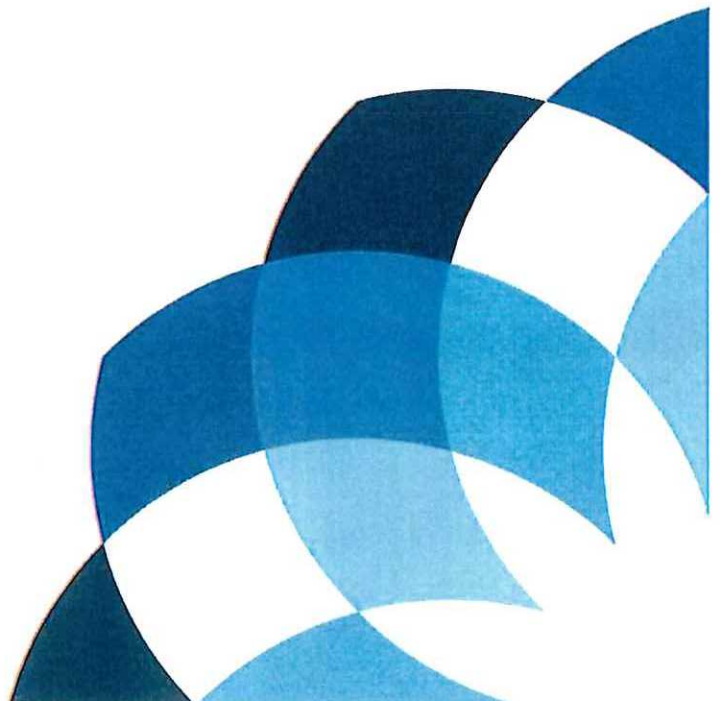


All redactions are S.9(2)(i)

Proposals for Short to Medium Term Responses to National Sword

A submission to New Zealand Ministry for the
Environment

11 October 2018



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Disclaimer

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Executive Summary

Since 1980, China has been the world's largest importer of recyclable paper and plastics. In July 2017, China announced its intention to "phase out imports of solid waste (recyclables) that can be substituted by domestic resources" by the end of 2019. China's abrupt withdrawal from the trading of recyclables has resulted in a significant drop in demand and subsequently lower prices for these commodities. The fall in commodity prices has put many councils and companies in the New Zealand resource recovery sector into financial risk.

The New Zealand Ministry for the Environment (Ministry) has engaged MRA Consulting Group (MRA) to develop proposals for short to medium term (6-24 months) responses to National Sword for the Ministry to consult on with key stakeholders. A Working Group and Local Government Group consisting of these key stakeholders have been established by the Ministry.

MRA developed a precis of potential short to medium responses to National Sword and presented these options at a set of workshops in September 2018 with the Ministry, Working Group, Local Government Group and Eunomia Consulting.

This document outlines MRA's proposed short to medium term responses to National Sword and includes an analysis of the pros, cons, costs and benefits of each option. Feedback from discussions during workshops with the Ministry, the Working Group and Local Government Group were incorporated into the analysis and responses recommended. MRA also provides a short-list of responses which cannot be ruled out from this initial analysis and require further investigation or reassessment upon future changes in market conditions.

MRA have developed a short-list of 10 recommended responses, as well as an additional list of 5 responses which require further investigation. These responses include interventions at levels spanning across the recycling supply chain.

A summary of the responses proposed can be found below.

	Response	Supply Chain Intervention Level	Proposal
1	Short-term gate fee variations	MRF	Recommended
2	Model contract development	MRF	Recommended
3	Contamination bands	MRF	Recommended
4	Commodity price risk-sharing arrangements	MRF	Recommended
5	Improve quality of MRF output	MRF	Recommended
6	Develop database of domestic re-processors	Secondary Reprocessing	Recommended
7	Investigate growth of on-shore fibre processing	Secondary Reprocessing	Recommended
8	Investigate growth of on-shore plastic processing	Secondary Reprocessing	Recommended
9	National waste data recording system	Government	Recommended
10	Positive procurement policy	Government	Recommended

	Response	Supply Chain Intervention Level	Proposal
11	Education to reduce contamination	Household	Requires further investigation
12	Stop collection of plastic grades 3-7	Household	Requires further investigation
13	National facility licence limits	MRF	Requires further investigation
14	Regulate recyclability of packaging	Government	Requires further investigation
15	Regulate recycled content of packaging	Government	Requires further investigation

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1 Introduction

Since 1980, China has been the world's largest importer of recyclable paper and plastics. In July 2017, China announced its intention to "phase out imports of solid waste (recyclables) that can be substituted by domestic resources" by the end of 2019. Up until this decision, the exportation of recyclables to China has been a relatively low-cost and economically efficient option upon which many developed countries have relied for managing recycling. 'China's National Sword' policy is a catch-all term used to describe China's recent actions taken to meet its policy announcement.

