

Issues Paper – Kerbside Recycling and Recycling Markets

There is a public perception that recycling is ‘free’, yet behind the scenes of Auckland Council’s kerbside recycling service, there is a complex array of local and international economic and regulatory mechanisms affecting council’s ability to plan for and finance its collection service.

These factors include: fluctuating global commodity prices; waves of competition from other countries to get material into over-saturated markets; increasing quality standards and the need to remove non-conforming materials (‘contamination’); limited capacity for NZ-based processing; shipping constraints and an increasing number of international import and export bans via treaties such as the Basel Convention, and 2018 implementation of China’s National Sword policy. These factors all add cost and complexity to the kerbside service.

Having local reprocessing capacity for recyclable materials in Auckland and NZ helps support the resource recovery sector. Recycling of glass, paper and plastics occurs in NZ, however we rely heavily on other off-shore markets also. New Zealand is not geographically close to all offshore recycling markets, and NZ’s resource recovery sector tends to concentrate exports to India, South Korea, Malaysia, and Indonesia. Shipping adds significant cost and vulnerability to the process. Yet as a small nation, the economic rationale for increasing the capacity of existing plants or building new recycling processing plants, does not always stack up either.

There is perhaps an even stronger argument here - more so than Europe, Asia or the US - to therefore reduce packaging consumption and create reuse systems which can reduce our reliance on expensive recycling solutions that are vulnerable to geopolitical shocks.

Aside from a non-specific target in the recently released National Waste Strategy to reduce the amount of material than needs final disposal by 30 per cent per person, New Zealand does not have any specific recycling targets for post-consumer packaging waste collected at kerbside.

There is also a broad statement by MFE that by 2030, the government wants to introduce minimum performance standards for councils to achieve at least 50 per cent of household waste to go into recycling and food scrap bins rather than ending up in landfills¹, however this does not mean all of this material will actually be recycled. Transporting household materials collected at kerbside to a Materials Recovery Facility (MRF) - where recyclables are separated into different material types and contamination removed - is just the first step in a long chain of interdependent factors that does not always mean higher value, tradable commodities and products are generated.

Auckland’s Materials Recovery Facility (MRF)

Significant ongoing investment is required to operate and maintain a MRF to produce clean material that meets standards accepted by local and overseas markets. Auckland Council recently received \$16.6 million from central government’s Covid 19 Response and Recovery Fund to upgrade

¹ <https://environment.govt.nz/assets/publications/Improving-household-recycling-and-food-scrap-collections.pdf>

Auckland's MRF, which is currently owned and operated by Visy Recycling MRFS (NZ) Ltd, and where all of council's kerbside material is taken to be sorted. The MRF is located in Onehunga and transfers to council ownership in 2024, at which time it will continue to be operated under a new contract with council. The upgrade was completed in 2022 and increased the processing capacity of the facility and invested in technology with capabilities to more accurately sort recyclable materials into additional categories (i.e. cardboard is separated from mixed-paper materials, and plastics are separated into five different types of plastic resins).

Currently the MRF receives all materials collected from council's kerbside and a small quantity (less than 5%) from commercial collections and other councils. The vast majority of materials sorted at a MRF is packaging, with the exception of paper materials which can be both packaging as well as materials that are used for information (newspapers/office paper/flyers/magazines etc). Contamination rates have not gone below 15 per cent in recent years, and this is a challenge increasingly difficult to address as MRFs are not designed to process waste. In 2023, the Government provided direction on a standard set of recyclable materials that all councils will be required to collect via household kerbside collections from February 2024. National consistency for household recycling collections assists with creating educational campaigns to help reduce contamination, increase quality of material, and support the recovery rates of recyclable materials.

Contamination in kerbside collections

While countries such as Germany and Japan demonstrate their citizens are prepared to put in the time and effort to achieve high rates of clean, single stream recycling that retain the value of a recycling system², New Zealand faces quite different cultural and socio-economic drivers that can impact our communities to fully engage with the system and adopt messages around 'recycling right'. As a result, NZ has significant levels of recycling bin contamination that puts the quality of recyclable commodities at risk and negatively impacts the MRF operation and its staff. Auckland's MRF is designed and operated to identify and separate recyclable materials. Contamination that enters the facility causes disruption and/or damage to the process and the MRF equipment, presents health and safety risks to staff who operate the MRF, as well as compromising the quality of sorted recyclable material and increasing costs for Auckland's ratepayers.

