

# Recovered Resources Market Bulletin

July 2019

Victorian Market Intelligence Pilot Project (edition #04)



This report was prepared for the Waste Management and Resource Recovery Association of Australia (WMRR) and Sustainability Victoria (SV) by Envisage Works, IndustryEdge and Sustainable Resource Use (SRU).

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, WMRR and Sustainability Victoria gives no warranty regarding its accuracy, completeness, currency or suitability for any particular purpose and to the extent permitted by law, does not accept any liability for loss or damages incurred as a result of reliance placed upon the content of this publication.

This publication is provided on the basis that all persons accessing it undertake responsibility for assessing the relevance and accuracy of its content.

This report is licensed under a Creative Commons Attribution 4.0 Australia licence. In essence, you are free to copy, distribute and adapt the work, as long as you attribute the work and abide by the other licence terms. Go to <http://creativecommons.org/licenses/by/4.0/> to view a copy of this licence.

### **Accessibility**

This document is available online in PDF format at <https://www.sustainability.vic.gov.au/Business/Investment-facilitation/Recovered-resources-market-bulletin>

### **Release date**

August 2019

# CONTENTS

---

<b>CONTENTS</b>	<b>3</b>
<b>Summary</b>	<b>4</b>
Market overview	4
Kerbside recycling markets: July developments	5
Overview of kerbside recovery and the challenges	6
<hr/>	
<b>1. Introduction</b>	<b>7</b>
1.1 About this bulletin	7
Who is this bulletin for?	7
Structure of the bulletin	7
History and context	8
1.2 Overview of kerbside recycling flows	8
1.3 Market risks, opportunities and activities	11
1.4 Export market review	13
1.5 Overview of status of countries with scrap import restrictions	14
<hr/>	
<b>2. Resource markets</b>	<b>16</b>
2.1 Kerbside recovered paper & paperboard (~27 kt/month)	16
2.2 Kerbside recovered glass packaging (~9 kt/month)	19
2.3 Kerbside recovered plastic packaging (~4 kt/month)	22
2.4 Kerbside recovered metal packaging (~1 kt/month)	27
<hr/>	
<b>3. Special topic areas</b>	<b>31</b>
3.1 The impacts of kerbside contamination	31
3.2 Closing the loop with post-consumer recycled content in fibre-based packaging	32
<hr/>	
<b>4. Supporting material</b>	<b>33</b>

# Summary

## Market overview

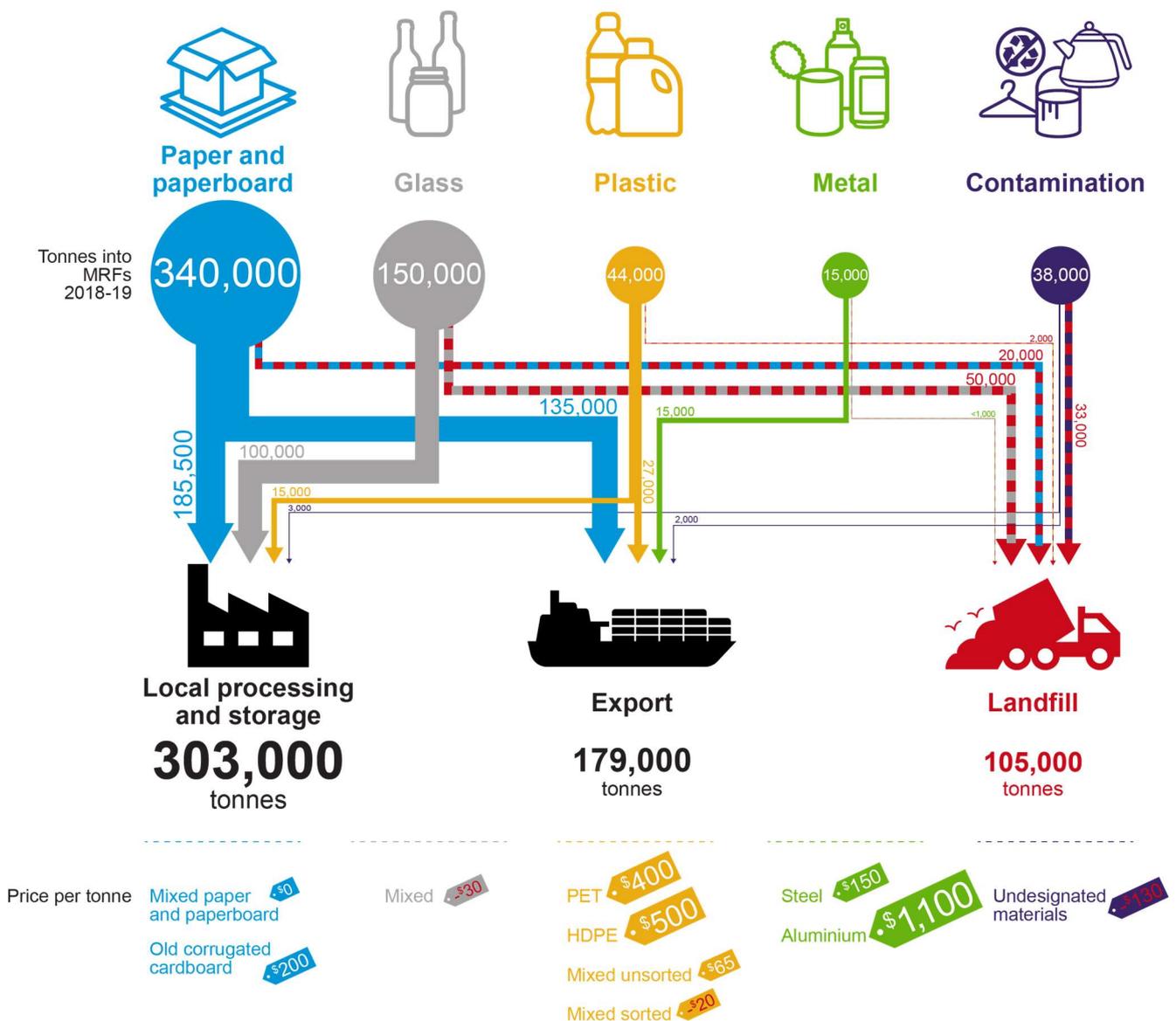
Around 600,000 tonnes of recycling are collected from Victorian kerbsides per year. Typically 15–20 per cent of this goes to landfill after sorting at material recovery facilities (MRFs). The sorted materials are then either exported, or processed locally (with some sent to landfill), and are then used in manufacturing new products. There is also currently more than 130,000 tonnes in storage.

Victoria has a greater reliance on export of recyclable materials than any other Australian State or Territory. Across January – April 2019, Victoria’s export contribution was:

- 44 per cent of national scrap paper & paperboard (209,000 tonnes of 475,000 tonnes)
- 36 per cent of national scrap plastic (30,000 tonnes of 83,000 tonnes).

The exports include material sourced through commercial and industrial collections (not only municipal kerbside collected materials). However, the figures illustrate the strong dependency of Victorian scrap markets on overseas buyers, and the need for additional local remanufacturing capacity and demand in Victoria.

Figure 1 – Flows of kerbside collection materials in Victoria



## Kerbside recycling markets: July developments

### Market-wide

**Development 1** – The current closure of SKM Recycling and sister company Glass Recycling Services is likely to result in significant quantities of recyclables, particularly glass, being sent to landfill in the short to medium term. It may also result in large quantities of previously stored materials also being sent to landfill. SKM is Victoria's largest sorting operator with approximately 40% of the processing contracts in Victoria at present.

**Development 2** – Exports for Victorian kerbside materials continue to be at the lowest levels for many years (due to market closures), albeit with some modest stabilisation or even recovery across February – May 2019 (see Section 1.4).

**Development 3** – There continues to be ongoing large-scale storing of sorted (but unsaleable) and unsorted Victorian kerbside recyclables. The growth in stored kerbside material is not sustainable and presents significant financial and operational risk to all MRF operators.

### Paper & paperboard

**Development 4** – Australian Paper Recovery opened its Truganina MRF in June. The facility is reported to be capable of sorting 39,000 tonne/yr of mixed recyclables from glass free sources. It is processing some material from regional Victoria and the recyclables from the glass separate trial in the City of Yarra.

**Development 5** – In May 2019, virgin pulp prices slumped in the main Chinese market. The major traded pulps experienced, on average, a 12.5 per cent decrease in prices in May relative to April 2019. Prices fell a little further into June.

### Glass packaging

No developments to mention.

### Plastic packaging

**Development 6** – The export markets for MRF sorted baled PET (1) and HDPE (2) plastic packaging remain steady, with strong local markets also available for good quality material. Some fall in the HPDE price is evident in May from around \$600 /tonne to \$500 /tonne. However, prices appear to have stabilised into June.

**Development 7** – Exports in May were a little down from April. Exports to Indonesia and Malaysia (the two major current destinations) were both down, but exports to Taiwan were up.

### Metal packaging

No developments to mention.

## Overview of kerbside recovery and the challenges

The following table summarises kerbside material flows and the market challenges.

Table 1 – Market snapshot

MRF outputs <sup>a</sup>	Sorted quantity (t)	Proportion	Destination(s) <sup>c</sup>	Approx. \$ per tonne (end-June 2019) <sup>d</sup>	The market challenges
Paper & paperboard	320,000	54%	<b>133,000 tonnes export</b> (37% drop on 2016–17) 187,000 t to local processing or storage	~\$0 for mixed paper & paperboard \$190 newsprint & magazine \$200 old corrugated paperboard \$75 for boxboard	The international markets for unsorted kerbside paper have collapsed (the material has no value), and Australian reprocessors can't take any more of this material. Significant stockpiling occurring.
Glass packaging	100,000	17%	<b>~100% to local processing</b>	-\$30 /tonne for mixed glass \$70 /tonne for source separated glass	Most Victorian glass packaging is sorted into a single 'mixed glass' product. This has been a low-value product for many years, with limited demand. Significant stockpiling occurring.
Plastic packaging	40,000	7%	<b>28,000 tonnes export</b> (27% drop on 2016–17) 15,000 t to local processing or storage	\$400 for PET (1) \$500 for HDPE (2) \$110 for mixed (1–7) -\$20 for mixed (3–7)	Markets for clean PET and HDPE are good, but around a third of plastics are sorted into a 'mixed plastic' product. The international markets for mixed plastics have collapsed. Significant stockpiling.
Metal packaging	10,000	2%	<b>~100% to export</b>	\$150 for steel cans \$1100 for aluminium	Markets for aluminium and steel packaging are steady.
Contamination and sorting losses	120,000 <sup>b</sup>	20%	All to landfill	-\$130 for landfill	Around 15–20% of material going into MRFs is sent to landfill. This is made up of unrecyclable contaminants (sorting losses), lost recyclables (mostly glass). This landfill component is a significant cost impost on MRF operators.
<b>Total</b>	<b>590,000</b>				This is the estimated total amount going in and out of Victorian MRFs in 2018–19.

a) Data are generally for 2018–19, except as otherwise identified. Derived by Envisage Works from 2018-19 ABS data, extrapolated 2017-18 SV (2019), and industry consultation.

b) Includes an estimated 20,000 tonnes of compliance related disposal to landfill in 2018–19.

c) Approximated full year 2018–19 exports, based on July 2018 to May 2019 data.

d) Prices are indicative typical spot price values, and can be highly variable on a day-to-day basis.