China's abrupt withdrawal from the trading of recyclables has resulted in a significant drop in demand and subsequently lower prices for these commodities. The fall in commodity prices has put many councils and companies in the New Zealand resource recovery sector into financial risk.

The New Zealand Ministry for the Environment (Ministry) has engaged MRA Consulting Group (MRA) to develop proposals for short to medium term (6-24 months) responses to National Sword for the Ministry to consult on with key stakeholders. A Working Group and Local Government Group consisting of these key stakeholders have been established by the Ministry.

Over two days in July 2018, MRA participated in workshops in Wellington, New Zealand with the Ministry, the Working Group and the Local Government Group to unpack the issues created by China's National Sword and discuss possible responses. Eunomia Consulting, contracted by the Ministry to provide a situational analysis of the New Zealand resource recovery industry, were also present at the workshops.

MRA developed a precis of potential short to medium responses to National Sword and presented these options at a set of workshops in September 2018 with the Ministry, Working Group, Local Government Group and Eunomia Consulting.

This document outlines MRA's proposed short to medium term responses to National Sword and includes an analysis of the pros, cons, costs and benefits of each option. Feedback from discussions during workshops with the Ministry, the Working Group and Local Government Group were incorporated into the analysis and responses recommended. MRA also provides a short-list of responses which cannot be ruled out from this initial analysis and require further investigation or reassessment upon future changes in market conditions.

2 Introduction to China's National Sword policy

Since 1980 and until early 2017, China was by far the largest importer of the world's recyclables, followed by Germany which imported less than half of China's volumes. Figure 1 presents the import data for 2015¹.

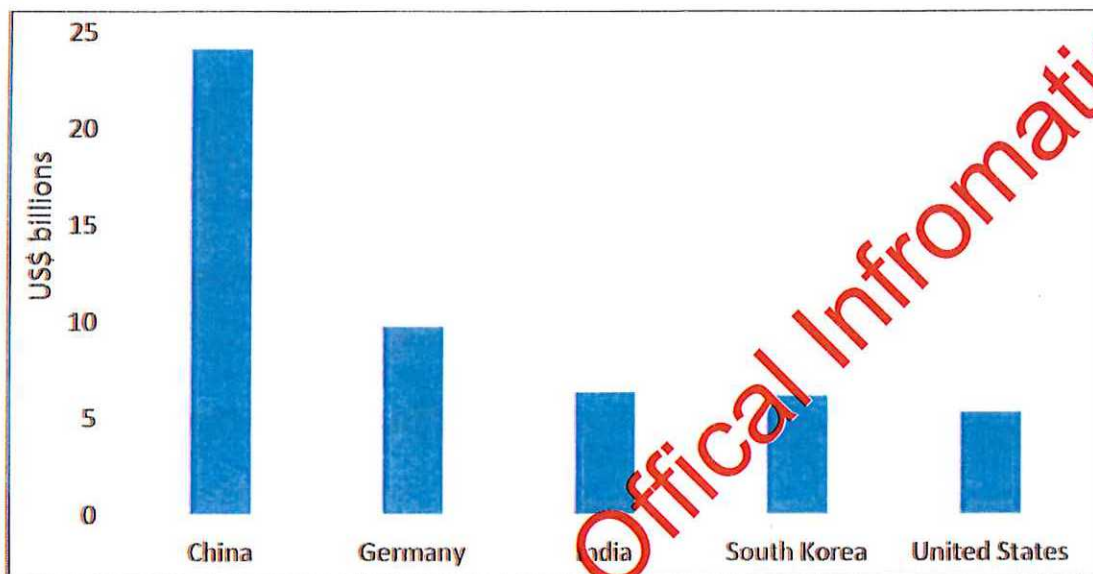


Figure 1 Top five waste and scrap importers in 2015

Chinese buyers purchased mixed paper and plastic with higher levels of contamination and at higher prices than other markets could use or afford. Between 1995 and 2016 Chinese imports of recyclables grew tenfold, from 4.5 million to 45 million tonnes, and since 2007 recyclables have been one of China's largest import categories.

