Australian Packaging Covenant Organisation

Market Impact Assessment Report

Chinese Import Restrictions for Packaging

In Australia

Contributors:	Australian Packaging Covenant Organisation; Envisage Works; Helen Lewis Research; Sustainable Resource Use.
Date:	March 30, 2018

Australian Packaging Covenant Organisation

CONTENTS

GLOSSARY / ABBREVIATIONS

Commercial and Industrial (C&I)	Material from all commercial and industry sources other than building and demolition.
Construction and Demolition (C&D)	Material from the construction, refurbishment and building demolition industries.
DFAT	The federal Department of Foreign Affairs and Trade.
Domestic	Material from domestic (household) sources.
EXW / ExWorks	Goods at the gate of the seller. The buyer must carry out all tasks of export & import clearance. Carriage & insurance is to be arranged by the buyer.
FAS / Free Alongside Ship	Goods are placed alongside the vessel at the named port of shipment by seller. The seller is required to clear the goods for export. This term can be used for sea transport only.
FOB / Free on Board	Goods pass the ship's rail at the named port of shipment at the cost of the seller. The seller must clear the goods for export. This term can only be used for sea transport.
Household	Material from domestic (household) sources.
In the gate	Material entering a facility for reprocessing. This may include material that is unrecoverable due to contamination.
Kerbside recycling/recyclables	Materials collected at the kerbside from municipal sources. Consists of both packaging and non-packaging materials.
Local use	Recyclate used within Australia by an Australian company in the manufacture of a new product.
Local/Locally	In Australia.
Mixed paper	Post-consumer kerbside mix of fibre based packaging and non-packaging papers. Includes materials such as magazine, newspaper, marketing, some OCC and others fibre-based formats. Typically has high levels of contamination, of which broken glass is an issue.
Mixed plastics	Post-consumer kerbside mix of plastics based packaging and non-packaging plastic items. Includes materials such as bottles, containers and other packaging formats consisting of all the major polymer groups. Often undergoes a polymer sort at MRFs or post-MRFs to positively recover a limited range of polymer types, typically PET and HDPE. Often has moderate to high levels of contamination.
MRF / Material Recovery Facility	A facility for the sorting of recyclables (typically packaging) into various product streams.
Municipal	Household material plus material from public place recycling.
OCC	Old corrugated cardboard.
Out the gate	Material leaving a facility following reprocessing; excludes most contamination.
Packaging	Material used for the containment, protection, marketing or handling of product. Includes primary, secondary and tertiary/freight packaging in both consumer and industrial packaging applications.
PE-HD or HDPE	High density polyethylene (PIC 2). Typically referred to as HDPE.
PE-LD/LLD or LDPE/LLDPE	Both low density polyethylene and linear low-density polyethylene (PIC 4). Known as LDPE/LLDPE.
PE-LD or LDPE	Low density polyethylene (PIC 4). Typically referred to as LDPE.
PE-LLD or LLDPE	Linear low-density polyethylene (PIC 4). Typically referred to as LLDPE.
PET	Polyethylene terephthalate (PIC 1).
PIC	Plastic identification code.
PP	Polypropylene (PIC 5).
PS	Polystyrene (PIC 6).
PS-E or EPS	Expanded polystyrene (PIC 6). Typically referred to as EPS.
PVC	Polyvinyl chloride (PIC 3).
Recyclate	Scrap material either before or after reprocessing.
Recycling	A general term covering the process chain of collection, sorting, reprocessing and the manufacture of new products.
Reprocess	Process(es) by which aggregated end-of-life materials are converted into a raw material that can be used as an input into new product manufacturing.

EXECUTIVE SUMMARY

This report has been prepared by the Australian Packaging Covenant Organisation Limited (APCO) and the contributing authors to assess the impact of new Chinese import restrictions for wastes imported as raw materials. The purpose of this report is to contextualise the issue and provide a framework to prioritise and develop appropriate responses for APCO to provide essential support to industry and government. As the central co-regulatory body, collaborating with all stakeholders in the value chain to provide essential resources and information relating to packaging design, use, collection, recycling, re-use and disposal APCO acknowledges their unique role in this issue.

The import restrictions central to this report have been developed to include higher standards for permissible contamination levels and a reduction in import permits. The new contamination standards entered fully into force from 1 March 2018, however started influencing imports into China 4–5 months prior to this date. The key change is a contamination threshold requirement of no more than 0.5% impurities for both scrap paper and scrap plastics. This Chinese initiative, often referred to as the 'National Sword', is part of a broader suite of measures designed to shift away from imported wastes as a source of raw materials.

In July 2017 the Chinese Government notified the World Trade Organization (WTO) that it intended to amend the import of four classes and 24 kinds of solid wastes. These included 'plastic waste from living sources' and unsorted paper waste (WTO, 2017). The stated rationale was that large amounts of dirty and hazardous materials had been mixed with imported solid wastes intended for use as raw materials, and that this was having a negative impact on China's environment and people's health.

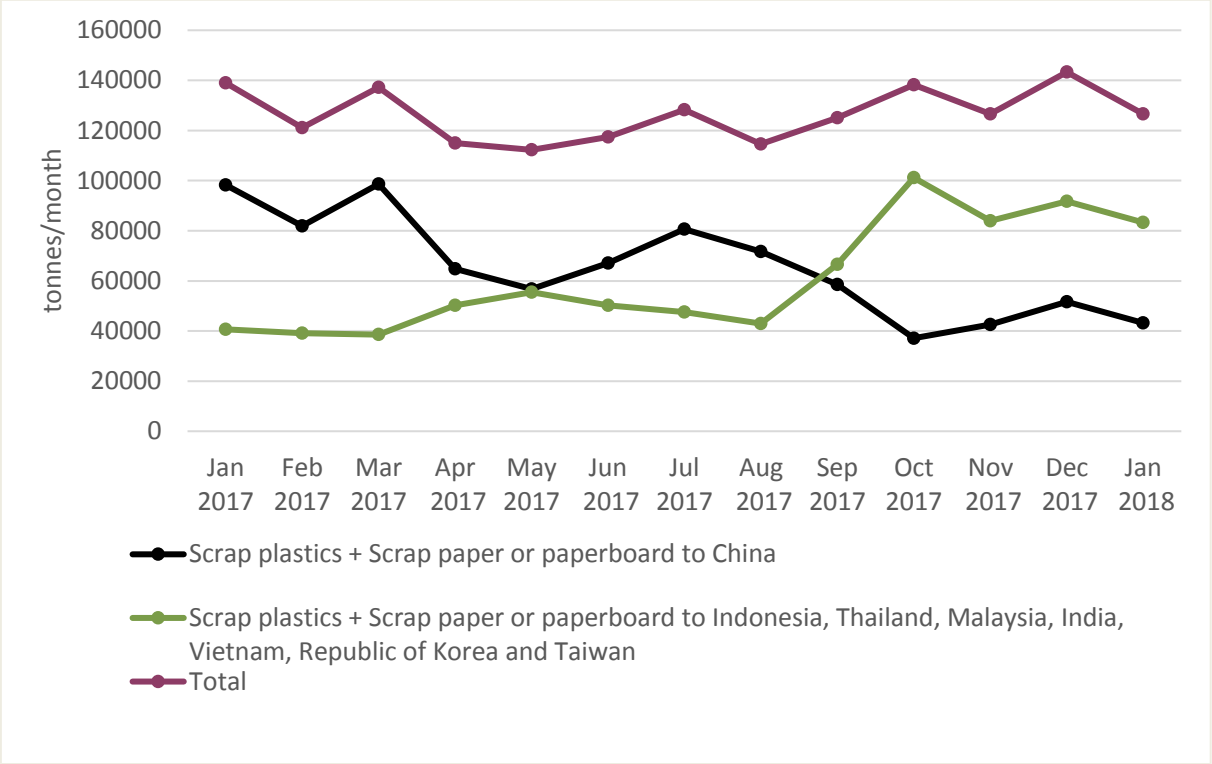
The change in Chinese import restrictions have resulted in a significant reduction in the value of scrap paper and cardboard, in addition the sale of scrap plastics has virtually ceased to China. For context, in January 2017 around 71% of Australian exports of scrap paper/paperboard and scrap plastics were exported to China (98 300 tonnes of the 139 400 tonnes total), by January 2018 this had fallen to 34% of Australian exports (43 200 tonnes of the 128 200 tonnes total).

The curtailment of China as a destination for global scrap recycling has resulted in the current saturation of some types of scrap paper and plastics in the international market, causing significant price falls in the value of these commodities. Over the past 12 months this has primarily impacted prices for mixed paper scrap, with average prices falling from around $124 /tonne (EXW) to $0 /tonne (EXW); prices for scrap mixed plastics, which have fallen from around $325 /tonne to $75 /tonne; and process for cardboard (OCC) which have fallen by around $210 /tonne to $125 /tonne.

As these materials are a large portion of the packaging waste streams recovered in Australia, these commodity price falls have had a proportionally large impact on the financial performance of exposed recycling industry participants, and the kerbside recycling industry that generates most of the scrap mixed paper and scrap mixed plastics commodities.

Over the last 12 months total Australian exports of scrap plastics and scrap paper or paperboard appear to have been relatively stable (see Figure E-1), albeit with a marked fall in January 2018. Other countries have largely absorbed most of the Chinese falls in scrap paper or paperboard imports, and about half of the fall in Chinese imports of scrap plastics at significantly reduced values.

Figure E-1 – Australian exports of HS 3915 and HS 4707 codes from January 2017 to January 2018 – To China versus combined Indonesia, Thailand, Malaysia, India, Vietnam, Republic of Korea and Taiwan



While export volumes remained relatively stable, there were marked falls in the value of scrap plastics and fibre-based packaging between December 2017 and the end of February 2018, particularly with respect to mixed plastics and mixed paper grades. Table E-1 shows the mid-range estimated value of each material or commodity stream ($/tonne of commodity) over this period.

Combined with the typical mass of each commodity in one tonne of unsorted kerbside recyclables as received by material recovery facilities (MRFs), this is used to calculate the value that each commodity contributes to the value of one tonne of co-mingled kerbside recyclables.

The fall in value of mixed paper, between the baseline value and the value at the end of February 2018, has contributed $50 /tonne (67%) of the loss in value of one tonne of kerbside Co-mingled recyclables. This was followed by cardboard (OCC), which contributed $14 /tonne (19%) of the loss in value, and mixed plastics which contributed $8 /tonne (11%) of the loss in value.

Table E-1 – Change in value of one tonne of kerbside recyclables – Mid-range estimates

Kerbside component	Composition	Baseline[1]		End Dec 2017		End Feb 2018	
	tonnes/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside
Fibre – cardboard	**0.180**	$208	$37	$253	$45	$125	$23
Fibre – mixed paper	**0.395**	$124	$49	$108	$42	-$3	-$1
Plastic – PET	**0.030**	$575	$17	$375	$11	$375	$11
Plastic – HDPE	**0.030**	$575	$17	$500	$15	$500	$15
Plastic – mixed	**0.030**	$325	$10	$225	$7	$75	$2
Glass	**0.300**	$0	$0	$0	$0	$0	$0
Steel	**0.025**	$350	$9	$400	$10	$400	$10
Aluminium	**0.010**	$1,750	$18	$2,250	$23	$2,150	$22
Totals	**1.000**	**-**	**$157**	**-**	**$153**	**-**	**$82**

1. Baseline values are estimates of average commodity values from July 2015 to June 2017.

Table E-2 provides a summary of the estimated low-end, mid-range and high-end changes in the value of one tonne of kerbside material compared to estimated baseline values.