Common materials that are considered 'contamination' include bagged rubbish and recycling, textiles, soft plastics, nappies, and food and liquids. Sorting processes also need to be sufficiently accurate to ensure minimal 'non-conforming' materials³ end up within a specific recyclable stream. Contamination reduces the value of the quality material the MRF relies on to sell in order to cover some of the costs of recycling. The costs to first separate and then landfill these additional materials adds to the targeted rates ratepayers are charged to cover the cost of recycling.

End markets for kerbside recycling

² [How Japan is using the circular economy to recycle plastics | circulareconomy.earth | Chatham House](#)

³ non-conforming could be contamination (i.e. materials that should be placed out for kerbside collections) or recyclable materials that end up in the wrong material stream (e.g an aluminium can contained in a bale of cardboard).

Kerbside collection service providers (councils and private operators) and MRF operators independently source and secure their own market arrangements for the materials collected and sorted within each region. For this reason, councils and commercial recyclers can be competitive with one another, and protective of arrangements they have with on-shore or offshore processors. Contractual arrangements often lock-in markets for long term periods to provide security and prevent councils/operators from being left exposed, with large volumes of material unable to shift to markets at short notice.

The Auckland MRF operation generates revenue from the recyclable commodities it sells which provides income to offset some operational costs. The existence of viable markets is a key feature to sustain resource recovery operations, as material value will enable and drive material recovery. However, in the recycling sector the development of markets for less valuable materials is an important way to stimulate further recovery, and this could happen through different policy initiatives, such as developing standards for material and recycled products, mandatory recycled content, or procurement policies. In other cases, phase-outs of low value and difficult to recycle materials and exploration of alternatives, such as reusables, may be the most appropriate.

A report published by the Ministry for the Environment in 2023 provides a stocktake of national resource recovery infrastructure and discusses end-markets for key recovered materials. The research was undertaken by Eunomia Research and Consulting in 2020/2021 and a common theme identified in the report was the debate regarding the merits of local versus export markets for recyclable commodities. For a number of materials, in particular fibre and plastics, the potential for greater levels of onshore re-processing in NZ to add value to materials is under careful consideration. The expectation is not necessarily that there will be more end uses found for recycled materials in NZ, but that recovered material will be re-processed to a higher standard and therefore able to find end markets more readily, whether local or export⁴.

End-markets for the different materials collected and separated at the Auckland MRF are discussed in the following sections.

Plastics

The majority of the sorted plastic types at the Auckland MRF (approximately 6500 tonnes per year) are polyethylene terephthalate (PET, #1) and #2 high-density polyethylene (HDPE), followed by #5 polypropylene (PP) packaging. As with all commodities, prices for recyclables fluctuate, however separated plastics have a high range, typically between \$50/tonne (or less) to \$1000/tonne depending on the plastic type⁵. The resin type that typically maintains the highest value is HDPE ('natural'), followed by PET (clear), then HDPE (coloured), and PP (coloured). PET (coloured) material has low recycling value and few markets and is considered non-recyclable in some countries, such as Australia.

Prices for HDPE materials that have no colour (referred to as 'natural') can sell for approximately double the value obtained for coloured HDPE material. Because natural HDPE and clear PET do not contain any colour, they can be used to manufacture a greater range of recycled plastic products. Coloured HDPE plastics have lower value as the colour in the plastic limits the range of possible

⁴ <https://environment.govt.nz/assets/publications/Waste/Waste-and-resource-recovery-infrastructure-and-services-stocktake-Project-summary-report.pdf> page 142

⁵ <https://www.letsrecycle.com/prices/plastics/plastic-bottles/plastic-bottles-2022/>

reprocessing applications. Local reprocessing options exist in NZ for PET, HDPE and more recently PP materials, via a handful of reprocessors⁶, although total processing capacity is limited.

Approximately 5 per cent of all of plastics collected through the council kerbside collection, get disposed to landfill. This tends to be dirty containers that have resin codes 1, 2 & 5 and resin codes 3, 4, 6 and 7 which have no markets in NZ or offshore and constitute small quantities of packaging materials, as well as representing some of the materials that are being phased-out by recent government regulations.