In April 2011, China adopted regulations (known as Article 12) aiming to reduce contamination in imported material: "In the process of importing solid waste, measures shall be taken to prevent it [imports] from spread[ing] seepage and leakage or other measures to prevent pollution of [the] environment."

In February 2017, the Chinese government decided to aggressively enforce Article 12 to improve the quality of the imported recyclables through 'Operation Green Fence'. The operation involved the detailed inspection of incoming material to prevent the importation of highly contaminated recyclables and waste.

'National Sword 2017', launched in February 2017 by China's General Administration of Customs (GAC), is the common English translation given to a 1-year campaign to combat the smuggling of agriculture products, guns, drugs, and resource commodities². Its scope was wider than Operation Green Fence, in terms of the material categories enforced and the targeting of smuggling and organised crime, and it involved cracking down further on the illegal use of waste import licences. During this crackdown, a team of inspectors was charged with visiting all Chinese waste and scrap importers, reportedly with the aim of decreasing the number of import permits by 60%³.

¹ Source: United Nations Comtrade, "UN Comtrade Database" <https://comtrade.un.org/data/>

² <https://resource-recycling.com/recycling/2017/02/21/china-announces-sword-crackdown-illegal-recyclable-material-imports/>

³ https://www.uscc.gov/sites/default/files/Research/October%202017%20Trade%20Bulletin_0.pdf

Then in mid-July 2017, China announced the ban of 24 import materials to the World Trade Organisation (WTO). The Chinese Government cited the protection of human health and the environment as the reason for the ban. The 24 items targeted included:

- eight (8) types of postconsumer plastic scrap,
- one (1) type of unsorted scrap paper,
- eleven (11) types of used or scrap textile materials, and
- four (4) types of metal slag that contain vanadium.

Further, on 27 July 2017 China announced its intention to “phase out imports of solid waste (recyclables) that can be substituted by domestic resources” by the end of 2019⁴.

In November 2017, additional filings were made to the WTO, lifting the severity of the outright ban announced in July by introducing contamination thresholds with an entry into force proposed for 1 March 2018⁵. On 11 January 2018, China confirmed the contamination standards⁶ and the ban has since entered into force. The key contamination thresholds include:

- 0.5% for plastics; scrap paper or paperboard; smelt slag; wood; waste electric motors; wires and cables; metal and appliance scrap; ferrous metals.
- 1% for non-ferrous metals.
- 0.3% for automobile scrap.

On the 6th March 2018, China’s GAC announced the ‘Blue Sky 2018’ campaign, an iteration of National Sword 2017⁷. The campaign will last from March 2018 to December 2018 and a press release from China’s GAC confirmed that the campaign’s enforcement activities will help implement the ban announced in 2017⁸.

⁴ The State Council of the PR of China, 2017, *Action plan to phase out waste imports*, Available at: http://english.gov.cn/policies/latest_releases/2017/07/27/content_281475756814340.htm [Accessed 29 Mar. 2018]

⁵ Recycling International, 2017, *Industry concern as China confirms new thresholds for contaminants*, Available at: <https://www.recyclinginternational.com/recycling-news/10933/business/asia/industry-concern-china-confirms-new-thresholds-contaminants> [Accessed 29 Mar. 2018]

⁶ Bureau of International Recycling, 2017, English translation of *Final Environmental Protection Control Standards for Imports of Solid Wastes as Raw Materials (GB 16487.2-13)*, Available at: <http://www.bir.org/news-press/latest-news/published-chinese-environmental-protection-control-standards-for-imported-solid-wastes-as-raw-materials/> [Accessed 29. Mar. 2018]

⁷ <https://www.letsrecycle.com/news/latest-news/china-customs-launches-blue-sky-2018/>

⁸ <https://resource-recycling.com/recycling/2018/03/13/chinese-customs-enforcement-ramps-up-with-blue-sky-2018/>

3 Impacts

3.1 International impact

In the USA, the largest exporter of scrap commodities in the world, the effect of the ban has been felt in both the stock and the commodities markets.

