

Market Analysis of South Australian Kerbside Comingled Recyclables

Report for the Local Government Association of
SA

Document verification

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Executive Summary

The Local Government Association of South Australia engaged Rawtec to provide an independent market analysis on the impact of the China National Sword Policy on Councils within South Australia.

Current kerbside recycling tonnes and destination in South Australia

Key findings from this analysis indicate that SA Councils currently collect approximately 140,000 tonnes of kerbside comingled recyclables each year. The majority of this is sourced from metropolitan Councils (78%). The 140,000 tonnes of kerbside comingled recyclables collected in SA are generally sent to one of five material recovery facilities (MRFs), with the majority (approximately 90%) sent to three large MRFs. Comingled recyclables include a number of different material streams, including mixed paper and cardboard (approx. 55% of input tonnes by weight), plastics (approx. 6%), metals (approx. 3%), glass (approx. 21%) and contamination (approx. 13%).

Impact on prices from China's National Sword Policy

China's National Sword Policy has predominately impacted the price of mixed paper and cardboard as well as mixed plastics. Due to the high proportion of mixed paper and cardboard that MRFs receive, the reduction in revenue from approximately \$150 per tonne to \$40 a tonne for this stream has had a significant impact on a MRF's revenue per tonne of comingled recyclables it receives. When all prices are considered, the net revenue of a MRF, not including income from gate rates or cost to operate the MRF, is estimated to have reduced by approximately \$63 per tonne due to the National Sword Policy. As such, the requested change in gate rate for SA Councils may be in the order of a \$63 per tonne increase¹.

The increase in gate rate has significant implications for SA Councils. The actual increase in cost per annum for Councils (if any) depends on the increase in gate rate and the total tonnes collected for recycling per annum. With an increase of \$63 per tonne, this equates to additional costs of approximately \$8.8 million across the state, if all recycled tonnes were subject to this increase for a one-year period.

Regional Councils may face additional pressure due to the transport cost for recyclables and relatively low cost for local landfill disposal. An analysis on these factors indicates that the cost to dispose of recyclables to landfill becomes lower than the cost to transport and process these materials when transporting the comingled recyclables over approx. 360 kilometres. Special consideration may need to be given to support regional Councils to enable them to provide this important service that the community expects.

Summary

In summary, Councils are facing potential increases in cost per tonne to process comingled recyclables, particularly if these recyclables were previously being sent to MRFs that sold the materials to China. This is likely to be in the order of a \$60 per tonne increase in gate rate, but may range from no change through to greater changes based on the previous contractual arrangements with the MRF operator. Local Government agencies should be prepared for these changes as MRFs or waste collection contractors start to approach them (if they have not done so already), and this document provides some guidance on these potential changes for SA Councils.

¹ Note the actual impact (if any) depends on Councils' current gate rates charged and what the contractor is proposing to increase these by in response to the China Sword Policy. Other factors influencing the potential increase in gate rate (if any) include whether the processor is vertically integrated, current contractual arrangements, desired profit margins by MRFs and so on.

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1. Introduction, Background and Assumptions

South Australia has a strong history of recycling. Underpinning this is the kerbside comingled recycling service offered to residents by South Australian Councils. Comingled recyclables collected at the kerbside are processed through a material recovery facility (MRF), which separates and bales/aggregates the items for sale and reprocessing/recycling into new products.

On 1 March 2018 China implemented its National Sword Policy.² The Policy included the restriction of imports of 24 categories of waste and requiring contamination to be 0.5% and lower. Prior to National Sword, accepted contamination levels were much higher, varying from 1.5% to 5%³.

Whilst there are some markets within Australia for recovered recyclables, two materials were commonly exported to China: mixed paper and cardboard, and plastics. It is estimated that 63% of Australia's recycled paper and cardboard and 69% of plastics were previously sold to China.⁴ In context, the proportion of cardboard/paper and plastics in the MRF feed stream is estimated to be around 55% and 6% by weight respectively. These recovered materials now also have strict contamination levels below 0.5%.

It is extremely difficult for MRFs to achieve the newly accepted contamination levels, leading to the oversupply of paper/cardboard into other alternative international markets. Prices have reduced significantly due to this effective closure of the China market for recycled materials, paper/cardboard and plastics dropping between 70-100%. This is flowing on to local Councils, with some being asked to increase the gate rate (i.e. the cost the Council pays per tonne) to have recyclables collected and processed.