Despite certain public perceptions that plastic drink or food containers are reprocessed back into the same type of plastic container, closed loop or container-to-container plastic recycling does not exist in NZ for the majority of food-grade plastic containers collected in kerbside collections. For certain higher value plastic resins (e.g. clear #1 PET and natural #2 High Density Polyethylene, HDPE) this closed-loop recycling is becoming increasingly possible⁷, however the capability in NZ and off-shore remains limited and more often these plastics are recycled into non-food grade plastic products or packaging. This is due to a number of reasons, one being that food grade plastics and plastics that have previously contained janitorial or other non-food products cannot be reprocessed together without expensive, specialised technology. Residue from products previously contained in plastic containers, for example bleaches or detergents, mean that such plastics cannot be used again to contain food. MRFs typically use automated equipment to separate plastic containers into different plastic types by identifying the resin type and/or container shape. MRF equipment cannot determine whether a container has once contained food or non-food products. To generate plastic recyclate for use in food-grade packaging, plastic reprocessing plants need to utilise newer technologies that can refine the separation of different post-consumer plastics received from MRF suppliers, as well as invest in specialised washing and deodorizing processes. Further barriers to creating sustained closed-loop plastic recycling relate to the low cost of raw virgin plastic resin feedstock, which is still cheaper than recycled material⁸, and the limited number of times a plastic material can be reprocessed and reformed using mechanical recycling processes.

Product packaging is not often designed for ease of sorting or recycling. Products come in a wide array of resin types, mixed and coloured plastic containers with labels, sleeves and adhesives that all reduce the ability of that package to be recognized and recovered inside an automated system. Coloured resins can only be dyed black in order to recycle them into another product, reducing their circularity. This often results in coloured resins or containers that have held chemicals such as bleaches and soaps being downcycled into durable plastic products such as pipes or electrical cable covers.

Constraints on transboundary exports of plastics introduced in 2021 via the Basel Convention Amendments on Plastic Waste has increased the scrutiny of plastic bales destined for recycling offshore. Mixed plastic bales, PVC, and plastics that are contaminated require an export permit to leave New Zealand, adding complexity and cost to the process. Currently it is the Environment Protection Authority which carries out the function of assessing and issuing Prior Informed Consent

⁶ Refer to Auckland Plastics Report (Eunomia, 2023) and <https://www.replastics.nz/read>

⁷ Flight Plastics in Wellington, owned by Pact Group, is the only reprocessing operation in NZ that reprocesses #1 plastic bottles/trays etc into other food-grade plastic packaging forms (but not bottle-to-bottle). While there is also recycling of non-food grade plastics packaging (e.g. janitorial bottles) happening in NZ, food-grade bottles that contain recycled content may be manufactured in NZ but uses food-grade recycled plastic resins imported from overseas.

⁸ <https://www.sustainability.com/thinking/creating-a-circular-economy-for-plastics/>

(PIC) permits. The Auckland MRF does not require permits as none of these plastic types are exported from the Auckland operation.

According to the Plastics Europe Circularity Report, plastic recycling rates are thirteen times higher, when material is separated by type⁹. The benefits of consumers being incentivised to empty, clean and divert a portion of the plastic containers through the government's proposed Container Return Scheme (instead of via kerbside collections) are some of the reasons Auckland Council is a strong advocate for such a scheme. While recycling is one part of a circular economy for some product packaging types, it cannot close the loop on plastic consumption overall or reduce the quantity of plastic packaging being manufactured and waste generated. Research conducted for Auckland Council by Eunomia in 2023 found only 13% of all plastics used in Auckland within a year are recovered for reprocessing/recycling.

While plastic packaging offers numerous functions and benefits, significant environmental harms result which are only now starting to be addressed at an international level as part of the Global Plastics Treaty¹⁰. At a national level, in 2021 the NZ government developed a National Plastics Action Plan and established a Plastics Innovation Fund¹¹, which followed on from recommendations in the Chief Science Advisor's Rethinking Plastics 2019 report¹² - a research project that Auckland Council contributed to. Funding for several initial Plastics Innovation Fund projects were announced by the MfE in September 2022, including funding to the Packaging Forum and Food & Grocery Council to lead the design of a national product stewardship scheme for plastic packaging.