China's new trading policies were cited as key factors in the downgrading of most publicly traded waste service providers in the USA. Although recycling represents only part of the activities of these companies, the downgrading resulted in significant drops in share value (by 3.7% for Waste Management, 4.5% for Republic Services, 7.9% for Casella Waste Systems, 3.7% for Advanced Disposal and 1.3% for Waste Connections⁹).

The commodities market was also affected with significant price drops that extended to Old Corrugated Cardboard (OCC), even though it is considered one of the few remaining profitable commodities¹⁰. OCC imports to China are subject to the new 0.5% contamination standard and have been more immediately affected by a shortage of import permits.

As China has scaled back the materials imported for recycling, other countries in the region have increased imports. The largest alternative markets for paper and plastics have been Indonesia and Malaysia respectively. Indonesia, Thailand, Malaysia, India, Vietnam, Korea and Taiwan have all received higher quantities of recyclables since Chinese import restrictions have taken place. These smaller countries do not have the capacity to process all of the material that China previously handled and there have been reports of large stockpiles of plastic scrap overwhelming ports.

In response Thailand has banned some types of electronic scrap and announced a ban to all plastics in the next two years. Vietnam has stopped issuing new licences for scrap imports and Indonesia has implemented a 100% pre-shipment inspection policy for fibre imports. Tighter plastic import restrictions have been also been announced for Malaysia, as well as a government levy to be imposed on plastic waste imports.

3.2 Scale of New Zealand's exposure

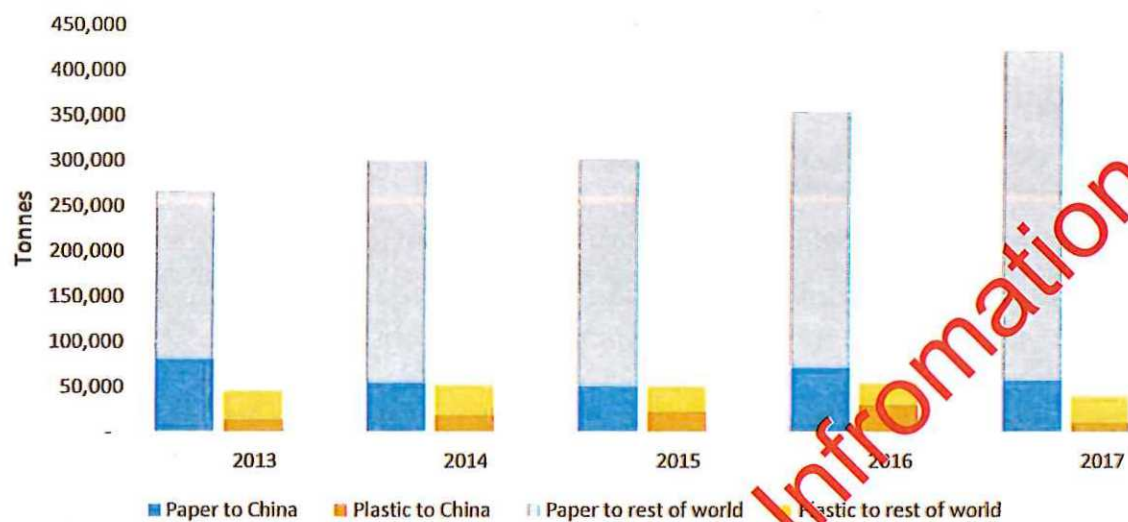
New Zealand exports approximately 20% of its recovered fibre and 40% of its recovered plastic to China. China's unexpected withdrawal from the trading of recyclables has resulted in an overall collapse in demand and subsequently, lower prices for recovered paper and plastic. While other markets in Asia still show some demand, the oversupply of American, European and Australian materials has meant that market prices paid for recovered recyclables have fallen significantly.

New Zealand exported approximately 420,000 tonnes of recovered fibre in 2017, of which 58,000 tonnes was sent to China. In the same year it exported approximately 42,000 tonnes of recovered plastic and sent 11,000 tonnes of this material to China¹¹.

⁹ seekingalpha.com/news/3299449-stifel-turns-nose-solid-waste-names-wm-rsg-cwst-downgraded Accessed 4 October 2017.

