)
Consumer Grocery	7.7%	6,243
Consumer Non-Grocery	6.1%	1,937
Non-Consumer Hospitality	8.4%	1,287

Milk Included Within the CRS

The estimated weight of associated with caps and closures POM where milk products are included in the CRS and therefore excluded within the POM estimates can be seen in Table 18.

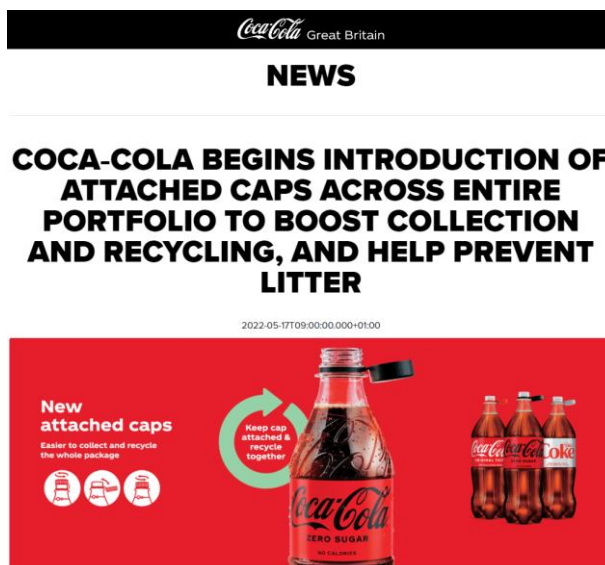
Table 18: % Weight Associated with Caps and Closures of the Total POM (Milk and CRS Packaging Removed) (t)

Market Sector	% of Caps and Closures of Total Plastic POM	Caps and Closures (t)
Consumer Grocery	7.8%	5,676
Consumer Non-Grocery	5.9%	1,831
Non-Consumer Hospitality	10.6%	1,149

Valpak recommends the inclusion of caps and closures within the standard materials for kerbside collections as

the associated weight will contribute to any collection targets set as well as creating a more simplistic kerbside recycling scenario for the public to follow. This is very much aligned to activity elsewhere, where emerging EU regulation states that caps must soon be tethered to bottles for both anti-littering and recycling purposes⁶⁷, albeit whilst this is a sign of the more general direction of travel elsewhere in the world toward collecting caps on bottles, it is noted that tethered caps will be permitted in consistent kerbside collections in New Zealand.

Figure 7: Cap tethering by Coca-Cola



⁶⁷ <https://www.coca-cola.co.uk/our-business/media-centre/coca-cola-attached-caps-great-britain>

4. Collection and Recycling of Plastic Packaging

4.1. Current Plastic Recycling Collection Routes

4.1.1 Overview of Current Recycling Collection Options

A wide variety of recycling collection options is provided across New Zealand, including kerbside collections; drop-off; post-back; commercial collections; municipal and commercial transfer stations, community recycling centres and resource recovery centres.

Kerbside collections tend to typically be concentrated in urban areas due to the inefficiency of providing regular collection services to all households in remote rural areas. Thus, urban authorities tend to offer kerbside collections to most of their residents, more rural authorities may only provide kerbside collections in urban locations, and very rural authorities may not provide any kerbside collections at all. *Please note that this will change with the introduction of national kerbside collection materials under the Standard Materials for Kerbside Collections Notice 2023.*

Some authorities provide their kerbside residual waste and recycling collections for no additional charge, as part of general rate payments, some charge for residual waste but provide recycling collections for no additional charge, and some charge for both. Charges may vary by bin size, or pre-paid bags may be used.

In addition to services provided by municipal authorities (via contractors), commercial waste companies provide residual waste and recycling collection services directly to domestic properties for a charge, sometimes in areas or authorities where there are no municipally provided kerbside collections, but often as a top-up or alternative to municipal collections. Thus, households that generate large amounts of waste and recycling can pay to have this collected. Some authorities offer reductions to rates to households or business premises that opt out of municipal collections.

Some authorities provide collection of commercial waste, either as part of rates paid by commercial properties, or for an additional charge. Where commercial waste collections are provided as part of rates, a set of bins are provided that are the same as provided for households, with additional waste requiring the provision of further municipal or commercial bins, for which there is a charge. The intention is to provide collection for employee-generated waste rather than for general commercial waste (i.e., 'household-like' waste).

Drop-off points are available at major retail stores for post-consumer soft plastics, with 80% of the population now within 20km of a drop-off location. A courier service is also available to pick up pre-paid courier bags of soft plastics.

There is an extensive network of municipal and commercial transfer stations, community recycling centres and municipal and commercial resource recovery centres that accept kerbside-type materials as well as a wider variety of recyclable materials. These are particularly important for communities without kerbside services, and they also provide additional capacity and accept more materials than those with kerbside services. Commercial transfer stations, resource recovery centres and some municipal transfer stations charge for the deposit of materials. Community-run resource recovery centres operate successfully across New Zealand, often as part of the Zero Waste Network Aotearoa, and achieve impressive diversion rates via manual sorting. Some of these also provide kerbside services, commercial collections, or recycling at events.

A Container Return Scheme (CRS) has been proposed, where beverage containers will have a refundable deposit applied within the purchase price, which will be refunded when the empty containers are returned to a designated drop-off point for recycling. This will increase recycling of these containers and may affect consumption patterns. It will also divert these containers from kerbside recycling collections.

4.1.2. Kerbside Recycling Collections

At present, there is a multitude of collection configurations among kerbside recycling collections in New Zealand. Much of this complexity will be reduced with the move to standardised provision under the New Zealand government's *Transforming Recycling* initiative. This initiative aims to:

- Make materials collected from households for recycling the same across New Zealand from February 2024.
- Ensure kerbside recycling services are provided to households in urban areas (i.e., towns of 1000 people or more) by 2027.
- Make food scraps collection services available to households in all urban areas by 2030.

This standardised collection scheme will make it easier to understand what can and can't be recycled, and an additional 200,000 people will have access to a kerbside recycling service by 2027, both of which will boost recycling considerably.

The materials that must be collected at the kerbside from February 2024 are:

- Plastic bottles and containers marked with recycling symbols 1, 2, and 5
- Paper and cardboard (including pizza boxes)
- Aluminium and steel tins and cans
- Glass bottles and jars.
 - (Territorial authorities that currently collect recycling but do not collect glass will have until 2027)

Only these materials will be allowed to be collected at the kerbside, so authorities that collect additional materials will need to change this.

Table 19 below summarises current kerbside recycling collections, indicating the type of recycling collection and the plastic resin types collected across the 67 territorial authorities in New Zealand.

- **Separate collections** mean the recycling materials are either separated by householders into different containers or they are sorted by recycling operatives at the kerbside. The operatives deposit the materials into different bays on the recycling vehicle. Generally, cans and plastic containers are collected together and sorted in a 'mini-MRF' at the recycling transfer station/depot, into plastic, steel, and aluminium streams. Separation by resin type would generally be carried out at a plastic processor or a Materials Recycling Facility (MRF) rather than at the mini-MRF. 16 authorities (24%) operate separate collections.
 - **Glass only:** One authority (1.5%) currently collects only glass in recycling at the kerbside.
- **Commingled collections** mean materials are collected together in a container and are not sorted at the kerbside but are collected in the same vehicle compartment for sorting at a MRF. The commingled materials are paper, card, cans and plastic containers and may or may not also include glass:
 - **Commingled, glass included:** indicates that glass is included in the commingled mix. 9 authorities (13%) have these collections.
 - **Commingled, glass separate:** indicates that glass is collected as a separate stream and deposited into a different compartment on the same vehicle as the commingled collections, or it is collected in a different vehicle. 34 authorities (51%) have these collections.
 - **Commingled, glass excluded:** indicates that glass is not included in the commingled mix and is not collected separately. 2 authorities (3%) have these collections, and another authority (1.5%) excludes glass from its commingled mix but collects glass separately in one township.

As stated above, all territorial authorities must collect plastic bottles and containers of resin types 1, 2 and 5 from 1 February 2024, and glass bottles and jars from 2027, as well as collecting paper and cardboard, and aluminium and steel tins and cans, so some of these collections will need to change.

To provide context, Table 19 also indicates the number of households and population in each authority, the population density (population per square km) and an indication of the urban/rural nature of the authority, based on its population density. These bands are to inform later analysis and are merely indicative: some predominantly rural authorities will have urban centres and likewise some predominantly urban authorities will have significant rural areas.

Table 19: Kerbside Recycling Collections and Demographics (Territorial Authorities in Alphabetical Order)

Territorial Authority	Population	Households	Pop. Density	Urban-Rural	Recycling Collection Type ⁶⁸	Plastics Currently Collected ⁶⁹
Ashburton	36,300	15,355	5.9	Semi-rural	Commingled, glass separate	1, 2, 5
Auckland	1,695,200	562,256	343.1	Urban	Commingled, glass included	1-7
Buller	9,730	5,504	1.2	Rural	Commingled, glass separate	1-7
Carterton	10,250	4,441	8.7	Semi-rural	Commingled, glass separate	1, 2, 5
Central Hawke's Bay	15,950	7,200	4.8	Semi-rural	Separate	1, 2, 5
Central Otago	25,500	12,448	2.6	Rural	Commingled, glass separate	1, 2, 5
Chatham Islands	800	360	1.0	Rural	No collections	N/A
Christchurch	389,300	160,026	274.9	Urban	Commingled, glass included	1, 2, 5
Clutha	18,650	8,969	2.9	Rural	Commingled, glass excluded	1, 2, 5
Dunedin	130,400	54,140	39.7	Urban	Commingled, glass separate	1, 2, 5
Far North	73,800	30,790	11.0	Semi-rural	Separate	1, 2, 5
Gisborne	52,100	18,806	6.2	Semi-rural	Separate	1, 2, 5
Gore	13,000	5,719	10.4	Semi-rural	Only glass	None
Grey	14,200	6,537	4.1	Rural	Commingled, glass included	1-7
Hamilton	179,900	62,218	1,635.5	Urban	Commingled, glass separate	1-5
Hastings	90,600	31,680	17.3	Urban	Separate	1, 2, 5
Hauraki	22,200	9,717	17.5	Urban	Commingled, glass separate	1, 2
Horowhenua	37,000	16,395	34.8	Urban	Commingled, glass separate	1, 2, 5
Hurunui	13,700	6,993	1.6	Rural	Commingled, glass excluded	1, 2, 5
Hutt	112,500	40,412	299.2	Urban	Commingled, glass separate	1, 2, 5
Invercargill	56,800	23,520	145.6	Urban	Commingled, glass included	1-7
Kaikōura	4,160	2,220	2.0	Rural	Separate	1, 2, 5
Kaipara	27,200	13,176	8.8	Semi-rural	Commingled, glass included	1, 2, 5
Kāpiti Coast	57,600	26,010	78.7	Urban	Private (Commingled, glass separate)	1, 2, 5
Kawerau	7,760	2,844	323.3	Urban	Separate	1, 2
Mackenzie	5,460	4,007	0.8	Rural	Commingled, glass separate	1, 2, 5
Manawatu	33,900	12,933	12.8	Semi-rural	Commingled, glass separate	1-7
Marlborough	51,900	26,000	5.0	Semi-rural	Separate	1-7
Masterton	29,000	11,769	12.6	Semi-rural	Commingled, glass separate	1, 2, 5
Matamata-Piako	37,100	14,407	21.1	Urban	Commingled, glass separate	1, 2, 5
Napier	66,800	25,928	636.2	Urban	Separate	1, 2, 5
Nelson	54,500	22,338	129.2	Urban	Commingled, glass separate	1, 2, 5

⁶⁸ If a recycling service is already in place, glass bottles and jars must be collected from 2027.

⁶⁹ Plastic resin types 1, 2 and 5 must be collected from February 2024.

Territorial Authority	Popula- tion	House- holds	Pop. Density	Urban- Rural	Recycling Collection Type ⁶⁸	Plastics Currently Collected ⁶⁹
New Plymouth	87,700	35,220	39.8	Urban	Commingled, glass separate	1, 2, 5
Ōpōtiki	10,500	4,230	3.4	Rural	Separate	1-7
Ōtorohanga	10,850	4,432	5.4	Semi-rural	Separate	1, 2, 5
Palmerston North	90,400	33,421	228.9	Urban	Commingled, glass separate	1-7
Porirua	61,600	19,604	352.0	Urban	Commingled, glass separate	1, 2, 5
Queenstown Lakes	49,500	22,252	5.7	Semi-rural	Commingled, glass separate	1, 2, 5 (1: clear bottles only)
Rangitīkei	16,100	6,702	3.6	Rural	No collections	N/A
Rotorua Lakes	76,800	30,700	31.9	Urban	Commingled, glass separate	1, 2, 5
Ruapehu	13,000	7,011	1.9	Rural	Separate	1, 2, 5
Selwyn	79,300	29,173	12.4	Semi-rural	Commingled, glass included	1, 2, 5
South Taranaki	29,600	11,955	8.3	Semi-rural	Commingled, glass separate	1, 2, 5
South Waikato	25,900	9,792	14.2	Semi-rural	Commingled, glass separate	1, 2, 5
South Wairarapa	11,750	6,131	4.9	Semi-rural	Commingled, glass separate	1, 2, 5
Southland	32,600	15,640	1.1	Rural	Commingled, glass included	1-7
Stratford	10,150	4,190	4.7	Semi-rural	Commingled, glass separate	1, 2, 5
Tararua	19,050	8,084	4.4	Rural	Commingled, glass separate	1, 2, 3, 5
Tasman	58,700	24,125	6.1	Semi-rural	Commingled, glass separate	1, 2, 5
Taupō	41,400	21,779	6.5	Semi-rural	Separate	1, 2, 5
Tauranga	158,300	61,547	1,172.6	Urban	Commingled, glass separate	1, 2, 5
Thames-Coromandel	33,700	28,500	15.3	Semi-rural	Commingled, glass separate	1, 2, 5
Timaru	48,500	21,559	17.8	Urban	Commingled, glass separate	1, 2, 5
Upper Hutt	47,700	17,457	88.3	Urban	Private (Commingled, glass separate)	1, 2, 5
Waikato	88,900	30,548	20.2	Urban	Separate	1, 2, 5
Waimakariri	67,900	26,810	30.6	Urban	Commingled, glass included	1, 2, 5
Waimate	8,320	4,893	2.3	Rural	Commingled, glass separate	1, 2, 5
Waipa	60,500	23,212	41.2	Urban	Commingled, glass separate	1, 2, 5
Wairoa	9,190	4,113	2.3	Rural	Separate	1, 2, 5
Waitaki	24,000	11,769	3.4	Rural	Private (Commingled, glass included)?	Unknown
Waitomo	9,670	4,273	2.7	Rural	Separate	1, 2, 5
Wellington	213,100	88,941	734.8	Urban	Commingled, glass separate	1, 2, 5
Western Bay of Plenty	59,700	23,858	30.6	Urban	Commingled, glass separate	1, 2
Westland	8,820	4,985	0.8	Rural	Commingled, glass excluded	1, 2, 5
Whakatāne	38,300	16,000	8.6	Semi-rural	Commingled, glass separate	1, 2, 5
Whanganui	48,700	20,429	20.5	Urban	Private (Commingled, glass separate)	1-7
Whangarei	100,500	39,164	37.1	Urban	Separate	1, 2, 5

Currently, out of the 67 territorial authorities in New Zealand:

- Two authorities (3%) do not have any kerbside collections: Chatham Islands and Rangitikei.
 - Chatham Islands will be exempt from this standardisation initiative as its total population is less than the 1,000 (in a town) that would mandate collections.
- Two authorities (3%) do not currently commission kerbside recycling collections and the kerbside service is provided by commercial companies without municipal contracts.
- Two authorities (3%) (Clutha and Westland) currently provide a kerbside collection service but do not accept glass; another (Hurunui) (1.5%) provides separate glass collections in one township only; and one other (1.5%) (Tararua) introduced glass collections in its urban areas in 2022. Westland indicated in a survey response that they will start to collect glass in February 2024.
- One territorial authority (1.5%) (Gore) only accepts glass in its kerbside recycling.

In terms of plastic resin types accepted:

- 47 (70%) already accept resin types 1, 2 and 5 only.
- 20 (30%) do not accept types 1, 2 and 5, or they accept a wider range of resins; each of these authorities (except Chatham Islands) will need to modify their collections to match the standard:
 - 12 (18%) already accept resin types 1, 2 and 5 plus other types:
 - 10 of these (15%) accept all resin types 1-7.
 - 1 (1.5%) accepts type 3 and 4 as well as 1, 2 and 5.
 - 1 (1.5%) accepts type 3 as well as 1, 2 and 5.
 - 1 (1.5%) only accepts clear plastic bottles for type 1 (PET), alongside types 2 and 5.
 - 3 (4.5%) only accept resin types 1 and 2 and will need to add type 5 from February 2024.
 - 1 (1.5%) does not accept any plastic in its kerbside collections; it only accepts glass.
 - 2 (3%) indicated in survey responses that they do not commission collections; however, one of these indicated that types 1, 2 and 5 are accepted by the commercial services in its area and it will be implementing a council-funded kerbside collection of standardised materials as specified.
 - 2 (3%) do not have any kerbside collections.

Table 20 below provides a list of kerbside recycling collection contractors and also MRF operators and their locations for commingled collections. Unknown/ unverified information is marked with a '?'. N/A indicates either no collections or that no MRF is used, as materials are collected separately.

To assist with identifying regional MRF infrastructure utilised by each authority, this table lists authorities in regional order, from north to south, with authorities listed alphabetically within regions. Authorities that are split across regions are listed within their majority region. Unitary authorities are included within the appropriate geographic region.

Table 20: Kerbside Recycling Collections, Contractors, MRF Operators and Locations (in Regional Order) in June 2023

Island	Region	Territorial Authority	Recycling Collection Type	Plastics Currently Collected ⁷⁰	Recycling Collection Contractors	MRF Operator	MRF Location
North Island	Northland	Far North	Separate	1, 2, 5	Northland Waste, Waste Management	Visy	Auckland
		Kaipara	Commingled, glass included	1, 2, 5	Kaipara Refuse	Kaipara Refuse	Ruawai
		Whangarei	Separate	1, 2, 5	Northland Waste	Visy	Auckland
	Auckland	Auckland	Commingled, glass included	1-7	Smart Environmental, JJ Richards, EnviroNZ. Changing to Northern Environmental, Green Gorilla and Waste Management in 2023/24.	Visy	Auckland
	Waikato	Hamilton	Commingled, glass separate	1-5	EnviroNZ	EnviroNZ	Hamilton
		Hauraki	Commingled, glass separate	1, 2	Waste Management	Smart Environmental	Kopu
		Matamata-Piako	Commingled, glass separate	1, 2, 5	Smart Environmental	Smart Environmental	Kopu
		Ōtorohanga	Separate	1, 2, 5	EnviroNZ	EnviroNZ	Hamilton
		South Waikato	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	Hamilton
		Taupō	Separate	1, 2, 5	EnviroNZ	EnviroNZ	Hamilton
		Thames-Coromandel	Commingled, glass separate	1, 2, 5	Smart Environmental (Waste Management from Sep 2023)	Smart Environmental	Kopu
		Waikato	Separate	1, 2, 5	Green Gorilla	Visy	Auckland
		Waipa	Commingled, glass separate	1, 2, 5	Metallic Sweeping	Metallic Sweeping	Te Awamutu, Waipa
Waitomo		Separate	1, 2, 5	EnviroNZ	EnviroNZ	Hamilton	
Bay of Plenty	Kawerau	Separate	1, 2	Waste Management	Waste Management	Tauranga	
	Ōpōtiki	Separate	1-7	Handee Can Services?	N/A	N/A	

⁷⁰ Plastic resin types 1, 2 and 5 must be collected from February 2024.