The Local Government Association of South Australia (LGA) recognises the impact that the import restrictions are having on Councils throughout South Australia (SA), with potential cost increases and changes to the way kerbside recyclables are processed and managed. In response, the LGA engaged Rawtec to provide independent guidance on the potential impact of China's National Sword Policy on metropolitan and regional SA Councils. This report provides an assessment of the current market of South Australian kerbside comingled recyclables and includes:

- An overview of China's National Sword Policy and indicative impacts on the prices of recovered commodities
- An estimation of the total tonnes of comingled recycling collected from kerbside in SA and the source locations (metropolitan versus regional)
- Kerbside recyclables processing locations and a breakdown (%) of the tonnes by processor
- The indicative impact of the National Sword Policy on the cost of processing at a material recovery facility (MRF) that would traditionally export the recovered materials
- The potential change in the cost per tonne for Councils (i.e. the gate rate)
- A cost comparison of sending kerbside recyclables to a local landfill versus transporting and processing these materials from regional SA Councils.

² WMAA China Response Letter to the Minister

³ <https://www.greenindustries.sa.gov.au/chinas-new-policy-on-waste-and-recycling> and Inside Waste Issue 82, Feb/ March 2018

⁴ <https://blueenvironment.com.au/wp-content/uploads/2018/03/Data-on-exports-of-recyclables-from-Australia-to-China.pdf>

1.1. Assumptions and limitations

The data within this Report is based on a number of assumptions and limitations. Prior to interpreting the below data and information, it is important to consider the following:

- All information provided should be considered indicative only for a point in time. Further detailed analysis including detailed commodity pricing, and individual Council arrangements (tonnes and contractors) should be considered if further accuracy is required for decision making.
- The kerbside recycling tonnes are based on Local Government Grants Commission, General Information Return, 2016-17 data and include some modification to account for a number of Councils that have resource recovery centres/transfer stations that are included in the recycled tonnes. It also includes updates from publicly available information (eg public tender documentation).
- The estimated allocation to the different MRF processors is based on publicly available information (eg Council minutes, tender documents, tender award documents, industry news publications). The MRF processors are anonymised and the tonnes from individual Councils are aggregated. In some cases, assumptions have been made for the allocated MRF processor, based on industry knowledge.
- The dollar values for commodities are from a point in time and intended to provide a guide to the expected range.
- Dollar values for commodities may change in future, however the timeframe for the current prices to recover is unknown.
- The processing cost per tonne for MRF operators will vary across different MRF operators depending on capital costs and technology employed, labour used, size of the plant. The value provided is indicative only.
- The actual financial impact on each Council's gate rate due to the China Sword (if any) depends on a number of factors and are likely to differ to the figures quoted in this report (these should be used as a guide only). Factors include the Council's gate rates prior to the National Sword, whether the processor is vertically integrated, previous contractual arrangements, desired profit margins of MRFs and a range of other factors.
- Transport costs for transport of regional comingled recyclables are based on a limited number of data points from regional councils and should be considered indicative only.



2. Kerbside Comingled Recycling in SA

2.1. Kerbside Comingled Recycling Tonnes Collected per annum

The assessment of the volume of kerbside comingled recycling tonnes generated in South Australia⁵ is included in Table 1 below. Based on the Local Government Grants Commission, General Information Return, 2016-17 data, around 140,000 tonnes per annum of kerbside recyclables are collected for processing in South Australia. Approximately 78% of the states kerbside recyclables come from metropolitan Councils, while 22% come from regional Councils.

Table 1: Kerbside recycling tonnes in SA overall and by region

Council Region	Total tonnes kerbside recyclables	%
Metropolitan	109,000	78%
Regional	30,500	22%
Total	139,500	100%

2.2. Processing Locations of Comingled Recycling and Approximate Tonnes processed per annum

There are five key processors of SA comingled recyclables⁶. Two are metropolitan based MRFs, one processor has a pre-processing facility in South Australia and transports materials to a MRF in Victoria, and the remaining two are regional MRFs.

The processing tonnes and locations is captured in Table 2 overleaf. As can be seen in this table, the majority (at least 89%) of the recyclables are processed at three MRFs (Alias MRF1, MRF2 and MRF3). This table also captures the total number of Councils and those that are metropolitan and regional. At least 37 of the 68 SA Councils send their recyclables to MRFs MRF1, MRF2 and MRF3, with MRF1 and MRF2 accepting mostly metropolitan Councils and MRF3 accepting mostly regional Councils.

Not every Councils processor of kerbside recyclables could be identified and these have been labelled 'unknown' which make up less than 10%. There are also a limited number of Councils that do not offer a kerbside comingled recycling service.

⁵ This is based on a range of sources including, where possible, publicly available data as well as EPA or LGA data to complete our analysis. In some instances, estimations are based on industry knowledge and experience

⁶ In the interest of commercial sensitivity, these processors have been anonymised for this report.