¹⁰ www.risiinfo.com/industry-news/risi-viewpoint-great-uncertainty-in-the-global-recovered-paper-markets

¹¹ International Trade Centre (ITC), 2018, *Trade Map*, Available at: www.trademap.org [Accessed 17 Sep. 2018]



Source: International Trade Centre (ITC) at www.trademap.org

Figure 2 New Zealand exports of recovered fibre and plastic

4 Methodology

Table 1 below outlines key assumptions in the analysis of the proposed responses to China's National Sword. Further detailed assumptions are provided in Section 5 for individual responses where required.

Table 1 New Zealand recycling data assumptions

Metric	Value	Unit of Measure
Kerbside recycling generation	300,000	tonnes per year
Number of MRFs	14	
Number of households	1,750,000	
Average contamination rate	12%	
Average MRF Gate Fee	20	\$/t
Average landfill gate fee	70	\$/t
MRF operating cost per tonne	80	\$/t
Mixed plastic % of bin	3%	
Fibre % of bin	50%	
Glass % of bin	30%	
% households with separate glass collections	50%	
Average cost per lift	\$1.00	per lift
Mixed fibre fall in value	200	\$/t
Mixed plastic fall in value	150	\$/t

Table 2 and Table 3 show the mass balances for recovered fibre and plastic material in New Zealand respectively, as presented by ERM and refined in discussions during the September workshops.

Table 2 New Zealand recovered fibre material flow summary

Fibre	C&I Source	MSW Source	Total
Export	155,000	120,000	275,000
NZ use	150,000	60,000	210,000

Table 3 New Zealand recovered plastic material flow summary

Plastic	C&I Source	MSW Source	Total
Export	30,000	10,000	40,000
NZ use	-	-	-

Responses have been grouped according to their location within the recycling supply chain, illustrated in Figure 3.

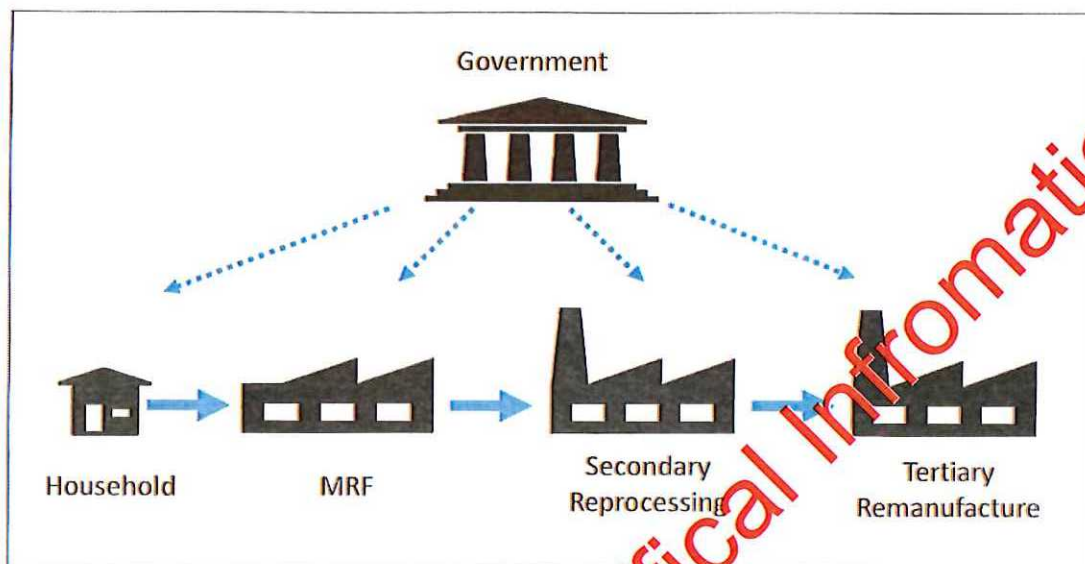


Figure 3 Recycling supply chain

MRA provided and presented the precis of potential responses to the Ministry, Local Government Group and Working Groups. Following the workshop and discussions with the groups of these options, MRA have developed a short-list of the recommended responses.

5 Proposed Responses to National Sword

This section provides an outline of the proposed short to medium term responses for New Zealand's resource recovery sector to China's National Sword. It provides a short-list of responses which are recommended, or cannot be ruled out in the first instance and require further investigation. Responses have been further grouped according to the location of the intervention within the recycling supply chain.