The mid-range drop in value of one tonne of kerbside materials at the end of February 2018, compared to the baseline, was around $75 /tonne. This is forecast to improve slightly to a $62 /tonne drop in value by the middle of 2018. Note that this does not consider higher transport costs that may be incurred by some MRF operators, such as those in regional areas.

The forecast for lower prices per tonne of sorted kerbside recyclables (EXW) by mid-2018 is mostly the result of the very low value of mixed paper for the foreseeable future, and to a lesser extent by continuing depressed prices for mixed plastics, cardboard, PET, HDPE and glass.

Table E-2 – Change in value of one tonne of kerbside recyclables – low/mid/high estimated commodity values with respect to baseline

Commodity values range	Change from baseline		
	End Dec 2017	End Feb 2018	Mid 2018 forecast
	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside
Low-end	-$5.00	-$85.25	-$63.17
Mid-range	**-$3.32**	**-$75.22**	**-$61.85**
High-end	-$1.64	-$65.19	-$60.54

1. Baseline values are mid-range estimates of average commodity values from July 2015 to June 2017.

Development of next steps

The purpose of this report is to contextualise the current issue and identify potential next steps for development. It should be noted that the potential next steps discussed are designed to progress the knowledge and capabilities of key stakeholders on this matter and enable further discussion and/or action. In developing appropriate responses APCO has considered the capacity to influence and impact various stakeholders to emphasise the importance of waste avoidance as the preferred outcome.

One of the key capabilities of APCO is the capacity to influence and lead industry initiatives to implement sustainable packaging optimisation strategies in the supply chain, as such APCO has focused on progressing activities that will have the greatest impact within this sphere, including;

- Review and development of the Sustainable Packaging Guidelines to address the issue of recycled content within packaging formats;
- Implementation of the APCO Packaging Recycling Label Program to drive consumer education and reduced contamination in kerbside collection programs nationally;
- Implementation of the Packaging Sustainability Framework to drive:
    - Design for recycling initiatives;
    - Sustainable supply chain activities;
    - Sustainable procurement policies;
    - Closed loop collaboration.
- Continue to engage with established international organisations/bodies to ensure best practice and international capabilities are integrated in to all activities.

APCO acknowledges that whilst it is essential for it to have knowledge of certain activities to inform industry and drive engagement, governments, local councils and, the waste and recycling sector have greater capacity to deliver on activities such as;

- The shift in pricing for kerbside services to align with new market realities;
- Potential consideration of landfill levy relief for packaging recyclate processors;
- Targeted licences for temporary stockpiling;
- Review of either a separate paper and cardboard collection service or a separate glass collection service;
- Financial support for MRF upgrades.

1 INTRODUCTION

1.1 Project purpose and scope

The report undertook to achieve the following:

- Determine current flows of used packaging, within the scope of the changes, to processing and end-market fates, including local and overseas markets by country (addressed throughout Sections 2 and 3).
- High level assessment of the current local reprocessing industry and product end-market capacities (Section 3.1).
- High level assessment of potential impacts on APCO members, e.g. on markets for used packaging waste generated on-site and stockpiling of used packaging (Section 3.1).
- Determine the impact of the China changes on paper/cardboard and plastic packaging scrap prices, and an indication of the anticipated direction of markets later in 2018 (Section 3.2).
- High level assessment of impact and response by international markets to the changes (Section 3.3).
- Potential next steps for APCO and key partners (Section 4).

1.2 Background

In July 2017 the Chinese Government notified the World Trade Organization (WTO) that it intended to changes the import of four classes and 24 kinds of solid wastes. These included 'plastic waste from living sources' and unsorted paper waste (WTO, 2017). The stated rationale was that large amounts of dirty and hazardous materials had been mixed with imported solid wastes intended for use as raw materials, and that this was having a negative impact on China's environment and people's health. Imports of the specified wastes would be prohibited from the end of 2017.

This initiative, often referred to as the 'National Sword', is part of a broader suite of measures designed to shift away from imported wastes as a source of raw materials. At the end of July, the Chinese Government approved an action plan that aimed to increase recycled domestic solid waste from 246 million metric tons in 2015 to 350 million tons by 2020 (The Peoples Republic of China, 2017). It is also the latest in a series of actions to enforce regulations on scrap imports, including intensive inspections under the 'Green Fence' initiative in 2013 (Resource Recycling, 2018).

In November 2017 China notified the WTO that it would introduce standards for contamination thresholds in solid wastes imported as raw materials, which would enter into force on 1 March 2018 (BIR, 2017). These include thresholds of 0.5% impurities for both paper and plastics. Under previous standards, paper bales with more than 1.5% contamination were rejected at the port of entry (Emterra, 2018).

China also controls imports of solid waste through import permits. These determine which companies can import solid waste, the types of waste they can import, and limits on the amount that can be imported (BIR, 2018). During the second half of 2017 the Chinese Government delayed issuing import permits for Old Corrugated Containers (OCC). Lee & Man, a company with several paper mills in China, notes that the licensing process has 'taken on a new meaning' in the context of recent import restrictions, with a typical mill seeing its import allotments cut by 15-20% (Staub, 2017).

Members of the WTO, including Australia, have questioned some elements of the Chinese changes, including their broad scope. As a result, the WTO has officially asked China to grant a longer transition period of up to five years (BIR, 2017), however the granting of substantial transitional period was generally considered unlikely by the government and industry stakeholders who ventured an opinion on this aspect, with the general consensus being that import restrictions were more likely to increase.

1.3 Project method

The key task undertaken in the completion of this project were:

- Desktop research including Chinese Government publications, media reports, export data and local recycling surveys.
- Consultation with stakeholders involved in collection, sorting, processing and/or export of scrap packaging
- Quantification of past, current and forecast flows and pricing of used packaging, to processing and end-market fates, both local and overseas markets.
- Reporting on:
    - The stakeholder consultation and other data collection outcomes.
    - Analysis of data from all sources to determine the market impacts of the Chinese import restrictions.
    - Identification of potential next steps for APCO and its members.

1.3.1 Currency conversions and commodity pricing

Unless stated otherwise, throughout this report all financial reporting is in Australian dollars (exclusive of GST). Any United States dollar to Australian dollar conversions have been undertaken at the monthly average exchange rate for the related period.

Commodity values are reported on an Ex. Works (EXW) basis unless stated otherwise.

1.3.2 Report use and limitations

APCO and the contributing authors have prepared this report with a high-level of care and thoroughness and recommends that it is read in full. This report is based on generally accepted practices and standards at the time it was prepared. It is prepared in accordance with the scope of work and for the purpose outlined in the project brief. The method adopted, and sources of information used are outlined in this report, except where provided on a confidential basis.

This report has been prepared for use by APCO, and only other third parties who have been authorised by APCO. APCO and the contributing authors are not liable for any loss or damage that may be occasioned directly or indirectly using, or reliance on, the contents of this publication.

This report does not purport to give legal or financial advice. No other warranty, expressed or implied, is made as to the professional advice included in this report.

This report was prepared to end of February 2018 and is based on the conditions encountered and information reviewed at the time of preparation. APCO and the contributing authors disclaims responsibility for any changes that may have occurred after this time.

Where conclusions have been drawn, these have been based upon information provided by stakeholders and other sources. Reasonable steps have been taken to verify the accuracy of the information provided within the boundaries of the agreed project scope and resources available. It is noted that the data presented in this study is reliant on a wide range of data sources, which vary in terms of quality and reliability.

APCO and the contributing authors have attempted to source the best available data for this study, however, in some instances, data was not readily available, and it was necessary to make assumptions. Where assumptions were necessary, these have been based on a reputable source or reasonable first principle basis. Some of the assumptions potentially have a significant impact on the analysis outcomes.

The data in Table 3 - Australian exports of HS 3915 and HS 4707 codes, 1 January 2017 to 31 January 2018, All countries; is customs data sourced through the Department of Foreign Affairs and Trade (DFAT). Other data is derived from a combination of confidential stakeholder consultations and supported with data from Steve Balmforth & Associates, Envisage Works and Sustainable Resource Use.

To avoid overstating the accuracy of the data and the subsequent calculations, data in this report has generally been rounded to the nearest 100 tonnes.

In the tables presented in this report, minor discrepancies may occur between totals presented at the bottom and right of tables, and the sums of the component items in tables. Totals are calculated using component item values prior to rounding, and therefore a minor discrepancy may occur from the stated total, and the apparent total that can be calculated from the rounded component item values.

Key assumptions

The key assumptions made in this report mainly relate to the value of kerbside recyclables calculations undertaken in Section 3.2, and are summarised here:

- The mid-range values used in calculations of the value of kerbside recyclables are typically average values of the low-end and high-end values of commodities as reported by stakeholders and other commodity market price sources. They are not weighted averages of market sales, and so should not be seen as ‘best estimates’.
- The adopted values for kerbside composition are based on both specific audit and whole of market Victorian and NSW kerbside compositional data, which are assumed to be materially the same as the average Australian kerbside composition of Co-mingled recyclables. The actual composition of kerbside recyclables collections will vary somewhat at both the council and state/territory levels depending on the materials designated for

collection and local patterns in consumption, and the presence of jurisdictional specific policy or legislative settings such as Container Deposit Legislation.

- Where required, the value of sorted recyclables has been converted from Free Alongside Ship (FAS)[1] prices to MRF gate (ExWorks or EXW)[2] prices by subtracting $25 /tonne. This is an estimated average road transport cost but may be higher for MRFs based in non-metropolitan locations, and lower for metropolitan MRFs.
- The limited forecasting of price data undertaken in this report assumes, as based on industry intelligence and stakeholder feedback, that the price of OCC will increase by around a third by the middle of the year (form the end of February 2018), and the price of mixed paper will recover only weakly. It is assumed that the price of all other commodities recovered from kerbside will remain flat.

[1] FAS (Free Alongside Ships): Goods are placed alongside the vessel at the named port of shipment by seller. The seller is required to clear the goods for export. This term can be used for sea transport only.

[2] EXW (Ex Works): Goods at the gate of the seller. The buyer must carry out all tasks of export & import clearance. Carriage & insurance is to be arranged by the buyer

2 IMPACTED PACKAGING FLOWS

2.1 Tariff and industry codes affected by the changes

The tariff codes affected by the import restrictions, and the type of restriction, are shown in Table 1. It should be noted that while most of the material classified under these codes is from packaging, they are not exclusively packaging.

More information on the types of materials that are classified under each code in Australia is provided in Table 2.

Table 1 – Packaging related Chinese import standards subject to changes

Harmonised system (HS) tariff code	Provisional description of changes
39151000 Waste, parings and scrap, of plastics –Of polymers of ethylene	No import licences issued for 1 January 2018 to 28 February 2018. 1 March 2018 onward <0.5% contamination.
39152000 Waste, parings and scrap, of plastics –Of polymers of styrene	No import licences issued for 1 January 2018 to 28 February 2018. 1 March 2018 onward <0.5% contamination.
39153000 Waste, parings and scrap, of plastics –Of polymers of vinyl chloride	No import licences issued for 1 January 2018 to 28 February 2018. 1 March 2018 onward <0.5% contamination.
39159092 Waste, parings and scrap, of plastics –Of other plastics	No import licences issued for 1 January 2018 to 28 February 2018. 1 March 2018 onward <0.5% contamination.
47071000 Recovered (waste and scrap) paper or paperboard – Unbleached Kraft paper or paperboard or corrugated paper or paperboard	1 March 2018 onward <0.5% contamination.
47072000 Recovered (waste and scrap) paper or paperboard – Other paper or paperboard made mainly of bleached chemical pulp, not coloured in the mass	1 March 2018 onward <0.5% contamination.
47073000 Recovered (waste and scrap) paper or paperboard – Paper or paperboard made mainly of mechanical pulp (for example, newspapers, journals and similar printed matter)	1 March 2018 onward <0.5% contamination.
47079000 Recovered (waste and scrap) paper or paperboard – Other, including unsorted waste and scrap	No import licences issued for 1 January 2018 onwards.

