

# The Truth about Plastic Recycling in Aotearoa New Zealand in 2020

Based on research funded by WasteMINZ Territorial Authorities' Officers Forum and the  
Ministry for the Environment's Waste Minimisation Fund

## The Truth about Plastic Recycling in Aotearoa New Zealand

We like to think of ourselves as a nation of committed recyclers, but new research shows there's significant room for improvement. Individual recycling behaviour, as well as product design and collection issues, are all reasons we are not as good at recycling as we could be.

The WasteMINZ Territorial Authorities' Officers Forum (TAO Forum) has received Waste Minimisation Funding for a project that aims to reduce contamination in household kerbside recycling and to promote resource reuse and reduction messages. Research was undertaken via an audit of domestic kerbside rubbish and recycling bins at eight locations<sup>1</sup> across Aotearoa New Zealand. The study gathered baseline information on recyclable materials that are disposed of by households via private and council-provided domestic kerbside rubbish and recycling collections.

The audits included rubbish or recycling (or both) from a total of 867 households and the results were extrapolated to the total population of Aotearoa New Zealand. This is the first time this type of analysis of recycling and rubbish has been carried out at a national level and at the level of detail of these audits. The results of the research have been divided into three separate reports. This first report focuses on plastic recycling.

Research results show that the average Kiwi household uses 941 plastic containers or bottles per year (extrapolated, this suggests there is an estimated 1.76 billion containers per annum from all households). Of these, 41 per cent by item count could potentially be recycled, but instead end up in landfill. The reasons for this are myriad and complex.








<sup>1</sup> Statistical background:

- 867 households in 8 locations Whangarei, Auckland, Lower Hutt, Dunedin, Clutha, Gore, Southland and Invercargill had their rubbish and recycling analysed with the results extrapolated to provide national figures.
- All statistics relate only to household rubbish and recycling bins (kerbside collections).
- All items have been analysed by both tonnage and item count.
- Swedish rounding has been applied to round up from 0.5 and above.

## Reason #1: Plastic Confusion

One reason plastic recyclables end up in landfill instead of being recycled is due to confusion as to whether a plastic is recyclable.

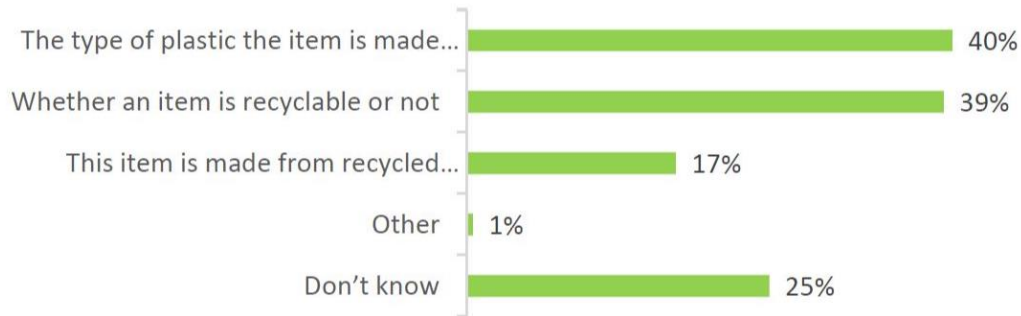
Many plastics have a code on them that identifies the type of plastic they are made from. These plastic ID codes were designed for industry, not the public, so that plastic types could be readily identified, sorted and separated at material recovery facilities and recycling facilities. The plastic codes are a number (i.e. 1, 2, 3 etc) inside a 3-arrow symbol. The arrow symbol was originally designed to indicate an item could potentially be recycled. However, the adoption by the plastics industry of the three-arrow loop to surround the plastic code has created confusion amongst consumers ever since.