Island	Region	Territorial Authority	Recycling Collection Type	Plastics Currently Collected ⁷⁰	Recycling Collection Contractors	MRF Operator	MRF Location
		Rotorua Lakes	Commingled, glass separate	1, 2, 5	Smart Environmental	Smart Environmental	Kopu
		Tauranga	Commingled, glass separate	1, 2, 5	EnviroNZ	Waste Management	Tauranga
		Western Bay of Plenty	Commingled, glass separate	1, 2	EnviroNZ	Waste Management	Tauranga
		Whakatāne	Commingled, glass separate	1, 2, 5	Waste Management	Waste Management	Tauranga
	Gisborne	Gisborne	Separate	1, 2, 5	Waste Management	Waste Management	Tauranga
	Hawke's Bay	Central Hawke's Bay	Separate	1, 2, 5	Smart Environmental	Smart Environmental	Kopu, Masterton
		Hastings	Separate	1, 2, 5	Smart Environmental	Smart Environmental	Kopu, Masterton
		Napier	Separate	1, 2, 5	Smart Environmental	Smart Environmental	Kopu, Masterton
		Wairoa	Separate	1, 2, 5	Smart Environmental	Smart Environmental	Kopu, Masterton
	Taranaki	New Plymouth	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	New Plymouth
		South Taranaki	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	New Plymouth
		Stratford	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	New Plymouth
	Manawatū-Whanganui	Horowhenua	Commingled, glass separate	1, 2, 5	Northland Waste	Smart Environmental	Masterton
		Manawatu	Commingled, glass separate	1-7	Smart Environmental	Smart Environmental	Manawatū
		Palmerston North	Commingled, glass separate	1-7	Palmerston North City Council	Palmerston North City Council	Awapuni, Palmerston North
		Rangitīkei	No collections	N/A	N/A	N/A	N/A
		Ruapehu	Separate	1, 2, 5	EnviroNZ	EnviroNZ	?
		Tararua	Commingled, glass separate	1, 2, 3, 5	Smart Environmental	Smart Environmental	Masterton
		Whanganui	Private (Commingled, glass separate)	1-7	No council-funded collections (public drop-off only)	Palmerston North City Council	Awapuni, Palmerston North
	Wellington	Carterton	Commingled, glass separate	1, 2, 5	Smart Environmental	Smart Environmental	Masterton
Hutt		Commingled, glass separate	1, 2, 5	Waste Management	OJI	Wellington	

Island	Region	Territorial Authority	Recycling Collection Type	Plastics Currently Collected ⁷⁰	Recycling Collection Contractors	MRF Operator	MRF Location
		Kāpiti Coast	Private (Commingled, glass separate)	1, 2, 5	Private collections only, via Northland Waste, Waste Management, Lucy's Bins, EnviroNZ	OJI	Wellington
		Masterton	Commingled, glass separate	1, 2, 5	Smart Environmental	Smart Environmental	Masterton
		Porirua	Commingled, glass separate	1, 2, 5	Waste Management	OJI	Wellington
		South Wairarapa	Commingled, glass separate	1, 2, 5	Smart Environmental	Smart Environmental	Masterton
		Upper Hutt	Private (Commingled, glass separate)	1, 2, 5	Private collections only, via Waste Management, Low Cost Bins and EnviroNZ	OJI	Wellington
		Wellington	Commingled, glass separate	1, 2, 5	EnviroNZ	OJI	Wellington
South Island	Tasman	Tasman	Commingled, glass separate	1, 2, 5	Smart Environmental	Smart Environmental	Richmond
	Nelson	Nelson	Commingled, glass separate	1, 2, 5	Nelmac	Smart Environmental	Richmond
	Marlborough	Marlborough	Separate	1-7	Metallic Sweeping (Waste Management from 2024)	Waste Management from 2024	Blenheim
	West Coast	Buller	Commingled, glass separate	1-7	Smart Environmental	Smart Environmental	Westland Greymouth
		Grey	Commingled, glass included	1-7	Smart Environmental	Smart Environmental	Westland Greymouth
		Westland	Commingled, glass excluded	1, 2, 5	EnviroNZ	EnviroNZ	Timaru
	Canterbury	Ashburton	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	Timaru
		Christchurch	Commingled, glass included	1, 2, 5	Waste Management	EcoCentral	Christchurch
		Hurunui	Commingled, glass excluded	1, 2, 5	Waste Control NZ	EcoCentral	Christchurch
		Kaikōura	Separate	1, 2, 5	Innovative Waste Kaikoura	N/A	N/A
		Mackenzie	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	Timaru
		Selwyn	Commingled, glass included	1, 2, 5	Waste Management	EcoCentral	Christchurch
Timaru		Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	Timaru	
Waimakariri	Commingled, glass included	1, 2, 5	Waste Management	EcoCentral	Christchurch		

Island	Region	Territorial Authority	Recycling Collection Type	Plastics Currently Collected ⁷⁰	Recycling Collection Contractors	MRF Operator	MRF Location
		Waimate	Commingled, glass separate	1, 2, 5	EnviroNZ	EnviroNZ	Timaru
		Waitaki	Private (Commingled, glass included)?	N/A	Private collections only, via Waste Management, WasteCo	Waitiki Resource Trust	Waitiki Resource Recovery Park
	Otago	Central Otago	Commingled, glass separate	1, 2, 5	All Waste; EnviroNZ as of 1 July 23	EnviroNZ	Timaru
		Clutha	Commingled, glass excluded	1, 2, 5	WasteCo	OJI	Dunedin
		Dunedin	Commingled, glass separate	1, 2, 5	EnviroNZ	OJI	Dunedin
		Queenstown Lakes	Commingled, glass separate	1, 2, 5 (1: clear bottles only)	Waste Management	Waste Management	Queenstown
	Southland	Gore	Only glass	None	Lions Club	N/A	N/A
		Invercargill	Commingled, glass included	1-7	Bond Contracts	Recycle South	Invercargill
		Southland	Commingled, glass included	1-7	Bond Contracts	Recycle South	Invercargill
Chatham Islands	Chatham Islands	No collections	N/A	N/A	N/A	N/A	

4.1.3. Survey of Territorial Authorities

Initial interviews were held with relevant members of the Technical Advisory Group to understand the New Zealand municipal and commercial recycling collection context, to help inform this report section. Following these interviews, questionnaire surveys were formulated to obtain more granular information from territorial authorities on their recycling services, routes used for sorting of recyclate and reprocessing of plastic, and to obtain tonnage information. The survey was sent to all 67 territorial authorities, with follow-up emails to increase participation.

Out of 67 authorities, 26 surveys were returned, representing 39% of authorities, covering 70% of the population and 68% of households. Between them, they covered:

- 37% of authorities in North Island and
- 42% of those in South Island
- 43% of designated 'urban' authorities,
- 43% of 'semi-rural' authorities and
- 28% of 'rural' authorities
- 33% of authorities collecting commingled with glass included,
- 41% of authorities collecting commingled with glass separate,
- 67% of authorities collecting commingled with glass excluded and
- 25% of authorities collecting recycling in separate streams

The respondents were felt to provide reasonably good coverage of these variables, although a higher number of responses from authorities would have been very beneficial, particularly for rural authorities and those collecting recycling separately.

Responses helped inform this report section and an analysis of responses is provided over the next pages.

Table 21 provides an overview of recycling and residual waste services operated in each authority that returned the survey. It shows:

- Recycling collection type
- Plastics resin types collected
- Recycling collection frequency and container(s)
- Residual waste frequency and containers
- Whether residual waste and recycling collections are charged
- Other recycling services provided in the authority area

Table 21: Recycling and Residual Waste Services: Survey Responses (Territorial Authorities in Alphabetical Order)

Territorial Authority	Recycling Collection Type and Plastics Collected	Recycling Collection Frequency & Container(s)	Residual Waste Frequency & Container	Is Residual Waste Charged? Is Recycling Charged?	Other Recycling Services
Auckland	Commingled, glass included 1-7	Fortnightly 240 litre wheeled bin	Weekly 120 litre wheeled bin/ varies	Varies by area Yes	11 community recycling centres and 15 commercial transfer stations. Not all commercial transfer stations will accept plastic for recycling.
Central Hawke's Bay	Separate 1, 2, 5	Weekly 60 litre crate for plastics & cans 60 litre crate for cardboard & paper 45 litre crate for glass	Weekly Pre-paid bags	Yes (pre-paid bags) Yes	Free recycling drop-off centres at transfer stations. Free recycling trailers for rural areas.
Christchurch	Commingled, glass included 1, 2, 5	Fortnightly 240 litre wheeled bin	Fortnightly 140 litre wheeled bin	Yes (Waste Minimisation Rate) Included in refuse fee	Transfer stations and recycling centres Proportion of Inner City are not charged waste levy and do not have a wheelie bin collection but can purchase 50 litre rubbish and recycling bags, collected outside the property. Rubbish collected nightly and recycling weekly. Some properties on Banks Peninsula do not receive a kerbside collection but have access to community collection points, which provide a rubbish and recycling service.
Dunedin	Commingled, glass separate 1, 2, 5	Fortnightly 80-240 litre bin (commingled) 45 litre crate for glass	Weekly Pre-paid bags	Yes (pre-paid bags) Yes	Street PPR (public places recycling) bins (approx. 94), six CBD and tertiary area recycling hubs, rural collection facilities, including two rural transfer stations. Also, two BP stations have glass and commingled recycling bins, emptied by a council contractor. Green Island - transfer station, resource recovery/recycling drop off and re-use store (accepts polystyrene).
Hamilton	Commingled, glass separate 1-5	Fortnightly 240 litre wheeled bin (commingled) 45 litre crate for glass	Fortnightly 120 litre wheeled bin	Fixed rate Yes, part of fixed rate	Transfer station: council contract operator (EnviroWaste) and other major waste solution provider
Hurunui	Commingled, glass excluded 1, 2, 5	Weekly Pre-paid bags	Weekly Pre-paid bags	Yes (pre-paid bags) Yes	5 transfer stations and 24/7 recycling bins in 7 locations.

Territorial Authority	Recycling Collection Type and Plastics Collected	Recycling Collection Frequency & Container(s)	Residual Waste Frequency & Container	Is Residual Waste Charged? Is Recycling Charged?	Other Recycling Services
Marlborough	Separate 1-7	Weekly 55 litre crate for mixed recycling	Weekly Pre-paid bags	Yes (pre-paid bags) Yes, included in waste fee	7 Transfer stations 4 reuse centres 1 repurposing centre 1 resource recovery centre 12 rural community recycling sites 1 hazardous waste centre
Matamata-Piako	Commingled, glass separate 1, 2, 5	Fortnightly 240 litre wheeled bin (commingled), 45 litre crate for glass	Weekly Pre-paid bags	Yes (pre-paid bags) Part of targeted rate for waste	3 refuse transfer stations
Nelson	Commingled, glass separate 1, 2, 5	Fortnightly 240 or 120 litre wheeled bin (commingled) Crate for glass	Weekly Pre-paid bags/ bins	Private service No charge	Free drop off for recyclables at the Nelson waste Recovery centre. 7-day operation
Queenstown Lakes	Commingled, glass separate 1, 2, 5 (1: clear bottles only)	Fortnightly (each container alternate weeks) 240 litre wheeled bin (commingled) 140 litre wheeled bin for glass	Weekly 140 litre wheeled bin	No charge No charge	2 x transfer stations 6 x bottle banks 1 x MRF
Rangitikei	No collections N/A	N/A	N/A	N/A	There are six waste transfer stations across the District which provide 'sorted' recycling services.
Rotorua Lakes	Commingled, glass separate 1, 2, 5	Fortnightly 240 litre wheeled bin (commingled) 45 litre crate for glass	Weekly 140 litre wheeled bin	Yes Yes	Rural Drop off Sites, City Recycling Centre and 1 x Transfer Station (run by Rotorua Lakes)
Selwyn	Commingled, glass included 1, 2, 5	Fortnightly 240 litre wheeled bin	Weekly 80 or 240 litre wheeled bin, or pre-paid 60 litre bags	Yes Yes	Recycling stations located in remote areas (takes the same type of material as kerbside bins), Agrecovery chemical container drop-off located at resource recovery park, Battery recycling drop-off points located around the district.

Territorial Authority	Recycling Collection Type and Plastics Collected	Recycling Collection Frequency & Container(s)	Residual Waste Frequency & Container	Is Residual Waste Charged? Is Recycling Charged?	Other Recycling Services
					Resource recovery park accepts a wide variety of items for recycling, including polystyrene.
South Taranaki	Commingled, glass separate 1, 2, 5	Weekly 140 litre wheeled bin (commingled) 60 litre crate (glass)	Weekly 120 litre wheeled bins	Yes Yes Targeted rate for all eligible properties	7 transfer stations 3 x 24-hour recycling stations accept commingled recycling and glass
Stratford	Commingled, glass separate 1, 2, 5	Fortnightly (each container alternate weeks) 240 litre wheeled bin (commingled) 60 litre crate for glass	Weekly 120 litre wheeled bin	Yes Yes	Transfer station, countdown collects soft plastics, Farm source has take back schemes for silage wrap, Agrecovery takes large agrichemical containers at cost
Taupō		Weekly 60 litre crates (commingled and glass)	Weekly Sacks/ bags	No charge No charge	6 transfer stations
Tauranga	Commingled, glass separate 1, 2, 5	Fortnightly (each container alternate weeks) 240 litre wheeled bin (commingled) 45 litre crate for glass	Fortnightly 140 litre wheeled bin	Yes Yes	Transfer station
Thames-Coromandel	Commingled, glass separate 1, 2, 5	Fortnightly (each container alternate weeks) 240 litre wheeled bin (commingled) 45 litre crate for glass	Weekly Pre-paid bags	Yes (pre-paid bags) Part of the Solid Waste rating costs	Soft Plastics recycling is available in the main centres of our district (Whitianga, Whangamata, Thames, Tairua) There are public place recycling bins 7 Transfer Stations (Whitianga, Matarangi, Coromandel Town, Thames, Whangamata, Pauanui and Tairua). Community run recovery centres (Seagull Centre, The Goldmine etc)
Upper Hutt	Private (Commingled, glass separate) 1, 2, 5	N/A	N/A	N/A	Recycling station accepts plastics #1,2,5, steel & aluminium cans, glass, paper/cardboard

Territorial Authority	Recycling Collection Type and Plastics Collected	Recycling Collection Frequency & Container(s)	Residual Waste Frequency & Container	Is Residual Waste Charged? Is Recycling Charged?	Other Recycling Services
Waimate	Commingled, glass separate 1, 2, 5	Fortnightly commingled weekly glass 240 litre wheeled bin (commingled) 45 litre crate for glass	Fortnightly 140 litre wheeled bin	Yes Yes	Rural residents are provided with rural recycling drop off stations. Transfer Station to accept recycled materials.
Waipa	Commingled, glass separate 1, 2, 5	Fortnightly commingled monthly glass 240 litre wheeled bin (commingled) 140 litre wheeled bin for glass	Varies (private service) Varies (private service)	Private service Yes	There are 2 privately owned transfer stations that accept recycling under their terms (small financial charge).
Waitaki	Private (Commingled, glass included)? N/A	N/A	N/A	N/A	4 council transfer station, 3 council recycling drop off points, private recycling centre
Wellington	Commingled, glass separate	Fortnightly (each container alternate weeks) 140 litre wheeled bin (commingled) 45 litre crate for glass	Weekly 50 litre pre-paid rubbish bags	Yes (pre-paid bags) No charge for recycling	The Tip Shop includes a recycle centre which accepts commingled recycling. Sustainability Trust in central Wellington accepts some items but not commingled recycling or plastic, except lids
Westland	Commingled, glass excluded 1, 2, 5	Fortnightly 240 litre wheeled bin	Fortnightly 120 litre wheeled bin	Yes Yes	7 rural transfer stations One transfer station offers additional services such as a re-use shop, e-waste and Agrecovery. Public recycling stations (glass, cardboard/paper, plastic & tins) have not been successful due to high contamination rates
Whakatāne	Commingled, glass separate 1, 2	Fortnightly 240 litre wheeled bin (commingled) 45 or 60 litre crate for glass	Weekly 80 litre wheeled bin	Yes Yes	Transfer stations accept free drop offs of recycling – paper, cardboard, tins, cans, plastics 1 and 2, tyres, metals, green waste
Whangarei	Separate 1, 2, 5	Weekly 60 litre crate for plastic and metal 45 litre crate for glass paper/card separate	Weekly Pre-paid bags	Yes (pre-paid bags) Funded by rates and waste levy	Council transfer stations and takeback schemes provided by retailers

* Fortnightly for each container, which are collected in alternate weeks

4.1.4. Analysis of Results from Authority Surveys

The survey requested tonnage data from each territorial authority, where available. From the 26 authorities that returned the survey:

- 10 (38%) provided kerbside recycling tonnages (for all materials)
- 11 (42%) provided non-kerbside recycling tonnages
- 4 (15%) provided MRF recycling tonnages
- 8 (31%) provided total recycling tonnages

These were not necessarily the same authorities: some authorities were able to provide kerbside tonnages but not non-kerbside tonnages, and vice versa. Of the 19 authorities that returned the survey that collect commingled at the kerbside, only 3 (16%) were able to provide tonnages sent for MRF processing.

For *plastic* tonnage data, of the 26 authorities that returned the survey:

- 5 (19%) provided kerbside plastic tonnages
- 6 (23%) provided non-kerbside plastic tonnages
- 4 (15%) provided MRF plastic (output) tonnages
- 8 (31%) provided total plastic recycling tonnages

Some authorities were able to provide kerbside plastic tonnages but not non-kerbside plastic tonnages, and vice versa. Fewer authorities provided plastic tonnages than provided total tonnages for all materials.

From survey responses, the low provision of tonnage data by territorial authorities was for various reasons:

- They didn't collect the data,
- They didn't have access to their contractor's data, or
- The recycling service was not provided under a municipal contract.

Due to the sparsity of data returns, only limited analyses could be performed. Table 22 provides an analysis of the tonnage data. It is presented in kg per household per year to allow comparison between authorities. The columns headed 'Kerbside (with service)*' show kg per household provided with the service per year, as kerbside services are often not provided to all households within a territorial authority area. The first set of columns provides analyses for overall dry recycling and the second set for plastic recycling only. Within each set of columns, data is provided for recycling at the kerbside, at non-kerbside locations, processed in a MRF and in total for the authority. Note that the totals columns show the averages/ minima/ maxima of the total recycling data supplied by authorities in that group; these totals are not the sum of the components shown in this table, as some authorities provided some components and not others, or only totals.