# 1. Introduction

## 1.1 About this bulletin

This is number 4 of 12 monthly bulletins that Sustainability Victoria (SV) and the Waste Management and Resource Recovery Association of Australia (WMRR) are releasing to provide the community, industry and government with an overview of the kerbside recycling markets in Victoria.

This work was commissioned by the Victorian Government to inform strategic investment and decision making by the waste and resource recovery sector.

These bulletins provide an up-to-date picture of the health of the markets, the ongoing challenges and opportunities, and action being taken to improve the resilience and recovery performance of our kerbside recycling systems.

The bulletins are a synthesis of many information sources, which primarily consist of monthly updates of ABS export data and published market reports, and more in-depth quarterly updates informed by extensive consultation with industry, government and community stakeholders.

Each bulletin includes a monthly update of a set of core data and information content:

- market overview and current Developments
- export data and receiving country updates
- commodity price tracking
- kerbside quantity flow approximations
- market developments and activity updates.

This bulletin #4 includes updates related to ABS data (to the end of May 2019) and published market reports.

Continuing on from previous bulletins a deeper look at two special topic areas is provided. The special topic areas explored in Section 4 for this month are:

- The impacts of kerbside contamination.
- Closing the loop with post-consumer recycled content in packaging.

Please contact SV (Kelly Wickham at [kelly.wickham@sustainability.vic.gov.au](mailto:kelly.wickham@sustainability.vic.gov.au)) if you have any comments or questions.

## Who is this bulletin for?

This bulletin is for anyone with an interest in kerbside recycling in Victoria. It presents a holistic overview of material flows and related markets, through generation, sorting, reprocessing, re-manufacturing and end-product markets.

[Bulletin #1](#) presents details of the stakeholders involved in kerbside recycling, and the roles that they can play in shifting our kerbside recycling systems and markets to a more resilient and sustainable (both environmentally and economically) basis.

## Structure of the bulletin

This bulletin has seven sections:

- **Market snapshot** – An overview of kerbside material flows, \$ values, and the key issues, opportunities and activities.

- **Introductory section** (this section) – A more detailed and integrated overview of kerbside material markets across all material types (paper & paperboard, glass packaging, plastic packaging and metal packaging).
- **Material specific sections** – Four specific sections on each of the material groups (paper & paperboard, glass packaging, plastic packaging and metal packaging). Each section provides: an overview of the material markets; the latest available information on prices, demand and supply; commentary on the key product end-markets for recovered materials; export and/or interstate market activity; and a summary of market risks, opportunities and developments.
- **Special topic areas** – A deeper look at two or three special topic areas each month.

## History and context

Around half the world's kerbside packaging was received by China until the end of 2017. While the current recycling market shocks may be the most significant, across even the past decade there have been downturns in the recycled materials market caused by the:

- Global Financial Crisis (GFC) in 2009
- new Chinese regulations in 2011 aimed at reducing the imports of highly contaminated scrap materials
- aggressive enforcement in 2013 by the Chinese of the 2011 regulations, through a campaign known as 'Operation Green Fence'.

A key aspect of the latest round of Chinese restrictions is the adoption of a maximum permissible contamination threshold of imported bales of scrap mixed paper & paperboard and mixed plastics of 0.5 per cent. This threshold is very low and MRFs internationally, including Victorian MRFs, are not capable of producing bales of material to meet the 0.5 per cent contamination threshold.

See [bulletin #1](#) for a more detailed outline of the history and context of the issues explored in these bulletins. All the bulletins are available [here](#).

## 1.2 Overview of kerbside recycling flows

Victorian collection of material from kerbside collection and sorting systems has been steady over the past three years at around 600,000 tonnes per year. After operating losses of 100,000 tonnes of contaminant material and unrecovered recyclables, an estimated 500,000 tonnes are available for reprocessing in Victoria, interstate or internationally. Paper grades and glass account for 85 per cent or more of this processed material by weight.

Figure 1.2.1 – Victorian MRF outputs by material category (tonnes)

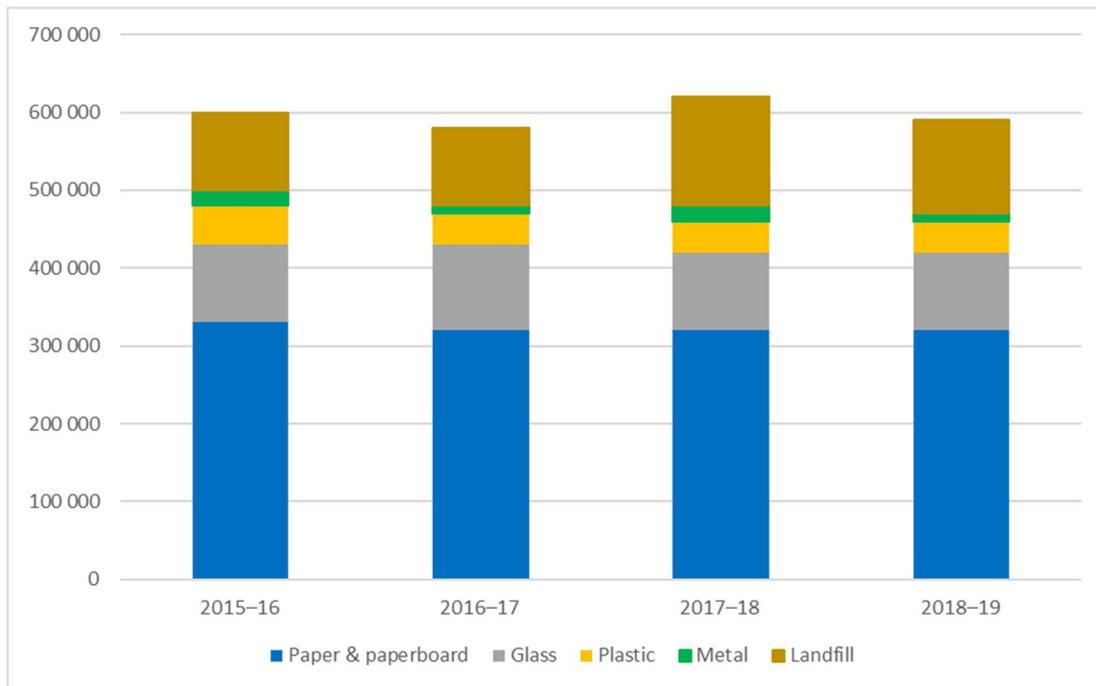


Table 1.2.1 – Victorian MRF outputs by material category (tonnes)

Material category	2015-16 (tonnes)	2016-17 (tonnes)	2017-18 (tonnes)	2018-19
Paper & paperboard	330 000	320 000	320 000	320 000
Glass	100 000	110 000	100 000	100 000
Plastic	50 000	40 000	40 000	40 000
Metal	20 000	10 000	20 000	10 000
Landfill	100 000	100 000	140 000 <sup>a</sup>	120 000 <sup>a</sup>
<b>Totals</b>	<b>600 000</b>	<b>580 000</b>	<b>620 000</b>	<b>590 000</b>

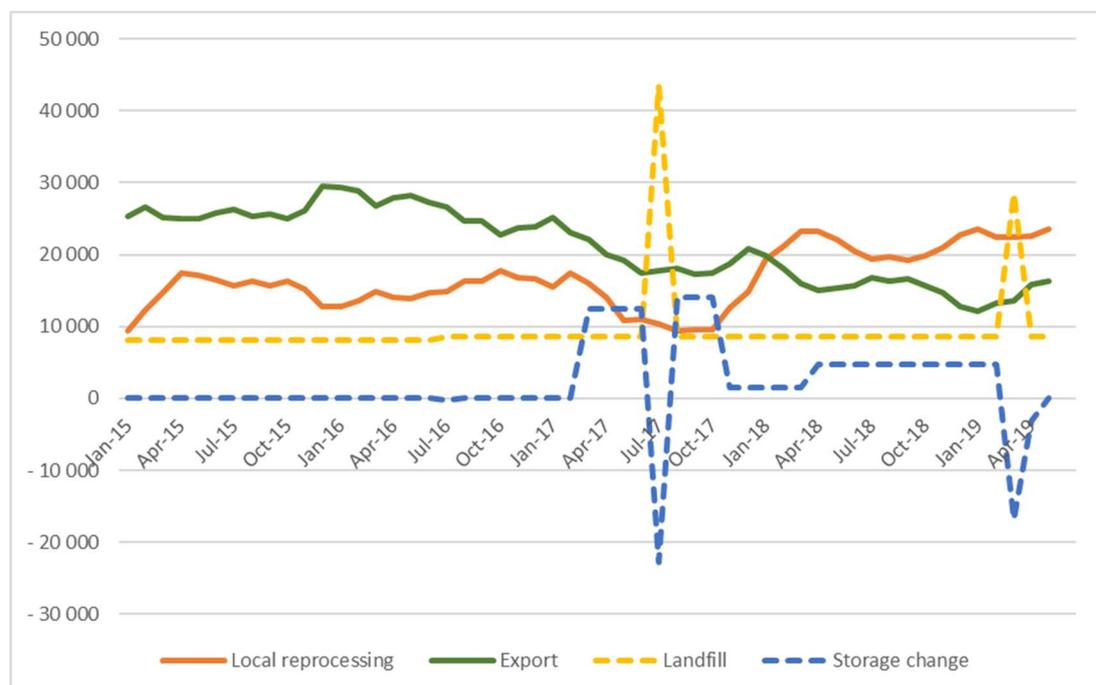
Source: SV (2017; 2018) and industry consultation.

a) Includes an estimated 30–40,000 tonnes of fire-related losses in July 2017, and 20,000 tonnes of licence compliance related disposal in March 2019.

Figure 1.2.2 presents indicative data on the destinations of Victorian MRF outputs. Exports of kerbside materials fell in 2017 and then more sharply in 2018, with some steadying of exports, albeit at a much lower level, across the first five months of 2019.

There appears to have been some response by the local reprocessing sector in taking up previously exported material since the beginning of 2018. However, the estimated increases in local reprocessing are highly dependent on the underlying estimations around storage of material and landfilling activities by the MRF operators, as indicated by a range of third party sources. The estimates are indicative only.

Figure 1.2.2 – Destination of Victorian MRF outputs from kerbside sources (tonnes/month)



Note 1: Data in the table above have been estimated based on publicly available sources, with totals verified through consultation.

Note 2: Historical total monthly MRF outputs have been approximated in Figure 2.2.2 to enable comparison with monthly ABS customs export data. 'Local reprocessing', 'Landfill' and 'Storage' estimates are indicative only.

Note 3: The 'Storage change' plot is an estimation of the change in material stored or stockpiled in that month.

Note 4: Storage includes estimates of both sorted and baled materials, and unsorted (but baled) materials. It excludes longer-term stored materials from before January 2015, which is most significantly legacy glass storage.