Table 2: Material classified under each tariff code within Australia

Harmonised system (HS) tariff code	Materials generally classified to each code in Australia
39151000 Waste, parings and scrap, of plastics –Of polymers of ethylene	No consistent classifications for exported polymers with inconsistent use of descriptors by local exporters, however probably primarily consists of sorted HDPE and LDPE/LLDPE packaging.
39152000 Waste, parings and scrap, of plastics –Of polymers of styrene	No consistent classifications for exported polymers with inconsistent use of descriptors by local exporters, however probably primarily consists of sorted PS and EPS packaging.
39153000 Waste, parings and scrap, of plastics –Of polymers of vinyl chloride	Only very low quantities exported, but probably primarily consists of post-industrial scrap from PVC product manufacturers.
39159092 Waste, parings and scrap, of plastics –Of other plastics	No consistent classifications for exported polymers with inconsistent use of descriptors by local exporters, however probably primarily consists of mixed plastics packaging, across PET, HDPE, PVC, LDPE, PP and PS.
47071000 Recovered (waste and scrap) paper or paperboard – Unbleached Kraft paper or paperboard or corrugated paper or paperboard	47071000 is primarily OCC and equates to the Grade (11) category used by industry and based on Institute of Scrap Recycling Industries (ISRI) grading of paper stocks.
47072000 Recovered (waste and scrap) paper or paperboard – Other paper or paperboard made mainly of bleached chemical pulp, not coloured in the mass	Code 47072000 is pre and post 'woodfree' grades and can be a combination of many ISRI listed pulp substitute grades as listed in brackets: • Hard white shavings (HWS) (30) • Hard white Envelope (HWE) (31) • Manifold white or coloured ledger (MWL)or (MCL) (39&41) • Sorted white ledger (SWL) (40) • Sorted office papers (SOP) (37) • Coated book stock (CBS) (43).
47073000 Recovered (waste and scrap) paper or paperboard – Paper or paperboard made mainly of mechanical pulp (for example, newspapers, journals and similar printed matter)	Code 47073000 is publishing grades and generally includes sorted: • Newspapers (6) • Magazines pre and post (10) • Groundwood shavings (44) • Flyleaf shavings (22).
47079000 Recovered (waste and scrap) paper or paperboard – Other, including unsorted waste and scrap	Code 47079000 is mixed grades and has a major overlap with 'Mixed paper' as referred to in this report. It is predominantly composed of post-consumer kerbside or Soft Mixed Paper (SMP) (1&2). It can also be: • Hard mixed Paper (HMP) (3) • Printers mixed Paper (PMP) (9) • Sorted office residual Mixed (SRM) (37).

2.2 Used packaging exports

Nearly 1.7 million tonnes of used packaging were exported from the start of 2017 to the end of January 2018 (13 months) under the tariff codes listed above. This comprised 155 200 tonnes of scrap plastics and 1 505 100 tonnes of scrap paper and paperboard.

A breakdown of exports by tariff code is shown in Table 3. Scrap paper or paperboard made up 90.6% of the total by mass and 85.8% by value. The largest single export category is 47071000 (unbleached Kraft or old corrugated containers).

Table 3 – Australian exports of HS 3915 and HS 4707 codes, 1 January 2017 to 31 January 2018, All countries

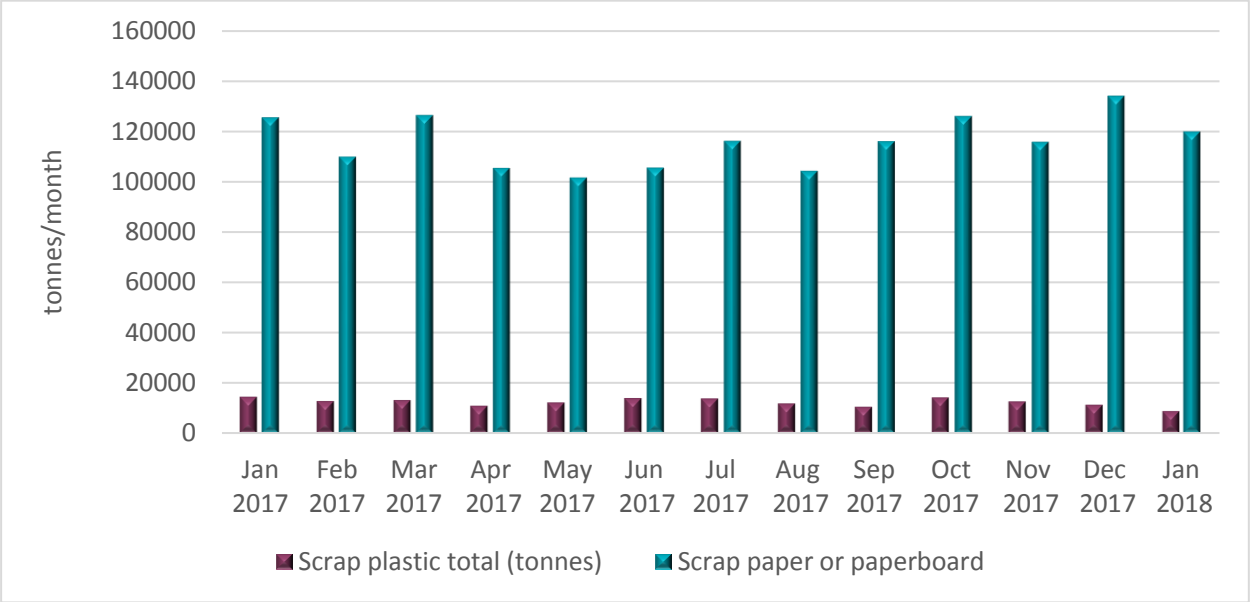
Tariff code	Quantity		Value	
	(tonnes)	(% total)	($'000)	(% total)
Scrap plastics				
39151000	40 400	2.4%	$15,500	4.4%
39152000	5 400	0.3%	$1,200	0.3%
39153000	100	0.01%	$100	0.03%
39159092	109 300	6.6%	$32,800	9.4%
Total plastics	**155 200**	**9.4%**	**$49,600**	**14.2%**
Scrap paper or paperboard				
47071000	920 800	55.5%	$171,200	49.0%
47072000	69 100	4.2%	$20,100	5.8%
47073000	162 300	9.8%	$33,400	9.5%
47079000	352 900	21.3%	$75,100	21.5%
Total paper or paperboard	**1 505 100**	**90.6%**	**$299,800**	**85.8%**
TOTAL	**1 660 300**	**100.0%**	**$349,400**	**100.0%**

Source: DFAT (2018)

It is important to note that the export value data (as reported by exporters to the federal Department of Home Affairs and obtained for this project from the Department of Foreign Affairs and Trade (DFAT), summarised in this section of the report covers non-packaging related kerbside streams, and is indicative of changes in overall value only. It is not specific to the requirements and scope of this project, unlike the commodity pricing data obtained through the industry consultation and review of industry market publications, as detailed in Section 3.2 of this report which is standardised to the out-going MRF gate (EXW) price.

After July 2017 as the Chinese import restrictions started to take effect, monthly scrap paper or paperboard exports remained relatively stable by mass, however scrap plastics exports fell by 37% to the end of January 2018 (Figure 1).

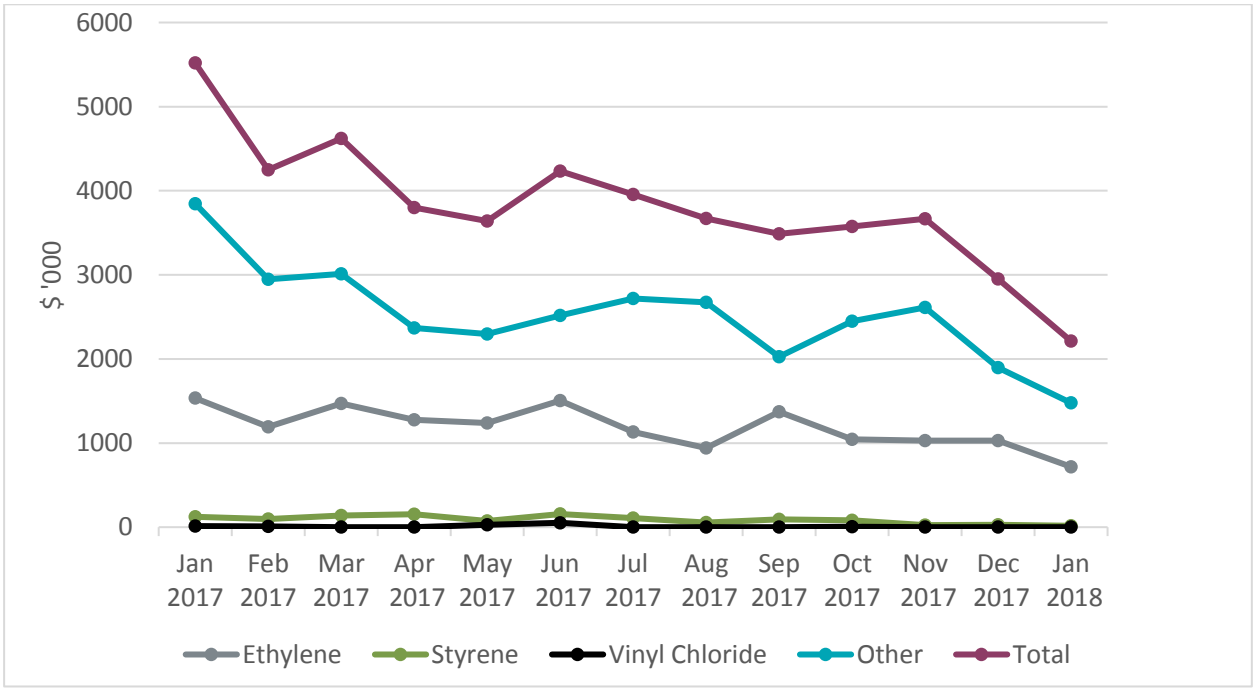
Figure 1 – Australian exports of HS 3915 and HS 4707 codes, all countries



Source: DFAT (2018)