The table provides the count of data provided for this variable to indicate the data availability and gaps, and the maximum, average and minimum in kg per household per year, to indicate the overall range.

The analysis by urban, semi-rural and rural authorities indicates that urban authorities tend to collect more recycling at the kerbside per household than semi-rural and rural authorities, even when considering the number of households provided with the service rather than overall households in the area. Not surprisingly, non-kerbside collections are higher in semi-rural and rural areas, which tend to have lower provision of kerbside services.

Analysis by kerbside recycling collection type indicates that commingled with glass included collects higher amounts than commingled with collected glass separately or excluded, which in turn collect higher amounts than separate collections. However, this does not factor in losses at MRFs or subsequent processing; kerbside-separated collections tend to collect higher quality materials with lower levels of non-target materials and other

contamination, as they are rejected by collection operatives at the kerbside. Glass-in collections will obviously have higher yields than glass-out collections, due to the significant weight of glass.

Analysis was also made by residual waste frequency, with fortnightly residual waste collections having higher recycling yields than weekly residual waste collections. This is to be expected, as householders tend to need to recycle more of their waste to not exceed bin capacity for fortnightly residual collections.

An attempt was also made to analyse by recycling collection frequency and by bin sizes or bin volumes per week, but the data was too sparse to obtain an informative analysis.

Table 22: Analysis of Recycling Collected and Processed in Surveyed Authorities, kg/household/year

	Total Recycling					Plastic Recycling				
	Kerbside	Kerbside (With Service)*	Non-Kerbside	MRF	Total**	Kerbside	Kerbside (With Service)*	Non-Kerbside	MRF	Total**
Summary										
Count of Authorities Providing This Data Field	10	10	11	4	8	5	5	6	4	8
Maximum	162	162	148	171	249	12	12	11	18	12
Average	74	84	36	89	132	8	8	3	12	9
Minimum	37	59	0.4	16	16	3	3	0.1	8	5
Urban-Rural										
Urban	102	103	33	132	155	9	9	2	10	10
Semi-Rural	67	79	44	74	145	4	5	1		6
Rural	48	66	70	16	16			11	18	
Kerbside Recycling Collection										
Commingled, Glass Included	162	162	9	171	171	9	9	0.4	11	9
Commingled, Glass Separate	70	77	37	84	145	10	11	6	8	11
Commingled, Glass Excluded	47	73								
Separate	37	64	110		147	3	3	4		7
Residual Waste Frequency										
Fortnightly	82	91	5	171	120	10	10	6	10	10
Weekly	67	79	37	84	145	7	8	2	12	8

* The 'Kerbside (with service)**' columns show kg per household provided with the service per year, as kerbside services are often not provided to all households within a territorial authority area.

** Note that the Totals columns show the averages/ minima/ maxima of the total recycling data supplied by authorities in that group; these totals are not the sum of the components shown in this table, as some authorities provided some components and not others, or only totals.

It has not been possible to analyse plastic tonnages or yields in kg/hh/yr from territorial authorities by resin type due to the lack of data returned in the surveys. MRF contractors generally do not provide territorial authorities with a breakdown of outputs by resin type, either overall for the MRF or pro-rata for their materials.

Similarly, it was not possible to provide a quantitative or qualitative assessment of the different routes of material collections and rank them by efficiency. However, it is known from experiences in other countries that kerbside collections have higher yields in kg/hh/yr than other forms of collection of packaging materials such as drop off or post-back: the convenience of a regular kerbside service leads to higher volumes of materials.

The position in New Zealand would benefit significantly (as has been the case in other countries) from having mandatory data reporting requirements to understand waste and recycling flows. This is currently planned for household waste and recycling collections: from July 2024, all private waste companies that provide regular household waste collections will need to record tonnes of residual waste, recycling, food, and garden waste

collected, and contamination rates. From late 2025, they will need to report these figures to the Ministry for the Environment. Territorial authorities will need to record and report this data from 2024. For New Zealand to be able to monitor the effectiveness of its recycling collection, sorting and reprocessing infrastructure, this data should be reported by material type and within plastics by resin type.

4.2. Current Material Recovery Facilities

4.2.1. Introduction

Once waste is collected from the kerbside, it is taken to Material Recovery Facilities (MRFs) for sorting, baling and further transport (e.g., for reprocessing or export). Material that goes to a MRF may be sorted at the kerbside (kerbside sort) or brought in as mixed recycling comprising of a mixture of materials and plastic resins (commingled).

4.2.2. Methodology

Initial Scoping

Preliminary secondary research was performed to gain a broad overview of the availability of information on MRFs online. Initial research suggested that there was little information on the number of MRFs across New Zealand or that it was difficult to access. Particularly, information on which MRFs accepted waste from which district was not readily available on websites belonging to the MRF operators.

Stakeholder Survey

To gain a clearer picture of the flow of waste across New Zealand, it was necessary to understand the inputs and outputs both to and from MRFs. This information was not readily accessible online, due to many MRF operators considering the information as commercially sensitive. Therefore, a survey was compiled and sent to stakeholders, including MRF operators and members of various trade associations. The survey questions sought to understand:

- Which districts sent waste to which MRFs
- Throughput and capacity of each MRF (tonnes).
- Breakdown of recycling tonnage by material (i.e., plastic, paper) and resin type (i.e., PET, HDPE etc.).
- Relative scale / Market share of the MRF or MRF operator.
- Any planned or recently occurred improvements to MRFs, e.g., new technologies or machines for sorting.

This information was intended to be used in compilation from as many MRFs as possible, with the intention to use market share to scale-up to full market, to account for any gaps in the data. Using market share would also allow for the aggregation of data, to provide a waste flow which was as accurate as reasonably possible while preserving the anonymity of individual MRF operators. In this way, more responses would increase the accuracy of the final data, while decreasing the likelihood that data from any one contributor could be determined.

Initial responses to the survey were limited, with only four MRF operators responding. Additionally, responses only covered a small number of MRFs across the country.

Information on MRF tonnage and market share was provided, in addition to material and resin breakdown, thus enabling an approximate estimation of total plastic packaging processed through all MRFs in New Zealand.

Secondary Research

Due to the limited number of survey responses, more in-depth secondary research was performed to find more

publicly available data on which districts sent waste to which MRFs. Instead of using the previous top-down approach (i.e., searching for information on MRF inputs via the MRF operator), a bottom-up approach was used which involved systematically investigating publications from each district council of New Zealand for information on the name and location of the MRF receiving that district’s waste.

Total Plastic Packaging Recovered by MRFs

Due to the limited information gathered from survey responses, total plastic packaging recovered by MRFs was estimated using contamination and losses data from a single MRF operator, in addition to the market share of this MRF.

The known output tonnages for a large MRF were used to scale up to the total output tonnages of all MRFs in New Zealand, using their known market share. Then, using an industry-verified figure for average contamination and losses across MRFs in New Zealand, the approximate MRF inputs were back-calculated. This enabled the calculation of an approximate figure for the total input of plastic packaging; however, this number only includes plastic packaging consisting of resins 1,2 and 5 (PET, HDPE, and PP).

4.2.3. Results

Survey Results

Survey responses yielded some information on the location of inputs for a small number of MRFs. The survey also provided indication of tonnage of waste processed through several MRFs in addition to their estimated market share. This information enabled an approximate estimation to be calculated of the total tonnage of waste collected by MRFs across New Zealand.

Total Plastic Packaging Recovered

Total MRF output of plastic packaging tonnages were scaled up using known output data from a single MRF. By applying a known market share percentage and back-calculating from outputs to inputs using an industry-verified loss percentage, it was estimated that 21,630 tonnes of plastic packaging were recovered by MRFs (resins 1, 2 and 5 only).

Publicly available information

As mentioned previously, secondary research was the main tool used to gain access to publicly available information about MRF location and inputs. Not all MRF input locations were identified, however all the South Island’s districts were covered and most of the North Island. In some cases (particularly more rural areas), a district’s waste is sent to several different MRFs based on proximity or function or may be processed through a ‘Resource Recovery Centre’. 26 MRFs or Resource Recovery Centres were identified, along with the locations of waste inputs. This information is summarised in Table 23.

Table 23: MRF Operator Names, MRF Locations and the Location of Inputs.

Company Name	MRF Location	MRF Inputs
Earthcare Environmental	Masterton, Masterton District	Masterton District
		Napier (25%)
EcoCentral	Christchurch	Christchurch
		Waimakariri District
		Hurunui District
		Selwyn District
		Other
EnviroNZ	Redruth, Timaru District	Timaru District
		Ashburton District
		Mackenzie District

Company Name	MRF Location	MRF Inputs
		Waimate District
		Hokitika (Westland District)
		Central Otago District
	Hamilton	Hamilton
	New Plymouth, New Plymouth District	New Plymouth District
		South Taranaki District
Stratford District		
Green Gorilla	Onehunga, Auckland	Auckland
Innovative Waste Kaikōura	Kaikōura, Kaikōura District	Kaikōura District
MetroWaste	Huntly, Waikato District	Waikato District
		Napier (75%)
OJI	Wellington	Wellington
		Kapiti Coast District
		Lower Hutt District
		Porirua
	Dunedin	Dunedin
		Clutha District
Palmerston North City Council	Awapuni Resource Recovery Park, Palmerston North	Palmerston North
Recycle South	Invercargill, Southland District	Invercargill
		Southland District
		Gore District
Smart Environmental	Kopu, Thames Coromandel District	Thames Coromandel District
	Greymouth, Grey District	Grey District
		North Westland (Westland District)
	Nelson, Tasman District	Nelson
		Tasman District
Westport, Buller District (Small MRF)	Buller District	
Fielding, Manawatū District (Small MRF)	Manawatū District	
Visy Recycling	Onehunga, Auckland	Auckland
		Whangarei District
		Commercial
Waitaki Resource Recovery Park	Oamaru, Waitaki District	Waitaki District
Waste Management NZ	Queenstown, Queenstown Lakes District	Queenstown Lakes District
	Northland	Unknown
	Whakatane	Unknown
	Hamilton District	Unknown
	Tauranga	Tauranga District
Waste Services Marlborough Ltd	Marlborough	Marlborough District
Xtreme Zero Waste	Raglan, Waikato District	Waikato District

4.3. MRF Export Calculations

Export tonnages were estimated using survey data provided by a large MRF operator.

4.3.1. Calculation Methodology

A large MRF operator, representing a significant fraction of the total market, provided output data for tonnages of plastic resins 1, 2 & 5 (PET, HDPE, and PP). Additionally, they also provided the fraction of each resin that was exported.

The export percentages were applied to output tonnages to calculate the total amount of each resin that was exported from the MRF. Due to the fact these were plastics collected by a MRF, it was assumed that most of this plastic was household and household-like plastic packaging, consisting of PET, HDPE, and PP.

Using an approximate market share provided by the MRF operator, the plastic packaging exports from the MRF were scaled up to represent all plastic packaging exported from New Zealand.

4.3.2. Results

The full market scaled export figure for plastic packaging waste (using 2022 data) was calculated as 16,159 tonnes. Important to note is that this estimate only includes resins 1, 2 and 5, so the actual number may be higher if any packaging is exported comprising other resin types, though this number may be small.

4.4. Current Recycling in New Zealand⁷¹

4.4.1. Introduction

This section considers the nature and capacity of New Zealand's reprocessing operations, aiming to provide a figure for overall reprocessing and how much can be attributed to plastic packaging. The below covers how figures were obtained, our findings regarding reprocessing operations and a discussion of the section's findings.

4.4.2. Methodology

Preliminary scoping, surveying, interviews, and secondary research were all utilised to calculate the total reprocessing tonnage within New Zealand. Having varying amounts of success within each methodology, the data obtained is the result of a conglomerative approach.

Scoping

Scoping was conducted in preparation for surveys, to identify and map reprocessors recycling appreciable tonnages, inform survey questions and identify potential survey candidates. Using this methodology to determine potential available data, it preceded the subsequent decision to collect data via survey, considering little publicly available data. Key items of interest were:

- Tonnages processed, to deem the size and importance of the recycler.
- Location, to achieve an early sense of geographic relevance of reprocessing operations.
- Resins processed, to assess how reprocessing operations might be structured around certain resin types.

Surveys

Following discussions with representatives of the PPPS, contactable and relevant reprocessors were selected, and survey questions were drafted. The scoping methodology was used to define any gaps in knowledge and

⁷¹ As of June 2023

thus inform the questions drafted. Of the 12 reprocessors discussed in this report, nine were deemed to be contactable and processing tonnages worthy of more detailed investigation, of which five responded.

Questions on the survey covered:

- Location and number of facilities.
- Current throughput and capacity at the given facilities.
- An estimated market share of plastic reprocessing activities by resin.
- Input and output tonnages per annum by resin.
- Processes and technologies used.
- Destinations of output streams.
- Planned modifications to facilities.
- Alterations to input streams.
- Anticipated changes in market demand for resin types reprocessed.

Interviews

Interviews with stakeholders were conducted to reinforce findings where appropriate. This was to aid any remaining data gaps left after conducting the surveys and build relationships with other parts of New Zealand's waste industry.

Interviews conducted focused on qualitative information, allowing for broader trends to be established in the context of the quantitative data we had received from surveys.

Secondary Research

Secondary research was employed to supplement the information gathered within the surveys and interviews and fill any remaining data gaps. This methodology was used extensively alongside interviews to offer a full picture of New Zealand's reprocessing activities.

Calculations

Where sufficient or detailed data sets were lacking, samples and scaling techniques were used to calculate estimates for New Zealand's total-reprocessing operations. The calculations that were used are below.

- **Tonnages split by resin.** Resin splits were often hard to identify and thus by using a sample of a large reprocessor processing the relevant resin types, resin splits across reprocessing activities were achieved by calculating a resin percentage split of said reprocessor's operations and extrapolating this to other reprocessors with less detailed data.
- **Tonnages split into a post-consumer plastic packaging figure.** The post-consumer split was achieved mainly via data supplied by reprocessors in the survey. In certain cases, an average was used to supply a PCR split where one could not be established using raw data alone.
- **Tonnages split into a non-consumer plastic packaging figure.** In the case of a non-consumer plastic packaging split, our identified post-consumer split was used as a backdrop to establish a non-consumer plastic packaging figure based on the percentage of non-consumer plastic packaging reported by the UK Covid-19 Packflow report⁵⁹.
- **Total plastic packaging figure.** Utilising the results of the above calculations, an overall figure for plastic packaging recycled was concluded.

4.4.3. Findings

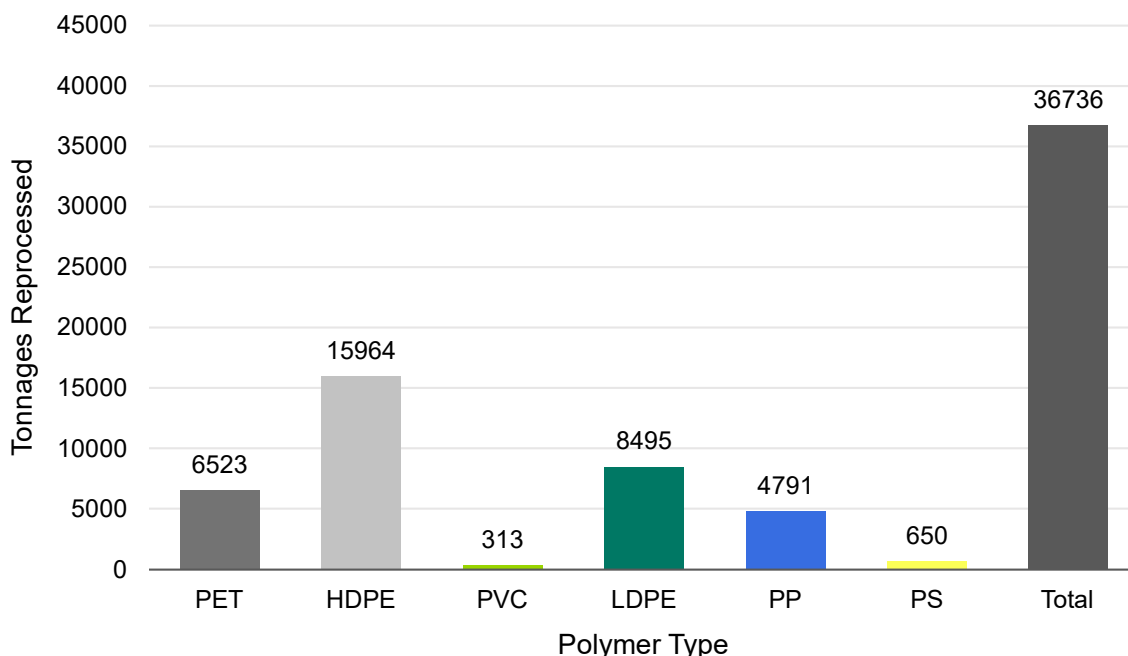
This section covers what can be concluded about total plastic recycling activities in New Zealand. Table 24 details the reprocessors covered by this project and their locations. Although, due to time and data constraints, this table may omit reprocessors that were un-contactable during this project.

Table 24: Reprocessors and Location

Operator	Location
Aotearoa NZ Made (formerly Budget Plastics)	Palmerston North
Comspec Ltd	Christchurch
Expol	Cromwell Although other facilities are noted as 'nationwide'
Future Post	Waiuku Additional South Island facility
Marley	Unknown
Pact Group	Auckland and Wellington
Polymer Processing Ltd	Unknown
Replas	Auckland
Save Board	Hamilton
Solo Plastics	Auckland
TC Transcontinental	Christchurch
Waipak NZ	Hastings

Figure 8 shows all plastic recycled in New Zealand, broken down by resin.

Figure 8: Resins Processed in New Zealand (t)^{72,73}



⁷² PVC figure taken from [Recycling - Marley](#)

⁷³ PS figure taken from [EXPOL | Polystyrene Recycling Snapshot](#)

Figure 8 above collates the total tonnages processed by reprocessors identified in Table 24 to display resin types processed by tonnage, finding a total of 36,736 tonnes reprocessed in New Zealand across resin types 1-6. As described above, certain resin tonnages were completed using calculations and estimates. The most reprocessed resins being HDPE, LDPE, PET, and PP in that order.

4.4.4. Discussion

From available data, this report finds that at least 36,736 tonnes of plastic are reprocessed domestically in New Zealand. 28,954 tonnes of this figure can be attributed to plastic packaging, 15,080 tonnes of said figure is post-consumer plastic packaging and 13,874 tonnes being attributed to non-consumer plastic packaging.

Highlights

- HDPE is the most reprocessed resin in New Zealand by volume.
- PP reprocessing has increased significantly since 2020.