SYMBOL	TYPE OF PLASTIC	PROPERTIES	COMMON USES
 PET	<b>PET</b> Polyethylene Terephthalate	Clear, tough, solvent resistant, barrier to gas and moisture, softens at 70°C	<b>Soft drink and water bottles</b> , salad domes, biscuit trays, salad dressing and peanut butter containers, <b>fleece clothing</b> and geo-textiles
 HDPE	<b>HDPE</b> High Density Polyethylene	Hard to semi-flexible, resistant to chemicals and moisture, waxy surface, opaque, softens at 135°C, easily coloured, processed and formed	Crinkly shopping bags, freezer bags, <b>milk bottles</b> , ice cream containers, juice bottles, shampoo, chemical and detergent bottles, buckets, rigid agricultural pipe, <b>milk crates</b>
 PVC	<b>PVC</b> Unplasticised Polyvinyl Chloride PVC-U  Plasticised Polyvinyl Chloride PVC-P	Strong, tough, can be clear, can be solvent welded, softens at 75°C  Flexible, clear, elastic, can be solvent welded	<b>Cosmetic containers</b> , electrical conduit, <b>plumbing pipes</b> and fittings, blister packs, wall cladding, roof sheeting, bottles  Garden hose, shoe soles, cable sheathing, blood bags and tubing, watch straps, commercial cling wrap
 LDPE	<b>LDPE</b> Low density Polyethylene  <b>LLDPE</b> Linear low density Polyethylene	Soft, flexible, waxy surface, translucent, softens at 80°C, scratches easily	<b>Cling wrap</b> , rubbish bags, squeeze bottles, black irrigation tube, black mulch film, rubbish bins, <b>shrink wrap</b>
 PP	<b>PP</b> Polypropylene	Hard but still flexible, waxy surface, softens at 145°C, translucent, withstands solvents, versatile	<b>Dip pottles</b> and ice cream tubs, potato chip bags, straws, microwave dishes, kettles, garden furniture, lunch boxes, blue packing tape, <b>automotive parts</b>
 PS	<b>PS</b> Polystyrene	Clear, glassy, rigid, brittle, opaque, semi-tough, softens at 95°C. Affected by fats and solvents	CD cases, plastic cutlery, imitation 'crystal glassware', low cost brittle toys, video cases, <b>water station cup</b> , <b>safety helmets</b>
 EPS	<b>EPS</b> Expanded Polystyrene	Foamed, light weight, energy absorbing, heat insulating	Foamed polystyrene hot drink cups, hamburger take-away clamshells, <b>foamed meat trays</b> , protective packaging for fragile items, insulation, <b>insulation panels</b>
 OTHER	<b>OTHER</b> Letters below indicate ISO code for plastic type including SAN (styrene, acrylonitrile), ABS (Acrylonitrile butadiene styrene), PC (polycarbonate), Nylon, degradable plastic e.g. PLA	Includes all other resins, multi materials (e.g. laminates) and degradable plastics. Properties dependent on plastic or combination of plastics	<b>Packaging</b> , car parts, appliance parts, <b>computers</b> , electronics, water cooler bottles, medical devices,

Research conducted by the TAO Forum in 2018 found that only 40 per cent of the population correctly understands what the plastic code symbols mean.

Base: All respondents (n=1,005)

**Q3: What does the following symbol indicate when you see this on packaging?**  
Tick all that apply



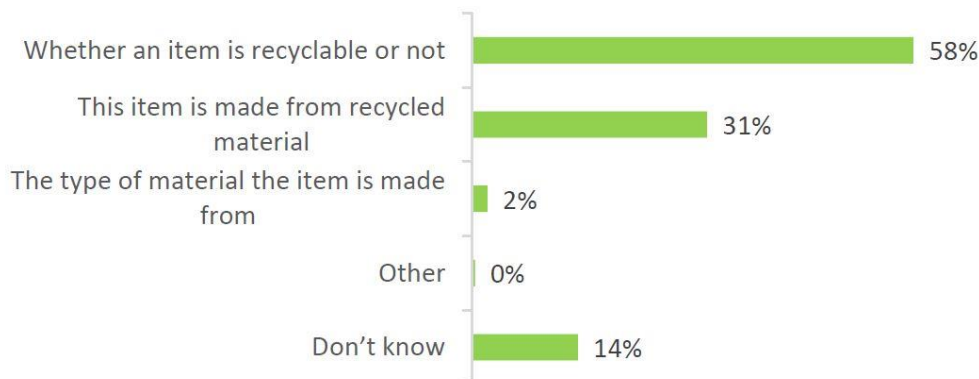
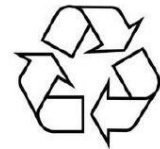
#### Understanding of plastic identification symbol

There is similar confusion when it comes to the international recycling symbol, which is a thicker 3 arrow symbol without a number inside. Only 58 per cent of respondents correctly understood what it meant.