Table 2: Estimated Kerbside Recycling Tonnes by MRF including Council location (metro versus regional)

MRF Alias	Estimated Total Tonnes Processed	Estimated Processing Split (%)	Total No. Councils	Metropolitan Councils	Regional Councils
MRF1	45,300	32%	6	6	0
MRF2	48,600	35%	15	10	5
MRF3	30,500	22%	16	3	13
MRF4	2,700	2%	2	0	2
MRF5	100	0.1%	1	0	1
Unknown MRF	12,300	9%	21	0	21
No service⁷			7	0	7
Total	139,500	100%	68	19	49

⁷ Note seven regional Councils do not offer a kerbside recycling service, however there may be a small volume (i.e. less than 600 tonnes per annum across all these Councils) of comingled recyclables dropped off by residents at transfer stations within these Councils



3. Impact on MRF Costs and Revenue

3.1. Key materials impacting MRFs

China's National Sword Policy has predominately impacted the price of plastics, paper and cardboard. Data from 2015 - mid-2017⁸ indicates that MRFs could previously sell recovered materials for anywhere between:

- \$100 - \$300 per tonne for mixed plastics
- \$100 - \$250 per tonne for mixed paper and cardboard (likely to be around \$150 per tonne on average)
- \$400 - \$500 per tonne for HDPE and PET.

These prices had been decreasing from mid-2017 until now (May 2018). However, from March 2018, the prices for most of these materials dropped significantly due to the China National Sword Policy officially coming into effect. Streams particularly affected include mixed paper and cardboard and mixed plastics. As of April 2018, it is estimated that MRFs can sell these materials for approximately⁹:

- \$0 - \$75 per tonne for mixed plastics (significant impact)
- \$0- \$80 per tonne for mixed paper and cardboard (significant impact)
- \$375 - \$500 per tonne for HDPE and PET (limited impact)

The reduction in prices per tonne has significantly impacted MRFs across the country that previously sold their products into China. For these MRFs, the most significant factor is the reduction in mixed paper/cardboard prices as this material makes up approximately 55% of the volume by weight of material entering a MRF. In recent years due to making up 50% of the kerbside recyclables, the mixed paper/cardboard commodity markets have underpinned the economics of operating a viable MRF. It should be noted that these impacts would not be as great for MRFs that sell these products to paper mills in Australia or those that are vertically integrated (i.e. those that own paper mills). As mixed plastics only makes up approximately 1% of the overall materials arriving at a MRF by weight, MRFs are not as impacted by the reduction in price for this product.

3.2. MRF Cost and Revenue Analysis

An analysis of the impact on MRF revenue and subsequent gate rates is provided in this section. The analysis considers the likely MRF revenue and cost data based on the proportion of each material received per tonne and estimated new prices per tonne for these materials.

The estimated overall impact of the China Sword Policy on the net revenue per tonne for a MRF (excluding gate rates and operating costs) is provided below (Table 3). As can be seen in this table, prior to the National Sword, and considering the income received for sale of the recyclables and costs to dispose of contamination to landfill, a MRF's revenue (excluding the income received for the gate rate and operating costs) is expected to be in the order of \$131 per tonne. With the reduction in prices for the recyclables post the China Sword Policy, the current net revenue per tonne for processing recyclables is in the order of \$68 (assuming the MRF reclaims the 10 cents per CDL item and pays a SA metropolitan landfill levy rate to dispose contamination presented in the kerbside comingled recyclables bin). The

⁸ RISI recovered paper prices, <https://www.businessinsider.com.au/australia-recycling-crisis-2018-2>, Inside Waste Issue 82, Feb/ March 2018, Australian Packaging Covenant Organisation (2018) *Market Impact Assessment Report. Chinese Import Restrictions for Packaging In Australia.*

⁹ Note that these rates are not 'set in stone' and may increase or decrease in future

change in gate rate (i.e. the additional price per tonne charged to Councils to process the recyclables) required to maintain the same level of commercial viability on average is in the order of \$63 per tonne¹⁰.

Table 3: Net estimated Revenue per tonne at MRFs, excluding gate rate and operating costs, pre- and post- China Sword

Item	Estimated current revenue (post National Sword)	Estimated previous revenue (pre-National Sword)
Net Revenue per tonne for all materials excluding gate rate and operating cost*	\$68*	\$131*
Estimated approximate change in Net Revenue per tonne from pre- to post- China National Sword	-\$63	

** Note that this is the estimated net revenue for sale of materials and includes the cost to send contamination to landfill. This figure does not include the gate rate received from councils or the operating cost per tonne. The operating cost may lie between \$90 and \$150 per tonne depending on a number of factors including the size of the MRF, infrastructure/technology installed, produce streams produced, age of MRF, number of staff employed at the MRF etc*

A more detailed analysis of the above can be found in Table 4 overleaf. As can be seen in this table, the previous estimated net revenue per tonne of material entering the MRF was \$131¹¹. The highest contributor to the revenue per tonne was mixed paper and cardboard at 52%, followed by CDL at 20%.