Process Losses

It is important to note New Zealand's estimated process losses as reported by a primary stakeholder. New Zealand's most reprocessed resin types are PET, HDPE, LDPE and PP, their loss rates estimated to stand at 28%, 20%, 30% and 30% respectively. These rates could have had a significant effect on reported tonnages recycled in New Zealand. This could be seen as a signal that additional funding aimed at increasing yield from MRFs and reprocessors may result in the achievement of higher recycling rates without increasing collection.

The Data Challenge

Low reporting rates due to unregulated private and local authority waste management industry entities make coherent and comprehensive data difficult to obtain. This is compounded by many key stakeholders in the industry being private enterprises, thus data being released or shared is often considered to be a breach of commercial sensitivity. Difficulty in reaching reprocessors was also a prevalent issue during this study, leaving much of the research in this section to be concluded by secondary sources, interviews, and calculations. New Zealand would benefit from the implementation of electronic waste transfer notes and/or a system not dissimilar from the National Waste Packaging Database, a digital platform for waste reporting in the UK. This would provide New Zealand with a tool to analyse its data more effectively.

4.5. New Recycling Capacity

Altogether, from discussions with key stakeholders and data gathered from reprocessors, opportunities to expand domestic recycling capacity amount to 15,900 tonnes. It is hard to establish accurate time frames for these expansions due to the diverse sources of the data; some expansions are set to happen within the next one or two years and some longer projects may take multiple years.

However, it is assumed that these expansions will occur within the next five years. The expansions accounted for by the above figure are as follows:

- Plastic innovation fund projects, those specifically affecting Marley and Comspec through the Waste Management and Aliaxis coalition⁷⁴ as well as the Plastics Innovation Fund Recycle South project concerning the recycling of agricultural plastics⁷⁵.
- Future enhancements in operational capacity of surveyed reprocessors.

Although this report was unable to establish tonnages for the following activities, it also finds evidence for:

⁷⁴ [Recycling - Marley](#)

⁷⁵ [Waste Investments \(shinyapps.io\)](#)

- Expansions into the recycling of coloured PET.
- The potential for chemical recycling of Polyolefins with feasibility studies underway⁷⁶.
- More general PP recycling increases considering its newly publicised recyclability⁷⁷.

4.6. Demand for Products

According to survey respondents, interviewed stakeholders and secondary research, demand for reprocessed plastic resins in New Zealand are expected to be affected by the following:

4.6.1. Resin specialisation

- A shift to a simplified recycling system that focuses on particular resins is imminent, as New Zealand currently lacks a large complex infrastructure able to deal with large and constant quantities of plastic waste diverse in resin variation – hindering its recycling capacity. Such a shift could lead to higher demand for resin types 1, 2 and 5, as reprocessors attempt to further concentrate operations on these resins in response to assumed and increased usage of the identified resin types⁷⁸.
- Specialisations such as this could affect identified smaller reprocessors with operations geared at processing mixed aggregate, with previously reprocessed resin types subsequently not being collected, going to landfill/export or simply being phased out.

4.6.2. Decreases in Export

- New Zealand has experienced an overall decrease in plastics exported in previous years and onshore reprocessing activities have increased as a result.
- A trend in decreasing exports is expected to follow as arguments for the ban of plastic exports have recently reached headlines⁷⁹, alongside an argument made via survey response that suggests reprocessing activities in New Zealand would benefit from such a ban. If this sentiment is widely held in the industry, domestic reprocessing activities would be expected to increase to match growing distaste for plastic exports.

4.6.3. Recycled Quantity Quotas

- It has been suggested that government enforced recycled quantity quotas would make New Zealand's recycled resin market competitive with other nations by increasing demand for products with recycled content. Although without authorised approval assuring the presence of Non-Intentionally Added Substances (NIAS) is either minimal or won't impact human health this issue should be treated with caution. NIAS can be common in food packaging made with recycled content, potentially having detrimental effects on human health⁸⁰.

4.7. Heat Map for Plastic Packaging Collected, Processed, Disposed

As discussed in Section 4.2, a mixture of primary and secondary research was used to determine MRF locations and inputs. Using this data, a map was generated of MRF locations across New Zealand, and the location of their inputs. This map is shown in Figure 9 and is as accurate as reasonably possible given the available information. MRFs are indicated in their general location by a small building with a recycling symbol. Arrows pointing towards a MRF indicate that a district's waste is sent to that MRF from the district indicated. Where no arrow is pointing towards a MRF symbol, this indicates that the information could not be located or sufficiently verified.

⁷⁶ [Projects | Licella](#)

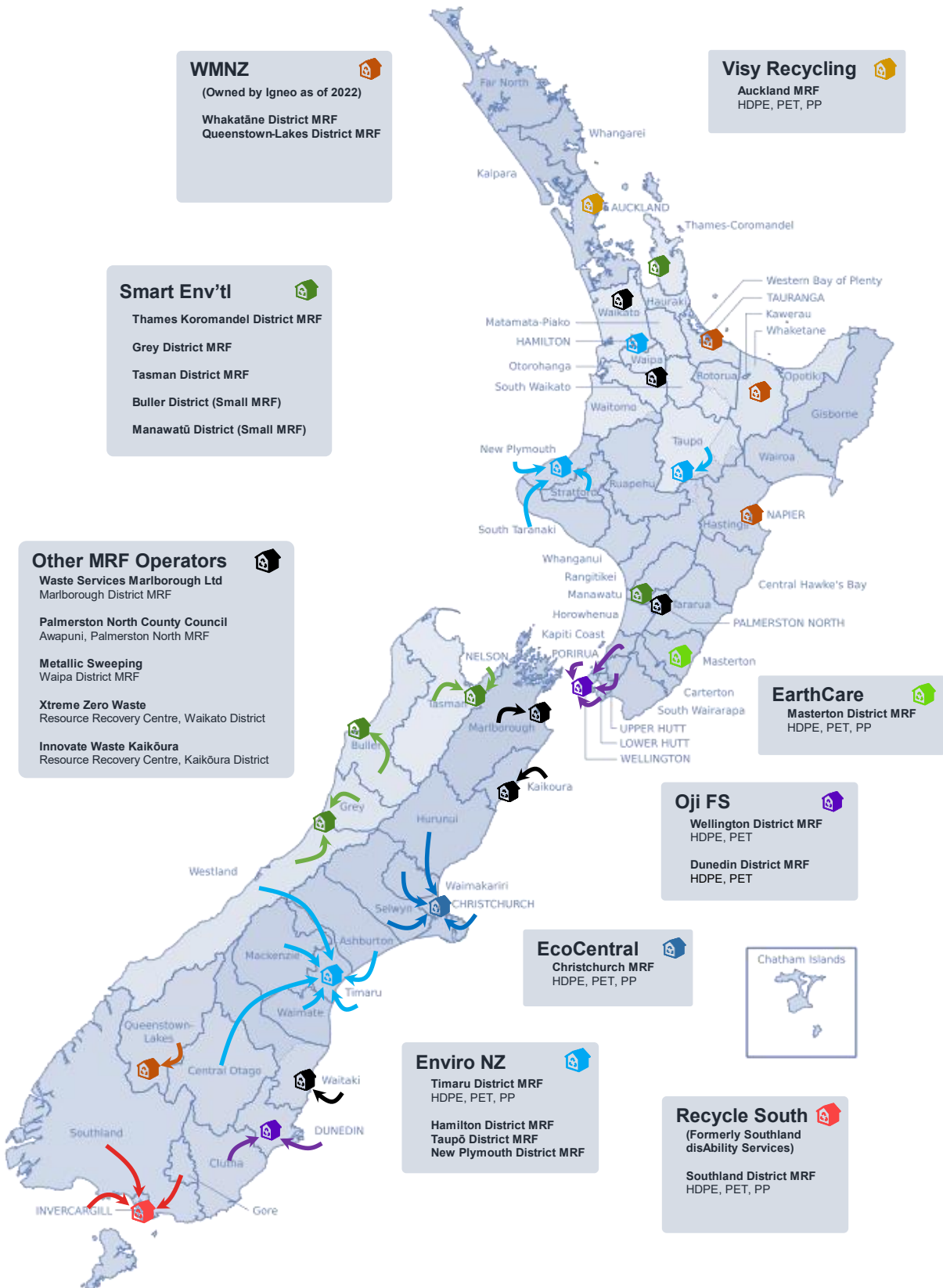
⁷⁷ [Polypropylene Progress Report August 2022.pdf \(plastics.org.nz\)](#)

⁷⁸ [Phasing out hard-to-recycle and single-use plastics | Ministry for the Environment](#)

⁷⁹ [Petition for New Zealand to ban plastic waste exports to developing countries: slated as 'waste colonialism' - NZ Herald](#)

⁸⁰ [Perils of plastic packaging for food and drink \(massey.ac.nz\)](#)

Figure 9: Map of MRFs and Their Inputs Across New Zealand⁸¹.



⁸¹ Image for background mapping taken from [Wikimedia commons](https://commons.wikimedia.org/) under a [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/) licence. Image re-coloured.

4.8. Processing Gaps

New Zealand's recycling operations cover 28,954 tonnes of plastic packaging. Although with infrastructural capacity, demand and export variations across resin types, there are often identifiable processing gaps. This section covers the nature of those gaps. Due to data constraints, it is difficult to attribute accurate tonnages to processing gaps, thus this sections' findings are mainly qualitative. It should be noted that although this report was unable to quantify amounts of plastics harbouring potentially problematic product, such as dangerous chemicals, there has been an acknowledgment of a potential gap in the re-processing of this type of plastic – which requires adequate treatment before it is recycled.

4.8.1. Clear PET

At present throughput, the run rate of PET recycling operations is below the amount of clear PET stock available. The availability of stocks was calculated as a forecast however, and exports of clear PET are estimated to be even greater, suggesting current availability could be higher than forecasted and confirming that domestic reprocessing operations cannot yet account for what is exported.

4.8.2. Coloured PET

This report finds that coloured PET is almost totally uncovered by existing reprocessing operations. Coloured PET is sometimes used in pots tubs and trays or beverage containers⁸², its usage being common in personal care products. Although it has been cited by survey respondents as export product by MRFs, coloured PET is often exported at a cost to the exporter, which could lead to increases in landfilling of coloured PET, this being more economically viable. With end markets overseas for coloured PET being cited as unucrative, New Zealand's technological inability to reprocess this resin for domestic markets or product to be exported represents a gap in present reprocessing activity. Although, this is simply feedback from findings and should not be considered a recommendation for future operations. As this report, quantifying plastic by resin type not by colour, would not have sufficient data to go beyond highlighting a potential gap regarding the reprocessing of coloured PET. It should also be noted that a shift from the usage of coloured plastics, rather than a move towards their recycling, has been highlighted as a strategy to combat the difficulty of recycling coloured plastic⁸³

4.8.3. De-odourised HDPE

New Zealand lacks deodorising technology, leaving a processing gap for janitorial HDPE. Employing such technology would unlock more end markets for this kind of HDPE, leading to a potential boost in demand.

4.8.4. Post-consumer HDPE Milk Bottles

Considering the capability of New Zealand's recycling infrastructure to deal with post-consumer HDPE milk bottles, and that this product accounts for a large proportion of recycled HDPE, the implementation of a milk bottle-to-milk bottle operation seems a logical step in infrastructural progression, given the current demand and technological capability for the reprocessing of post-consumer HDPE. As MRF facilities export significant quantities of post-consumer HDPE milk bottles, a plant such as this could fill a gap in reprocessing activity.

4.8.5. LDPE Exports

New Zealand recycles around 8,495 tonnes of LDPE per annum. Reprocessing of LDPE takes up a significant portion of New Zealand's reprocessing activities, being the second most recycled resin type in New Zealand. Yet, despite technology capability, high quantities of LDPE are still exported (it should be noted that this is not uncommon globally), highlighting a gap in processing activity. Stakeholder insight has pointed toward contamination being the reason for missed potential in the recycling of LDPE.

⁸² [Policy & Infrastructure Reports - RECOUP Recycling](#)

⁸³ [Science Digest: The truth about plastics and recycling - and the common products you can't recycle - NZ Herald](#)

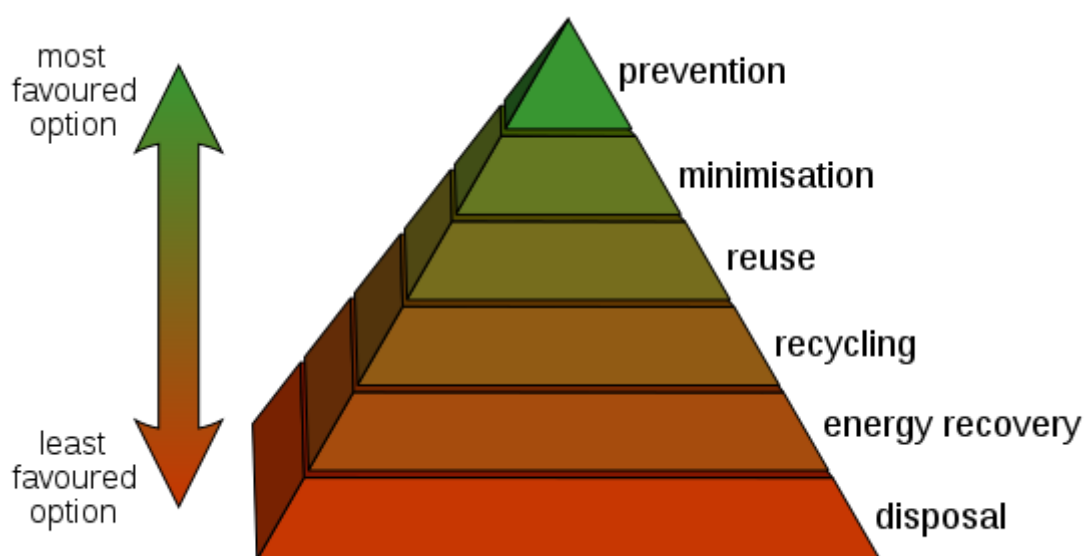
4.8.6. Untapped PP Potential

Despite PP being largely recyclable and valuable in global end markets, most of New Zealand's collected PP had previously gone to landfill or exported for recycling elsewhere⁷⁷. This trend is likely to have affected the results of this report, being that the recycling of PP offered in this report is 4,791 tonnes and the amount of recyclable PP in kerbside waste and recycling streams is thought to be around 8,000-10,000 tonnes⁷⁷. This could represent a potential processing gap.

4.9. Options / Pathway for Recovery and Processing

The Zero Waste Hierarchy is a framework for preventing plastic and other packaging from being sent to landfill. The Zero Waste Hierarchy is structured in order of most to least desirable, as follows: Prevent, reduce, re-use, recycle, recover, dispose (landfill). This section will focus on available and potential options for recycling and recovery of plastic packaging.

Figure 10: A Schematic of the Zero-Waste Hierarchy⁸⁴.



4.9.1. Recycling: Non-mechanical Recycling of Plastic

Non-mechanical recycling, also known as 'chemical recycling', is a group of technologies that break plastics down into their constituent parts. Each technology has various benefits and drawbacks, and some may be considered as open-loop, while others could be considered as closed-loop recycling depending on the technology being used and the level of waste product.

According to the UK's Waste and Resources Action Programme (WRAP), the four types of non-mechanical recycling are as follows⁸⁵:

- Pyrolysis – Breakdown of material into wax, oil, and gas; the latter of which may be burned to provide energy.
- Gasification – Combustion of material into carbon monoxide (CO) and hydrogen gas (H₂). The gas may then be burned for energy or production of hydrocarbons.

⁸⁴ Image taken from [Wikimedia Commons](#) and used under a [CC BY-SA 3.0](#) license. Image not modified.

⁸⁵ https://wrap.org.uk/sites/default/files/2020-08/WRAP-Non-Mechanical-Recycling-of-Plastics-WRAP-v.3_0.pdf

- Chemical depolymerisation – Material is broken down into its constituent monomers using chemicals.
- Dissolution – Materials are dissolved in a particular solvent to remove contaminants before precipitation of the pure resin occurs.

According to WRAP, these technologies may only be considered as ‘recycling’ if the resulting product can be used as a secondary raw material.⁸⁵ Therefore, they consider only chemical depolymerisation and solvent dissolution as meeting these requirements.

In 2019, OJI Fibre Solutions (OjiFS) announced⁸⁶ their intention to work with iQ Renew to begin using Licella’s Catalytic Hydrothermal Reactor (Cat-HTR™) technology, a form of chemical depolymerisation, to improve their plastic recovery and recycling. This technology uses superheated water to breakdown plastic resins into their raw ingredients, to produce plastic that has the same quality as plastic made from virgin materials. The benefits of this technology are that materials which are not typically easily recyclable (e.g., plastic film, and pots, tubs, and trays) can be reliably recycled. Other benefits are that up to 85% of the plastic’s mass is converted into product, with the removal of contaminants.⁸⁷ However, there are some drawbacks, such as the fact that the process is relatively energy-intensive and expensive, so these may need to be taken into consideration when considering alternative technologies in future.

4.9.2. Recycling: Mechanical Recycling

As of 2017, closed-loop PET recycling has been possible in New Zealand due to the introduction of Flight Plastic’s wash plant in Lower Hutt, Wellington⁸⁸. This enabled up to 5,000 tonnes of PET to be processed and remade into food-grade rPET trays and containers, reducing both the amount of waste plastic exported and the amount of virgin resin imported⁸⁹. In 2021, Flight Plastics was acquired by Pact Group, making Pact the only packaging manufacturer in New Zealand with integrated PET recycling capability. Pact has set a target of 30 percent recycled content across their products, with a goal of 60,000 tonnes recycling capacity by 2025⁹⁰. In 2020, Pact announced a \$500 million investment in plastics recovery over the following five years to support these goals⁹¹.

4.9.3. Recovery: Energy from Waste (EfW)

Energy from waste is the process of incinerating residual waste to recover energy in the form of electricity, heat, or fuel. UK government guidelines state that ‘Recovering energy from waste is only appropriate for waste that cannot be prevented, reused or recycled with less greenhouse gas emitted’⁹². Energy from waste is used for mixed residual waste that would otherwise be sent to landfill. EfW is considered preferable to landfill when the waste has a higher renewable content (*i.e.*, organic matter from biomass which has grown in the last ~100 years; paper, food, or wood rather than fossil-fuel derived waste such as plastic) and is processed in a plant that is energy efficient⁹³.

Te rautaki para/waste strategy sets out the New Zealand Government’s principles and considerations of Energy from Waste/waste to energy technology⁹⁴. Using mixed and non-biological waste (like municipal solid waste) in EfW processes can be technically challenging. These types of waste are more likely to create hazardous by-products and generate greenhouse gas emissions. Large scale EfW facilities like incinerators are significant capital investments that depend on having a consistent supply of feedstock for their 20–30-year lifetime. However, many other initiatives are underway to reduce, reuse and recycle waste, particularly plastic which will quickly reduce the supply of this feedstock for a waste to energy operation.