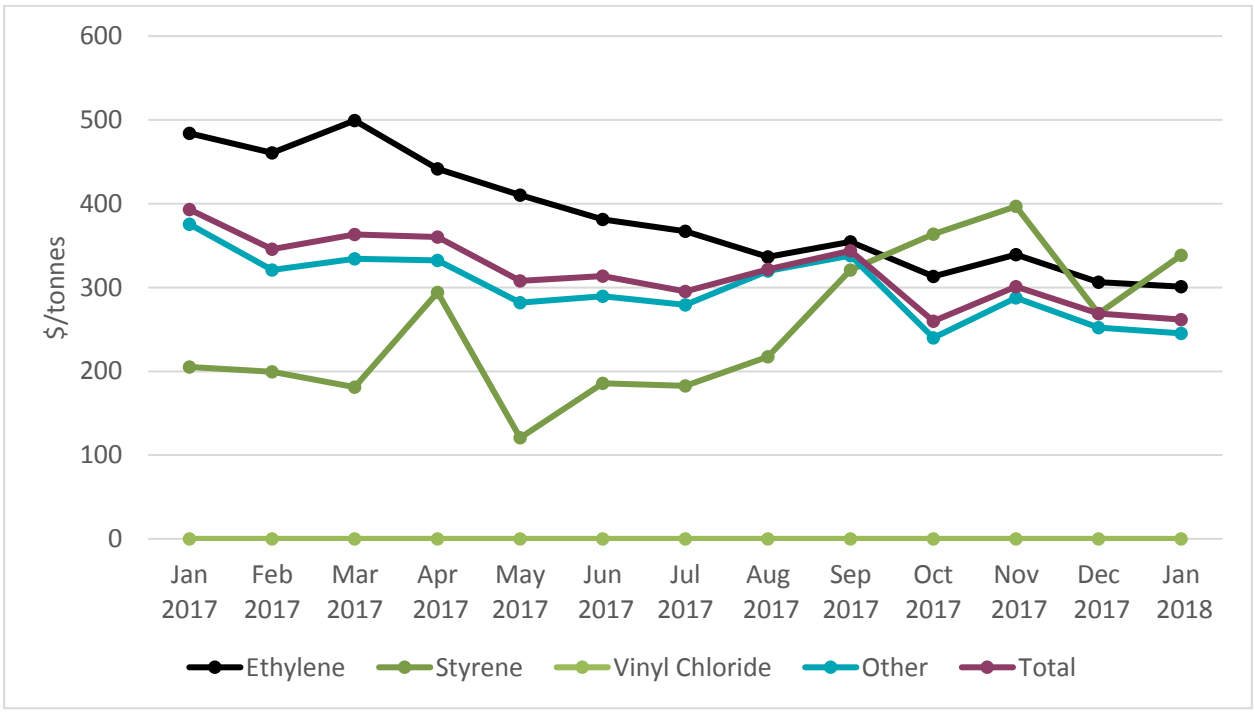
Prices of exported scrap plastics started to fall across 2017. This is evident in both total value (Figure 2) and dollars per tonne (Figure 3). According to these figures, the average monthly price for scrap plastics fell from $393/tonne in January 2017 to $262/tonne in January 2018, however this figure masks significant variability in the impact of the Chinese import restrictions on different grades of scrap plastics, and any further price changes post 1 February 2018.

Figure 2 – Australian exports of HS 3915 codes (scrap plastics), all countries, total $ value



Source: DFAT (2018)

Figure 3 – Australian exports of HS 3915 codes (scrap plastics), all countries, $/tonne

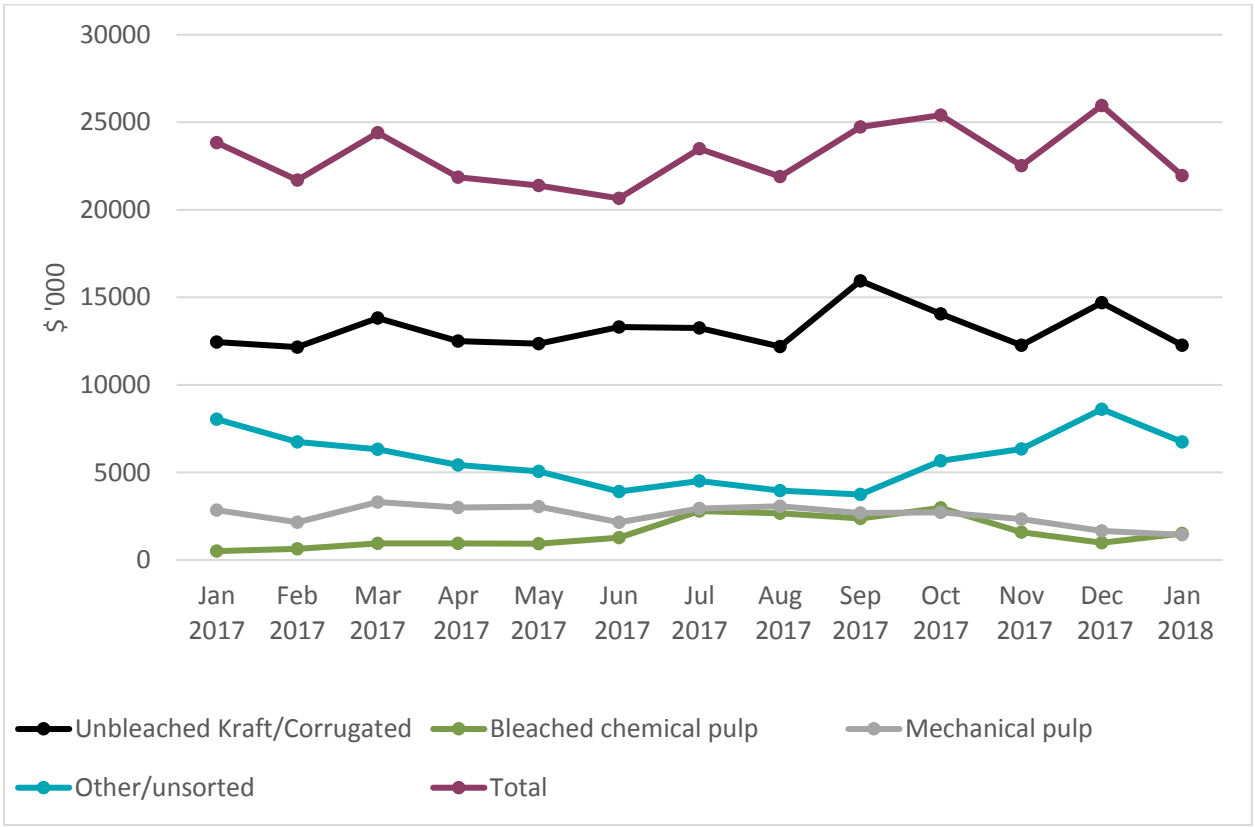


Source: DFAT (2018)

Prices for paper and paperboard appeared to be somewhat more stable, in both total value (Figure 4) and dollars per tonne (Figure 5). However, as shown later in this report (Section 3.2), independent industry data and stakeholder feedback shows that price falls for OCC and mixed paper (at the MRF gate

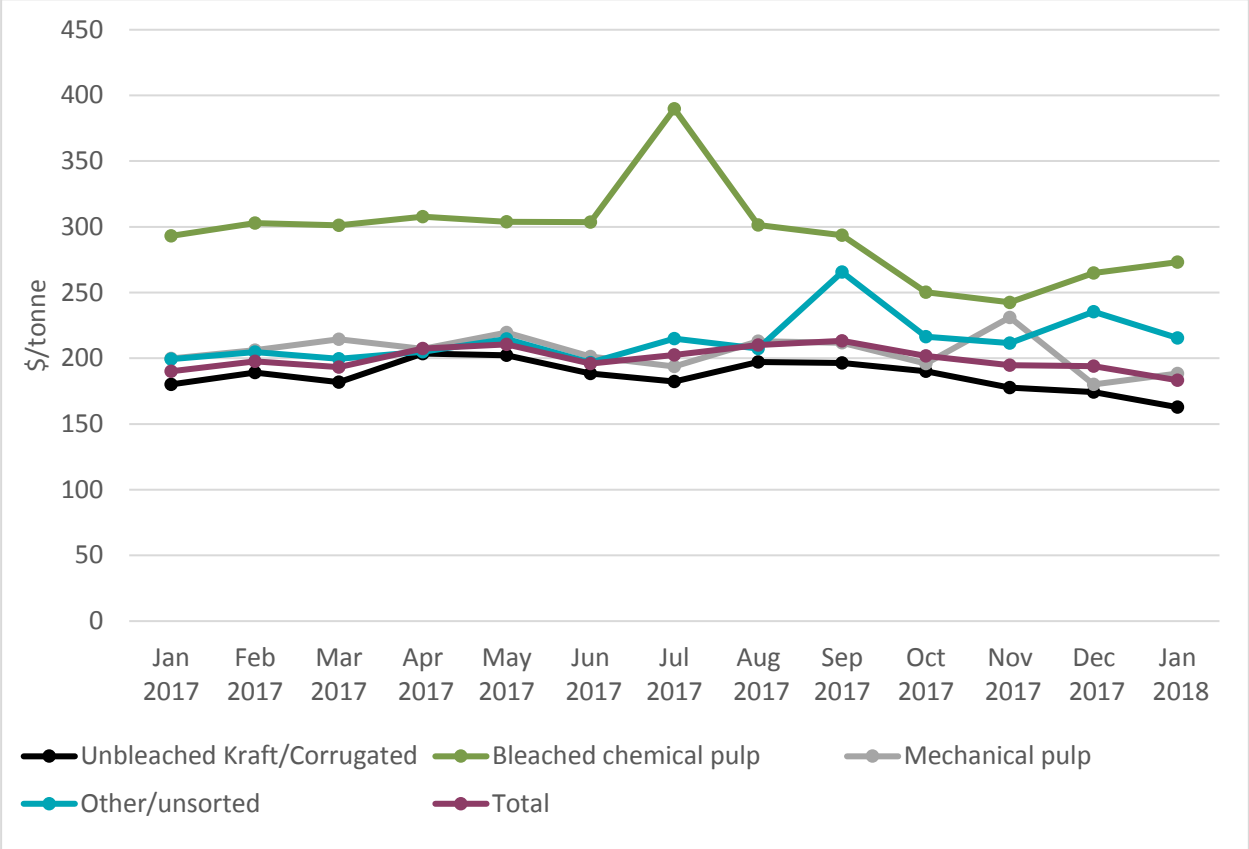
or EXW) have been significantly greater than those appearing in the Customs data to the end of January 2018, which are typically reported in terms of Free Alongside Ship (FAS).

Figure 4 – Australian exports of HS 4707 codes (scrap paper), all countries, total $ value



Source: DFAT (2018)

Figure 5 – Australian exports of HS 4707 codes (scrap paper), all countries, $/tonne



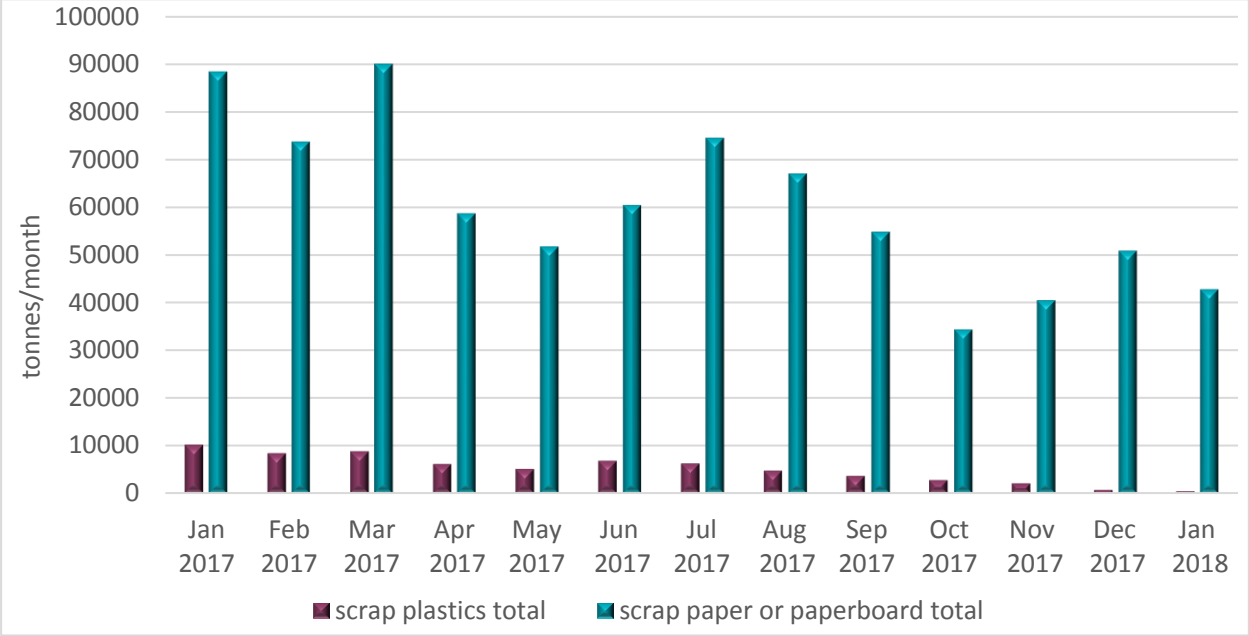
Source: DFAT (2018)

2.3 Country of destination

During the first half of 2017 China and Hong Kong were the dominant markets for Australian exports of scrap plastics, paper or paperboard accounting for 59.4% of plastics and 62.8% of paper or paperboard by weight. During the second half of 2017 this fell to 27.8% of plastics and 45.3% of paper or paperboard, with scrap plastics continuing to fall sharply over the last quarter of 2017 and into January 2018.