Note 5: Landfill estimates include MRF licence compliance related disposal to landfill, and fire related losses to atmosphere. Landfill data presented are an approximation based on annual waste to landfill rates.

Source: ABS (2019) and Envisage Works.

The typically growing storage estimates in Figure 1.2.2 represent a significant and growing storage and handling cost impost to MRF operators, a loss in sales income, and a potential future liability if disposal to landfill is required.

Some of the main drivers underlying the storage estimates in Figure 2.2.2 are outlined in detail in bulletin #3.

SKM Recycling is reportedly in the process of wind up proceedings. Sister company Glass Recycling Services (the glass sorting facility located next door to the SKM facility in Coolaroo and with a second facility in Penrith NSW) is understood to not be involved in these proceedings.

In late July 2019, SKM ceased receiving and sorting kerbside recyclables as of the end of July, and the fate of the three MRFs (in Coolaroo, Laverton and Geelong) is uncertain.

The facilities were receiving over 300,000 tonnes/yr of commingled recyclables, or more than 50% of all Victorian generation of this material. Some of the 25,000 tonnes/month that was going to SKM facilities may be diverted to other MRF operators, stored temporarily while other arrangements are made, or sent to landfill. The low market value for the diverted materials will place an added burden on the remaining MRF operators.

### **1.3 Market risks, opportunities and activities**

As outlined in previous bulletins and now exhibiting through the latest development with SKM, the large and potentially still growing storage of unsold kerbside materials represents a significant risk to the companies holding these materials, and the facilities that they are located in.

While not confirmed, it appears possible that some kerbside glass (~1,000–2,000 tonnes/month) may be being exported from Victoria to Malaysia. Investigations are continuing on this activity.

Reduction in export market outlets has not been matched by an expansion of domestic reprocessing and remanufacturing activity. This is further reinforced by less demand for the reprocessed materials into new manufacturing in Australia in general.

This is a particular issue for Victoria given its heavy historical reliance on exporting. For example, in May Victoria made up an estimated 48% of Australian exports of kerbside recovered materials, and 46% in April.

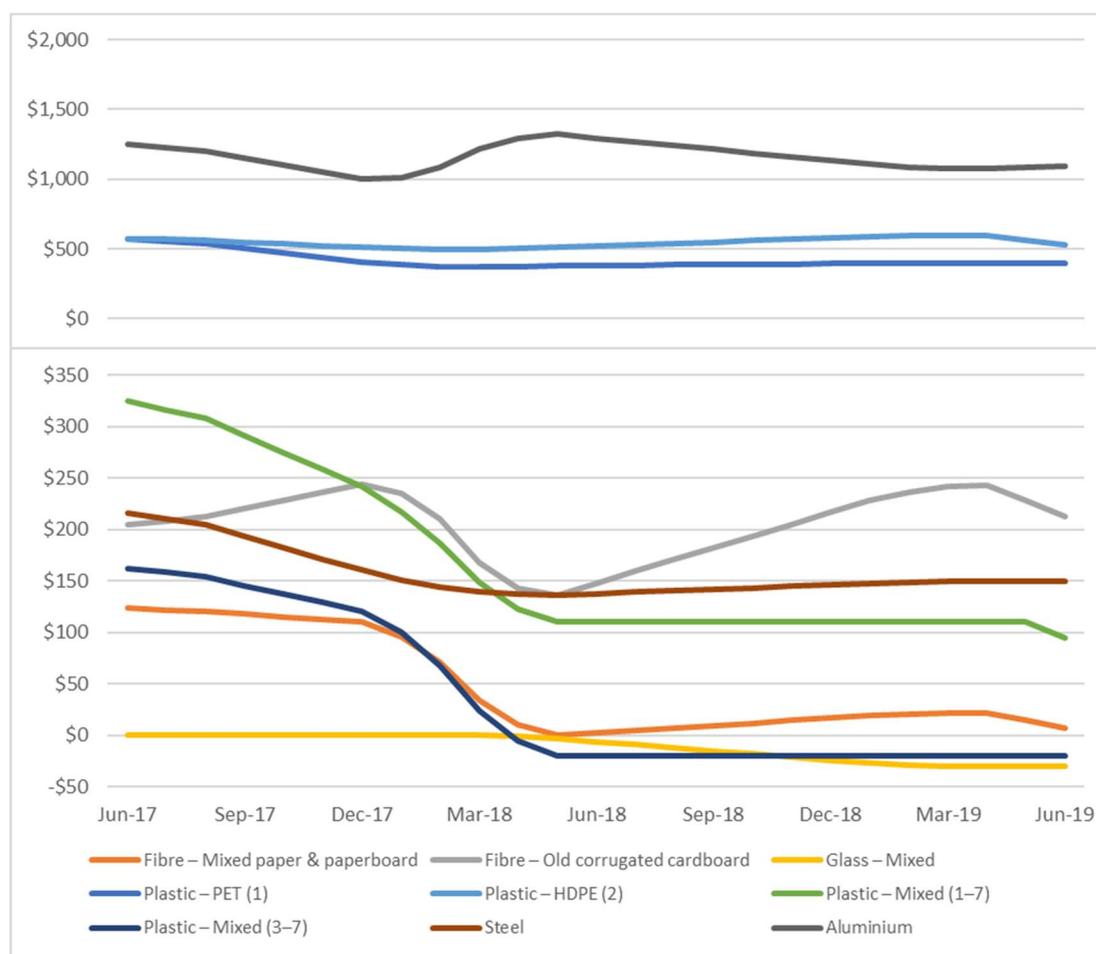
There are a number of significant secondary reprocessing facilities (taking sorted materials from MRFs) recently coming online or in the pipeline which can supply reprocessed materials to local or overseas remanufacturing facilities. However, these take time to become fully operational. Examples of these facilities include the Advanced Circular Polymers (ACP) plastics reprocessing plant in Somerton, and the Alex Fraser glass recycling facility in Laverton North.

Exports in May 2019 were steady from the previous month, but the risk of overseas markets tightening further with respect to the acceptance of mixed kerbside materials is increasing. Inspection regimes overseas continue to tighten and product is reported as being returned for not meeting specifications.

There were no imports of scrap plastics into Australia during May from Malaysia (reported widely in the media as sending containers of poor-quality scrap plastics back to originating countries in May). However, it has been reported that some Australian scrap sent to Malaysia and Indonesia has been rejected and may have been either sent back to Australia. The quantities and scrap material types are unknown at the current time.

While overseas markets may recover eventually for mixed paper and plastics, relying on this recovery is solidifying as a high-risk and longer-term strategy.

Figure 1.3.1 – Victorian recovered kerbside materials commodity values (\$/tonne)



Source: Industry consultation. Prices are to May 2019 and are indicative only.

Table 1.3.1 provides pricing on selected virgin material commodities that are (generally) competing with recycled material. It is important to note that the kerbside material commodity values presented in Figure 1.3.1 are estimated prices at the out-going MRF gate, and prior to any secondary processing (along with the associated processing costs).

Table 1.3.1 – Virgin material commodity values end June 2019 (\$/tonne)

Material category	Value	Comments
Fibre – Bleached softwood kraft (BSK) pulp	\$900–\$950	BSK and BHK pulps are not directly competing with recycled fibre in the Australian market. Values provided to give some context on virgin pulp prices.
Fibre – Bleached hardwood kraft (BHK) pulp	\$850–\$900	
Glass – Virgin material inputs	\$550–\$650	Estimate based on typical flint glass composition.
Plastic – PET (1) virgin resin	\$1,300–\$1,400	-
Plastic – HDPE (2) virgin resin	\$1,700–\$1,800	-
Plastic – PVC (3) virgin resin	\$1,000–\$1,200	-
Plastic – LDPE (4) virgin resin	\$1,700–\$1,800	-
Plastic – PP (5) virgin resin	\$1,600–\$1,700	-

Plastic – PS (6) virgin resin	\$1,900–\$2,000	-
Steel	\$400–\$450	LME scrap steel price.
Aluminium	\$1,700–\$1,800	LME aluminium alloy

To provide some context, plastics manufacturers sometimes report that recycled plastics have to be around 10–20 per cent cheaper than virgin resin to justify the additional purchasing, handling, processing and quality assurance cost imposts associated with introducing a significant proportion of high quality recycled content into the incoming material mix.

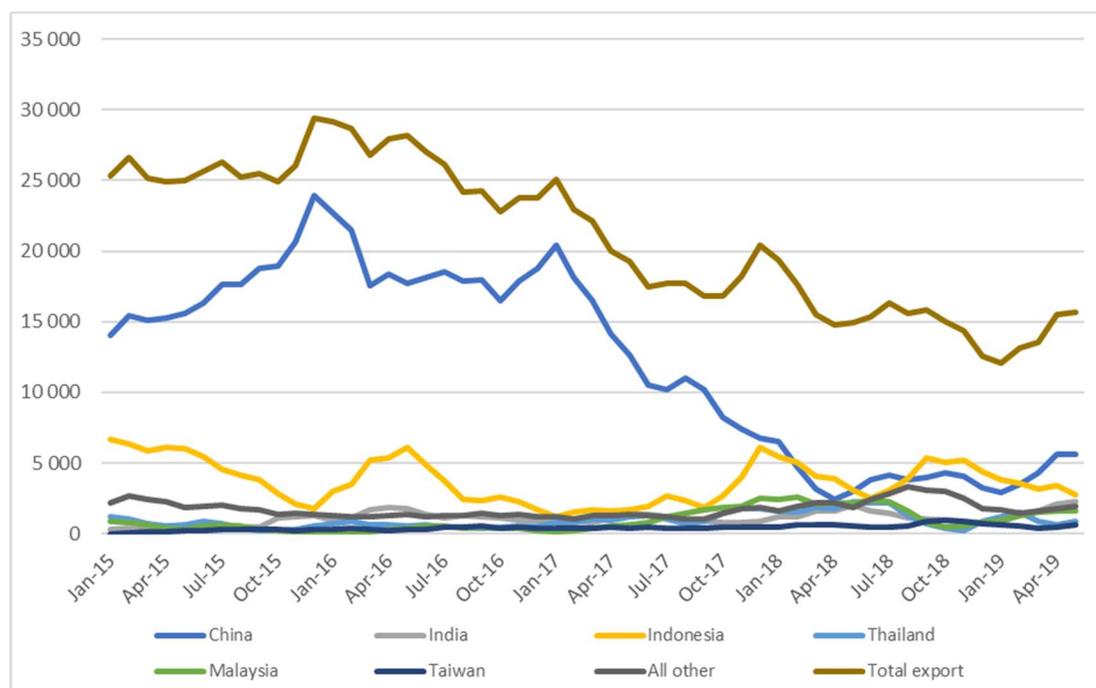
As time-series virgin resin pricing data builds up this will be published in future bulletins.

## 1.4 Export market review

Victorian exports of kerbside recovered material have dropped by around 50 per cent over the past couple of years. These falls have been driven entirely by lost sales to China, with the fall in export of bales of mixed paper & paperboard the main products contributing to the export reduction. From February to April 2019 there was some recovery in exports from the low in January 2019, which had the lowest export volumes for many years.