⁸⁶ <https://www.scoop.co.nz/stories/BU1908/S00085/oji-fibre-solutions-teams-up-on-plastic-recycling-technology.htm>

⁸⁷ [https://www.theengineer.co.uk/content/news/uk-firm-to-build-world-s-first-commercial-scale-cat-htr-plastics-recycling-plant#:~:text=Cat%2DHTR%20\(Catalytic%20Hydrothermal%20Reactor,new%20plastic%20and%20other%20materials](https://www.theengineer.co.uk/content/news/uk-firm-to-build-world-s-first-commercial-scale-cat-htr-plastics-recycling-plant#:~:text=Cat%2DHTR%20(Catalytic%20Hydrothermal%20Reactor,new%20plastic%20and%20other%20materials)

⁸⁸ <https://environment.govt.nz/what-you-can-do/stories/flight-plastics-limited/>

⁸⁹ <https://www.pmcsa.ac.nz/2019/11/06/developing-onshore-closed-loop-mechanical-recycling-solutions/>

⁹⁰ <https://wastemanagementreview.com.au/pact-group-acquires-nz-packaging-manufacturer-flight-plastics/>

⁹¹ <https://wastemanagementreview.com.au/pact-group-announces-500m-investment-in-plastics-recovery/>

⁹² <https://www.gov.uk/guidance/generating-energy-from-waste-including-anaerobic-digestion>

⁹³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/284612/pb14130-energy-waste-201402.pdf

⁹⁴ <https://environment.govt.nz/publications/te-rautaki-para-waste-strategy/>

In 2021 a large Energy from Waste plant was proposed in South Canterbury that would have an estimated capacity of 350,000 tonnes waste per year⁹⁵. A chief concern of opponents of EfW is that it may compete with traditional recycling methods, encouraging less waste to be recycled and more to be sent to incineration.

4.10. Summary of Current and Future Processing Capacity

To calculate the total planned and current reprocessing in New Zealand, including current known reprocessing and any planned future capacity, a mixture of secondary research and stakeholder engagement was used. Table 25 shows a summary of this data at the time of writing. The tonnages for Known Current Reprocessing are a summary of the data shown in Figure 8. Planned Reprocessing Capacity for each resin was determined using figures provided from industry stakeholders, as well as publicly available data from secondary research. Known and planned reprocessing were then combined to determine the Total Planned and Current Reprocessing, i.e., that is currently in use or is due to be commissioned in New Zealand due to investments in infrastructure.

Table 25: Total (Current and Planned) Reprocessing for ALL Plastic, and Current Estimated Onshore Reprocessing and Exports for Plastic Packaging ONLY (t)⁹⁶

	Total Planned and Current Reprocessing (All Plastic)	Planned Reprocessing Capacity (All Plastic)	Known Current Reprocessing (All Plastic)	Current Estimated Onshore Reprocessing (Plastic Packaging)	Current Estimated Exports (Plastic Packaging)
Total	52,636	15,900	36,736	28,954	16,159
PET	6,523	0	6,523	Unknown	11,452
HDPE	27,007	11,043	15,964	Unknown	3,762
PVC	439	126	313	Unknown	Unknown
LDPE	12,634	4,139	8,495	Unknown	Unknown
PP	5,384	593	4,791	Unknown	945
PS	650	Unknown	650	Unknown	Unknown

As Table 25 shows, the current estimated tonnage of onshore reprocessing for plastic packaging is 28,954 tonnes. When combined with all the plastic packaging that has been exported for recycling, this gives a total recycling figure of 45,113 tonnes of plastic packaging. Currently, the known reprocessing in New Zealand for all plastics is 36,736 tonnes, which is not enough to be able to process all the existing recovered plastic packaging, therefore some plastics must be exported overseas for processing. However, with a planned additional recycling capacity of approximately 15,000 tonnes, it is likely that in future, New Zealand will have enough onshore recycling capability to be able to process most of the plastic packaging recovered, resulting in little need to export plastic packaging for recycling overseas. However, this will depend on how successful future initiatives are for collecting plastic packaging and therefore reprocessors should track the success of future collections by resin to assess the requirement for further future investment. There is also an obvious requirement for onshore demand for this material or, conversely, achievable offshore demand for reprocessed material (as an input to a manufacturing process).

Important to note that the figures shown above in Table 25 were determined using best estimates resulting from available data. Any inaccuracies in these figures are the result of the limitations of available data. In a positive future scenario, granular data on the tonnages of each resin processed by reprocessing facilities would be collected and recorded, which coupled with POM data can be used for planning future reprocessing requirements.

Also, depending on how recycling and producer responsibility systems are implemented in New Zealand, there may be the requirement to collect data on a household/ non-household basis and by resin. This kind of data

⁹⁵ <https://www.rnz.co.nz/news/business/451555/huge-waste-to-energy-plant-proposed-in-south-canterbury>

⁹⁶ Sums may differ from the total due to rounding.

granularity would also aid with future planning and help to better understand the capacity available at each facility, which might help to better manage how much plastic is transported to each facility.

Although data availability was limited, the calculated estimates in Table 25 show that recycling capacity appears to be increasing and improving, leading to greater on-shore recycling capability with less reliance on off-shore exports of waste material. As international markets are becoming less accepting of imported and unprocessed plastic for recycling, particularly in East Asia, unprocessed post-consumer plastic exports are increasingly undesirable (even when sorted) from both a material recovery perspective and an end-market perspective. The current evidence suggests that New Zealand is moving in a positive direction to be able to recycle a high proportion of the plastic packaging generated.

4.11. Plastic Packaging Mass Balance Reporting System

To truly understand recycling routes and performance in New Zealand, a comprehensive data reporting system is required. This would involve reporting of:

- Placed-on-the-market (POM) data via producer responsibility regulations.
- Collections data – tonnages collected by territorial authorities and commercial waste collectors: by material/ stream (and preferably by collection route) and next destinations.
- Sorting data – MRF inputs and outputs, including reject rates and destinations (exports or to a New Zealand facility).
- Reprocessing data – inputs and outputs (finished or intermediate products) from New Zealand facilities, and, if available, from contracted overseas facilities.

For POM data, it is recommended that the plastic product stewardship scheme for New Zealand includes mandatory systems for collecting accurate data from producers, with robust auditing processes.

For collections data, territorial authorities currently only need to report amounts sent to landfill and going via transfer stations, using the Online Waste Levy System (OWLS)⁹⁷, to assess amounts owed in landfill tax. From 2024, they will need to record and report household waste and recycling data, as mentioned in section 4.1.4, with commercial companies collecting domestic waste following suit in 2024/25. This will allow calculation of overall domestic recycling rates by comparing amounts recycled with total amounts collected.

However, to get a full understanding of resources and waste flows, it is necessary to record and report all waste and recycling collections data, including commercial, industrial, agricultural and construction and demolition waste. For New Zealand to be able to monitor the effectiveness of its recycling collection, sorting and reprocessing infrastructure, this data should be reported by material type and within plastics by resin type. This would allow an understanding of opportunities for closed loop and open loop recycling by identifying different material/ collection streams and current routes of reprocessing or disposal.

For sorting data, this would involve MRFs and other sorting facilities reporting input and output tonnages by material stream (and by resin type for plastics), including tonnages of non-target materials and contaminated items that are sent for disposal, and destinations of output streams, by type of facility and location, i.e., country of export or identification of a New Zealand facility.

For reprocessing data, New Zealand facilities would be expected to report input tonnages by material type (and by resin type for plastics), output tonnages of finished products or intermediate products such as flakes or pellets and destinations of these. It would also be very useful to have similar data from contracted overseas facilities as otherwise assumptions will need to be made for reject rates for these and whether they undertake closed or open loop recycling.

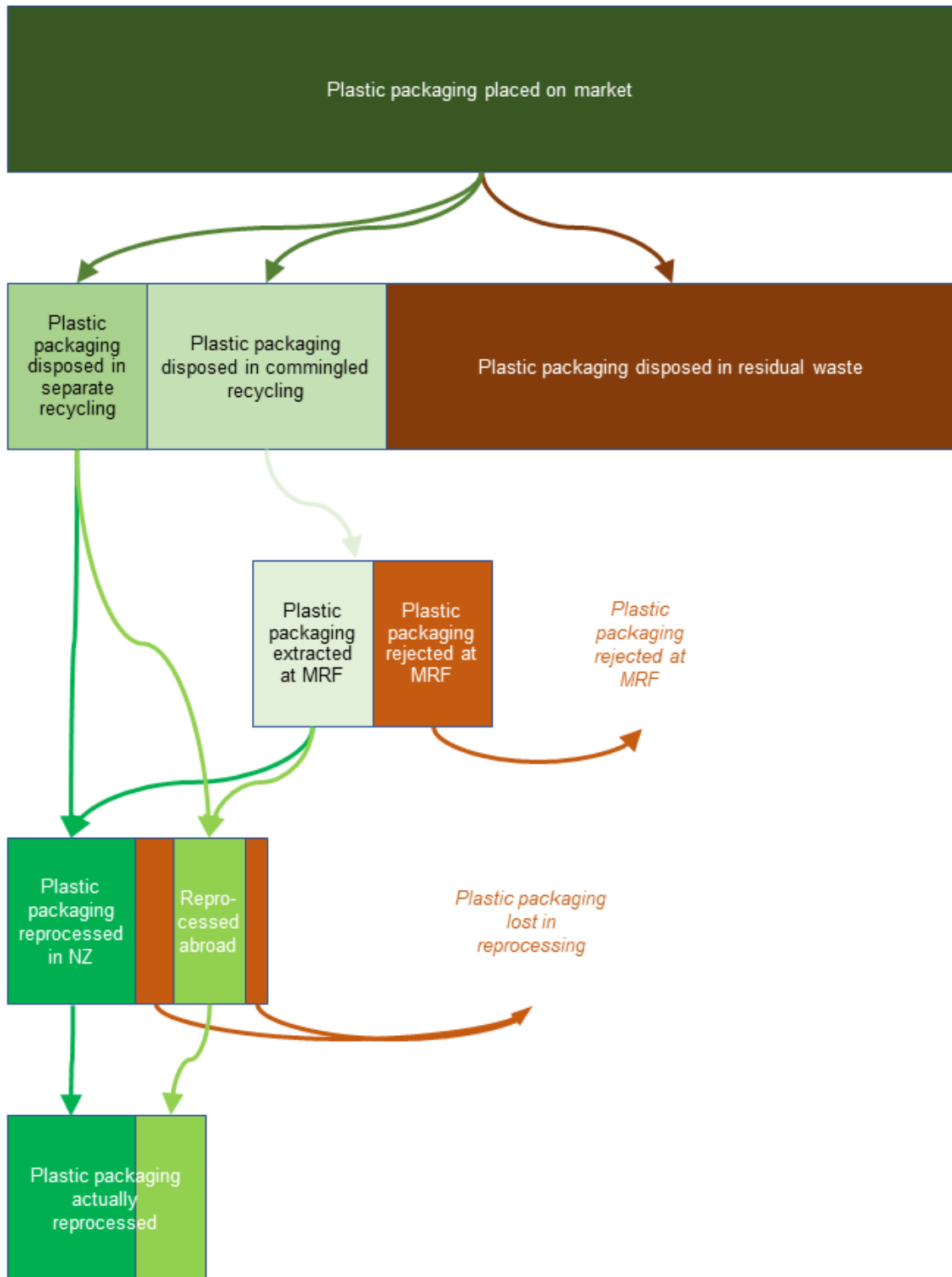
An additional benefit of mandatory reporting of collections and transfers is that it would enable identification of potentially fraudulent, criminal, or problematic activity for further investigation, for example sources of fly-tipping,

⁹⁷ <https://www.wastelevy.govt.nz/>

illegal/ unlicensed waste disposal sites, sites that are not operating according to licence conditions and sites stockpiling 'recycling' that is later disposed or needs to be dealt with when the operator becomes bankrupt.

Figure 11 provides a schematic illustration of plastic packaging mass flows, from being placed on the market to disposal, collection, sorting and processing.

Figure 11: A Schematic Illustration of Plastic Packaging Mass Flows



4.11.1. Manual Waste Data Compilation and Reporting: UK Examples

Currently, much of the waste data gathering and reporting globally is done manually, which is both resource intensive and subject to errors or intentional misreporting that then needs to be minimised via auditing. It may also not be comprehensive, covering all waste arisings.

For instance, in the UK, municipal authorities must report in detail their waste and recycling collections and subsequent sorting and processing data via WasteDataFlow⁹⁸, a web-based system originally set up in 2004. This involves maintaining local spreadsheets or databases of all weighbridge tickets for vehicles carrying waste and recycling arriving at and leaving their sites, noting the waste source and nature of the waste or recycling stream and the date and time of transfers. They then need to track the waste, recycling, and composting streams through to final destinations, obtaining data from each MRF, merchant or reprocessor on reject rates and percentage compositions of output streams to apply this to their own inputs. The data is audited extensively by checking mass balances and comparing with performance in previous years and with other authorities using the same facilities. The MRFs used need to provide robust sampling data to justify reject rates.

There is not currently a similar system for non-municipal waste in the UK, and management of commercial and industrial waste arisings have been estimated using large-scale and expensive waste composition analyses and individual analysis of waste transfer notes (how transfer of ownership of waste from one party to another is legally documented).

In the UK, producer responsibility legislation requires recyclers and exporters of packaging waste to report their data to the Environment Agency (EA), or equivalents within devolved administrations, which is then published on the National Packaging Waste Database (NPWD)⁹⁹. The database issues tradable electronic Packaging Waste Recovery Notes (PRNs) and Packaging Waste Export Recovery Notes (PERNs) to accredited reprocessors and exporters so that they can obtain a market-based payment per tonne that acts as a financial top-up over and above gate fees, which incentivises increased recycling (by incentivising increasing yields from collected material and allows for additional payments for waste to stimulate additional collection) up to the national recycling targets.

UK producer responsibility legislation also requires producers of packaging waste to report all the packaging that they place on the market each year via the NPWD, and they must purchase a prescribed number of PRNs or PERNs the next year based on that tonnage or produce evidence of tonnages recycled themselves. (Different percentage targets are set for each recycling material stream and these may be varied each year to increase recycling.)

The NPWD is then used to identify the total quantity of packaging recycled and exported for recycling and compares this with the amounts placed on the market to calculate the UK's recycling rate for each packaging material. Reporting by resin type to NPWD is not required, just by plastic, aluminium, steel, paper/board, glass, wood and 'other'. Fibre-based composites (liquid paper board) will be reported separately from 2023; previously they were included under paper/board as the material of predominant weight.

Amounts arising and collected within different consumption categories (domestic, commercial, industrial etc) can be assessed by analysis of WasteDataFlow data and other data sources. This can help identify where collection rates can be improved, including via legislation, and where there are opportunities for closed and open loop recycling.

4.11.2. Mandatory Digital Waste Transfer Notes

Mandatory digital Waste Transfer Notes (WTNs) provide the opportunity to track all waste streams being collected, transferred, sorted, processed, and disposed in either real time or near real time. This is currently being proposed in the UK¹⁰⁰, with a consultation held in 2022 and a government response due in 2023 followed by proposed legislation. It will cover all waste transfers, whether from municipal or non-municipal sources.

⁹⁸ <https://www.wastedataflow.org/>

⁹⁹ <https://npwd.environment-agency.gov.uk/>

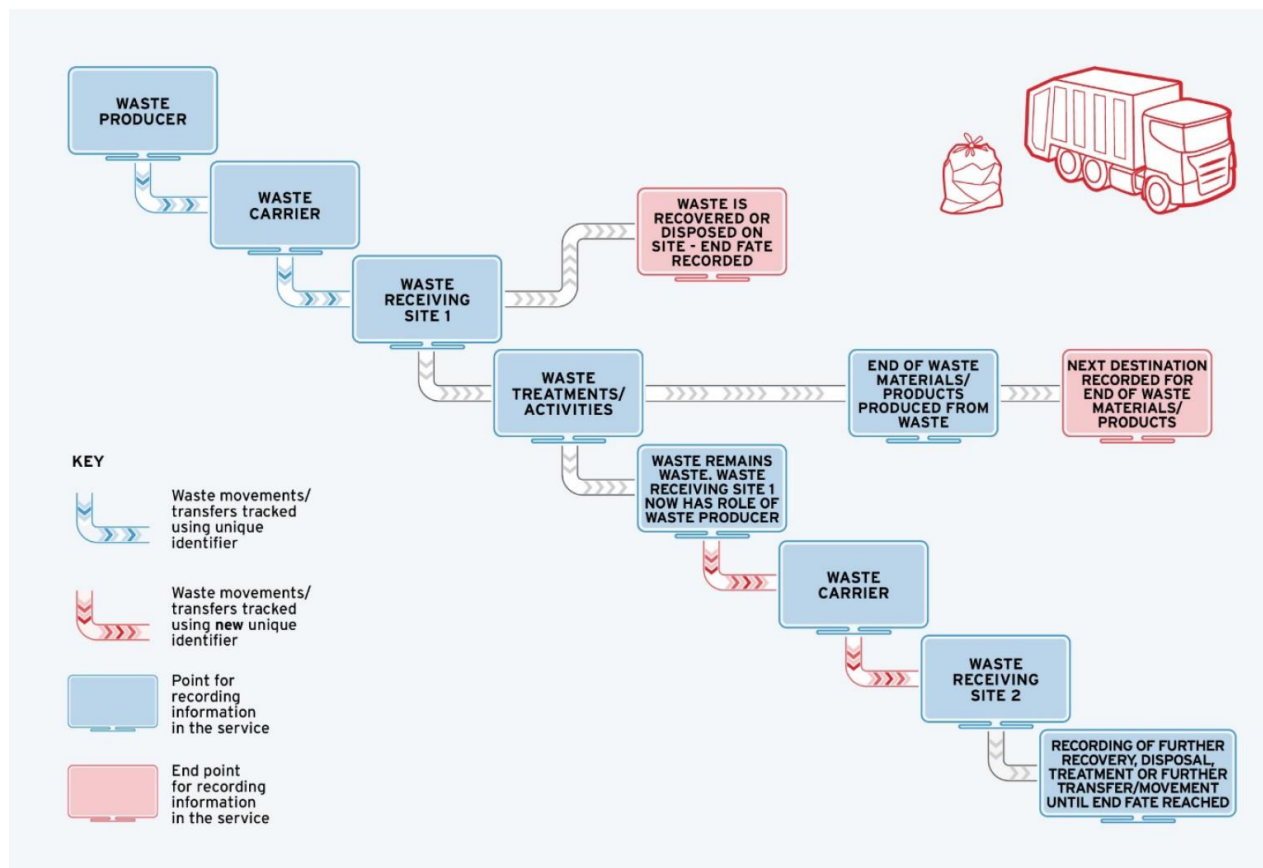
¹⁰⁰ <https://consult.defra.gov.uk/environmental-quality/waste-tracking/>

Currently all waste transfers in the UK need to be accompanied by a paper based or digital WTN, or a consignment note for hazardous waste. These must then be kept for a defined number of years to enable regulatory officers to inspect and audit them and compare with licensed capacities and declared tonnages. Digital WTNs were first introduced and allowed in 2014¹⁰¹ but were not mandatory, and organisations can use their own versions of paper or digital WTNs. The proposal for mandatory digital WTNs is to have one central comprehensive way of tracking all waste from collection through to destination. This will allow identification of unlicensed or criminal waste collection, storage or disposal and will help to eradicate this over time. It also has the added benefit of removing the storage of vast quantities of paper-based forms. Householders and other waste producers will be able to track the waste and recycling they dispose, to see where it ends up.