Exports of scrap plastics fell from 10 000 tonnes in January 2017 to 400 tonnes in January 2018, a fall of 96%. Scrap paper and paperboard exports fell by 52% over the same period, from 88 300 tonnes to 42 800 tonnes.

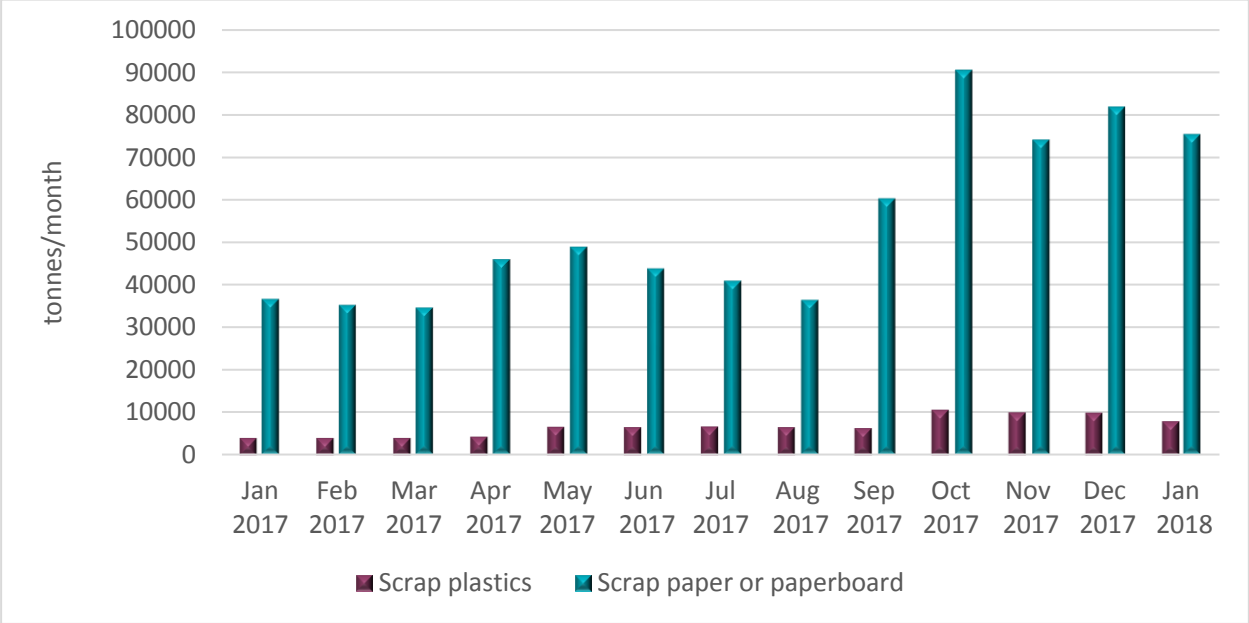
Figure 6 – Australian exports of HS 3915 and HS 4707 codes to China and Hong Kong



Source: DFAT (2018)

During the latter part of 2017 and into January 2018 other countries absorbed much of the material that would have previously been exported to China (Figure 8), particularly with respect to paper or paperboard. However, other countries only took about half the scrap plastics quantity that had previously been exported to China and Hong Kong.

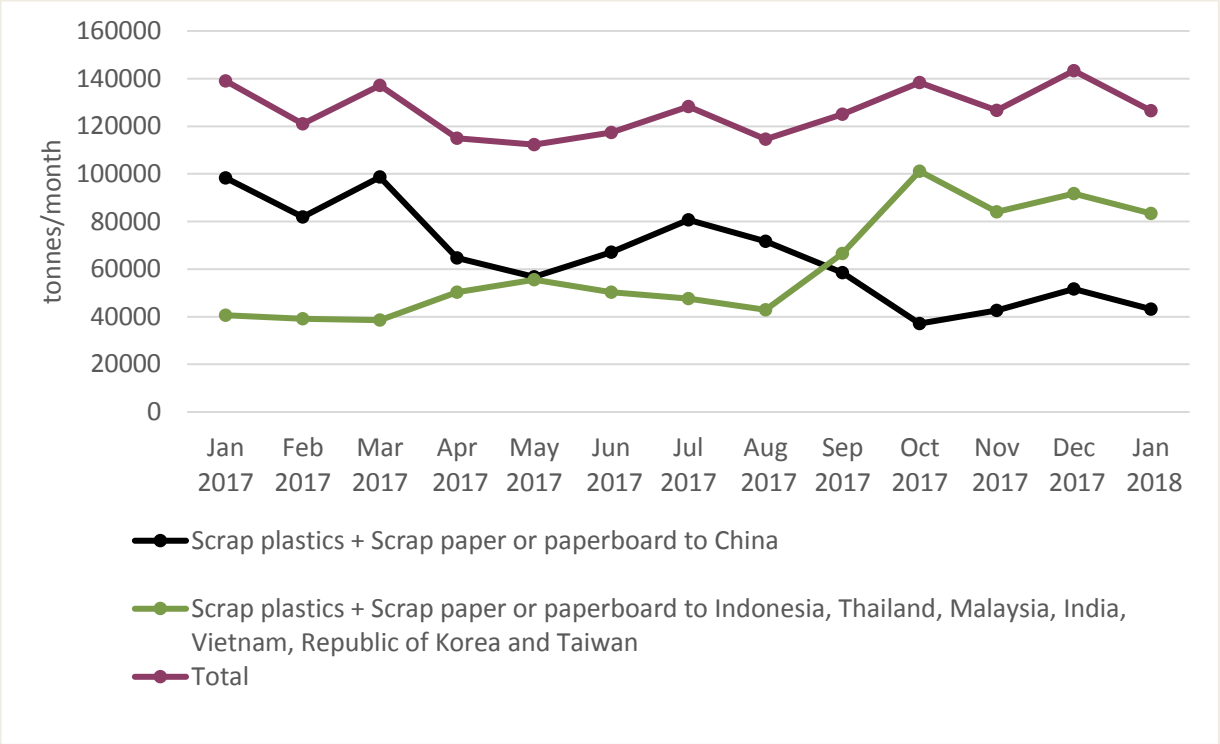
Figure 7 – Australian exports of HS 3915 and HS 4707 codes to Indonesia, Thailand, Malaysia, India, Vietnam, Republic of Korea and Taiwan



Source: DFAT (2018)

The net change in combined exports of scrap plastics and scrap paper or paperboard across the 2017 year was negligible, however a fall in January 2018 was observed, as presented in Figure 8. The depth of the markets in other export countries will be tested in the first half of 2018, and the resilience of total export quantities does not communicate the price falls for specific commodities.

Figure 8 – Australian exports of HS 3915 and HS 4707 codes to China versus combined Indonesia, Thailand, Malaysia, India, Vietnam, Republic of Korea and Taiwan



3 MARKET IMPACT ASSESSMENT

3.1 Overall impact on markets for used packaging

3.1.1 Fibre packaging

Higher spec material

The price of sorted OCC has seen significant shifts in pricing over the past year. Between mid-2015 and mid-2017 the price was generally in the range $160–$320/tonne (EXW), rising to the $320/tonne at the end of this period. Since then the price paid for this grade has fallen below long-term levels to $115–$135 (end February 2018).

Based on the synthesis of stakeholder consultation feedback and available industry market price forecast data it is anticipated that this price will recover by the middle of 2018 to around $180/tonne. This recovery will be underpinned by increasing prices for virgin pulp and finished product. This is still around 10% lower than the average price for OCC between July 2015 and June 2017.

C&I organisations that generate paper or paperboard waste in their operations are starting to see impacts on their recycling contracts, with one very large company seeing a 30% increase in recycling costs for cardboard (APCO, 2018).

Mixed grade material

The mixed paper grade material that is being produced from Australian kerbside systems is a blend of cardboard, boxboard, newspaper, magazine and printing and writing grades. While each of these grades have markets with strong prices, their value is much lower as a mixed grade product.

During global shortages paper mills will occasionally receive this material to fulfil their raw material requirements. When there is an oversupply, this material becomes less desirable and the price drops. Now, with China almost ceasing imports of this grade, there is an oversupply and the price has dropped dramatically.

Between mid-2015 and mid-2017 the price fluctuated widely, falling well under $100 /tonne (EXW) in early 2016 but reaching $200 /tonne or more during the first quarter of 2017. The average price during this period was around $124 /tonne. Since then the price paid for this grade has fallen far below long-term levels to minus $25 to minus $20 /tonne (end February 2018).

The expectation is that this price will only recover weakly by the middle of 2018 to around $10 /tonne. It is anticipated that this recovery will be underpinned by prices for virgin pulp and finished product, both of which are on the way up. This is still around 90% lower than the average price for mixed paper between July 2015 and June 2017.

A huge quantity of this material is being exported from Europe and the US to South East Asian mills. The price is likely to recover more slowly than OCC due to this global oversupply. Australian MRFs are structured to allow most of their paper to be baled and sorted as a mixed paper grade. This was viable while China was receiving the material, with probably well under 20% finding its way into Australian mills. The Norske Skog mill in Albury NSW is processing a proportion of kerbside collected paper, however many mills are currently unable to, including the large Orora mill at Botany in Sydney. These mills have a requirement for specific grade feedstock (OCC at Botany and ONP/OMG at Albury). It may be possible for these and other mills nationally to take an increased proportion of the mixed fibre stock that is currently in global oversupply.

There is also now an opportunity to sort the mixed grades more diligently to obtain better prices for the cardboard, newspaper/magazine and white fractions. While this will require additional equipment or sorting staff, it has potential to achieve both higher prices and greater market security. In the short term, there may be an option to negotiate more of this mixed paper going into local packaging and newsprint mills in Australia.

3.1.2 Plastics packaging

In 2016–17 approximately 155 000 tonnes of scrap packaging plastics were exported from Australia, sourced from both municipal and C&I waste streams. During this period a total of 176 000 tonnes of scrap plastics that are subject to the Chinese import restriction were exported from Australia (both packaging and non-packaging scrap plastics), so around 88% of scrap plastics exported from Australia was used packaging.