May 2019 exports across all materials are fairly steady from April, with some unconfirmed glass cullet export activity possibly developing.

Figure 1.4.1 – Victorian recovered kerbside materials, to export country (t/month)



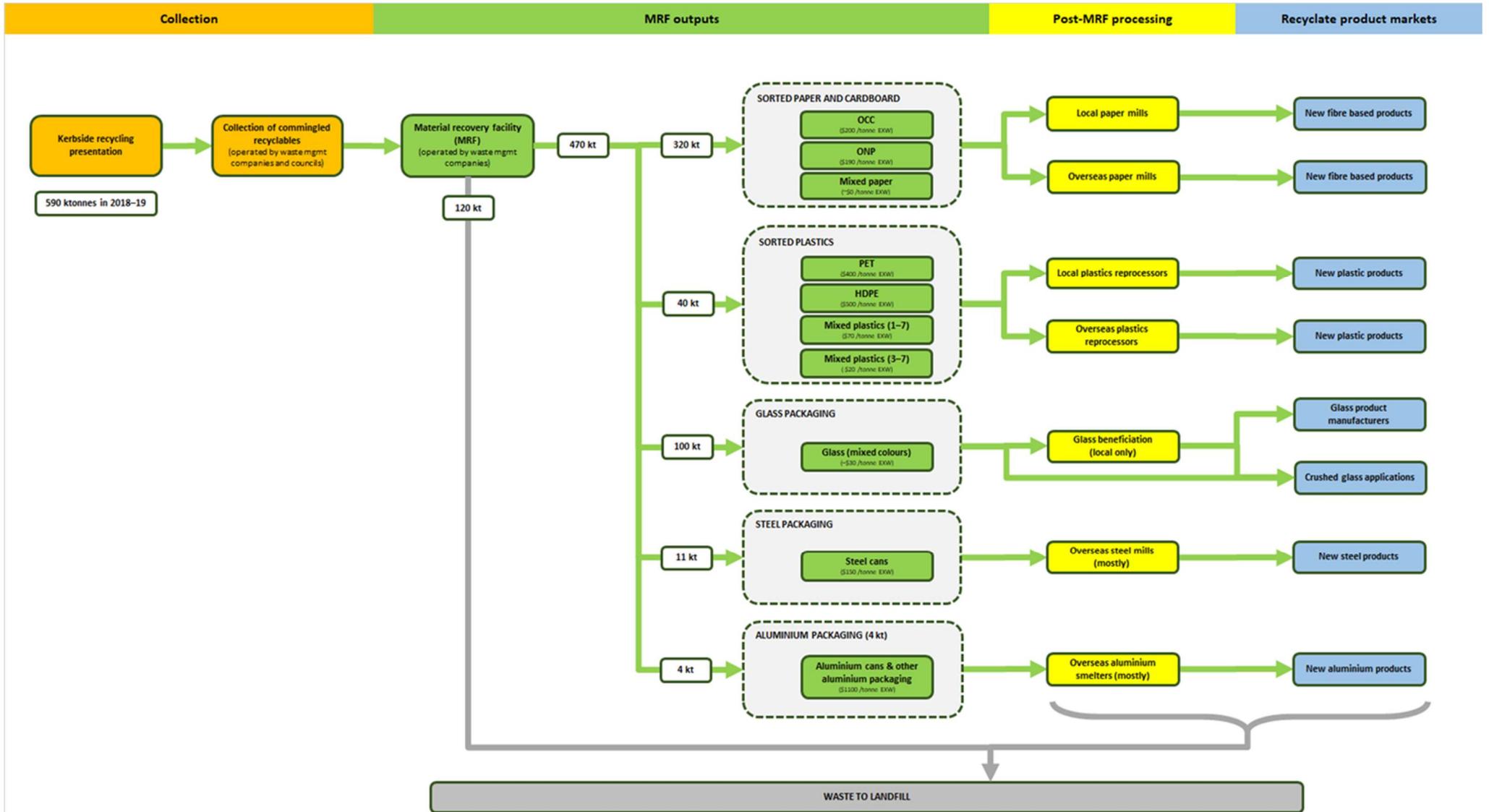
Source: ABS (2019) and Envisage Works

## 1.5 Overview of status of countries with scrap import restrictions

An updated overview of the status (as of the end of June 2019) of countries that receive major kerbside related scrap exports from Australia:

- **Bangladesh** – No identified changes in import conditions. There have been no specific import restrictions identified for paper and paperboard, and the identified requirement for scrap plastics imports is that they do not contain any toxic or radioactive substances.
- **China (restrictions on scrap plastic, paper, metals, and other types of scrap)** – the Chinese import restrictions or outright bans that began in March 2018 (but started to impact sales months earlier), became more extensive at the end of 2018, and will extend further at the end of 2019, with completed bans on a range of scrap materials foreshadowed in mid-2019 and early 2020.
- **India (restrictions on scrap plastics)** – India announced bans in March 2019 prohibiting scrap 'solid plastic' from being imported into the country, including in special economic zones. Exports of kerbside plastics from Victoria to India are negligible, so this will not reduce exports. However, India is less likely to start importing significant quantities of scrap plastics.
- **Indonesia (new inspection regime)** – as of 1 April 2019 all (100 per cent) scrap paper imports into Indonesia will be inspected at ports (up from around 10 per cent previously). The contamination threshold (impurity limit) is 0.5 per cent, which is the same as China, so can be expected to have a major impact on Australian exports of mixed paper into Indonesia. The 100 per cent inspection rate already applies to scrap plastics and steel imports into Indonesia. The 100 per cent inspection rates will remain in force until the Indonesian Ministry of Trade completes development of updated specifications on scrap imports.
- **Malaysia (restrictions on scrap plastics)** – restrictions implemented from July 2018, with a significant impact on scrap plastics imports. Many import permits revoked following these restrictions coming into force. In May 2019, reports circulated in the media regarding further import restrictions for waste plastics. The Malaysian Environment Minister noted that plastics will be returned to their country of origin. Review of Australian scrap plastics import data for May did not identify any shipments from Malaysia. However, it is understood that some Australian material is been returned.
- **Taiwan (restrictions on scrap paper and plastics)** – restrictions implemented from October 2018, with only old corrugated paperboard (OCC) and other higher quality grades accepted. There are also restrictions on scrap plastics. Little material from Victoria has been shipped to Taiwan.
- **Thailand (restrictions on scrap plastics)** – restrictions implemented from August 2018, to escalate over the next two years, with tighter controls on e-waste imports also foreshadowed. Low quality plastic waste imports may be banned from 2021.
- **Vietnam (restrictions scrap plastic, paper, metals and other types of scrap)** – restrictions implemented from around August 2018, with further tightening of scrap imports from late February 2019. Low quality plastic waste imports may be banned from 2025.

Figure 1.5.1 - Snapshot of kerbside recyclables flows (2018–19) and pricing (end June 2019)



Source: Envisage Works

Note: There may be some export of kerbside glass packaging (to be confirmed).

## 2. Resource markets

### 2.1 Kerbside recovered paper & paperboard (~27 kt/month)

#### Market developments this month

**Development 1** – Australian Paper Recovery opened its Truganina MRF in June. The facility is reported to be capable of sorting 39,000 tonne/yr of mixed recyclables from glass free sources.

**Development 2** – Contaminant standards will tighten in key markets across the second half of 2019 and into 2020, implying less recovered paper will be exportable than normally observed.

**Development 3** – In May 2019, virgin pulp prices slumped in the main Chinese market. The major traded pulps experienced, on average, a 12.5 per cent decrease in prices in May relative to April 2019. Prices fell a little further into June but appear to have largely stabilised.

**Development 4** – The current closure of SKM Recycling is likely to result in significant quantities of paper & paperboard being sent to landfill in the short to medium term.

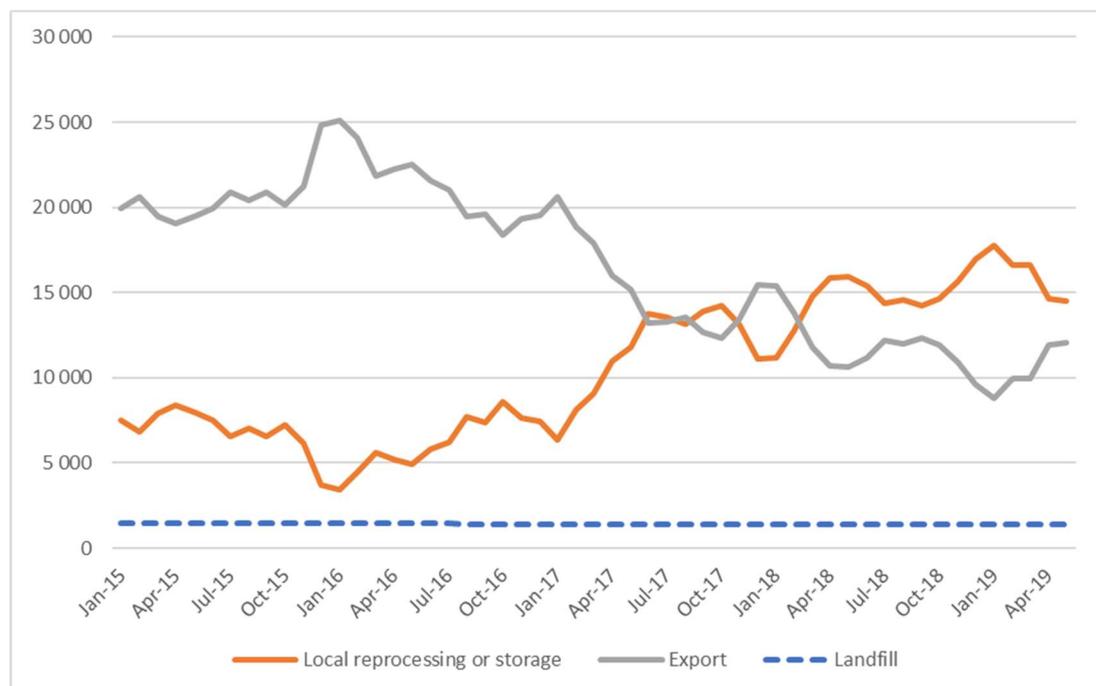
#### Material overview and market summary

For detailed sector overview and information see [bulletin #1](#).

Recovered paper and paperboard prices appear to have stabilised somewhat in the global market in June. Local demand and supply are generally unaffected because the main local users (manufacturers of recycled paperboard for use in corrugated carton manufacture and newsprint manufacturers) are experiencing relatively normal demand.

Demand for products that need to be packaged locally in corrugated boxes has remained relatively stable.

Figure 2.1.1 – Destination of Victorian MRF outputs (tonnes/month) – Kerbside paper & paperboard



Note 1: Historical total monthly MRF outputs have been approximated in Figure 2.1.1 to enable comparison with monthly ABS customs export data. The overall trends are the key aspect of the figure.

Note 2: The combined 'Local reprocessing or storage' estimate is indicative only, and these fates will be presented separately if this level of data becomes available. Landfill excludes disposal from storage and is an approximation based on annual waste to landfill rates.