Figure 12 is an illustration of the UK’s proposed mandatory digital waste tracking system, taken from the summary document for the consultation¹⁰². At each movement between sites, waste tonnage data and information will need to be entered onto the waste tracking system, generating a unique identifier. End fates will be recorded when waste is disposed on a site. Waste that has been treated on a site to achieve end of waste status or products will be recorded along with its next destination. Waste that is transferred for further treatment processing or disposal will acquire a new unique identifier.

When this system is established, there will be no need for municipal authorities to report data using WasteDataFlow; they will be able to interrogate the data stored on the tracking system to produce the same analyses of performance and to identify where their waste and recycling streams end up. Other waste management organisations and customers would also be able to track their waste.

Figure 12: A Mandatory Digital Waste Tracking System



Source: ‘Summary of the proposals - Introduction of mandatory digital waste tracking’¹⁰²

¹⁰¹ edoc, electronic duty of care: <https://www.gov.uk/government/groups/edoc-electronic-duty-of-care>

¹⁰² https://consult.defra.gov.uk/environmental-quality/waste-tracking/supporting_documents/Summary%20of%20the%20proposals%20%20Introduction%20of%20mandatory%20digital%20waste%20tracking.pdf

5. International End Markets for New Zealand Plastics

5.1. Introduction

One of the most comprehensive reports on plastics production, its use, and waste generation was recently published by the Organisation for Economic Co-operation and Development (OECD) in 2022¹⁰³.

The report states that the international trade in plastic scrap can often be driven by countries which have a competitive advantage in recycling plastic i.e., in countries in Asia, particularly China and India where products can be made cheaply due to lower labour costs and economies of scale in terms of reprocessing/manufacturing capacity.

It is well documented that China has traditionally been the world's largest export destination for plastics. Exports to China were also supported by cheap shipping to China, driven by the country's trade surplus which meant that shipping containers delivering products around the globe could backhaul plastic scrap relatively cheaply to feed the manufacturing sector.

However, global trade in plastic scrap peaked in 2014, and then started to decrease. This decrease was largely due to China introducing stricter import requirements which aimed to increase the quality of material coming into the country, reduce material leaked and support the recycling of plastics collected within China.

In 2013 China introduced their 'Green Fence' policy which banned imports of mixed plastic waste that contained more than 1.5% contamination. Then in 2017 they introduced the 'National Sword' policy which reduced the contamination limit to 0.5%. Due to this limit being difficult to meet it significantly reduced the export of plastic scrap to China from countries around the world.

This has meant that countries have either had to significantly improve the quality of material they export to China (the drop in exports to China indicates this has not happened in any significant quantities), find other markets for their materials, or develop domestic recycling infrastructure and end markets. It is expected that for these reasons the global trade in plastic scrap is likely to continue falling in the short to medium term.

5.2. Total Exports of Plastic Scrap from New Zealand (2012 – 2022)

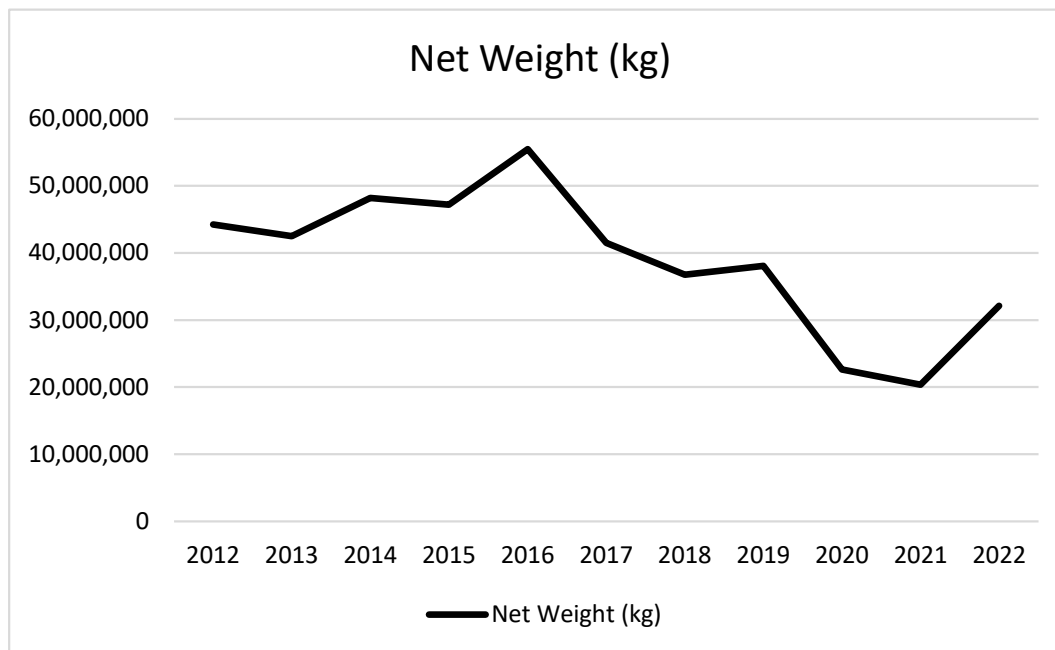
Figure 13 shows the total exports of plastic scrap (including but not limited to post consumer plastic packaging) from New Zealand¹⁰⁴. It shows that although exports rose in 2022, overall, there is a downward trend.

This shows that since 2012 plastic scrap exports from New Zealand peaked in 2016. Further interrogation of the data shows that China Hong Kong SAR was the main export destination followed by China, Indonesia, Malaysia, Thailand, Australia, and Viet Nam.

¹⁰³ OECD (2022), *Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options*, OECD Publishing, Paris.

¹⁰⁴ Data extracted from the Comtrade database on 30/05/2023: <https://comtradeplus.un.org/> using Comtrade code 3915 'Waste, parings and scrap, of plastics'

Figure 13: Plastic Scrap Exports from New Zealand (2012-22)



5.3. Key Export Destinations for Plastic Scrap (2022)

Since the legislative changes were introduced by China coupled with the overall international decline of plastic exports the end market destinations for plastic scrap has changed since 2016 with Malaysia now being the main destination, closely followed by Indonesia.

Table 26: Plastic Scrap Exports from New Zealand by Destination Country (2022)

Export Destination	Comtrade Code	Net Weight (kg)
World	3915	32,143,420
Malaysia	3915	10,574,050
Indonesia	3915	9,380,010
Thailand	3915	3,831,282
China	3915	3,035,050
Australia	3915	2,375,790
Other Asia, not elsewhere specified	3915	1,313,074
China, Hong Kong SAR	3915	715,011
USA	3915	351,110
Viet Nam	3915	298,563
Portugal	3915	188,190
Italy	3915	37,730
Netherlands	3915	23,020
Lao People’s Dem. Rep.	3915	20,540

The figures included in the table above relate to all scrap plastic exports from New Zealand including packaging. When compared to known plastic packaging exports, as detailed in Section 4.3, which indicates that at least 16,159 tonnes of packaging were exported, plastic packaging accounted for 50.3% of plastic exports from New Zealand in 2022.

The Comtrade Code 3915 can be broken down further into more detailed Comtrade Codes, which have been mapped into resins by the United Nations as shown in Table 27.

Table 27: Comtrade Sub-Codes and UN Resin Mapping

Comtrade Code	391510 (Ethylene resins; waste, parings, and scrap)	391520 (Styrene resins; waste, parings, and scrap)	391530 (Vinyl chloride resins; waste, parings, and scrap)	391590 (Plastics n.e.c. in heading no. 3915; waste, parings, and scrap)
United Nations Comtrade Mapping to Resins	HDPE, LDPE, LLDPE, PET, PP, PUR, Elastomers (tyres)	PS	PVC	Fibres, Marine Coatings, Road Marking Coatings, ABS, ASA, SAN, Other

Appendix II shows the quantity of plastic exports by code/sub-code to each of export destinations. This shows that 391510 (Ethylene resins; waste, parings, and scrap) makes up most plastic scrap exports at 67% with 391590 (Plastics n.e.c. in heading no. 3915; waste, parings, and scrap) making up approximately 33%, with a minimal amount of 391520 (Styrene resins; waste, parings, and scrap) exported. No 391530 (Vinyl chloride resins; waste, parings, and scrap) was reported on Comtrade as exported from New Zealand.

6. Plastic Recycling Rate for New Zealand

The plastic packaging recycling rate for New Zealand was calculated by combining the quantity of plastic packaging recycled in New Zealand with the quantity of plastic packaging exported for recycling.

6.1. New Zealand Total Plastic Packaging Recycled in 2022

Known reprocessor figures determined that 15,080 tonnes consumer packaging was processed onshore. Previously published information from the UK Packflow report¹⁰⁵ showed that in the UK, 52% of plastic packaging comes from consumers while 48% comes from non-consumer. By using this proportion as a proxy and applying it to the New Zealand reprocessor figure, it was determined that 13,874 tonnes of packaging was reprocessed from non-consumer sources, to give a total of 28,954 tonnes of plastic reprocessed onshore in New Zealand.

The total tonnage of packaging which was exported from New Zealand was previously calculated as 16,159 tonnes. By applying the same 52%/48% split to this number, it was determined that 8,419 tonnes consumer packaging was exported, and 7,743 tonnes non-consumer packaging was exported. Therefore, an estimated total of 45,113 tonnes packaging was recycled in New Zealand in 2022.

6.2. Consumer and Non-consumer Recycling Split

To calculate the total consumer/non-consumer recycling split, the reprocessor and export breakdowns were combined. For consumer recycling, 15,080 tonnes from reproducers and 8,416 tonnes from exports gave a total of 23,496 tonnes of total consumer recycling in New Zealand. For non-consumer recycling, 13,874 tonnes from reproducers and 7,743 tonnes from exports gave a total of 21,616 tonnes of non-consumer recycling in New Zealand.

Non-consumer recycling was then further broken down into market sectors, to determine which recycling was in or out of scope. The five sectors were C&D, Agriculture, Back of Store, Hospitality, and Manufacturing & Other.

Taking the POM data for each market sector (Section 2), a recycling rate was applied to each sector based on the estimated (based on knowledge of the situation outside of New Zealand) recycling rates for C&D, Agriculture and Back-of-Store and then applying likely recycling rates for Hospitality, and Manufacturing & Other. These estimates were then reviewed and revised by a Valpak Recycling Services expert, with in-depth knowledge of recycling markets. This allowed the calculation of tonnes recycled for each of the five sectors for illustrative purposes, shown in Table 28. It also shows which sectors are in and out of scope of this report.

¹⁰⁵ <https://www.valpak.co.uk/knowledge-hub-post/packflow-covid-19-report/>

Table 28: Recycling by Sector (2022)

Sector	Recycled (t)	In Scope	Out of Scope
Consumer Recycling			
Consumer	23,496	✓	
Total Consumer	23,496		
Non-consumer Recycling			
C&D	991		✓
Agriculture	479		✓
Back of Store	6,066	✓	
Hospitality	3,137	✓	
Manufacturing and Other	10,944		✓
Total Non-consumer	21,616		
TOTAL	45,113		

6.3. In/Out of Scope Recycling

When calculating the tonnage of recycling arising from each non-consumer sector, a known estimate of recycling rate was used for Back of Store. In the absence of any other information on the other four sectors, it has been assumed that recycling is done at the same rate. It was calculated that of the 21,616 tonnes of non-consumer recycling: 991 tonnes came from C&D; 479 tonnes came from Agriculture; 6,066 tonnes came from Back of Store; 3,137 tonnes came from Hospitality and 10,944 tonnes came from Manufacturing & Other.

Of the five non-consumer sectors mentioned, only Back of Store and Hospitality were in scope. Therefore, by combining consumer recycling tonnages with non-consumer Back of Store and Hospitality tonnages, it was estimated that 32,699 tonnes plastic packaging recycled was in-scope, while 12,414 tonnes is out-of-scope.

6.4. In-Scope Recycling Rate

To calculate the in-scope recycling rate, the total tonnage of in-scope plastic packaging POM (Section 2) was used. The total POM in-scope was 171,348 tonnes while the total recycled in-scope was 32,699 tonnes. This gives a total recycling rate (in-scope) of 19.1%.

It should be noted that due to the high reprocessing rejects/losses identified in Section 4.4.4.2, which show they can be as high as 67% in some cases, material which has been collected may not be recycled due to it being uneconomical to do so, which means investment is required to make this material economically viable.

6.5. New Zealand Total Plastic Packaging Recycling Rate 2022

To calculate the total plastic packaging recycling rate for New Zealand (i.e., including all packaging, both in and out of scope), the total plastic packaging POM figure was used. The total quantity of plastic packaging POM (In and Out of Scope) in 2022 was 263,231 tonnes. The total quantity of plastic packaging recycled was 45,113 tonnes, therefore the total plastic packaging recycling rate for New Zealand was 17.1%.

Table 29: New Zealand Total Plastic Packaging Recycling Rate (2022)

Sector	POM (t)	Recycled (t)
Consumer Recycling		
Consumer	140,546	23,496
Total Consumer	140,546	23,496
Non-consumer Recycling		
C&D	7,333	991
Agriculture	3,544	479
Back of Store	7,582	6,066
Hospitality	23,220	3,137
Manufacturing and Other	81,006	10,944
Total Non-consumer	122,685	21,616
TOTAL	263,231	45,113
TOTAL RECYCLING RATE		17.1%

This recycling rate can be used to compare the New Zealand plastic packaging recycling performance with other countries.

Research regarding the quantity of caps and closures indicates that when all plastics are included in the sample i.e., including CRS and milk products that they make up 12.7% of consumer plastics and 7.8% of hospitality (non-consumer) plastics¹⁰⁶. If these are applied to the quantities of plastics recycled from these sectors it means that caps and closures account for 3,475 tonnes or 7.7% of the total plastics recycled. Therefore, if caps and closures are removed from the total plastics recycled it reduces the total recycling rate by 1.2% to 15.9%.

6.6. New Zealand Total Plastic and Plastic Packaging Exports 2022

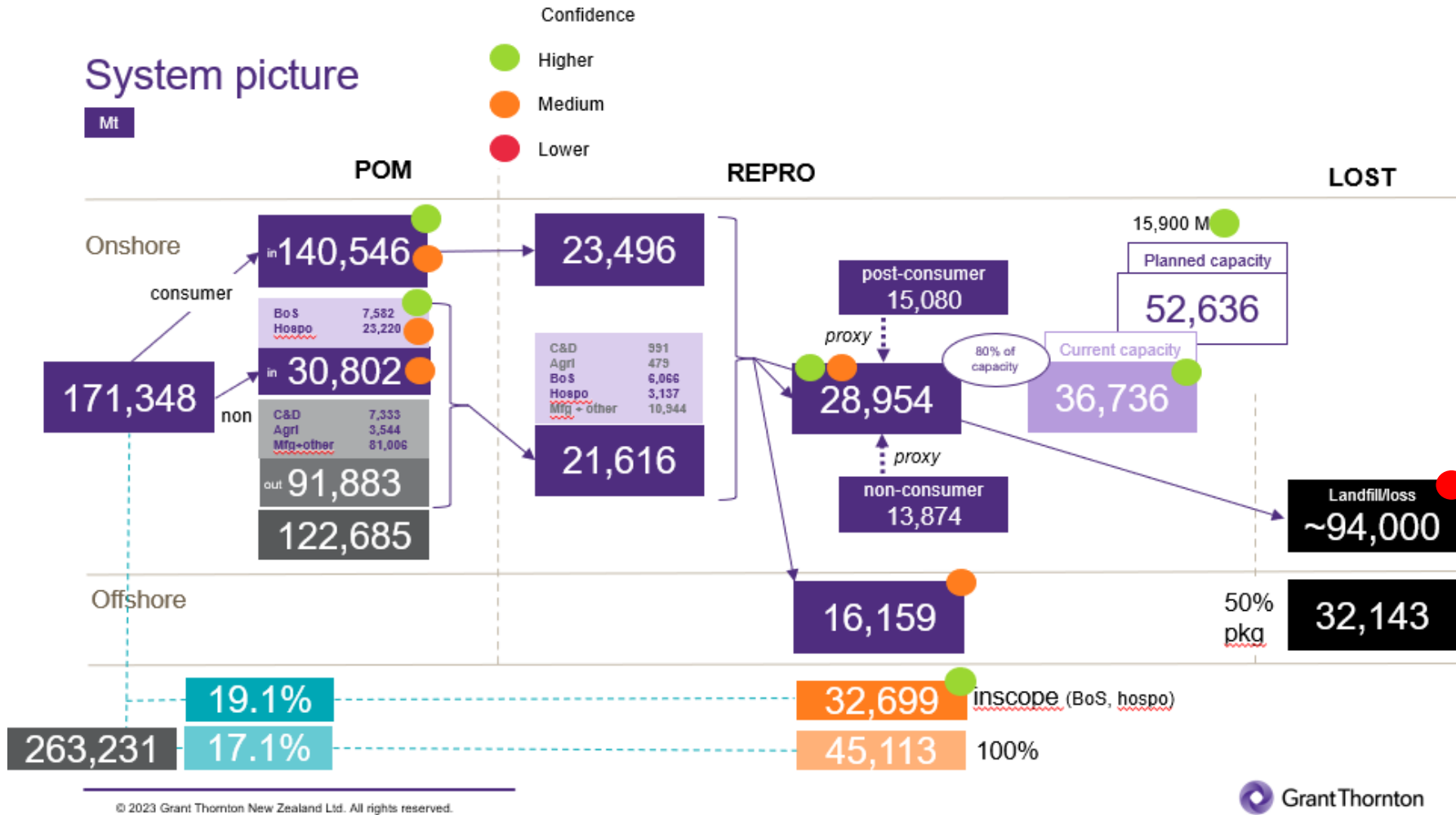
By using the Comtrade database it was identified that 32,143 tonnes of ‘Waste, parings, and scrap, of plastics’ were exported in 2022. However, when compared to known plastic packaging exports, as detailed in Section 4.3, which indicates that at least 16,159 tonnes of packaging were exported, this means that plastic packaging accounted for 50.3% of plastic exports from New Zealand in 2022.

6.7. System Picture and Confidence Levels

A workshop was held with stakeholders to discuss the data provided in a final draft of this report and assign confidence levels to the data. The figure used in this stakeholder meeting was updated following the discussions and is included as Figure 14 on the next page.

¹⁰⁶ <https://www.valpak.co.uk/knowledge-hub-post/recycled-content-in-caps-and-closures-white-paper/>

Figure 14: Image of System Picture and Confidence Levels from Key Stakeholder Meeting¹⁰⁷



¹⁰⁷ Slide produced by Grant Thornton for workshop with stakeholders using data from this report and updated subsequently.