#### Symbol indicating item is recyclable

Base: All respondents (n=1,005)

**Q4: What does the following symbol indicate when you see this on packaging?**  
Tick all that apply



#### Understanding of international recycling symbol

The lack of understanding about what the plastic code symbol represents is exacerbated by the annual consumption of approximately 182 million containers (5,736 tonnes) used by New Zealand households that do not have a plastic code on them. Consumers need clear, standardised, national labelling that goes beyond the current plastic identification system.

**Recommendation: NZ Manufacturers need to improve the labelling of their products. In the short term they should ensure that all plastics that can be readily recycled are clearly labelled with their plastic code (i.e. it needs to be seen and read easily by the consumer). In the longer term, both manufacturers and the government should investigate the adoption of national labelling such as the Australasian Recycling Label or similar.**

## Reason #2: Not all plastics are readily recyclable

All councils in Aotearoa New Zealand accept bottles made from plastics 1 and 2 in household or free drop-off collections, except for the Chatham Islands, who only accept plastics 1.<sup>2</sup>

Bottles made from plastics 1 and 2 are widely accepted in kerbside recycling because there are high volumes of these materials and they are easily recycled and turned into other useful products, both in Aotearoa New Zealand and offshore. If the plastic is of high quality, it can be recycled back into the same product e.g. plastic drink bottles can be recycled back into plastic drink bottles. Plastics 1 and 2 can be recycled an estimated six to seven times before no longer being recyclable.

Other plastics are not as widely accepted in kerbside collections in Aotearoa New Zealand:

- 36 councils out of 67 take plastics 6 and 7;
- 42 accept plastics 3 and 4;
- 44 accept plastics 5.

The reason for this is plastics 3, 4, 6 and 7 are more difficult to recycle into other products, which affects the value of these materials in international commodity markets. These plastics baled on their own currently have a negative market value. The low volume of materials collected from around Aotearoa New Zealand, due to our relatively small population, combined with the distance from overseas export markets, makes collection difficult, and increases our sorting and transportation costs which can't be offset by the commodity market price. In order to sell these materials on international markets and recover costs, higher value plastics, such as coloured HDPE (plastic 2), are added to the bales.

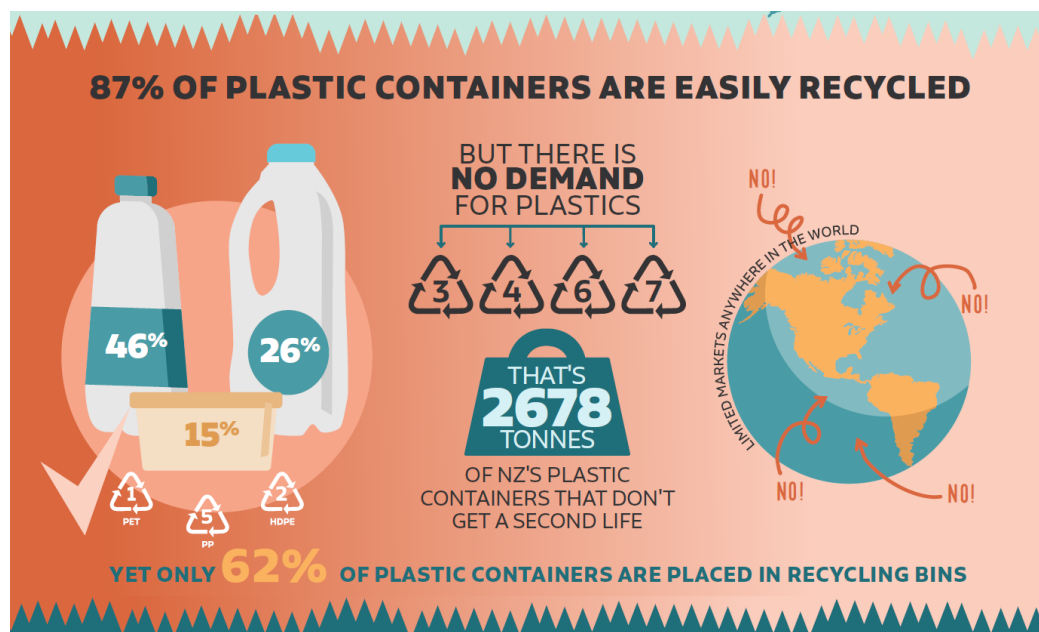
**Table 1: Plastic bottles and containers in kerbside rubbish and recycling per annum**