Source: ABS (2019) and Envisage Works

## Prices, demand and supply

Kerbside collected mixed paper & paperboard (that is not contracted for supply to a local paper mill) continues to be almost unsaleable locally or through export in any significant volume and has a current value of around \$0 /tonne. Little has changed in the local market over the last month, with respect to sales.

Non-kerbside (and low-contamination) sourced newsprint and magazine grades continue to be purchased in the Australian market at prices as high as \$250 /tonne. However, there is no sorting of these grades by Victorian MRFs, severely limiting the supply and quality of available material. It is also important to note that demand is also locally capped for this material.

Premium prices (as much as \$350 /tonne) are available for the negligible volumes of post-consumer sorted white office paper or bleached kraft, that is available in the market. Pre-consumer volumes from printers and converters is highly sought after and premiums are still paid for what is a limited supply.

OCC prices continue to be under severe stress at the end of June.

Market demand for the MRF sorted mixed paper & paperboard product remains negligible. To expand on a point made in bulletin #3, Visy is understood to be the only MRF operator moving any paper & paperboard. This is due to its vertical integration with the Visy Coolaroo papermill and other Visy mills in Australia. It is unique in being able to take material in and produce a recycled sheet with strong end-markets.

## Key end-markets and related specifications

There are no new end-markets for kerbside recovered paper. Recovered paper markets more widely operate to seasonal demand factors, and factors related to the general health of the Australian economy. This is particularly the case for packaging grades of paper and paperboard.

The opening of Australian Paper Recovery's (APR) 39,000 tonne/yr 'glass free' MRF does provide a potential source for a larger volumes of higher quality material to be supplied to local reprocessors. However, this facility is not configured to handle the standard municipal commingled recycling stream, which consists of around 30% glass packaging. Several Victorian councils are trialling or considering glass separate collection. A trial of 1000 households in the City of Yarra is producing a glass free feed to APR and high quality glass cullet to beneficiation.

Unless secondary sorting of MRF mixed paper & paperboard (to multiple higher quality grades) meets the requirements of a local or international market, it will not find an end market.

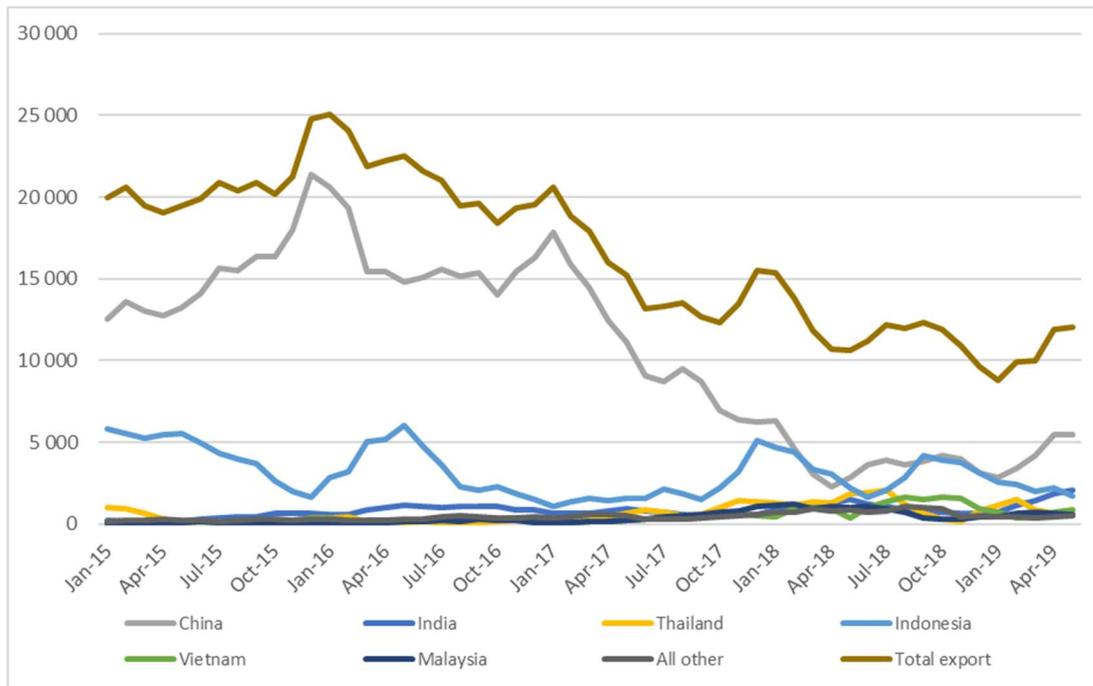
## Export and interstate market review

In May, kerbside related exports from Victoria were around 12,000 tonnes, and total recovered paper exports from Victoria totalled 46,000 tonnes (kerbside plus all other sources). This result was similar to April.

The average export price in May was down to around \$160 /tonne on a free-on-board (FOB) basis (\$170 /tonne in April). Given the sharp downturn in virgin pulp prices reported last month, expectations are that export prices will trend a little lower in coming months.

---

Figure 2.1.2 – Victorian recovered kerbside paper & paperboard, to export country (tonnes/month)



Source: ABS (2019) and Envisage Works

### Market risks, opportunities and activities

One of the major risks associated with stockpiling materials has crystallised over the last couple of weeks, with the current closure of SKM. The other MRF operators in Victoria continue to have challenges at the current time. The increasing stockpiles of recovered paper, and other recyclables, are economically damaging and increase the risks of operating MRFs from a regulatory and commercial perspective.

Some materials from SKM may be diverted to the other MRF operators. However, a proportion of the recovered mixed paper & paperboard, mixed glass and mixed plastics still do not have end-markets and so alternatives may be required (e.g. storage).

Moving on from the SKM situation, a significant opportunity in the fibre market is to undertake a secondary sort (following primary sorting by MRFs) of larger quantities of paper and cardboard, free from the major contaminants. A major contaminant is glass, and as Australian Paper Recovery (APR) appears to be demonstrating, when the glass is removed (or excluded from the incoming stream in the case of APR) and sorting occurs, satisfactory grades of recovered papers can be achieved.

This approach appears to be a part of the path forward, where source separation might be introduced selectively and progressively. This would provide scrap paper and paperboard products of ever improving quality and quantity, suitable for domestic reprocessing or for sale into export markets.

## 2.2 Kerbside recovered glass packaging (~9 kt/month)

### Market developments this month

**Development 1** – While not confirmed, it appears possible that some kerbside glass is being exported from Victoria to Malaysia.

**Development 2** – The current closure of SKM Recycling and sister company Glass Recycling Services is likely to result in significant quantities of glass being sent to landfill in the short to medium term.

### Material overview and market summary

For detailed sector overview and information see [bulletin #1](#).

Victorian glass packaging consumption was likely to have been around 250,000–300,000 tonnes in 2018–19. Over the past 5–10 years or so there has been some small growth in imports of both filled and empty (for local filling) glass packaging, which displaced domestic production, reducing demand for recovered glass for use in local packaging production. This shift to imports has flattened off over the last couple of years.

It was previously thought that there is no export of kerbside glass cullet from Victoria for recycling. However, this may be changing, with notable potential exports occurring across April and May. This apparent activity may be related to non-packaging glass from commercial sources, and not kerbside commingled glass.

Most glass coming through commingled kerbside collections is going to beneficiation (sorting and sizing processes) and cullet feed at Owens-Illinois (O-I) glass plants. Some quantities are going into lower grade construction applications (see [bulletin #3](#) for details on the new Alex Fraser facility), and some is being stored. The Alex Fraser facility is capable of processing 800 tonne per day into asphalt and other construction applications. In Victoria, over 90 per cent of recycled glass cullet comes from MRF sources (as opposed to CDS related sources in other states).

Highly mechanised commingled recycling collection, compaction and sorting tends to break glass into small pieces that are not easily recoverable. A market analysis on glass packaging published by SV in 2014 estimated that around 34 per cent of glass that is collected for recycling is lost through collection, sorting and beneficiation losses.

Sorted glass from MRFs that is to be recycled back into packaging is then required to be sent to one of six beneficiation plants nationally (three located in Victoria). These plants also receive some loads sent and paid for by O-I from regional locations where freight costs are high. This includes glass into Melbourne from Tasmania. With the GRS beneficiation site not receiving glass, the capacity at the remaining two beneficiation plants may become an issue.

The impact of glass fragments on other materials is an issue as it contributes to the contaminant load of baled commodities going to export. The recovered glass itself is of much lower value when collected through commingled kerbside systems, due mainly to colour mixing and cross contamination, than when it is collected separately.

### Prices, demand and supply

Gate fee rates for MRFs sending material for beneficiation can vary, based on quality and quantities. Gate fees of \$0 /tonne (EXW MRF<sup>1</sup>) to -\$30 /tonne (EXW MRF) are reported. Following beneficiation O-I then receives the glass cullet from beneficiation plants in each city. The price paid by O-I to these facilities has remained largely unchanged in recent years.

---

<sup>1</sup> EXW MRF means that the sale price is an estimate at the outgoing gate of the MRF.

Glass reprocessors report that due to reduced energy use and furnace maintenance costs, increased cullet use provides savings compared with the use of virgin materials.

There is a small amount of separated glass going directly from pubs and clubs to beneficiation. This material is cleaner and generates a gate price of approximately \$70 per tonne.

The cost of beneficiation is estimated at around \$150–\$200 per tonne.

Cullet makes up 37 per cent of the input to O-I glass manufacture in Victoria. Higher cullet input reduces energy use and furnace wear. O-I report they are targeting 50–60 per cent cullet composition, and can technically accept an even higher ratio, particularly for amber and green glass production.

### Key end-markets and related specifications

Beyond taking glass packaging waste back into packaging production, there are a range of other secondary markets that can be used, but these do not offer a high market price. These include glass into road base material, abrasives, and filter media. These markets will be explored in more detail in future bulletins.

Table 2.2.1 provides indicative estimates (by glass colour) of MRF recovery. Note that in Victoria almost all of this is sorted by MRFs into a single mixed glass product, which is then colour sorted and beneficiated.

Table 2.2.1 – Victorian MRF outputs (average monthly generation in 2017–18) – Glass packaging, by colour

Material type	Quantity (tonnes)
Glass – Amber	2,600
Glass – Flint	4,100
Glass – Green	2,000
Glass sorting losses	3,800
<b>Total</b>	<b>12,500</b>

Source: Envisage Works, SV (2018) and industry consultation

### Export and interstate market review

As outlined previously there may be some export of Victorian kerbside glass packaging to Malaysia. However, at this time the nature of this export material has not been confirmed. This activity will be clarified in next bulletin.

Glass cullet is generally not exported due to its low value and significant weight relative to shipping costs. Significant export markets will not eventuate.

There is often a mismatch in demand for different colours in different States and Territories, and green glass is in oversupply in Sydney and Melbourne, so some is transported to Adelaide for wine bottle production.

### Market risks, opportunities and activities

The potential closure of SKM may result in up to 9,000 tonnes/month of packaging glass being sent to landfill, depending on how much commingled recyclables can be diverted to other MRF facilities.

The risks to glass recycling relate primarily to its method of collection and local manufacture needing to absorb (recycle) imported glass packaging for beer, wine and food. This means that there will generally always be more supply than demand back into local packaging manufacturing. So other end-markets for the glass, such as the construction sector, are needed.