Auckland Council plays an advocacy role in supporting these various government initiatives, from providing input on Treaty negotiations to contributing to the design of the product stewardship scheme for plastic packaging. We also see a role for council and recycling industry representatives advising brands on packaging choices to meet MRF operational requirements and end-market standards. Auckland Council continues to advocate to strengthen government proposals to reduce plastic waste, including:

- supporting the phase-out of hard to recycle plastic at the packaging design stage
- complying with national regulations on standardising kerbside recycling
- advocating for reusable packaging materials to avoid single-use packaging
- advocating for recycled content to be used in plastic products/packaging
- supporting the development of recycled and reusable packaging systems through the WMIF grants, council projects and procurement processes

These measures all support the market shift to using more high-value materials, coupled with greater investment in recovery infrastructure.

Paper and Cardboard

Like plastic, there is competition within and between councils and recycling agents in New Zealand for access to local and international paper and cardboard recycling markets. All paper and cardboard

⁹ https://plasticseurope.org/wp-content/uploads/2022/06/PlasticsEurope-CircularityReport-2022_2804-Light.pdf p23.

¹⁰ <https://environment.govt.nz/what-government-is-doing/international-action/towards-a-global-treaty-to-combat-plastic-pollution/>

¹¹ <https://environment.govt.nz/news/acting-on-plastic-waste-the-government-releases-its-national-plastics-action-plan/>;

¹⁸ <https://environment.govt.nz/news/four/>

¹² <https://www.pmcsa.ac.nz/topics/rethinking-plastics/>

sorted at the Visy MRF in Auckland is shipped offshore for reprocessing (approximately 55,000 tonnes per year). This is due to two main reasons – i) quality standards required by the main reprocessing plant in NZ owned by Oji Paper and located in Penrose, and ii) Oji's plant receives sufficient feedstock from supply agreements with other NZ recycled paper suppliers. If Auckland's supply was provided to the Penrose plant this would result in large quantities of paper/cardboard collected elsewhere in the country having no local market.

Shipping offshore adds significant cost and uncertainty to the MRF operation. The recycled paper trade is at times vulnerable to global geopolitical shocks, such as the European energy crisis which has seen paper mills across Europe shut down due to restrictions on natural gas from Russia. Impacts during the peak of the Covid-19 pandemic also included closed mills across the world and reduced access to shipping.

For mixed paper in particular, the net value received for this material over the past couple of years by the Auckland MRF operation has often fallen below zero. On principle, the MRF owner/operator and Council continue to commit to finding recycling markets for the recyclable materials, even though landfilling can often be the cheaper option. In 2018/2019 Auckland Council commissioned research to investigate the feasibility of establishing additional capacity for the onshore reprocessing of recovered mixed fibre, which then contributed to later national investigations led by the Ministry for the Environment on the same issue. By separating out cardboard materials as part of MRF upgrades undertaken in 2022 (using government funding received via the Covid 19 Response and Recovery Fund), the MRF is now able to obtain higher prices and access more markets for the separated cardboard materials.

Glass

Like plastic and paper/card, there is competition within and between councils and recycling agents in New Zealand for access to end-markets for recovered glass. Compared to other recyclable commodities however, there is only one glass processing plant within NZ (owned by Visy in Auckland) and no easily accessible off-shore markets for glass materials. The amount of packaging glass used in New Zealand is approximately double the capacity of the glass furnace at the Visy Glass plant.

All of the glass material collected via council kerbside collections is separated out in the first stage of the MRF operations (approximately 45,000 tonnes per year), and sold to Visy who operate a beneficiation plant situated at an adjacent site. Here, Visy receives glass from other suppliers around the country, and the glass material is cleaned and sorted into colour fractions. About half of the glass materials from the Auckland MRF is taken to the Visy Glass plant for reprocessing into glass packaging, and the remaining material is used for other purposes including aggregate and sand as well as some disposed to cleanfill. Some of this 'glass' material is also the wrong glass types (i.e. crockery, mirror, window) or other contamination.

Metals

Quantities of steel and aluminum cans/packaging received at the MRF (approximately 5000 tonnes per year) are not significant compared to annual quantities of fibre and glass, however the price per tonne received for the materials is relatively high. For example, aluminium cans can receive up to \$2000/tonne. A small quantity of recovered ferrous metal (iron/steel) is starting to be reprocessed within New Zealand, although the vast majority and all the non-ferrous material, is exported to offshore reprocessing plants and end-markets. All metal materials collected and separated at the

MRF operation are exported to off-shore markets within the Asia-Pacific region such as aluminium to South Korea.