Plastic containers in kerbside rubbish and recycling	Tonnes collected via kerbside rubbish in NZ per annum	Tonnes collected via kerbside recycling in NZ per annum	Total tonnes collected in kerbside rubbish and recycling in NZ per annum
Drink containers #1	4,042	13,003	17,045
Other containers #1	6,744	7,194	13,938
Dairy containers #2	1,757	7,861	9,618
Other containers #2	3,305	4,506	7,811
Containers #3	49	84	133
Containers #4	78	160	238
Containers #5	4,947	5,169	10,115
Containers #6	1,073	642	1,716
Containers #7	196	395	591
Unidentifiable containers	3,565	2,171	5,736
Bottle tops and lids (loose)	1,411	1,087	2,498
<b>TOTAL plastic containers</b>	<b>27,166</b>	<b>42,272</b>	<b>69,438</b>

Products such as tomato sauce, biscuits, sushi, yoghurt, sour cream and cream cheese are items that are commonly packaged in the more difficult to recycle plastics 3, 4, 6 and 7. Many of these items could potentially be packaged in more easily recyclable plastics.

<sup>2</sup> Most councils accept all containers made from Plastics 1 and 2 with only one accepting bottles-only.

Plastic 7 category means “other” and can include compostable rather than recyclable plastics, such as those made from polylactic acid (PLA). If captured in a recycling system, these compostable plastics can cause problems as they get mixed in with the recycling and affect the quality of plastic recycling. Plastics 7 are sometimes sold overseas in mixed plastic bales but, because of their variability and low volume, their value is negligible.



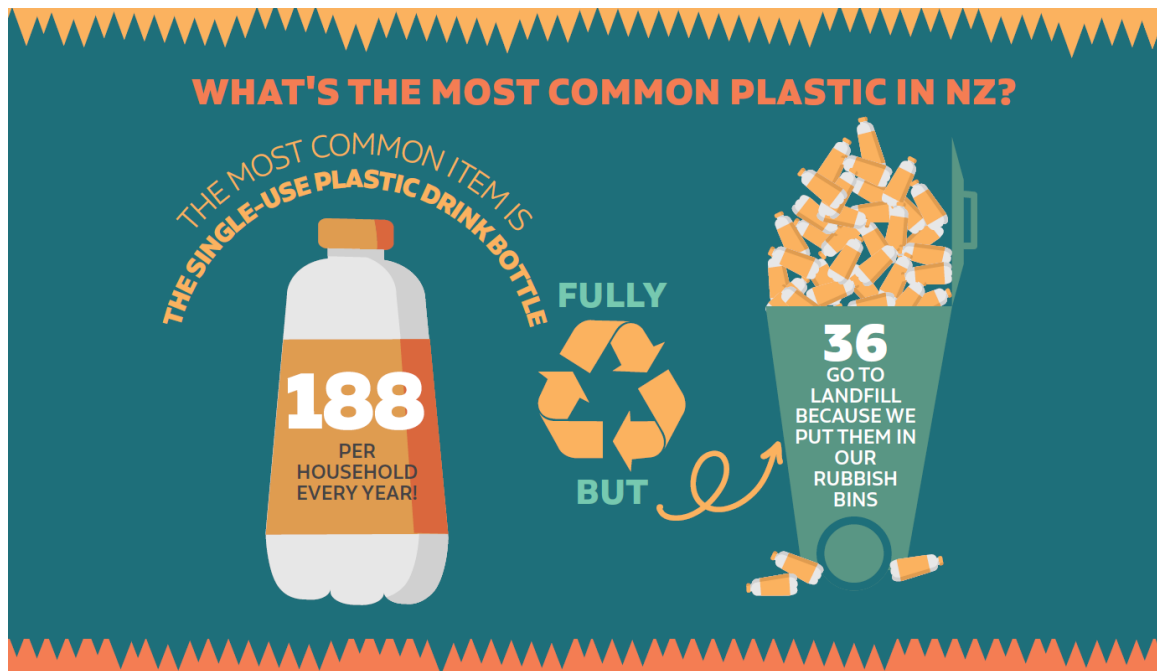
Historically, plastic number 5 was also treated as a lower value plastic and bundled together with plastics 3, 4, 6 and 7 in mixed plastic bales. However, onshore opportunities for recycling this plastic have been identified and the bin audit research shows that the tonnage of plastic 5 being collected is sufficient to investigate separation and baling of these for recycling. Currently, 5,169 tonnes of plastic 5 are collected for recycling per annum with an additional 4,947 tonnes being collected in kerbside rubbish. Recyclers and councils in Aotearoa New Zealand are beginning to explore how plastic 5 can be separated out and baled for recycling.