There is around 1 million tonnes of glass bottle manufacture in Australia, with 350,000 tonnes of that being met from recycled glass cullet.

The commingling of glass with other recyclable materials and contaminants results in low quality glass from kerbside-sourced glass and also affects the value and markets for recovered paper and plastics.

The experience of other States and Territories suggests that glass packaging returned through container deposit schemes is cleaner and has a higher demand and value compared with glass from MRFs. There is interest in separate glass recycling collections that are being trialled by the City of Yarra and Moyne City Council to examine the impact on glass recovery levels and paper grades quality and value. The Yarra trial is producing glass within specification and the remaining material is now largely glass free. Other councils are exploring this option. Reports on these trials will be included in future bulletins as information becomes available.

## 2.3 Kerbside recovered plastic packaging (~4 kt/month)

### Market developments this month

**Development 1** – The current closure of SKM Recycling and sister company Glass Recycling Services may result in significant quantities of plastics being sent to landfill in the short to medium term.

**Development 2** – The export markets for MRF sorted baled PET (1) and HDPE (2) plastic packaging remain steady, with strong local markets also available for good quality material. Some fall in the HDPE price is evident in May from around \$600 /tonne to \$500 /tonne. However, prices appear to have stabilised into June.

**Development 3** – Exports in May were a little down from April. Exports to Indonesia and Malaysia (the two major current destinations) were both down, but exports to Taiwan were up.

### Material overview and market summary

For detailed sector overview and information see [bulletin #1](#).

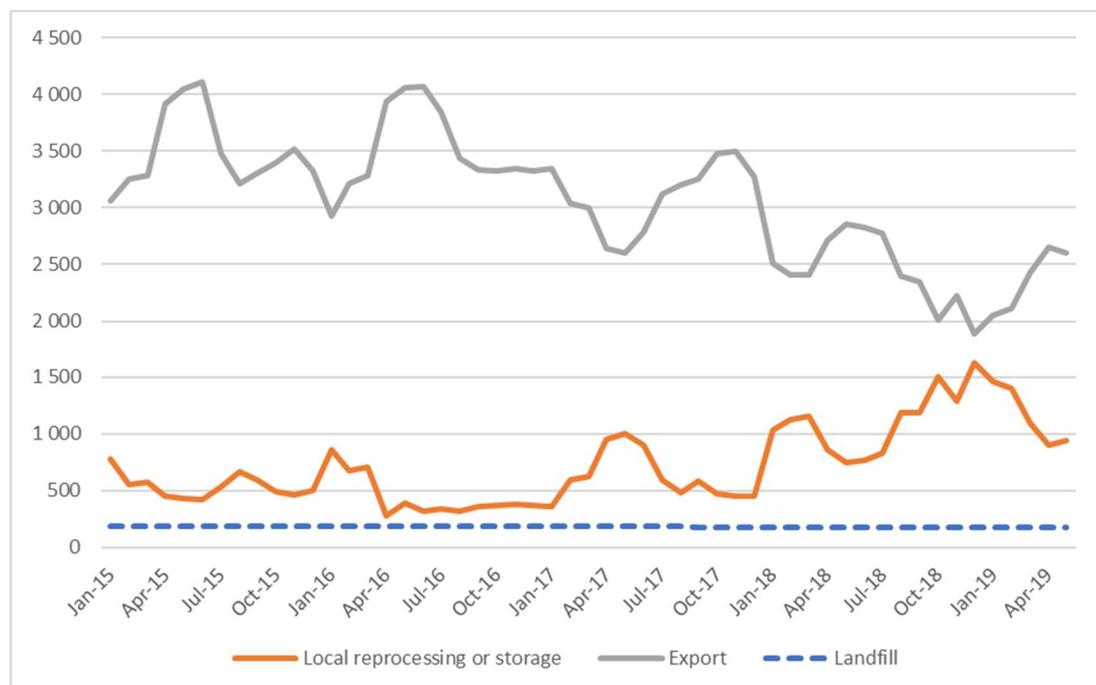
During 2017–18, around 200,000 tonnes of consumer plastics packaging was used in Victoria. This packaging is both produced here and also imported from overseas. A large proportion of the resin used in local packaging manufacture is also imported. For example, there is no local production of virgin PET resin at all.

Plastics collected through kerbside collections are generally sent to MRFs and sorted from commingled recycling into either a single mixed plastics grade (1–7 plastic-polymer mix), or more commonly three grades, which are PET, HDPE and the residual mixed plastics grade (a 3–7 plastic-polymer mix, but with some residual quantities of PET and HDPE still present). Most MRF operators undertake the polymer sorting locally, but others have overseas partners for the polymer sorting so are particularly exposed to import restrictions on mixed and contaminated materials.

Baled PET and HDPE packaging is processed and remanufactured locally, and also exported to a wide range of countries. The main overseas destinations across January to May 2019 were Indonesia, Malaysia and Taiwan (in order of quantities). New Malaysian import restrictions entered into force in July 2018, and had a major impact on Australian exports. However, Malaysia receipts of Australian shipments recovered in February and March, and were steady in April. However, a fall in exports in May is apparent.

Figure 2.3.1 provides data on the change in exports of kerbside recovered plastic packaging since the beginning of 2015. There was a fall in exports of around 40–50 per cent across 2018, most of which would have been mixed plastic bales. A significant proportion of this material has been diverted into storage. However, estimates are not currently available.

Figure 2.3.1 – Destination of Victorian MRF outputs (tonnes/month) – Kerbside plastic packaging



Note 1: Historical total monthly MRF outputs have been approximated in the figure above to enable comparison with monthly ABS customs export data. The overall trends are the key aspect of the figure.

Note 2: The combined 'Local reprocessing or storage' estimate is indicative only, and these fates will be presented separately if this level of data becomes available. Landfill excludes disposal from storage and is an approximation based on annual waste to landfill rates.

Source: ABS (2019) and Envisage Works

### Prices, demand and supply

There continues to be strong local and export markets for clean PET bales that are collected and sorted to specification, with prices holding fairly steady over the past April–June quarter at \$350–\$400 /tonne (EXW MRF<sup>2</sup>).

The price of recycled resin is linked to the price for virgin resin. In the case of PET, the virgin price generally increased across 2018, in part due to China utilising more of this material as it received less imported recyclate, however virgin prices did see some significant falls starting in October 2018 and continuing into early 2019.

The situation is similar for HDPE, with markets and pricing for clean material remaining strong. There was some export price reduction due to the Chinese restrictions with prices falling to around \$500 /tonne in early to mid-2018. Prices then recovered somewhat but over the last couple of months have fallen back to the \$500 /tonne level. Virgin resin prices have been fairly steady since the first quarter of 2018 at around \$1,700–\$1,800.

The market for mixed plastic packaging bales continues to be very poor at \$0 /tonne or less, assuming it can be sold. Due to a lack of demand for this product it is understood that storage of mixed plastics packaging continues to be undertaken by both MRF operators and reprocessors.

<sup>2</sup> EXW MRF means that the sale price is an estimate at the outgoing gate of the MRF.

## Key end-markets and related specifications

Exported plastics packaging has specifications relating mostly to contamination levels. The positive sorting of PET and HDPE that is undertaken at MRFs allows the baled material to generally meet these specifications without major difficulty or manual sorting input.

Previously plastics packaging has been overwhelmingly exported to China, until the latest round of restrictions. Indonesia is now the largest destination for Victoria kerbside plastics, followed by Malaysia and Taiwan.

A proportion of the mixed plastic packaging is used in durable (timber substitute type) plastics applications such as outdoor equipment and building materials.

The new Advanced Circular Polymers mixed plastics recycling facility opened in Somerton in June. The facility is reported to be capable of processing 70,000 tonnes per year (once fully commissioned) of mixed polymers into polymer sorted flake. The level of contribution the facility will be able to make to the mixed kerbside plastics market problems will depend in large part on the sorted flake specifications to plant can achieve. We aim to report on this in bulletin #5.

Others are also assessing the potential to expand the plastics recycling infrastructure in Victoria.

Table 2.3.1 provides indicative estimates (by grade) of MRF recovered plastic packaging. Most rigid packaging in Victoria is positively polymer sorted for PET and HDPE, leaving a residual 3–7 polymer stream that is baled, this is also referred to as a 2:2:6 bale (i.e. 20 per cent PET, 20 per cent HDPE and 60 per cent other polymer types). Many of these 2:2:6 bales are in or entering storage, with the eventual fate unclear at this time.

Table 2.3.1 – Victorian MRF outputs (av. monthly generation in 2017–18) – Plastic packaging, by polymer

Material type	Quantity (tonnes)
Plastic – PET (1)	1 100
Plastic – HDPE (2)	1 300
Plastic – Mixed (1–7)	0
Plastic – Mixed (3–7)	1 200
Plastic – LDPE film	0
Plastic – Other	0
Plastic sorting losses	200
<b>Total</b>	<b>3 800</b>

Source: Envisage Works, SV (2018) and industry consultation

## Export market review

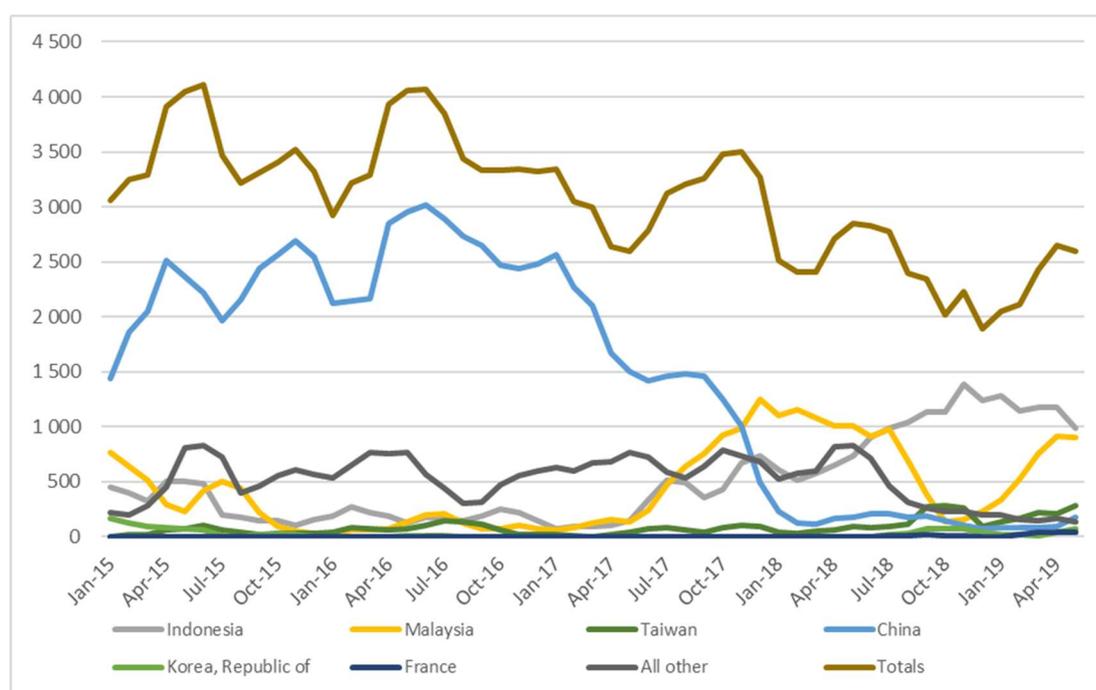
Plastic packaging exports from Australia compete in receiving countries with plastics from the US, Europe and many other countries. It is destined for wherever the demand requires material for production. Generally, demand and pricing will increase or decrease based on worldwide supply and demand conditions.