7. International Plastic Packaging Recycling Rates

7.1. Introduction

This section of the report seeks to identify the plastic packaging recycling performance of other countries to allow for New Zealand's performance to be benchmarked against their current performance and to help inform future target setting.

The research identified that the level of data collected/reported regarding plastic packaging recycling varies significantly between countries. It also identified that countries could use different metrics/methods for reporting how much plastic packaging they recycle, which can often make it difficult to make direct comparisons between countries.

7.2. New Zealand Total Plastic Packaging Recycling Rate 2022

To compare the plastic packaging more directly with other countries, the total New Zealand plastic packaging POM was estimated. This has been estimated at 263k tonnes (details can be found in Section 2). The total plastic packaging POM for all sectors has been calculated by using the POM estimates for the sectors in scope of this report (consumer grocery, non-grocery, non-consumer BoS and hospitality) and UK data was used as a proxy for the sectors outside of the scope of this project (C&D, Agriculture, C&I – manufacturing & other).

Then by calculating the total quantity of plastic packaging recycled (both in New Zealand and exported), which is estimated at 45,113 tonnes it gives a New Zealand plastic packaging recycling rate of 17.1% in 2022.

7.3. International Reported Plastic Packaging Recycling Rates

7.3.1. EU

One of the best regions for reporting plastic packaging recycling performance is the European Union (EU). This is largely due to the introduction of the original EC Packaging Directive 94/62/EC in December 1994 which gave countries several years to transpose the legislation into their own national legislation. Countries are relatively free to decide how to implement the legislation if the overall recycling targets are met.

Figure 15 below shows the plastic packaging recycling performance across the EU. The Netherlands, Lithuania, Slovakia, Spain, Bulgaria, and Cyprus recycled more than half of their plastic packaging waste generated. In contrast, less than one-third of plastic packaging waste was recycled in Malta, France, Denmark, Hungary, Ireland, Romania, Poland, and Austria¹⁰⁸. This information and other data/statistics regarding plastic packaging can be found on the Eurostat website: <https://ec.europa.eu/eurostat/web/main/home>.

¹⁰⁸ <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20221020-1>

Figure 15: Plastic Packaging Recycling Performance in the EU (2020)



Although the New Zealand performance for 2022 would be at the lower end of the EU league table, the EU’s performance has been supported by legally binding legislation that has driven plastic packaging recycling.

It should also be noted that the EU directives allow national regulations to be implemented as those Governments see fit, so long as the overarching aims of the directives are met. It is important to acknowledge that the measurement of a recycling rate will not necessarily be undertaken in consistently across the EU.

In terms of countries outside of the EU the reporting of plastic packaging recycling becomes less detailed.

7.3.2. Australia

In 2021 Australia recycled 16% of its plastic packaging, which was lower than the 18% achieved in 2020¹⁰⁹. However, it should be noted that the figures are higher for individual resins e.g., 36% of PET and 23% of HDPE were recycled¹¹⁰. This would put them amongst the lowest performers if compared to countries in the EU and means they have a lot of work to do to achieve their 70% target by 2025.

7.3.3. Canada

In 2019 Canada generated 1.89 million tonnes of plastic packaging¹¹¹, of which 12% is estimated to have been recycled¹¹². However, the table below breaks the performance down by format and resin, which shows that the rigid packaging performance of 21% is driven predominantly by HDPE and PET.

¹⁰⁹ <https://www.packagingnews.com.au/latest/plastic-recycling-time-for-a-reality-check-and-a-fast-reset>

¹¹⁰ <https://apco.org.au/news/20Y4a0000000Q9EAI>

¹¹¹ With a population of approximately 38 million this equates to approximately 51kg of plastic packaging generated per person, which seems high when compared to the UK which has a population of approximately 68 million and produces 34kg per person.

¹¹² <https://plasticspact.ca/wp-content/uploads/2021/10/PPP-Foundational-Research-on-Canadian-Plastics-Packaging-Flows-May-2021-final.pdf>

Table 30: Canada’s Plastic Packaging Recycling Rate by Format and Resin (2019)

	Generated (t)	Recycled (t)	Recycling Rate
Rigid Plastic Packaging	997,548	210,969	21%
PET	212,166	98,255	46%
HDPE	74,862	39,716	53%
PET/HDPE	3,399	2,064	61%
Other ¹¹³	155,954	28,952	19%
Unclassified ¹¹⁴	551,168	41,980	8%
Flexible Plastic Packaging	896,166	8,735	1%
Film	130,607	8,726	7%
Laminates	80,147	10	0%
Unclassified ¹¹⁴	685,412	6,928	1%

In terms of flexible plastic, the top-level figure is a 1% recycling rate, however it seems unclear how they have incorporated the unclassified recycling estimate within the ‘film’ category but not included the unclassified material within the ‘film’ generated to determine their film recycling rate. However even if this anomaly was addressed it would only have a limited effect on the overall flexible recycling rate.

7.3.4. UK

In the UK there are also statistics for the recycling performance of packaging by format, the Valpak ‘PackFlow Covid-19 Phase I: Plastic¹¹⁵’ report breaks down the packaging by format and is shown in Table 31.

Table 31: Summary of UK Plastic Packaging Recycling Rates by Format (2019) (k tonnes, %)

Stream	POM	Recovered Plastic IN	Recycled Resin OUT	Recycling Rate (In)	Recycling Rate (Out)
Consumer Total	1,447k	549k	465k	38%	32%
Consumer PTTs/Bottles	942k	528k	445k	56%	47%
Consumer Film	311k	21k	19k	7%	6%
Consumer Other	194k				
Non-consumer Total	843k	623k	572k	74%	68%
Non-consumer Rigid	477k	162k	145k	34%	30%
Non-consumer Film	354k	462k	428k	130%	121% ¹¹⁶
Non-consumer Other	11k				
Total	2,290k	1,172k	1,037k	51%	45%

¹¹³ Means non-bottle rigid plastic packaging made from resins other than PET and HDPE such as EPS, PP, PS, and PVC.

¹¹⁴ Means plastic packaging for which data by resin was not available.

¹¹⁵ <https://www.valpak.co.uk/knowledge-hub-post/packflow-covid-19-report/>

¹¹⁶ As can be seen from the above table, there is a discrepancy in the recycling rates of non-consumer film (121- 130%). Based on a more feasible recycling rate of 70-80% recycling of non-consumer film, there remains 144- 179k tonnes of non-consumer film recycling that cannot be identified. One explanation for this could be the incorrect allocation of PRN/PERNs against either non-packaging film or non-UK packaging. Alternatively, or in addition, it could suggest that the non-consumer film POM estimate is low.

This shows the plastic packaging recycling rate for the UK in 2019 is between 45% and 51%. If measuring recycling on entry to reprocessing, the UK's plastic packaging recycling rate is estimated at 51% (1,172k tonnes recycled). If measured after conversion on the exit of reprocessing, the rate would be lower at 45% (1,037k tonnes recycled). This puts them amongst the highest performers if compared to countries in the EU.

The UK's performance is underpinned by the Packaging Waste Regulations, which was the UK's first piece of producer responsibility legislation and works on the principle of shared producer responsibility. They require packaging producers (businesses that perform an activity on packaging) to take responsibility for their environmental impact and obligated producers must pay a proportion of the cost of the recovery and recycling of packaging via the purchase of certificates or recycling evidence, otherwise known as Packaging Waste Recovery Notes (PRNs)¹¹⁷. This encourages and financially supports the recycling of plastic packaging beyond that material which is considered the 'low hanging fruit' or financially attractive to ensure more challenging categories of plastics packaging are recycled. Without this or a similar system to support the waste management and recycling sectors in achieving high collection and recycling rates, the UK would not be achieving such positive plastic packaging recycling rates when compared to the highest performing international countries.

In the UK the producer responsibility regime implements the Packaging and Packaging Waste European Directive (94/62/EC). The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (as amended) and 2016 amendments cover recycling and recovery. The Producer Responsibility Obligations (Packaging Waste) (Amendment) (England and Wales) Regulations 2022 cover the updated recycling targets for 2023. The Packaging (Essential Requirements) (Amendment) Regulations 2013 cover single market and design and manufacturing aspects¹¹⁸.

7.3.5. China

Another country that publishes plastic recycling rates include China, which reported a 17.6% plastics recycling rate in 2020, however it should be noted that this includes all plastics and not just plastic packaging and would place it at the low end of the scale when compared to the EU¹¹⁹.

This work will allow for the New Zealand performance to be benchmarked against other countries and will help steer further research into what makes some countries perform better than others.

¹¹⁷ <https://www.valpak.co.uk/knowledge-hub/uk-packaging-waste-regulations/>

¹¹⁸ <https://www.gov.uk/guidance/packaging-producer-responsibilities>

¹¹⁹ <https://www.statista.com/statistics/1257741/plastic-product-recycling-rate-in-china/#:~:text=In%202020%2C%20the%20recycling%20rate,plastic%20products%20remained%20relatively%20low.>

8. Conclusions and Recommendations

This section provides an overview of key conclusions and recommendations for further work.

8.1. Data Overview

A workshop was held with stakeholders to discuss the data provided in a final draft of this report and assign confidence levels to the data. The figure used in this stakeholder meeting was updated following the discussions and is included as Figure 16 (repeated from Section 6.7 for clarity).

8.2. Conclusions: POM

Total Plastic Packaging POM in New Zealand

The total estimate of plastic packaging POM in 2022 in New Zealand is 263,231 tonnes, as seen in Table 33.

The focus for this report was to calculate the plastic packaging POM within the consumer grocery, non-grocery and non-consumer hospitality and back of store sectors, excluding C&D, agriculture, and the C&I manufacturing & other sectors.

The estimate of plastic packaging POM within the sectors in scope of this report in 2022 is 171,348 tonnes. For the purposes of this report, estimates of the packaging POM excluding both packaging in scope of the proposed CRS and milk were calculated. It is estimated that 135,592 tonnes are POM when CRS packaging is excluded and 122,032 tonnes when both milk and CRS packaging are excluded from the total tonnage.

Lack of Producer Reported Data Makes It Challenging to Quantify the Amount of Plastic Packaging POM

This project has highlighted that there are many data gaps within each sector, both within the scope of this project (grocery, non-grocery, BoS and hospitality) and outside (C&D, Agriculture and C&I manufacturing and other), where accurate, reliable data is not available or collected by producers. This has led to difficulties in accurately quantifying the amount of plastic packaging POM and resulted in UK data being used as a proxy to fill in the data gaps to aid the calculation process.

To improve the robustness of POM estimates it is recommended that the Plastic Product Stewardship Scheme includes mandatory systems for collecting accurate data from producers, which can be used for estimating the total POM. This POM estimate can then be coupled with recycling data so that a recycling rate can be identified.

It should be noted that the data collected should be at a suitable level which enables the ability to monitor and manage progress by collecting data at a resin level to support a move away from less recyclable resin types for example. Collecting data at this level also provides material sortation facilities and recyclers with the information they require to plan for the treatment of the material, which will potentially end up at their facilities and allow them to plan investment in expanding recycling infrastructure.

Another aspect of data collection is what type of organisation should receive, audit, and analyse the data. This may be undertaken by a Competent Authority, which can be defined as:

“any person or organization that has the legally delegated or invested authority, capacity, or power to perform a designated function. Similarly, once an authority is delegated to perform a certain act, only the competent authority is entitled to take accounts therefrom and no one else”¹²⁰.

¹²⁰ https://en.wikipedia.org/wiki/Competent_authority

In the UK this function is performed by the Environment Agency, which is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs, supported by one public body¹²². It is important to note that, within the UK system, this competent authority has responsibility for an effective scheme but is not a PRO, compliance scheme or responsible for delivery of successful outcomes within the regulatory system (that responsibility falls on producers).

This competent authority can use the data to publish official figures regarding the performance of the scheme i.e., recycling rates, upon which new targets can be set.

It is imperative to ensure that POM figures are as robust as possible as this allows for accurate target setting and reporting and reduces the risk of volatility within the system.

Regular POM Estimates Required

In the UK and across the EU, producers are currently obligated to report on the total amount of packaging handled (including imports and exports) split by material type (and their role in the packaging supply chain in the case of the UK) on an annual basis. This allows the governments to accurately estimate the flow of packaging placed on to the market and from what sectors this packaging arises.

By obligating producers in New Zealand to collect and report on the packaging that they handle, informed and targeted efforts can be made to help reduce the amount of packaging being set to landfill and minimise packaging POM.

It is important to perform regular updates of POM as this helps regulatory authorities monitor and manage the system to ensure recycling targets are challenging but achievable, and subsequently reducing volatility within the market (certainly in those schemes where an element of competition is introduced as a mechanism to control prices and stimulate innovation).

8.3. Conclusions: Recycling

New Zealand Total Plastic Packaging Recycled in 2022

By adding recycling from the consumer and non-consumer sectors an estimated 28,954 tonnes of plastic packaging were recycled onshore in New Zealand in 2022. If this is added to the quantity of plastic packaging exported for recycling (16,159 tonnes) New Zealand recycled 45,113 tonnes of plastic packaging in 2022.

In/Out of Scope Recycling

It was calculated that of the 21,616 tonnes of non-consumer recycling: 2,493 tonnes came from C&D; 2,374 tonnes came from Agriculture; 6,066 tonnes came from Back of Store; 3,137 tonnes came from Hospitality and 10,944 tonnes came from Manufacturing & Other.

Of the five non-consumer sectors mentioned, only Back of Store and Hospitality were in scope. Therefore, by combining consumer recycling tonnages with non-consumer Back of Store and Hospitality tonnages, it was concluded that 32,699 tonnes plastic packaging recycled was in-scope, while 12,414 tonnes are out-of-scope.

In-Scope Recycling Rate

To calculate the in-scope recycling rate, the total tonnage of in-scope plastic packaging POM (Section 2) was used. The total POM in-scope was 171,348 tonnes while the total recycled in-scope was 32,699 tonnes. This gives a total recycling rate (in-scope) of 19.1%.

¹²² <https://www.gov.uk/government/organisations/environment-agency#:~:text=EA%20is%20an%20executive%20non.supported%20by%201%20public%20body.>

New Zealand Total Plastic Packaging Recycling Rate

The total quantity of plastic packaging POM (In and Out of Scope) in 2022 was 263,231 tonnes. The total quantity of plastic packaging recycled was 45,113 tonnes, therefore when compared to the POM the plastic packaging recycling rate for New Zealand was 17.1%.

The Importance of Caps and Closures to the Total Recycling Rate

Research regarding the quantity of caps and closures indicates that when all plastics are included in the sample i.e., including CRS and milk products these products make up 12.7% of consumer plastics and 7.8% of hospitality (non-consumer) plastics¹²³. If these are applied to the quantities of plastics recycled from these sectors it means that caps and closures account for 3,475 tonnes or 7.7% of the total plastics recycled. Therefore, if caps and closures are removed from the total plastic packaging recycled it reduces the total recycling rate by 1.2% to 15.9%. The inclusion of caps and closures within collection infrastructure will ensure that the associated weight will contribute to any collection targets set as well as creating a more simplistic collection system for the public to follow. This would align to systems in Europe and around the world.

New Zealand Total Plastic and Plastic Packaging Exports 2022

By using the Comtrade database it was identified that 32,143 tonnes of 'Waste, parings, and scrap, of plastics' were exported in 2022. When compared to the known plastic packaging exports, as detailed in Section 4.3, which indicate that at least 16,159 tonnes of packaging were exported, plastic packaging accounted for 50.3% of plastic exports from New Zealand in 2022. The main export destinations are Malaysia, Indonesia, Thailand, China, and Australia.

Lack of Data to Monitor Collection and Recycling

This research has highlighted that there are some significant data gaps which will need to be addressed to be able to fully set up, manage and assess the impact of a plastic product stewardship scheme for New Zealand.

- **Collection**

An exercise to collect information from territorial authorities in New Zealand regarding the collection of plastic packaging identified that many authorities did not collect tonnage data on what is collected or for subsequent sorting and processing. Contracts with MRFs or processors did not usually require operators to provide tonnage breakdown of outputs or final destinations. Due to limited data provided by territorial authorities it was not possible to build a comprehensive dataset that could be used to compare performance by authority or provide robust benchmarks.

As noted in sections 4.1.4 and 4.11, territorial authorities will need to start collecting and reporting domestic waste and recycling data in 2024, with commercial companies collecting domestic waste required to start collecting data in 2024 and reporting it in 2025. For New Zealand to be able to monitor the effectiveness of its recycling collection, sorting and reprocessing infrastructure, this data should be reported by material type and within plastics by resin type.

Territorial authorities currently report amounts sent to landfill and going via transfer stations in the Online Waste Levy System. Such a system could be used for recording domestic waste and recycling collection and treatment in more detail. The UK has been using and developing an online waste database, WasteDataFlow, since 2004 to record municipal waste and recycling collections and subsequent processing and treatment in detail and New Zealand could follow that approach. However, at present it requires a huge amount of manual data compilation.

Implementation of a mandatory digital waste tracking system would allow New Zealand to leapfrog over a manually intensive data gathering stage and instead make use of current technological capabilities to ascertain in real-time or near real-time where waste and recycling is being transported or stored and to extract recycling performance to be able to compare territorial authorities. This could be used to identify good practice in collections or recycling campaigns, which could then be followed by other authorities.

¹²³ <https://www.valpak.co.uk/knowledge-hub-post/recycled-content-in-caps-and-closures-white-paper/>

- **Material Recovery Facilities**

A key hurdle to determining the total quantity of waste collected by MRFs was firstly understanding where MRFs were located and by whom they were owned. Also challenging was establishing which New Zealand districts sent waste to which MRFs, whether this was the nearest located MRF or an alternative MRF with more capacity, a different service or providing a better price but further away.

One of the major challenges was ascertaining how much waste was sent to each MRF, what its material composition was, and how much of this was exported or sent to reprocessors. When capacity or export data for each MRF was publicly available, it was not specific enough (e.g., all materials vs all plastic vs plastic packaging) to allow for aggregating the total tonnages of each material and understanding the fate of each resin type.

Surveys were sent out to major MRF operators and trade organisations; however, response rates were low, and the few responses that were received were sometimes not granular enough for our purposes (with a few exceptions). Understandably, MRF operators may be reluctant to share data that is considered commercially sensitive, but such data is necessary to understand how plastic packaging is moved through the recycling system in New Zealand. Mandatory (and confidential) reporting of this data to a secure system may be a potential future pathway as such data may then be suitable for publication in the aggregate without betraying commercial confidentialities.

- **Recycling**

This report's recycling sections identify New Zealand's largest reprocessors, the most popular resins reprocessed, processing gaps in New Zealand's operations, a resin split of total recycling, processes used and coming expansions in recycling capacity.

It was challenging to identify through research the total quantity of plastic packaging recycled (and by resin) as there was no publicly available database reporting the quantity of plastic packaging recycled in terms of both material recycling onshore and exported for recycling. Therefore, the research had to rely on surveys and interviews to estimate the quantity of plastic packaging recycled and exported for recycling. This approach is reliant on the engagement of all MRFs, reprocessors and exporters who have no obligation to report this data, which could be considered commercially sensitive. This therefore poses a risk to confidently identify the exact quantity of plastic packaging which is being recycled. Although calculations were used to present the most accurate picture the team was able to provide, low response rates and a lack of publicly available data must be considered when discussing this report's total recycling figure.