**Recommendation: Manufacturers redesign product packaging currently manufactured from plastics 3, 4, 6 and 7 and look to see if other materials including plastics 1, 2 and 5 are suitable alternatives. Councils investigate collecting plastic 5 as it can be recycled onshore and recyclers investigate how their material recovery facilities can be reconfigured to separate out plastic number 5.**

### Reason #3: Some people place readily recyclable plastics in their rubbish bin

Despite the good recycling potential of plastics 1 and 2, some of these never get a chance to be recycled because they are incorrectly placed in the rubbish bin. The research found that 42 per cent of all plastic packaging is placed in the incorrect bin. As mentioned above, all councils accept bottles made from plastic 1 and all, except the Chatham Islands, accept bottles made from plastic 2. However, these audits highlight that:

- 19 per cent of drink bottles made from recyclable plastic 1 are put directly in householders' rubbish bins, resulting in an estimated 68 million bottles per annum that could potentially be recycled going straight to landfill instead.



- 14 per cent of milk bottles and dairy containers (made from plastic 2) are put in rubbish bins. This means every year approximately 29 million dairy containers that could be recycled go straight to landfill instead.

**Recommendation:** While further research is being planned to understand why people place recyclable items into rubbish bins, ways to incentivise recycling and behaviour change also need to be considered. A container return scheme (currently being designed) is one of the ways that recycling could be incentivised. Improved on-pack labelling would also assist.

#### Reason #4: Problematic packaging designs

At least 46 million bottles made from plastics 1 and 2 with shrink-wrapped sleeves are consumed in Aotearoa New Zealand per annum. Typically, the sleeves cover most of the container and are made from soft plastic.

Of the containers identified in the audit, only 32 per cent included a zip or perforation symbol with instructions for consumers to remove the sleeve. Even with the zip and instructions, 25 million of these bottles are placed in recycling bins per annum with sleeves intact. These shrink-wrapped plastic covers cause recyclability issues because:

- The cover effectively disguises the type of plastic from which the container is made. Optical sorters cannot distinguish the outer sleeve from the container itself.
- The sleeves are not easily removed during the materials' washing process (unlike traditional labels applied with adhesive) and contaminate the recycling process.

Both issues result in the plastic being included in a low-grade, low-value mixed plastic (3-7) bale instead of a high-value plastic 1 or 2 bale.

**Recommendation: Manufacturers should avoid using plastic shrink-wrapped sleeves and consider other options for branding containers made from plastic 1 and 2.**



### Reason #5: Coloured containers

For many New Zealanders, the amber-coloured L&P bottle holds a special place in their nostalgic memories of past summers. Sadly, the unique amber colour makes the L&P bottle less recyclable. Clear plastic 1 has high value because it can be recycled easily back into clear RPET (recycled plastic 1) or other coloured RPET. Coloured plastic 1 turns a grey colour when recycled. It loses value as it can only be used to make grey- or black-coloured recycled plastic products.

As with the shrink-wrapped sleeves, coloured plastic is included in a low-grade, low-value mixed plastic (3-7) bale instead of a high-value plastic 1 or 2 bale.