The current estimated net revenue per tonne is now \$68¹¹ with the new market commodity prices. CDL now plays a much larger role received per tonne at a MRF (if applicable) and is the highest proportion of the revenue per tonne at 34%. Comparisons with MRFs that do not recover income from CDL items and that pay Victorian landfill levy rates (which are lower than SA) indicate a net revenue per tonne in the order of \$47.

¹⁰ Note that these costs are based on a number of assumptions (e.g. that the MRF is not vertically integrated) and further research would be required and consideration of the individual MRF to clarify the change in revenue and impact on the MRF. MRFs may request different changes in gate rates depending on the contract with council, operating costs for the MRF and other factors

¹¹ Note this assumes the MRF is receiving revenue for CDL and the landfill levy is metropolitan Adelaide April 2018 (\$87 per tonne)



Table 4: Estimated costs to run a MRF, pre and post National Sword¹²

Incoming Streams		Yield (% of overall incoming weight) ¹³	Estimated current pricing (April 2018)			Estimated previous pricing (2015 – 2017)		
			Price Received or Paid at gate after transport (\$/t)	Income/ Cost per input tonne	Proportion of revenue ¹³	Price Received or Paid at gate after transport (\$/t)	Income/ Cost per input tonne	Proportion of revenue ¹³
Paper Cardboard	Commons/ mixed Paper	55%	\$40	\$22	23%	\$150	\$82	52%
Glass	Glass Sorted	8%	\$70	\$5	6%	\$70	\$6	3%
	Glass Fines	13%	-\$87 ¹⁴	-\$11	0%	-\$87 ¹⁴	-\$11	0%
Plastics	HDPE	3%	\$425	\$13	13%	\$425	\$13	8%
	PET	1%	\$425	\$5	5%	\$425	\$5	3%
	PP	1%	\$100	\$1	1%	\$100	\$1	0.6%
	Mixed Plastics	1%	\$50	\$1	1%	\$300	\$3	2%
Metal	Aluminium	1%	\$1,800	\$16	17%	\$1,800	\$16	10%
	Steel	2%	\$90	\$2	2%	\$90	\$2	1%
General Waste Disposal to Landfill (not incl glass fines)		13%	-\$137	-\$17	NA	-\$137	-\$17	NA
CDL	LPB, Glass, plastic, aluminium	3%	\$0.10	\$32	34%	\$0.10	\$32	20%
Net Revenue per tonne excluding gate rate and operating cost for all materials*		100%		\$68*	100%		\$131*	100%
Change in Net Revenue per tonne from pre- to post- China National Sword						-\$63		

* Note that this is the estimated net revenue for sale of materials and includes the cost to send contamination to landfill. This figure does not include the gate rate received from councils or the operating cost per tonne. The operating cost may lie between \$90 and \$150 per tonne depending on a number of factors including the size of the MRF, infrastructure/technology installed, produce streams produced, age of MRF number of staff employed at the MRF etc. Also note this row includes the sum of the percentages.

¹² Note the above figures are estimations only and based on reported income ranges from a number of sources. Data may change from MRF to MRF and will depend on a number of factors (contractual arrangements for sale of materials, landfill levy rates, contamination levels, operating costs to run the facility etc). These variations would alter the net revenue per tonne reported here. The previous pricing is likely to be in line with pricing around mid-2017, and current pricing as of April 2018. These prices may change in future and this would impact the income received per tonne of input material at MRFs. In addition, the change in gate rate (if any) may not be the same as the change in revenue received per tonne, as other factors will influence this such as previous gate rates, the profitability of the MRF, other cost saving measures implemented by MRFs to offset these price decreases etc.

¹³ Note percentages may not add to 100% due to rounding

¹⁴ The cost per tonne for glass fines is for the landfill levy and assumes no gate rate

3.2.1. Impacts of MRF Costs on SA Councils

Based on the analysis above, the difference in income for MRFs from pre to post China's National Sword Policy is approximately \$63 per tonne (from a net revenue of \$131 per tonne, to a net revenue of \$68 per tonne, not including income from gate rates and operational costs).