In the UK, recyclers and exporters report their data to the Environment Agency (EA), or equivalents within devolved administrations, which is then published on the National Packaging Waste Database¹²⁴. This database is then used to identify the total quantity of packaging recycled and exported for recycling, which is used to calculate the UK's recycling rate for each packaging material. As discussed above a similar system in New Zealand would be useful to ensure consistent reporting and monitoring of recycling performance by material. Alternatively, a mandatory digital waste transfer system would capture this information and help guard against stockpiling of materials that are subsequently not recycled.

Regardless of how it is collected, the data collected should be collected at a suitable level (such as by resin), which enables governing bodies the ability to monitor and manage progress as well as allow for planning investment in new recycling infrastructure. The data should be collected by a Competent Authority which can receive, audit, and analyse the data and to use the data to publish official figures regarding the performance of the scheme i.e., recycling rates etc.

Benefit of Including Lids in Recycling Collections

Indicative calculations showed that caps and closures account for approximately 6k tonnes of plastic packaging (when CRS and milk are excluded from the total POM) across the consumer grocery, consumer non-grocery and non-consumer hospitality sectors. Should material specific recycling targets be set, this tonnage can be counted towards hitting targets.

¹²⁴ <https://npwd.environment-agency.gov.uk/>

Including caps and closures within standardised kerbside collections will also result in a more simplistic kerbside recycling scenario that is easier for the public to follow. This should allow for more accurate disposal of waste, improving the quality of waste collected.

8.4. End Markets

Support National Collection and Recycling Infrastructure

A global decline in plastic scrap exports has largely been driven by countries introducing stricter import requirements, which aim to increase the quality of material entering their country, reduce material leakage and support the national recycling infrastructure, it is likely that this global trend will continue, especially across East Asia. This has been reflected in the reduction in plastic scrap exports from New Zealand since 2012.

As it is expected that the global trade in plastic scrap is likely to continue falling, consideration should be given to how a plastic product stewardship scheme for New Zealand could best support the development of national collection and recycling infrastructure. This also helps reduce the reliance on international markets and any volatility for the reasons identified above and other influences that can impact end market dynamics.

Appendix I

Guidance for Setting the Definition of Plastic Packaging – UK

Introduction

This section of the report provides an overview of definitions of packaging from the UK to give guidance on what is included/excluded and why.

The UK has been used as an example due to the project team having access to the details of how it was introduced, how it's developed since its inception and how it is going to change to provide an overview of how the system has evolved.

Guidance can also be found for setting the definition of plastic packaging in Austria^{125, 126} and Germany^{127, 128}. The UK, Austria and Germany were also selected to provide a range of how prescriptive each country is in setting the scope of plastic packaging within their schemes, with the UK being the least complex. Austria takes a pragmatic approach which without undue complexity allows for differentiation between packaging types and recyclability. Germany has a more detailed and extensive prescriptive catalogue of what they include.

This information can help in the setting up and scoping of packaging within a plastic product stewardship scheme for New Zealand to ensure that consideration is given to the wide variety of nuances around packaging. It can also help inform where and how a new plastic product stewardship scheme could be positioned based on available data and regulatory framework in the target country.

Background to UK Packaging Regulations

The original EC Packaging Directive 94/62/EC was introduced in December 1994 and gave European Commission (EC) states a lead in time to transpose the legislation into their own national regulations. Being an EC Directive rather than regulations countries are relatively free to introduce their own regulations if the overall recycling targets are met, and some specific rulings were followed. Therefore, there has been significant variance in each country's system and what packaging they focused their efforts on. Most other countries focused compliance on a single point rather than the UK's shared obligation.

Packaging Definition

Within the Directive the definition of packaging is:

1. 'packaging` shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery, and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable` items used for the same purposes shall also be considered to constitute packaging.

'Packaging` consists only of:

(a) sales packaging or primary packaging, i.e., packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase.

(b) grouped packaging or secondary packaging, i.e., packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics.

(c) transport packaging or tertiary packaging, i.e., packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packaging's in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship, and air containers.

2. 'packaging waste` shall mean any packaging or packaging material covered by the definition of waste in Directive 75/442/EEC, excluding production residues.

¹²⁵ <https://www.ara.at/>

¹²⁶ <https://www.ice.it/it/sites/default/files/inline-files/ARA%20Practical%20Guide.pdf>

¹²⁷ <https://www.verpackungsregister.org/en>

¹²⁸ https://www.verpackungsregister.org/fileadmin/files/Katalog/Guideline_catalogue.pdf

Inclusions and Exclusions

This definition above is wide ranging. However, some specific examples of what was to be counted / not counted and in what circumstances as packaging were detailed in Annex 1 of the Directive and were followed in the UK's introduction of the regulations. A few examples of items mentioned in the Annex as not being packaging are listed below:

1. CD or DVD cases as considered long term storage items.
2. empty clothes hangers when bought in a pack from retailers are regarded as product not as packaging. If sold with clothes, then counted as packaging.
3. Teabags and beverage system coffee capsules were excluded as long as contents didn't dissolve. In the case of coffee pods there were far lower numbers in existence back in 1994 so it wasn't an issue and the pods/sachets that did exist were normally used in vending machines at commercial sites rather than at home.

This Annex remained largely unchanged until the recent reforms. More examples can be found here: [European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste \(legislation.gov.uk\)](https://legislation.gov.uk/eur-parliament/council-directive/1994/62/EC)

Revisions to the UK Regulations

In the UK there have been a small number of revisions to the regulations over the years on items included under the regulations. For example:

- Originally there was no obligation on 'special' producer packaging i.e., primary packaging directly in contact with hazardous goods although it did need to be reported.
- Imported second hand pallets were excluded initially.
- Leased packaging such as Chep pallets were originally exempt.
- Reusable Gas cylinders became obligated on first use.
- Coin bags used by banks were excluded as money was not considered to be a product.

Regulatory Agency Activity

The Environment Agency (EA) as the regulatory Agency for England produced a document 'Positions and technical interpretations: producer responsibility for packaging'. This has been updated several times, with the latest version being 1.19, and can be obtained from the EA NPWD website¹²⁹.

The document sets out guidance/clarifications/technical interpretations made by the agencies across the UK (Environment Agency, Natural Resources Wales, Northern Ireland Environment Agency, and Scottish Environment Protection Agency) on whether an item is packaging or not.

Legal Challenges

Since the regulations were introduced, there have only been a few legal challenges to what and what isn't regarded as packaging. With the costs of the regulations up until the last few years not normally being significant to most producers it has not been worth them challenging. The main example of this dates back to 2000/2001 when there was a challenge over flowerpots which were removed after plants had been supplied to customers¹³⁰.

¹²⁹ <https://npwd.environment-agency.gov.uk/Public/Guidance.aspx?CategoryId=41fc1dbb-47a2-47fd-bb82-4938d83729e0&ReturnUrl=%2fPublic%2fNewsAndGuidance.aspx>

¹³⁰ <https://www.letsrecycle.com/news/court-rules-that-flower-pots-are-packaging-and-subject-to-prn-regulations/#:~:text=General-Court%20rules%20that%20flower%20pots%20are%20packaging%20and%20subject%20to,to%20the%20Packaging%20Waste%20Regulations>

2023 Regulations: Changes to System and Reporting Requirements

The Extended Producer Responsibility (EPR) Regulations, which are in the process of being introduced into the UK have some significant differences to the current regulations:

- Point of compliance changes to brand holder.
- More detailed data required including new packaging categories.
- Additional charges for packaging that normally ends up in the household waste stream.
- Most beverage packaging likely to be covered by Deposit Return Scheme (DRS) eventually.
- Changes to business size threshold requirements. Due to the lower threshold introduced businesses affected will need to review their reporting processes to ensure they capture and report the required data.

Point of Compliance Changes

In 2024 the UK is moving the obligations of producers from the current shared responsibility approach where the costs are split across the packaging chain. Although most companies perform multiple activities:

1. Raw Material Manufacturer (that goes into Packaging)
2. Packaging Manufacturer (Convertor)
3. Packer Filler
4. Seller (Supplier of packaged item to the 'end user' of the packaging)
5. Importer picks up the obligation for the activities completed abroad

The new EPR changes the point of compliance to the brand owner or importer.

Data Changes

The data requirements for EPR are going to require obligated companies to provide more information regarding the packaging they place on the market including¹³¹:

- Packaging activity – this is how you supplied the packaging.
- Packaging type – for example, if the packaging is household or non-household.
- Packaging class – whether the packaging is primary, secondary, shipment or tertiary.
- Packaging material and weight.

Information about which nation in the UK packaging is supplied in and which nation in the UK packaging is discarded in is also required.

Obligations in Future

It is intended in future that all packaging at least for the first few years is to continue to have a Packaging Recovery Note¹³² (PRN) obligation under the new regulations with the exception of packaging covered by DRS once operational (see below). In additional packaging regarded as Household/Household-like will also receive a new EPR fee to cover the collection and recycling costs. While most of the rules and guidance is now in place it is currently a moving situation, therefore there are likely to be some changes in the future.

¹³¹ <https://www.gov.uk/guidance/how-to-collect-your-packaging-data-for-extended-producer-responsibility#what-data-you-need-to-collect>

¹³² Under the regulations, packaging producers can meet their recycling obligations by buying recycling evidence, known as Packaging Waste Recovery Notes (PRNs), or Packaging Waste Export Recovery Notes (PERNs), from accredited reprocessors or exporters (www.letsrecycle.com).

Deposit Return System (DRS)

Packaging that falls under the DRS for each UK country will fall out of scope of the EPR regulations once they are in operation. Until that point packaging will be covered in the regulations. Currently dates are not finalised for introduction of DRS although in Scotland it is planned to start in 2024 after several delays.

Thresholds Reduced

Currently only producers with turnovers of £2 million or more and handling 50 tonnes of packaging are obligated under the UK regulations. In future producers with turnovers with £1 million or more and handling 25 tonnes will be required to register and provide some data, although they won't receive recycling obligations and the associated cost.

New Regulations & Packaging Definition

The introduction of the 'Packaging Waste (Data Reporting) (England) Regulations 2023' requires producers of packaging to collect and report data on the amount and type of packaging that they place on the market in England. This data is required to calculate the fees (which will differ between household and non-household packaging) that producers will be required to pay to cover the cost of managing packaging as part of the Extended Producer Responsibility (EPR) for packaging scheme. Regulation 6 & 7 of the new regulations lays out the new definitions of packaging included.

Packaging and Packaging Categories¹³³

6.—(1) “Packaging”, for the purposes of these Regulations, means all products made of any materials of any nature to be used for the containment, protection, handling, delivery, and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer, including non-returnable items used for the same purposes, but only where the products are—

(a) primary packaging, which is packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase.

(b) secondary packaging, which is packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is supplied as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting the product's characteristics.

(c) tertiary packaging, which is packaging conceived so as to facilitate handling and transport of a number of sales units or secondary packaging's in order to prevent damage from physical handling and transport damage, and for the purposes of these Regulations, tertiary packaging does not include road, rail, ship, and air containers.

(d) shipment packaging, which is packaging, added in addition to primary packaging, on items which are sold online or by mail order which are either delivered direct to the purchaser or collected by the purchaser from a shop or other collection point after they have been purchased.

(2) The following items are also to be treated as packaging on the basis of the criteria set out below—

(a) items that fulfil the definition in paragraph (1), without prejudice to other functions which the item may perform, unless the item is an integral part of a product and it is necessary to contain, support or preserve that product throughout its lifetime and all elements are intended to be used, consumed, or disposed of together.

(b) items designed and intended to be filled at the point of sale and disposable items supplied, filled, or designed and intended to be filled, at the point of sale, provided they fulfil a packaging function described in paragraph (1).

(c) packaging components and ancillary elements integrated into packaging are considered to be part of the packaging into which they are integrated, and ancillary elements hung directly on, or attached to, a product which performs a packaging function are considered to be packaging unless they are an integral part of the product and all elements are intended to be used, consumed, or disposed of together.

¹³³ <https://www.legislation.gov.uk/uksi/2023/219/made>

(3) Schedule 5 to the Packaging (Essential Requirements) Regulations 2015⁽⁸⁾ contains illustrative examples of the rules set out in paragraph (2).

(4) For the purpose of these Regulations, packaging and packaging waste is to be treated, subject to paragraphs (5) and (6), as falling into one of the following packaging categories, depending on the material from which the packaging is made—

- (a) aluminium.
- (b) fibre-based composite materials.
- (c) glass.
- (d) paper or board.
- (e) plastic.
- (f) steel.
- (g) wood; or
- (h) other materials.

(5) Packaging materials composed of a combination of the materials referred to in paragraph (4) (“paragraph (4) materials”) are to be treated as made of the material, which is predominant by weight, unless paragraph (6) applies.

(6) Where packaging materials are composed of a combination of different paragraph (4) materials in equal proportions, each material of which the packaging materials are comprised is to be treated separately for the purpose of these Regulations.

Household Packaging

7.—(1) In these Regulations, “household packaging” is primary or shipment packaging which is not supplied to a business which is the final user of that packaging.

(2) All primary packaging and shipment packaging is to be treated as household packaging unless the producer supplying that packaging can provide evidence that it has been supplied to a business which does not supply to any other person—

- (a) the packaging; or
- (b) the product which the packaging contains in its packaged form.

(3) For the purposes of paragraph (2), a product is to be treated as being supplied in its packaged form unless all packaging is removed from the product before it is supplied to the final user of that product.

(4) The Environment Agency may issue guidance on the evidence which may be used to demonstrate that primary packaging or shipment packaging is supplied to a business which is a final user of the packaging.

Guidance on Household and Household-like Packaging

Further Guidance has been issued to help producers determine what they need to report in terms of household and household-like packaging, which can be found on the Gov.UK website¹³⁴. It should be noted that this guidance and the regulations are still evolving and could still change. Currently the regulations and guidance are implying that any primary and shipment packaging should be classified as household packaging unless a producer has evidence that this packaging is ending up with a business. For example, an Intermediate Bulk Container (IBC) that is clearly for industrial use could fall under the household category as it is primary packaging.

Organisations affected by extended producer responsibility (EPR) for packaging must collect and submit data regarding household and non-household packaging.

¹³⁴ <https://www.gov.uk/guidance/how-to-collect-your-packaging-data-for-extended-producer-responsibility#household-and-non-household-packaging>

Household Packaging is Classified As:

- Primary packaging
- Shipment packaging

If a producer supplies primary or shipment packaging to a business which supplies it on to another business or an end-consumer, with any packaging included, all packaging should be reported as household packaging. For example, if a producer supplies packaging to a business through a third party such as a distributor or wholesaler.

If a producer has clear evidence that some of its primary and shipment packaging is supplied directly to a business that is the end user of all the packaging, it does not need to report it in this category.

Non-household Packaging is Classified As:

A producer should class the following packaging as non-household packaging:

- Secondary packaging
- Tertiary packaging

A producer should also class primary or shipment packaging as non-household packaging if it supplies it to a business which is either of the following:

- The end-consumer of the goods contained in the packaging.
- An organisation that supplies the goods to an end-consumer with all of the packaging removed.

A producer needs to be able to show evidence of this. If it cannot, it must class this packaging as household.

How to Provide Evidence That Something is Non-household Packaging

The environmental regulator will review and assess the evidence of whether the packaging is household or non-household. The producer is required to keep this evidence for at least seven years.

Evidence for Specialist Goods That Are for Business Use Only

This applies to bespoke or specialist goods where the end-consumer could only be a business. The end-consumer is also producer's customer. In this case, evidence could include:

- Bespoke product specifications.
- Invoices (with VAT numbers to evidence business accounts).
- Customer contracts.

Evidence for service or maintenance contracts

This applies to products that are part of a direct supply arrangement. For example, an organisation may supply a product as part of a service agreement. In this case, evidence could include:

- Service contracts.
- Stock replenishment reports.

Other evidence

In addition to the evidence listed above a producer may use customer confirmations as a source of evidence. A customer confirmation should demonstrate that the producer's direct business customer is the end user of the primary and shipment packaging, or they do not supply it on to anybody else.

The producer should also use customer confirmations if they aren't able to provide any of the evidence listed. This evidence could include:

- Supply contracts.
- Written customer confirmations (making it clear that the customer you supplied the packaging to is the end user)

Historical issue of Municipal Waste Definition

There has long been an issue in the UK of what is included as household/household like waste and what is considered commercial/business waste. This can be highlighted by the UK's traditional definition of 'Municipal Waste' which has differed from most of the rest of Europe.

Due to this difference, it was difficult to compare UK waste statistics with other European countries. In the UK it has traditionally been seen as waste collected by Local Authorities. However, the European Landfill Directive includes household waste and that which is similar in nature or composition which clearly includes a significant amount of waste generated by businesses and not collected by local authorities. Therefore, a compromise was made in 2010 after a consultation as it impacted on EU Landfill diversion targets in England. For more details: <https://www.gov.uk/guidance/local-authority-collected-waste-definition-of-terms>

Appendix II

New Zealand Exports of Plastics by Comtrade Sub-Code

Table 32: New Zealand Plastic Scrap Exports by Comtrade Sub-Code (kg)

Comtrade Code	391510 (Ethylene resins; waste, parings and scrap)		391520 (Styrene resins; waste, parings and scrap)		391530 (Vinyl chloride resins; waste, parings and scrap)		391590 (Plastics n.e.c. in heading no. 3915; waste, parings and scrap)	
United Nations Comtrade Mapping to Resins	HDPE, LDPE, LLDPE, PET, PP, PUR, Elastomers (tyres)		PS		PVC		Fibres, Marine Coatings, Road Marking Coatings, ABS, ASA, SAN, Other	
TOTAL	World	21,665,111	World	17,660	World	World	World	10,460,649
	Indonesia	8,395,730	Malaysia	17,660			Malaysia	4,020,210
	Malaysia	6,536,180					China	2,803,480
	Thailand	3,048,230					Indonesia	984,280
	Australia	1,527,580					Australia	848,210
	Other Asia, (not elsewhere specified)	1,042,010					Thailand	783,052
	USA	326,630					China, Hong Kong SAR	418,170
	China, Hong Kong SAR	296,841					Other Asia, (not elsewhere specified)	271,064
	China	231,570					Viet Nam	258,273
	Portugal	138,760					Portugal	49,430
	Viet Nam	40,290					USA	24,480
	Italy	37,730						
	Netherlands	23,020						
	Lao People's Dem. Rep.	20,540						

Appendix III

Total Plastic Packaging POM

Table 33: Total Plastic Packaging Estimated POM within New Zealand in 2022 (CRS and Milk Packaging Included)

Sector	POM (t)
Grocery	107,228
Non-Grocery	33,318
C&D	7,333
Agriculture	3,544
C&I Retail (BoS)	7,582
C&I Hospitality	23,220
C&I Manuf. + Other	81,006
TOTAL	263,231