China, as a traditionally large export market destination, effectively ceased the acceptance of all scrap plastics. India, Malaysia, Thailand and Vietnam have also all introduced import restrictions or bans on the imports of scrap plastics. However, there is evidence that shipments were able to enter Malaysia across February to May 2019.

Exports of kerbside recovered mixed plastic packaging have dropped dramatically over the past few years. In 2016 exports were around 42,000 tonnes, down to 37,000 tonnes in 2017 and then 29,000 tonnes in 2018. So far this year, January to May 2019 exports have been around 12,000 tonnes, so appear similar to 2018.

The falls across 2017 and 2018 were driven entirely by lost sales to China, with exports to Malaysia and Indonesia taking up some of this material. Malaysian sales dropped sharply after the introduction of import restrictions around July 2018, but have seen strong recovery across February–April of this year, and steady exports in May.

Figure 3.3.2 – Victorian recovered kerbside plastic packaging, export country (t/month)



Source: ABS (2019) and Envisage Works

### Market risks, opportunities and activities

The closure of SKM may result in up to 3,000 tonnes/month of packaging plastics sent to landfill, depending on how much commingled recyclables can be diverted to other MRF facilities.

The depressed and constrained market for mixed plastic packaging from kerbside collections has contributed to putting kerbside systems under pressure here, interstate and globally. It is leading to a higher level of sorting of polymers than had previously occurred. It has also triggered some expansion of plastics recycling in Victoria and interstate (South Australia in particular).

Recognising the challenges of recycling a broader range of polymers, many brand-owners and retailers are selecting PET and HDPE in more formats to the exclusion of other polymer types. This trend is expected to continue over the next few years in Australia and globally, with the prospect of problematic plastics being designed out of products. However, the ongoing introduction of new polymer formulations of PET and HDPE not compatible with the recycling of bottle-grade PET or HDPE may pose risks to the ability to easily recycle plastic packaging in future.

Polypropylene (PP) is also widely used in consumer packaging and sorting this material from other polymers may be a more accepted market outcome. The pursuit of nationally adopted targets for the eliminating of problematic plastics packaging is also likely to see a rationalisation of material used in plastic packaging.

## 2.4 Kerbside recovered metal packaging (~1 kt/month)

### Market developments this month

**Development 1** – The possible closure of SKM Recycling is likely to result in significant quantities of metal packaging being sent to landfill in the short to medium term.

**Development 2** – Almost all recovered steel and aluminium packaging bales are sold to export, and the export markets for both packaging types have no current quantity constraints. However, tin-plate steel packaging is not reprocessed in Australia and is low value. It is at some risk of future import restrictions by receiving countries.

**Development 3** – Export markets for metals are steady across January to May 2019.

### Material overview and market summary

For detailed sector overview and information see [bulletin #1](#).

Steel and aluminium cans, mostly recovered through kerbside recycling collections from households, account for only a small fraction of overall metals recovery from Victoria.

MRFs are well equipped to separate these materials from household collections into marketable grades of recyclate, which although small in volume (around 3–4 per cent of the average household recycling bin) represent a valuable source of revenue for MRFs.

Recovered steel packaging is considered a low-value form of steel scrap, but it still sought after in overseas markets, but not by local smelter operators. It has been reported during stakeholder consultation that contamination levels of bales steel cans can be as high as 10% or more, with plastics, food residues, glass fragments and other contaminants, however this level of contamination has not been confirmed.

Aluminium beverage cans have been a key component of kerbside recycling systems since their beginning. CDS in other States and Territories have reduced the amount of aluminium cans coming back through kerbside collections by as much as 25%.

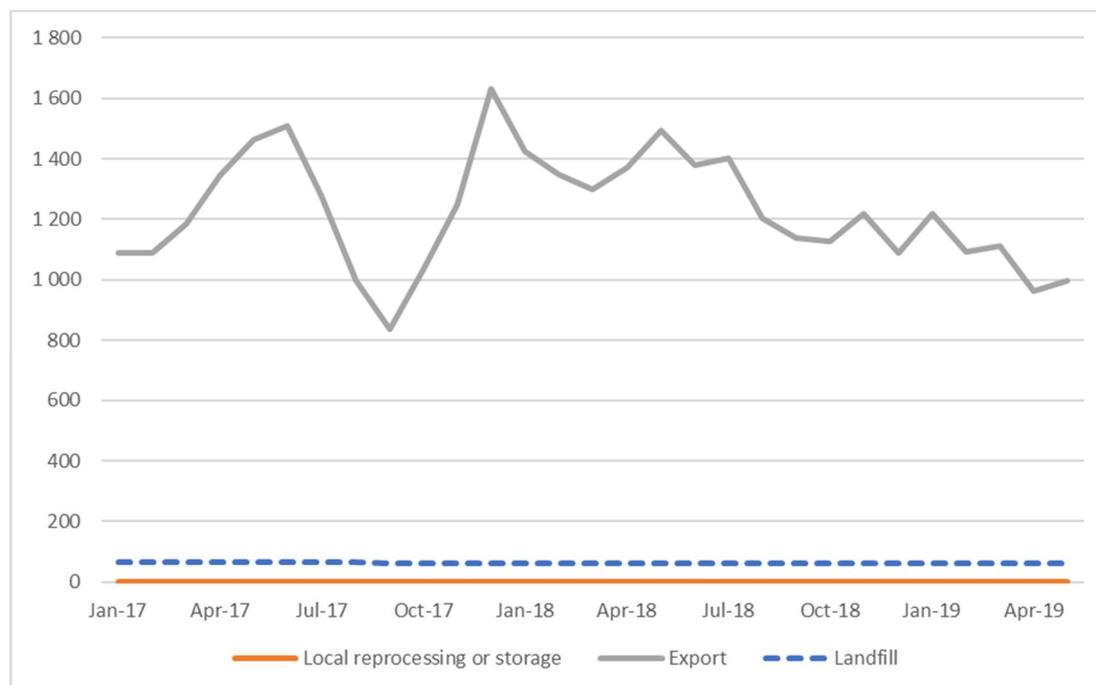
There is no longer any tin plated steel sheet or aluminium can sheet produced in Australia. All is imported and the recycled content is often unknown.

The baled steel and aluminium packaging is sent to a wide range of countries, with the main destinations over the past few years being Taiwan, India, South Korea and Malaysia. Almost all recovered metal packaging is sold into export markets, with no tin-plated steel or aluminium packaging identified as being reprocessed in Australia.

Australia's scrap metal exports are not experiencing difficulties comparable to some other recycling streams in the wake of the Chinese National Sword restrictions. This is due in part to China not being a major destination for these materials prior to the National Sword import restrictions.

Figure 2.4.1 provides data on the change in exports of kerbside recovered metal packaging since the beginning of 2017. Exports have been trending somewhat downwards since the beginning of 2018.

Figure 2.4.1 – Destination of Victorian MRF outputs (tonnes/month) – Metal packaging



Note 1: Historical total monthly MRF outputs have been approximated in the figure above to enable comparison with monthly ABS customs export data. The overall trends are the key aspect of the figure.

Note 2: The combined 'Local reprocessing or storage estimate is indicative only, and these fates will be presented separately if this level of data becomes available. Landfill excludes disposal from storage and is an approximation based on annual waste to landfill rates.

Source: ABS (2019) and Envisage Works

### Prices, demand and supply

There is now little, if any, steel or aluminium packaging scrap reprocessed in Australia. However, international markets for these commodities remain strong.

There is no significant storage of steel or aluminium packaging.

There are no limits on quantity of steel or aluminium packaging into any international markets. The nature of the mechanised sorting at MRFs means there should generally be little contaminant material (apart from some product residue) and therefore minimal market concerns. That said, tin-plate steel packaging is not reprocessed in Australia, is low value, and there are reports of high levels of contamination. It is at some risk of future import restrictions by receiving countries.

The price of steel packaging is strongly linked to global steel pricing. The current price received for baled steel packaging is approximately \$130–\$150 /tonne (EXW MRF).

The price of shipped aluminium packaging is linked to virgin aluminium pricing. The current price received for baled aluminium beverage cans is approximately \$1000–\$1100 (EXW MRF).

### Key end-markets and related specifications

Exported steel packaging has specifications relating to contamination levels and bale density. The sorting that is undertaken at MRFs allows the baled material to meet these specifications without major difficulty or manual sorting input. A similar situation exists for aluminium packaging.

Generally steel and aluminium packaging is recycled back into the respective scrap metal pools and go into durable applications such as vehicles, building materials and many other products.

Table 3.4.1 provides indicative estimates (by metal type) of MRF recovered metal packaging. As time-series monthly data become available, the bulletin will provide data with increased granularity on this important component of MRF output.

Table 2.4.1 – Victorian MRF outputs (average monthly generation in 2017–18) – Metal packaging

Material type	Quantity (tonnes)
Steel	900
Aluminium	300
Metal sorting losses	100
<b>Total</b>	<b>1 300</b>

Source: Envisage Works, SV (2018) and industry consultation

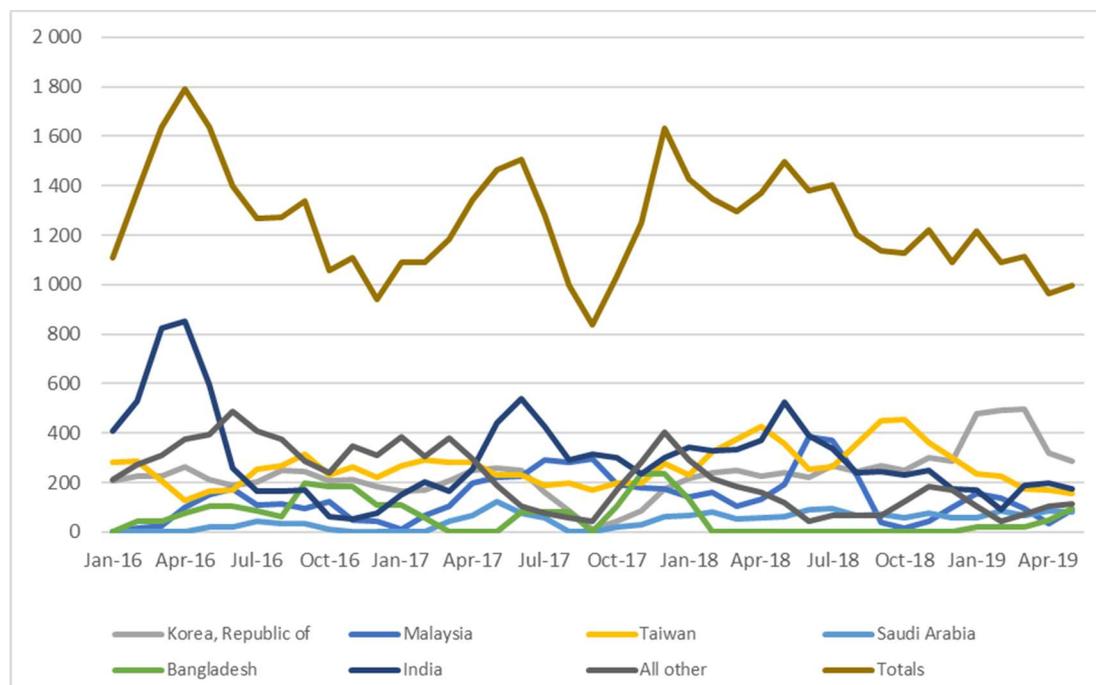
### Export market review

The exported steel and aluminium packaging are sold into large markets with most metal coming from non-packaging sources. The material flows from all countries and is destined for wherever the demand requires material for production. Unlike some other materials, there is no way of knowing the origin of the steel or aluminium in new product. Demand and pricing can increase or decrease based on worldwide supply and demand conditions.