Prior to implementation of the import restrictions in the first half of 2017 around 60% of scrap plastics exports were sent to China. Chinese imports dropped away sharply in the second half of the year, and by December only accounted for 7% of Australian scrap plastics exports.

The price of sorted PET packaging has seen significant falls in value over the past year. Between mid-2015 and mid-2017 the price was generally in the range $550–$600/tonne (EXW). Since then the price paid for this material has fallen to around $350–$400 (end February 2018), but now appears stable and is not anticipated to fall further during the first half of 2018.

The price of sorted HDPE packaging has also seen falls in value over the past year. Between mid-2015 and mid-2017 the price was generally in the range $550–$600 /tonne (EXW). Since then the price paid for this material has recovered more strongly than PET, to around $450–$550 /tonne (end February 2018). It now appears stable and is not anticipated to fall further during the first half of 2018.

The price of mixed plastics packaging has experienced more significant falls than either PET or HDPE over the past year. Between mid-2015 and mid-2017 the price was generally in the range $300–$350/tonne (EXW). Since then the price paid for this material has dropped sharply to around $50–$100 (end February 2018), and is not anticipated to recover significantly during the first half of 2018.

Some C&I organisations that generate plastic wastes in their operations, for example at production or distribution sites, are also starting to see impacts on their waste diversion or recycling costs. Examples cited in a survey by APCO include a plastics recycler refusing to accept coloured LDPE film, and a waste management contractor refusing to accept any plastics for recycling (APCO, 2018). In these cases, more on-site waste is being disposed to landfill. One company mentioned that they are being charged for plastic waste to be recycled, whereas it was previously done for free.

3.1.3 Other packaging materials

Steel

Steel cans are a very small part of the local and international scrap steel market and are not subject to the Chinese import restrictions. The price of steel scrap has been stable over the past year and will not have affected revenue levels from sorting facilities.

Aluminium

Aluminium packaging is a small part of the local and international scrap aluminium market and is not subject to the Chinese import restrictions. The price of aluminium increased slightly over the past year and this would have offset (to a small extent) the impact of declines in other material prices.

Glass

There is no export of glass cullet from Australia for recycling. Most glass coming through Co-mingled kerbside collections is going to beneficiation plant and then to cullet feed at Owens Illinois' (O-I) glass plants. Some quantities are going into lower grade construction applications and some is being stockpiled. The Orora glass plant in Gawler, South Australia, utilises glass from container deposit sources in that State.

Glass collected from kerbside recycling is recycled back into glass packaging at O-I plants in Brisbane, Sydney, Melbourne and Adelaide. Glass from NT and Tasmania is shipped to Adelaide or Melbourne. Glass collected in WA is utilised in civil construction projects such as in road base applications.

The quality of collected glass and the relatively low price received for this material has been an issue in kerbside recycling collection and sorting and sale for many years.

O-I receives the glass cullet from beneficiators in each city. The price paid for the glass has remained largely unchanged in recent years. Green glass is in oversupply in Sydney and Melbourne so some of it is shipped to Adelaide for wine bottle production. The price of green cullet has reduced in Sydney and Melbourne but not significantly. The price received for cullet is locked into 3–7 year contracts with beneficiators. It is likely that the price for cullet is close to the long-term average of $72 /tonne. Currently cullet makes up 40% of the input to O-I glass manufacture. They are targeting 60% input and can accept an even higher ratio.

The price that MRF operators get for glass delivered into beneficiators is not fixed. There have been additional beneficiators offering processing in recent years and this brings increased competition. As there is competition, a fixed price for cullet and no limit on outlet, the price received by MRF operators should be stable or improving. There is generally a gate fee for glass collected to cover beneficiation costs. As the cullet contract price has not changed, any surge in price paid at the gate would appear to be opportunistic or the result of poorer quality material being received. Some of the same companies (Visy, SKM) operate MRFs and beneficiation in some capital cities.

In the absence of feedback from MRFs on gate fee rates, a gate fee of $0 /tonne (EXW) has been adopted, unchanged over 2017–18. It may be that some MRFs are being charged by beneficiators in the order of $40–$60 /tonne, but this is not verified and if it is occurring could be linked to the provision of poor quality of material.

3.2 Value of kerbside recyclables

Table 4 provides a synthesis of all available data on prices paid for materials from kerbside collections. This is used to determine the mid-range estimated change in the value of one tonne of kerbside materials compared to estimated baseline values (average commodity values from July 2015 to June 2017). The values of kerbside recycling stream components have been standardised, as much as possible, to the post-sort value at the MRF gate (EXW).

In Table 4 the mid-range estimated value of each commodity stream ($/tonne of commodity) is weighted against the typical mass of each commodity in one tonne of unsorted kerbside recyclables, as received by material recovery facilities (MRFs), to calculate the value that each commodity contributes to the value of one tonne of kerbside recyclables.

The fall in value of mixed paper, between the baseline value and the value at the end of February 2018, has contributed $50 /tonne (67%) of the loss in value of one tonne of kerbside Co-mingled recyclables. This was followed by cardboard (OCC), which contributed $14 /tonne (19%) of the loss in value, and mixed plastics which contributed $8 /tonne (11%) of the loss in value.

The mid-range drop in value of one tonne of kerbside materials at the end of February 2018, compared to the baseline, was around $75 /tonne. This is forecast to improve slightly to a $62 /tonne drop in value by the middle of 2018. Note that this does not consider circumstances where higher transport costs are incurred by MRF operators, such as those in regional areas.

Table 4 – Change in value of one tonne of kerbside recyclables – Mid-range estimates

Kerbside component	Composition	Baseline[1]		End Dec 2017		End Feb 2018		Mid 2018 forecast		Change from baseline		
										End Dec 2017	End Feb 2018	Mid 2018 forecast
	tonnes/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside	$/tonne of commodity	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside
Fibre – cardboard	**0.180**	$207.81	$37.41	$252.50	$45.45	$125.00	$22.50	$171.83	$30.93	$8.04	-$14.91	-$6.48
Fibre – mixed paper	**0.395**	$123.61	$48.83	$107.50	$42.46	-$2.50	-$0.99	$10.00	$3.95	-$6.36	-$49.81	-$44.88
Plastic – PET	**0.030**	$575.00	$17.25	$375.00	$11.25	$375.00	$11.25	$375.00	$11.25	-$6.00	-$6.00	-$6.00
Plastic – HDPE	**0.030**	$575.00	$17.25	$500.00	$15.00	$500.00	$15.00	$500.00	$15.00	-$2.25	-$2.25	-$2.25
Plastic – mixed	**0.030**	$325.00	$9.75	$225.00	$6.75	$75.00	$2.25	$75.00	$2.25	-$3.00	-$7.50	-$7.50
Glass	**0.300**	$30.00	$9.00	$30.00	$9.00	$30.00	$9.00	$30.00	$9.00	$0.00	$0.00	$0.00
Steel	**0.025**	$350.00	$8.75	$400.00	$10.00	$400.00	$10.00	$400.00	$10.00	$1.25	$1.25	$1.25
Aluminium	**0.010**	$1,750.00	$17.50	$2,250.00	$22.50	$2,150.00	$21.50	$2,150.00	$21.50	$5.00	$4.00	$4.00
Totals	**1.000**	**-**	**$165.73**	**-**	**$162.41**	**-**	**$90.51**	**-**	**$103.88**	**-$3.32**	**-$75.22**	**-$61.85**

1. Baseline values are estimates of average commodity values from July 2015 to June 2017.

Source: Envisage Works

Table 5 provides a summary of the estimated low-end, mid-range and high-end changes in the value of one tonne of kerbside material compared to estimated baseline values. The lower value of one tonne of sorted kerbside recyclables (EXW) by mid-2018 is mostly the result of the very low value of mixed paper for the foreseeable future, and to a lesser extent by continuing depressed prices for mixed plastics, cardboard, PET, HDPE and glass.

Table 5 – Change in value of one tonne of kerbside recyclables – low/mid/high estimated commodity values with respect to baseline

Commodity values	Baseline[1]	End Dec 2017	End Feb 2018	Mid 2018 forecast	Change from baseline		
					End Dec 2017	End Feb 2018	Mid 2018 forecast
	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside	$/tonne of kerbside
Low-end	$157.32	$152.33	$72.08	$94.15	-$5.00	-$85.25	-$63.17
Mid-range	$165.73	$162.41	$90.51	$103.88	-$3.32	-$75.22	-$61.85
High-end	$174.14	$172.50	$108.95	$113.60	-$1.64	-$65.19	-$60.54

1. Baseline values are mid-range estimates of average commodity values from July 2015 to June 2017.

Source: Envisage Works

3.3 Impacts and responses by international markets

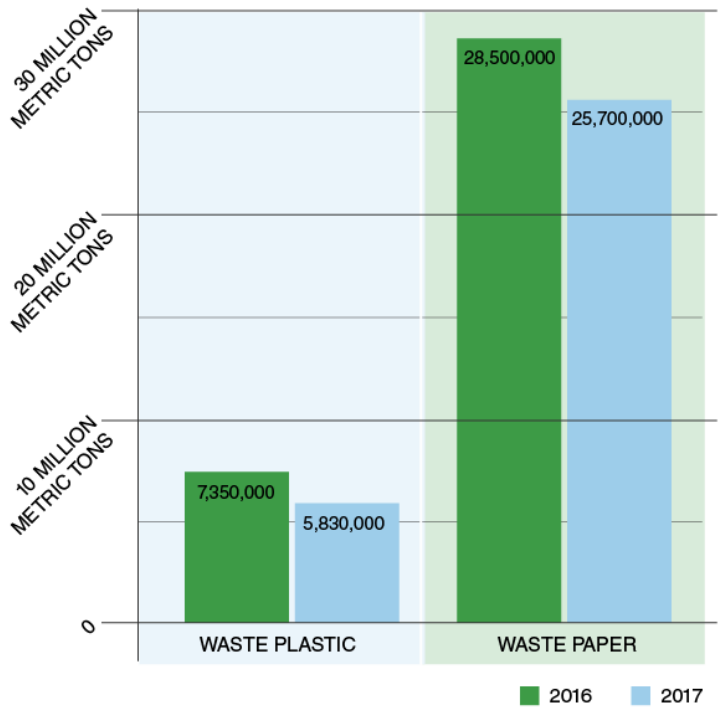
3.3.1 Global

China has been responsible for around 55% of global recycled fibre imports and 51% of scrap plastic imports. By the end of 2017 the impacts of the new import restrictions were already being felt around the world. Chinese data on imports of waste plastic and paper showed a significant year-on-year fall (Figure 9).

There has been a corresponding increase in imports of recyclable plastics and paper by countries in Southeast Asia, including Thailand, Malaysia, Vietnam, India and Taiwan. It is not clear whether this trend will continue, and there is concern that other nations will follow China in restricting imports of waste material (Boteler, 2018). Imports by these countries are also falling short of the total tonnage previously imported by China.

While many commentators have expressed concerns that the global recycling industry will be 'thrown into turmoil' (e.g. O'Sullivan, 2017), others, such as the head of the United Nations Environment Program, have used it as a call to action on plastics pollution and recycling (Twomey, 2018).

Figure 9 – Recyclables imported into China in 2016 and 2017



Source: Resource Recycling (Staub, 2018c)

3.3.2 European Union

The imposition of Chinese import restrictions in 2017 resulted in a surplus of plastic scrap and falling prices for recyclable materials in Europe. One of the main challenges was a lack of sorting capacity in the EU. Because of strict regulations on paper stockpiling for safety reasons, some paper was apparently being incinerated (Tamma, 2017).