An overall potential increase in cost for Councils across the state, based on the number of tonnes in metropolitan and regional Councils, is provided in Table 5 below. This indicates that across the state, if all Councils were charged an additional \$63 per tonne for the gate rate of recyclables, the total increase in costs would be approximately \$8.8 million per annum (\$6.9M for metropolitan Councils and \$1.9M for regional Councils). Note that this assumes all Councils would be subjected to an increase in cost of \$63 per tonne for their recyclables, regardless of the MRF that the materials are sent to. In reality, each Council will have different price changes per tonne depending on the current contract arrangements, the gates rates in place between the Councils and their contractor (be it processor or collection contractor that has the contract with the processor) and the markets the processor is selling to. The range of expected change may be from no change through to others that may have a price change more than \$63 per tonne.

Table 5: Potential increases in cost across SA Councils, by region

Council Region	Total kerbside recyclable tonnes per annum	Potential gate rate cost differential per tonne	Overall potential maximum cost increase per annum
Metropolitan	109,000	\$63	\$6,877,000
Regional	30,500	\$63	\$1,924,000
Total	139,500	\$63	\$8,802,000¹⁵

¹⁵ Note sums may not equate due to rounding



3.3. Regional Transport Costs

The impact of the China National Sword Policy may place regional Councils kerbside recycling under further financial stress due to the additional cost to transport recyclables in combination to the increase in processing costs. This can lead to transport and processing costs for recyclables being higher than the cost to send them to landfill in the region, where the landfill levy is half the metropolitan levy.

An analysis of the transport distance and estimated cost to transport and process the recyclables versus the cost to send the recyclables to landfill is provided below. This analysis demonstrates that at a processing cost of \$60 per tonne to Councils for the recyclables, and the approximate transport cost of \$12 per tonne per 100 kilometres¹⁶, landfill becomes a more economically viable option between 300 and 400 kilometres¹⁷ from the Council to the location the kerbside recyclables are sent.

This does not mean that kerbside recycling should be sent to landfill, rather that special consideration should be given to support regional Councils to enable them to provide this important service that the community expects. This may include infrastructure for local sorting and baling of kerbside recycling (as this can decrease the costs to then bulk transport the recyclables), or other support measures.

Table 6: A comparison of transporting recyclables from a regional Council to a metropolitan MRF/ transfer station with sending them to landfill¹⁸

Transport distance (km)	Transport Cost \$/ t/ allocated distance	Est. Recyclables Processing Cost (\$/t)	Est. Total Recycling Costs (\$/t/ allocated distance)	Current Regional Landfill Disposal Cost (\$/t)	Recycling/ Regional Landfill Difference (\$/t)
100	\$12	\$60	\$72	\$104	\$32
200	\$24	\$60	\$84	\$104	\$20
300	\$36	\$60	\$96	\$104	\$8
400	\$48	\$60	\$108	\$104	-\$5
500	\$60	\$60	\$120	\$104	-\$17
1000	\$120	\$60	\$180	\$104	-\$77

¹⁶ This is based on data provided by two Councils. This value may be higher or lower, depending on the Council and their agreement with the recyclables transport contractor

¹⁷ With the assumed costs, the distance that the cost is the same as sending to landfill is approx. 360 kilometres

¹⁸ Note t = tonne, \$ = Australian dollar, assumed processing cost is \$60 per tonne, assumed transport cost is \$12 per tonne per 100 kilometres, the cost to dispose to landfill is \$103.5 which includes an assumed gate rate of \$60 per tonne and a levy of \$43.50 per tonne. Note that the regional landfill levy will increase to \$50 per tonne in July 2018 but this is not included in the calculation above.

4. Conclusion

In summary, China's National Sword Policy has had significant impact to operators of MRFs that previously sent recycled materials to China. The main materials impacted by China's National Sword Policy are mixed paper and cardboard and mixed plastics. Given the majority of the input materials are mixed paper and cardboard, the income of MRFs that previously sold materials to China have potentially decreased around \$60 per tonne.

This potential reduction in revenue for MRFs could potentially impact Councils across Australia including in SA. With a potential gate rate change around \$60 per tonne, Councils are facing potential significant increases in costs to have kerbside recyclables collected and recycled. If this change in price was applied to all the kerbside recycled materials across the state, Councils are facing maximum increases in costs of around \$8.8 million per annum¹⁹.

¹⁹ Note the actual financial impact on each Council's gate rate due to the China Sword (if any) depends on a number of factors and are likely to differ to the figures quoted in this report (these should be used as a guide only). Factors include the Council's gate rates prior to the National Sword, whether the processor is vertically integrated, previous contractual arrangements, desired profit margins of MRFs and a range of other factors





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