If a large market such as China suffered a contraction in economic activity, this could result in price reductions. The worldwide virgin steel and aluminium production capacities are also changing and a contraction or expansion in capacity will influence pricing.

Exports of kerbside recovered metal packaging have remained fairly steady over the past couple of years, at around 16,000 tonnes in 2016, 17,000 tonnes in 2017, 15,000 tonnes in 2018, and 5,500 tonnes across January to May 2019.

Figure 2.4.2 – Victorian recovered kerbside metal packaging, to export country (tonnes/month)



Source: ABS (2019) and Envisage Works

### Market risks, opportunities and activities

The global steel and aluminium markets have both been able to consistently absorb metal packaging from kerbside systems, better than the local or global markets for any of the other packaging materials. This is primarily due to the lack of barriers in using MRF-sourced metal packaging into most steel and aluminium market outlets.

However, it is worth noting that there is no longer any reprocessing of tin-plate steel or aluminium packaging in Australia. Should import restrictions change in receiving countries Australia is highly exposed to the ramifications.

If there was a dramatic negative shift in supply/demand at a global level, this could lead to significant price reductions for baled steel or aluminium packaging. However, there is no reason to believe that this is currently a risk.

### 3. Special topic areas

Each monthly bulletin examines a couple of special topic areas. These provide a deeper examination of specific issues of interest to a broad audience, while updating and building on the core information and time-series data that are integral to the bulletin each month.

This bulletin looks at:

- the impacts of kerbside contamination
- closing the loop with post-consumer recycled content in packaging.

Refer to [bulletin #2](#) and [bulletin #3](#) for the special topics explored in those editions.

#### 3.1 The impacts of kerbside contamination

One of the key issues emerging from reduced recycling export markets has been the inability to deal with contamination in recycling. For those handling materials at the sorting or reprocessing stage, contamination is a very real issue and can span everything from health hazard from organic matter, and load rejection, through to machinery damage and market resistance.

Contamination can include both well-recognised commingled 'non-recyclable' materials, such as soft plastics, nappies and food waste, but also packaging materials that consists of more than one type of material. For example, a PET water bottle has an HDPE lid and a paper label and therefore even a bale of empty water bottles may not meet the Chinese import requirement of less than 0.5 per cent contamination.

With all packaging materials, significant food or beverage residue is a problem, particularly if the material is stockpiled or transported before use. Beyond this, for each recycling material, contaminants come in different forms.

For glass and metals which undergo high temperature processing, labels and residue present no significant problems. However, the major glass contaminants are ceramics, stone and porcelain (CSP) which, even in tiny amounts, cause problems in bottle production due to higher melt temperatures than the glass. Once glass breaks into small fragments during collection and sorting it becomes impossible to detect and remove CSP contamination.

Glass fragments generated during collection and sorting are in turn a major issue for other recyclable materials, particularly paper and cardboard. Fragments can be carried into the paper during production and can also damage paper making equipment. It is for this reason some paper recyclers will not accept paper and cardboard from commingled collection systems. This incompatibility between glass and other materials in a commingled collection system is the motivation for trials of glass separate collection.

Plastic contaminants are more varied. Metals can damage flaking and extruding equipment. Labels and adhesives can be problematic and product residue can be taken up by the plastic and restricts market applications back into food contact packaging.

Finally, one of the worst contaminant problems for some plastics is other plastics. PVC is a serious problem for PET recycling and hard to detect. It is reported that PVC contamination in recovered PET packaging at levels as low as 50 parts per million will make that PET commercially unusable for the manufacture of food contact recycled PET.

Polyethylene and polypropylene are less serious contaminants to each other, but PET is not compatible with them. Layered packaging with small amounts of nylon, carbon black or aluminium, can result in a recycled plastic being downgraded or unsaleable.

For these reasons the Australian Packaging Covenant Organisation (APCO) and many brand owners, retailers and packaging suppliers are actively attempting to address problematic plastics, including through deselecting them from consumer packaging applications.

With almost the entire population recycling, it is inevitable that some will be adding to the contamination problem either through a misunderstanding, the challenge in recycling the large variety of packaging formats currently available, or in a minor number of cases, not caring about contaminating the recycling stream.

Education by local councils and state-based media campaigns can improve the level of contamination in the collection and sorting systems. In the case of recidivist contaminators, removal of the recycling bin can have a significant effect, as a very small number of highly contaminated bins can be the source of much of the problem.

Some householders work on the basis that ‘I think it should be recycled so I will include it’. As a result, loose flexible plastic packaging is becoming an increasing contaminant problem. The same trend is occurring with clothing and textiles. This is not likely to be reduced until clothing and flexible plastics have a clear recycling pathway.

Of critical importance is thoughtful packaging design to ensure that packaging is highly recyclable, or else it is made very clear to consumers that the packaging is for disposal to landfill. There is much being done in the packaging design space by packaging manufacturers, brand-owners and APCO. Improvements in packaging design and material selection are a major opportunity for reducing packaging contamination in the medium to longer term.

Levels of contaminants at MRFs are typically 6–10%. Specifications of sorted paper and plastics for export is 1% or lower. One of the major challenges is reducing contamination into MRFs, together with running MRFs in a manner that achieve reprocessor specifications. Packaging designers, brand-owners, consumers, state and local government, and MRF operators, all have a role to play in this.

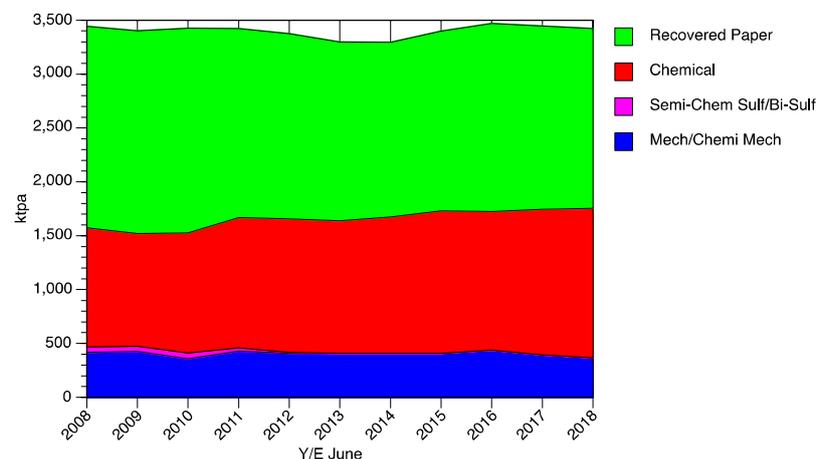
### 3.2 Closing the loop with post-consumer recycled content in fibre-based packaging

Closing the loop is not a new concept, especially in sectors like pulp and paper. Production, consumption, recovery and recycling are fundamental to the sector, with some products using more than 50% recovered fibre.

Corrugated boxes are the prominent example, with some boxes made entirely from recovered paper. Virtually every corrugated cardboard box uses some recovered paper.

Around half of all fibre used in Australia’s pulp and paper industry is recovered, (shown in green) as the chart below shows. The other products shown are virgin pulp grades. In 2017–18, the proportion of recovered paper used was 47%, amounting to 1.7 million tonnes. In the same year, recovered paper exports from Australia totalled 1.4 million tonnes.

Figure 3.2.1 – Australian paper industry fibre use 2008–2018 (kt)



Source: IndustryEdge

Increasing the total proportion of recovered paper used in paper manufacturing is difficult. Some grades of paper are, for performance reasons, more likely to be made from virgin fibre, or at least, a majority of virgin fibre. Toilet paper, high quality printing papers and some liners for corrugated boxes are examples.

The latter is interesting because it might seem that brown corrugated boxes could be made from any material, so they should be very suitable for recovered paper. While that is the case in general, it does not apply for all box applications.

Corrugated boxes contain three layers – a top liner, corrugating medium and a bottom liner. Corrugating medium is invariably made from recovered fibre. However, the liner boards can be made from either recovered or virgin fibre, depending on the specific performance requirements for the boxes.

Virgin liner is known as kraftliner in the industry (kraft means strong in German). It is needed wherever boxes have high performance requirements. Boxes that have to be stackable, travel long distances, or be chilled or frozen along with their contents, need strong liners to remain intact. Exports, for example, are often in boxes made from virgin liner.

Recovered liners are generally unsuitable for the same purposes. They are more likely to be used for boxes that don't have to perform as well, or for as long, in business-to-business (B2B) transactions and for shipment of lighter goods.

The reason recycled liners are not as strong as their virgin fibre counterparts is because in their use, and through the recovery process, the fibres are damaged. There is no hard and fast rule, but it is widely accepted that fibres can be recycled up to seven times before they are unusable.

Some fibre simply cannot be recycled. Tissue products like toilet paper, documents kept in storage, boxes like those used to package pizzas that are contaminated with food are all examples of fibre that cannot be recovered.

The amount of recovered paper from kerbside collections that can currently be used in Australia is therefore limited. It is limited by contamination with other materials, but also by declining quality of the material itself.

The rise of e-commerce and home deliveries has increased consumption of corrugated packaging around the world. Australia is no exception. Nearly all boxes delivered to households are smaller, lighter and more likely to be made from recycled fibre. The average quality of the fibre in kerbside collections is possibly deteriorating.

Contamination from glass, food and other items makes the kerbside stream's contribution to further recycling of fibre very challenging. There is plenty of fibre that either needs to be separated at the source, or cleaned extensively before it is used.

It is possible to tighten the loop with fibre-based packaging, but as the circularity of the economy becomes more complete, it is important to remember that at some point old fibre does have to be removed and new fibre added to the paper & paperboard packaging pool.

## 4. Supporting material

Please refer to the document *Supporting resources – Glossary and references* for a detailed glossary of the terms used throughout the bulletins, and a listing of the references and other sources drawn on in the development of the bulletins.

This document is available for download at: <https://www.sustainability.vic.gov.au/Business/Investment-facilitation/Recovered-resources-market-bulletin>.