The European Union's strategy for plastics in a circular economy notes that the Chinese restrictions on imports are likely to have an impact on local recycling systems, given that 11% of post-consumer plastics are exported to China (EC, 2018). The strategy notes that while there may be adverse effects in the short term, '[I]n the long term the changes of waste imports by China represents an opportunity for the European industry'.

The EU strategy includes several actions to increase the use of recycled plastics within Europe, including:

- development of quality standards for sorted plastics and recycled plastics
- better waste collection and sorting systems
- finalising authorisation of processes for recycled plastics in food contact applications
- an EU-wide pledging campaign targeting industry and public authorities to ensure that 10 million tonnes of recycled plastics are used in products on the EU market by 2025
- recommending that national authorities introduce well-designed Extended Producer Responsibility (EPR) or deposit schemes.

Other options that have been flagged by members of the European Commission include a tax or curbs on throw-away items like plastic bags, imposing quality standards and new rules at ports (Reuters, 2018).

3.3.3 North America

Reduced demand has put downward pressure on prices for some materials, for example the average OCC price in the US fell by 36% in late September (Staub, 2017). In California, where around 85% of mixed paper and OCC have been exported to China, the recycling industry is struggling to cope with reduced demand and lower prices (Staub, 2018a). There has been less impact to date on markets for plastics, but there are concerns about future impacts on plastics coded 3–7.

Recyclable plastic exports from the US are shifting to Southeast Asia, including Malaysia, Thailand, Vietnam and India (Staub, 2018d). Some plastic reprocessors in these countries will create pellets that can be sent to Chinese end users. Exports of mixed paper from the US are shifting to India, Mexico and Canada (Staub, 2018d).

The recycling industry is responding in a variety of ways. Some companies are reportedly stockpiling recyclable materials in the hope that China will loosen restrictions (Emterra, 2018).

Waste Management, the seventh largest exporter of recyclables in the US, has responded to the recent market turmoil by actively looking to develop relationships with buyers that make 'recycled content' a part of their branding (Staub, 2018b). These markets are considered to be relatively stable. The President of Pratt Recycling has called on local councils to be more 'judicious' about adding more materials to kerbside recycling, given that some programs have as much as 50% contamination (Staub, 2018b).

A summary of potential responses being raised include:

- processing plastics resin into virgin resin equivalent forms, thus circumventing the Chinese import restrictions
- temporary stockpiling
- enhanced relationships between exporters of recyclate materials and (US based) current or potential users of the material
- lifting state regulations on recovery of carbon from paper and plastic through technologies such as gasification and pyrolysis
- kerbside collectors investing more capital and labour to meet the new standards
- state governments support to the recycling industry to educate the public as a way of reducing contamination.

3.3.4 Other receiving market responses

As China has reduced the range and volume of materials imported for recycling, some other countries have increased imports. This is showing up in the destinations for both paper and plastics sent from Australia. The largest alternative market for paper has been Indonesia, while the largest alternative market for plastics has been Malaysia. Across the region; Indonesia, Thailand, Malaysia, India, Vietnam, Republic of Korea and Taiwan have all received more Australian recyclables over the past 6–9 months as Chinese imports have reduced.

Most exporters expect that other markets will struggle to make up for the Chinese downturn. There is also reason to believe that the resistance by China to receiving contaminated loads will eventually extend to other receiving markets. If Australian mixed paper and plastics are to find secure export destinations (and improved local markets), they will need to have much lower levels of contamination than in the past.

4 NEXT STEPS

4.1 Markets for collected recyclables

4.1.1 All packaging

The Chinese import restrictions present some immediate challenges to Australia's recycling industry. Addressing these challenges will require coordinated action by all key stakeholders including state and local governments, manufacturers and the waste industry.

APCO has an important role to play because its membership includes organisations that make, use or recycle packaging. It also has close links to the federal and state governments through its co-regulatory arrangement status.

It is worth highlighting that China is a significant market destination for some materials but not for all. Steel and aluminium packaging is usually traded to local outlets or as a minor fraction of large metal recycling shipments. The Chinese import restrictions do not affect these packaging materials. Similarly, glass is a heavy and low-value material that is not internationally traded for recycling. While the Chinese import restrictions do not affect steel, aluminium and glass directly, market challenges for paper and plastics may threaten the viability of kerbside recycling for the combined basket of materials that are currently recovered through Co-mingled collections.

4.1.2 Fibre packaging

OCC

Markets for sorted fibre packaging remain stable with less price and supply challenges than mixed fibre paper. Sorted cardboard (OCC) that is free of glass fragments will continue to be sought as a feedstock for paper production here and in all other markets including China. The price of virgin fibre has increased making the market for recycled fibre stronger at a global level. Expectations from export traders and the local reprocessing industry is that fairly quickly the price per tonne of OCC will recover back to levels more closely aligned to long term averages. In the meantime, this material can be sold locally or be shipped to a range of other paper producing markets.

Mixed grade

The markets for other sorted grades, such as newsprint and printing and writing paper are also resilient or not exposed to the Chinese import restrictions. However, the mixed fibre material coming out of kerbside collections faces much more challenging market conditions. The price of mixed fibre is down very significantly, and this weakness is likely to continue, reflecting the oversupply and poor demand for this material. For existing clients, markets can be accessed at a lower price. For those seeking new market outlets, finding buyers is more difficult. These are referred to as 'distressed tonnes' and in some markets this material is so low in demand that it is being traded for $0.

Part of the challenge for mixed fibre material from Co-mingled kerbside collections, is that glass fragments are embedded in the paper, particularly where the paper is damp. While shakers and trommels can remove some of these fragments, there remains a residue of glass that can damage equipment throughout the sorting, pulping and paper making process. Some stakeholders in the paper field have expressed the view that they couldn't understand why anyone would take this material into their paper making processes.

Sorting facilities are generally not positively sorting this mixed material to meet different higher-grade specifications. It is therefore sold as 'Mixed Papers (54)' grade material. One option is to seek to divert more of this material into the cardboard or other specialised grades that have a higher value and greater market acceptance. This could be achieved by additional sorting staff, slowing the sorting line, additional sorting equipment or a combination of these. Despite this, the issue of glass fragments will remain and will eventually have to be addressed.

For this reason, some stakeholders have suggested that the current fully Co-mingled collections have a serious misalignment with scrap material market expectations. They have suggested that the solution would be to collect paper and cardboard material through a separate bin at the household. As this would split recycling volumes in to two equal halves, the paper recycling bin and the remaining Co-mingled recyclables bin could be collected on alternate frequency (e.g. fortnightly instead of weekly or monthly instead of fortnightly).

This would add to establishment and collection costs but would see savings in sorting costs and added value for sorted material. There is a possibility that this paper stream could be delivered directly to the mill and be blended as a feedstock without any sorting. This is a major change to kerbside systems around the country. It should be assessed looking at its current use in Northern Beaches Council in Sydney and in European jurisdictions. The benefits of this approach are in both preventing glass contamination and making grade sorting for (higher value) specification compliance easier.

4.1.3 Plastics packaging

Plastic packaging consists of a broad range of polymers and single polymer formats and those with more than one material, often as a barrier layer.

For single polymer consumer packaging, the dominant plastics are PET, HDPE, LDPE and PP. There are also packaging formats made from PS, EPS, PVC and ABS.

For single polymer PET material that is collected and sorted to specification, there are strong local and export markets. Those selling this material into export markets are reporting a decline in the price received. This is from a strong longer-term price of $500–$600 /tonne down by around 32% to $350–$400 /tonne. The price of recycled resins is often linked closely to the price for virgin material. In the case of PET, the virgin price has increased recently, in part due to China utilising more of this material as it receives less imported recyclate.

This higher virgin price is expected to draw the price of recycled PET back up in 2018. There is minimal difficulty in finding a destination for collected PET packaging. The exception to this is the broader use of PET packaging with mixed polymer barriers in punnet applications. This can hamper recycling and affect prices received. Several stakeholders were keen to see this barrier material deselected by brand-owners. The price of RPET (recycled PET) for use in bottle manufacture has also increased, reflecting a strong demand for this high-quality material.

The situation is similar for HDPE with the outlets and pricing for clean material remaining strong. There has been some export price reduction due to the China restrictions with prices of $500–$550 coming down by $100 /tonne. Despite the loss of China as a market for this material (unless a contaminant level of 0.5% or less can be achieved), there remain strong local and South East Asian market destinations for this material.

LDPE material is a little more affected with some challenges in market destinations for this material. Export prices for this material are said to be down 33%.

Many local plastic recyclers seek to obtain post industrial waste plastic as it is a more consistent feedstock with a single known polymer origin. By contrast, once the PET and HDPE fractions of the plastics are sorted, kerbside material is a mix of polymers in poorly specified ratios. This severely restricts the applications for this material.

Several plastic recyclers are geared to take this material and make a mixed plastic product suitable for applications such as posts, seating and boardwalks. The ability of these recyclers to take this material is limited by the sale of the finished products. While they have expanded the market in recent years, the failure to get strong growth in major purchases from customers such as road authorities, parks agencies and local councils restricts the production levels of this facilities.

Some have capacity to handle double the current volumes if end market procurement was assured. There are some who are advocating a stronger procurement practice from governments at all levels and major industries as a key to more local processing of kerbside materials.

At a global level, most of this material was sent to China and other markets with low labour costs and the ability to sort mixed material into different polymers. The Chinese import restrictions have substantially curtailed this. Some of this material is being transferred to other low labour cost centres but there is likely to be a shortfall in demand for this material for the foreseeable future. The key to resolving this market challenge is through a combination of controlling input packaging polymer profiles and with more diligent sorting of the fractions by a combination of automated and manual means.

As strong markets exist for PET, HDPE, LDPE and PP, the use of these plastics in consumer packaging, without other polymer additives, would see more packaging sorted and sold at higher prices. At the sorting level, all facilities should be equipped to detect and sort these polymers with automated equipment. Some newer MRFs are so equipped. Other major industry participants do no polymer sorting of plastics at all and this approach has no ongoing role in a reliable recycling future.

Alongside the need to maintain polymer purity, there is a need to keep the material free from contaminants such as glass fragments, paper and some adhesives and inks. There needs to be strong dialogue between brand-owners and packaging designers, and those seeking to recycle packaging plastics.

4.2 Issues and potential responses

4.2.1 Packaging design and labelling

Design for recycling is becoming more critical. APCO will need to consider the implications of the Chinese standards for packaging design and ensure that these are reflected in the updated Sustainable Packaging Guidelines (SPG) and the PREP design tool.

Packaging design is usually on an annual or biannual basis. For this reason, brand-owners need assurance that packaging designated and promoted as recyclable will remain so over the medium to longer term. There is concern amongst some brand-owners that if recycling systems collapse, or if certain materials are excluded, this could leave packaging claims at variance with consumer practice. This in turn may leave brand-owners and retailers vulnerable to ACCC claims for misleading practice. Therefore, it is crucial that the recycling system is structured to maintain collections and markets for designated recyclable material.

Packaging needs to meet a range of technical and marketing requirements. It also needs to be designed with consideration for recycling at end of life. The selection of single polymer plastics without contaminant barriers, adhesives or inks will enable a higher proportion of plastic packaging to be sorted separately for recycling.