The audits showed that 14.5 per cent of plastic 1 and a whopping 45.3 per cent of plastic 2 is coloured.<sup>3</sup> 4.5 per cent of plastic 5 is black. In total, 258 million plastic 1 and 2 containers are made from coloured plastic, preventing them from being recycled into like-for-like items. This may result in them only being recycled into bins or pallets, which may prevent them from being able to be recycled again.

**Recommendation: Manufacturers should use clear plastics.**

### Reason #6: Lids

Plastic lids are problematic when it comes to recycling. Some councils require lids to be left on bottles and containers when collected for recycling. However, as the lids are often a different plastic and colour from the bottle, they lower the quality of the recycled material. In addition, when lids are

<sup>3</sup> Plastic 2 can be produced in natural HDPE, white, lightproof and coloured. Both white and lightproof are considered coloured plastic in terms of their end of life recyclability.



left on, any contents in the plastic bottle will remain inside, which contaminates the recycling (2 per cent of plastic bottles collected for recycling still include some of the contents i.e. approximately 8,256,000 bottles).

Loose lids in the recycling are often too small to be detected by the optical sorters and end up going to landfill. Every year, a total of 2,498 tonnes of loose lids are disposed of through either rubbish bins or recycling bins. This is more than the tonnage of plastics 3, 4 and 7 combined.

**Recommendation: There are three manufacturers in NZ who could recycle plastic lids onshore in NZ if they were separated out, but kerbside collections bins are not the best means to collect them. Lids could potentially become part of a container return scheme where consumers could receive a small return on depositing lids separately alongside beverage containers.**

## Conclusion

Market prices, consumer error, current packaging design decisions and practices by brand owners and packaging manufacturers (including not using the plastic identification symbol), and a lack of standardisation as to what is accepted for recycling around the country, are all contributing to only 60 per cent of the plastic containers consumed by the public going in a recycling bin and even fewer being optimally recycled and given a second life.

If we want to maximise recycling opportunities and increase the rate of plastics containers that end up being recycled, then brand and product owners, packaging designers, packaging manufacturers and suppliers, councils, recyclers and consumer households all need to work together to innovate and overcome existing barriers and design effective solutions.

**HOW CAN WE MAKE PLASTIC MORE RECYCLABLE?**

BUSINESSES CAN IMPROVE THE RECYCLABILITY OF EXISTING PLASTIC PACKAGING BY MAKING IT

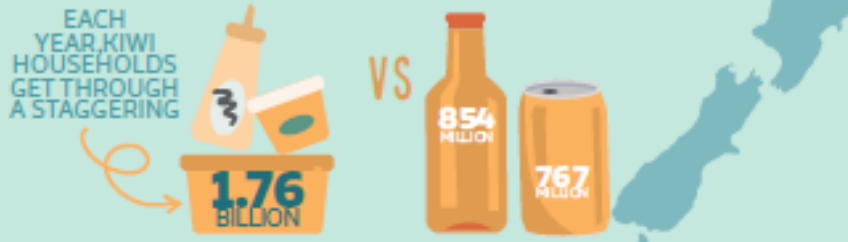
- CLEAR**
- SLEEVELESS**
- ADD LABELLING**
- CHOOSE** 1 + 2 + 5
- AVOID MIXED-MATERIALS** E.G. PLASTIC STUCK TO CARDBOARD

FOR MORE INFORMATION ON HOW TO DESIGN FOR RECYCLABILITY GO TO [wasteminz.org.nz](http://wasteminz.org.nz)

# OUR PLASTIC PACKAGING: OUR BUSINESS

## THE TRUTH ABOUT RECYCLING PLASTIC CONTAINERS

### HOW MUCH PLASTIC DO WE USE IN NZ?



### 87% OF PLASTIC CONTAINERS ARE EASILY RECYCLED



YET ONLY **62%** OF PLASTIC CONTAINERS ARE PLACED IN RECYCLING BINS

### WHY AREN'T MORE PLASTICS RECYCLED IN NZ?

IT'S NOT JUST CONSUMER ERROR



### HOW CAN YOU MAKE YOUR PLASTIC PACKAGING MORE RECYCLABLE?

BY MAKING IT:



FOR MORE INFORMATION ON HOW TO DESIGN FOR RECYCLABILITY GO TO [wasteminz.org.nz](http://wasteminz.org.nz)