4.2.2 Collection systems

For most of the past twenty years, recyclable packaging has been collected in mechanised, bin-based, fully Co-mingled systems. Many stakeholders have pointed out that, while this delivers collection efficiencies, mixing materials and compaction result in cross contamination and reduced quality of the material collected.

Of concern is the impact of glass fragments on other materials, particularly paper grades. The glass itself is of much lower value when collected through comingled kerbside systems. This has prompted several stakeholders to suggest either a separate paper and cardboard collection or a separate glass collection. This would represent a significant shift in approach, and the costs and benefits would need to be assessed to inform the review of options.

LDPE flexible packaging is a large and growing packaging format used for applications such as bread, rice, frozen foods, fresh produce, electronics, toilet paper, biscuits, pet food etc. The cost-effective and convenient collection of LDPE flexible packaging, combined with efficient sorting, will be critically important to increasing plastic packaging recycling and lowering contamination rates.

4.2.3 Sorting systems

Differences in sorting facility design and operation between MRFs are highly significant. Many MRFs lack the full suite of automated material detection and separation equipment. Some have no polymer sort at all. The speed of material processing can also have a profound effect on the quality of sorted material.

The two kerbside recycling fractions that are currently suffering market challenges are mixed paper and mixed plastics. Both fractions could be significantly reduced (i.e. converted to higher grades) through MRF equipment upgrades, better design of sorting lines, more staff or reduced line speeds. Funding assistance to achieve these improvements should be considered.

4.2.4 Consumer education

The Chinese import restrictions relate to the level of contaminant materials. This can include cross-contamination with other recyclables, but contamination with materials that are not selected for kerbside recycling often has a greater impact. This includes food, liquids, garden organics, batteries, nappies, hoses, wire, rocks and durable consumer products such as appliances and clothing and footwear. Often these are added to kerbside recycling bins by householders due to a poor understanding of the sorting and reprocessing system. Efforts already being undertaken to educate householders could be extended or repeated by local government and through media campaigns and at retail level.

Beyond the accidental contamination of recycling bins, some households do not respond to education or warnings about contamination. Spot monitoring supported by removal of bins from these residential or commercial locations, while small, could have a major impact on contaminant levels. This would have to be undertaken as part of a carefully developed and supportive wider program.

4.2.5 Local reprocessor support

Some local recycling outlets receive little or no kerbside material into their operations, including the large Orora mill at Botany in Sydney. While this mill has a requirement for specific grade feedstock (OCC), it may be possible for Orora and other mills nationally to take an increased proportion of the mixed fibre stock that is currently in global oversupply. Even a short-term arrangement, e.g. 3–6 months, would benefit recycling by providing an outlet for this material at a price above export prices and allow the industry and local council's time to adjust. At the very least it would minimise stockpiling and/or disposal to landfill.

As many of these mills have a capacity in the hundreds of thousands of tonnes, absorbing some less sought-after grades in the tens of thousands of tonnes may be possible. This arrangement could link back to product stewardship responsibilities as these are the same mills that produce the material currently impacted by the Chinese restrictions.

A dialogue involving APCO, mill and MRF operators could find a solution for at least some of the mixed paper. MRF operators may also be able to sort closer to mill requirements with additional staffing.

4.2.6 Temporary or permanent adjustment of kerbside contracts

There is no doubt that the Chinese import restrictions have had a financial impact on the revenue streams of those receiving and sorting recyclables. This has coincided with the increasing costs of electricity, fires at some facilities, stricter compliance requirements and large increases in insurance costs.

The financial impact is mostly due to the lower price for mixed paper grades. The impact on a per tonne basis for all recyclables will vary from one sorting facility to another. Based on the analysis of reported prices for each commodity, the overall impact to end of February compared to long term averages is estimated to be a loss of between $65 and $85/tonne.

It is not clear who should be absorbing this impact. Long term contracts were written at a price that was intended to allow for the highs and lows of commodity pricing cycles. As such, most councils would expect their contracts to be honoured at the contracted rates. Some sorting facility operators have recently claimed that the lower market prices for commodities have left their operations unviable without price adjustments in their contracts with councils. Some are seeking adjustments of between $50 and $200 for all tonnes processed.

Whether current council contracts or renewing council contracts are adjusted by these amounts will be the subject of debate and negotiation. Based on the analysis in this report, claims for adjustments above $75–$85 /tonne would appear difficult to justify.

Clearly some of the possible measures outlined in this report could also mitigate some of the price impact of the Chinese restrictions.

It should be remembered that all commodities are cyclical, and it is widely expected that there will be some price recovery for some key materials in 2018.

4.3 Development of next steps

The purpose of this report is to contextualise the current issue and identify potential next steps for development. It should be noted that the potential next steps discussed are designed to progress the knowledge and capabilities of key stakeholders on this matter and enable further discussion and/or action. In developing appropriate responses APCO has considered the capacity to influence and impact various stakeholders to emphasise the importance of waste avoidance as the preferred outcome.

One of the key capabilities of APCO is the capacity to influence and lead industry initiatives to implement sustainable packaging optimisation strategies in the supply chain, as such APCO has focused on progressing activities that will have the greatest impact within this sphere, including;

- Review and development of the Sustainable Packaging Guidelines to address the issue of recycled content within packaging formats;
- Implementation of the APCO Packaging Recycling Label Program to drive consumer education and reduced contamination in kerbside collection programs nationally;
- Implementation of the Packaging Sustainability Framework to drive:
    - Design for recycling initiatives;
    - Sustainable supply chain activities;
    - Sustainable procurement policies;
    - Closed loop collaboration.
- Continue to engage with established international organisations/bodies to ensure best practice and international capabilities are integrated in to all activities.

APCO acknowledges that whilst it is essential for it to have knowledge of certain activities to inform industry and drive engagement, governments, local councils and, the waste and recycling sector have greater capacity to deliver on activities such as;

- The shift in pricing for kerbside services to align with new market realities;
- Potential consideration of landfill levy relief for packaging recyclate processors;
- Targeted licences for temporary stockpiling;
- Review of either a separate paper and cardboard collection service or a separate glass collection service;
- Financial support for MRF upgrades

5 REFERENCES

APCO, 2018. *Member survey on Chinese import restrictions*.

BIR, 2017. *Bureau of International Recycling.* [Online] Available at: http://www.bir.org/assets/PressCuttings/611Chinese-Thresholds.pdf [Accessed 1 March 2018].

BIR, 2018. *News of the first list of companies allowed to import waste & scrap into China.* [Online] Available at: http://www.bir.org/news-press/latest-news/news-of-the-first-list-of-companies-allowed-to-import-waste-and-scrap-into-china/ [Accessed 1 March 2018].

Boteler, C., 2018. *Data show Malaysia, Vietnam, India increasing plastic scrap imports.* [Online] Available at: https://www.wastedive.com/news/data-show-malaysia-vietnam-india-increasing-plastic-scrap-imports/514922/ [Accessed 2 March 2018].

DELWP, 2018. Department of Environment, Land, Water and Planning. [Online] Available at: https://www.environment.vic.gov.au/sustainability/victorians-urged-to-keep-recycling [Accessed 14 March 2018].

DFAT, 2018. *Australian Customs Service – HS 3915 and HS 4707 scrap export data – 2017,* Canberra: Department of Foreign Affairs and Trade.

EC, 2018. *A European strategy for plastics in a circular economy,* s.l.: European Commission (EC).

Emterra, 2018. *How will China's ban of recyclable material affect Canadian recycling programs in 2018 and beyond?* [Accessed 1 March 2018].

Envisage Works, 2016. *2015–16 Australian Plastics Recycling Survey material recovery facility (MRF) survey,* Melbourne: Envisage Works and Sustainable Resource Use.

Envisage Works, 2018a. *2016–17 Australian Plastics Recycling Survey – National report,* Melbourne: Prepared by Envisage Works and Sustainable Resource Use on behalf of the Department of the Environment and Energy.

Envisage Works, 2018b. *Chinese import restrictions assessment – Stakeholder consultation,* Melbourne: Envisage Works and Sustainable Resource Use.

Hair, J., 2018. *Local councils in Victoria get $13m for recycling collection to help deal with China waste ban.* [Online] Available at: http://www.abc.net.au/news/2018-02-23/china-recycling-ban-victorian-councils-get-$13m-for-collections/9476962 [Accessed 10 March 2018].

O'Sullivan, K., 2017. *China's plastics ban will cause 'chaos' for global waste industry.* [Online] Available at: https://www.irishtimes.com/news/environment/china-s-plastics-ban will-cause-chaos-for-global-waste-industry-1.3339174 [Accessed 2 March 2018].

Page, D., 2018. *Hunter recycling industry on brink of collapse following China's ban on waste imports.* [Online] Available at: http://www.theherald.com.au/story/5244294/recycling-crisis-chinese-ban-hits-hunter-waste-industry/ [Accessed 10 March 2018].

Resource Recycling, 2018. *From Green Fence to red altert: a China timeline.* [Online]
Available at: https://resource-recycling.com/recycling/2018/02/13/green-fence-red-alert-china-timeline/ [Accessed 1 March 2018].

Reuters, 2018. *EU targets recycling as China changes plastic waste imports.* [Online]
Available at: https://www.reuters.com/article/us-eu-environment/eu-targets-recycling-as-china-changes-plastic-waste-imports-idUSKBN1F51SP [Accessed 2 March 2018].

Solomons, M., 2018. *Household recycling 'at risk' from China ban.* Sydney.

Staub, C., 2017. *Chinese actions tank US OCC prices.* [Online]
Available at: https://resource-recycling.com/recycling/2017/10/10/chinese-actions-tank-us-occ-prices/ [Accessed 1 March 2018].

Staub, C., 2018a. *How China fallout is shaking recycling in California.* [Online]
Available at: https://resource-recycling.com/recycling/2018/01/30/china-fallout-shaking-recycling-california/ [Accessed 1 March 2018].

Staub, C., 2018b. *Industry heavyweights have their say on China.* [Online]
Available at: https://resource-recycling.com/recycling/2018/02/06/industry-heavyweights-say-china/ [Accessed 1 March 2018].

Staub, C., 2018c. *Latest Chinese permit details show impacts of National Sword.* [Online]
Available at: https://resource-recycling.com/recycling/2018/02/06/latest-chinese-permit-details-show-impacts-national-sword/ [Accessed 1 March 2018].

Staub, C., 2018d. *Where exports displaced from China are finding a home.* [Online]
Available at: https://resource-recycling.com/recycling/2018/01/16/exports-displaced-china-finding-home/ [Accessed 1 March 2018].

Tamma, P., 2017. *Chinese waste ban 'wake-up call' for European recycling.* [Online]
Available at: https://www.euractiv.com/section/circular-economy/news/httpwww-euractiv-comsectioncircular-economynewschinese-ban-on-plastic-waste-imports-could-see-uk-pollution-rise/ [Accessed 2 March 2018].

The Peoples Republic of China, 2017. *Action plan to phase out waste imports.* [Online]
Available at:
http://english.gov.cn/policies/latest_releases/2017/07/27/content_281475756814340.htm [Accessed 1 March 2018].

Twomey, D., 2018. *UNEP says China's plastic waste ban spur to recycle.* [Online]
Available at: http://econews.com.au/56636/unep-says-chinas-plastic-waste-changes-spur-to-recycle/ [Accessed 2 March 2018].

WTO, 2017. *China's import ban on solid waste queried at import licensing meeting.* [Online]
Available at: https://www.wto.org/english/news_e/news17_e/impl_03oct17_e.htm [Accessed 1 March 2018].