5.1 Recommended Responses



Intervention at MRF Level

5.1.1 Short-term gate fee variations

MRF business models rely on the commodity values of the materials processed and gate fee revenue covering operating and capital expenses to remain financially viable. With the abrupt withdrawal of China from the recyclables market and subsequent fall in commodity prices, MRF viability is under threat.

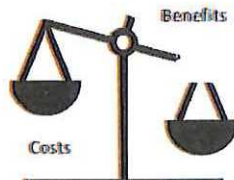
To ensure the continued function of the recycling system, short term contract variations to compensate for the fall in commodity values should be considered. This should involve MRFs providing substantiation of any proposed gate fee increases and regular (at least annually) review of the pricing variation to ensure any changes in the market conditions are reflected. The adjustment in gate fee will pass costs onto councils and ultimately residents. Negotiations will be dependent on contractual and commercial conditions.

PROS	CONS
<ul style="list-style-type: none">✓ Compensates MRFs for the current fall in commodity value✓ Keeps the recycling system financially viable✓ Provides MRF certainty to some degree✓ Avoids MRF collapse and landfilling of recyclables✓ Formalises current negotiations	<ul style="list-style-type: none">✗ Cost to ratepayers✗ Cannot deal with future falls in commodity value✗ Requires sunset clause to ensure price uplift is not embedded for life of contract

Assuming this action avoids the financial collapse of one MRF and the equal distribution of tonnes processed across all MRFs, the following costs and benefits are estimated:

Costs

\$.9 (2) (i)



Benefits

\$.9 (2) (i)

5.1.2 Model contract development

Development of a suite of model contract, specification and supporting documents for waste management and resource recovery services will promote a consistent approach to the preparation of tenders and reduce time required for contract administration. It will improve the quality of documents by effectively setting a benchmark standard and streamline the tendering process. Higher-quality tenders may also result as tenderers become used to the standard documents.

PROS	CONS
<ul style="list-style-type: none"> ✓ Reduces negotiation complexity ✓ Improves tender pricing certainty ✓ Brings all councils into a common legal arrangement ✓ Can be adapted from existing model contract templates in other jurisdictions ✓ Specifications can be modified for unique circumstances 	<ul style="list-style-type: none"> ✗ No incentive for council to use ✗ Requires legal and waste experts to develop

Assuming S.9(2)(i) reduction in recycling contract management costs due to streamlining of the tendering process and reduction in contract administration requirements, the following costs and benefits are estimated:

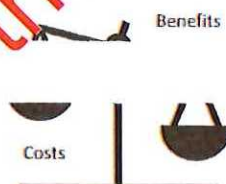
Costs

S.9(2)(i)

Benefits

Benefits

S.9(2)(i)



Examples:

Several states in Australia have developed model, or template, waste contracts for use by local councils. The New South Wales Environment Protection Authority (EPA) provides 'model waste and recycling collection contracts' to help councils streamline the tendering process¹². It is a comprehensive package, including a user guide and timeline tool, and was developed in consultation with councils, collection contractors and industry.

The Local Government Association of South Australia (LGASA) provides a similar package of documents for South Australian councils.

¹² <https://www.epa.nsw.gov.au/your-environment/waste/local-council-operations/resources-for-local-councils>

5.1.3 Contamination bands (established at time of tender)

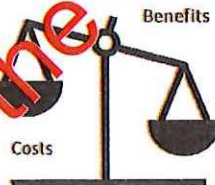
Agreed acceptable contamination rates and stepped penalties for exceeding these will produce a cost-sharing arrangement between contract partners for the cost burden of disposing of non-recyclable material. It ensures all parties have incentive to reduce contamination.

PROS	CONS
<ul style="list-style-type: none"> ✓ Eliminates game playing ✓ Ensures contamination penalties ✓ Provides councils with a simple cost/benefit equation for investing in contamination reduction ✓ Puts contamination cost estimates onto MRF at time of tender ✓ Provides certainty to contract partners 	<ul style="list-style-type: none"> ✗ Eliminates contamination risk for MRFs ✗ Requires revision of existing contracts or introduction at time of next tender ✗ Requires regular audits ✗ Requires education of contract managers (council and MRF)

Assuming *S.9(2)(i)* the price of the average MRF gate fee resulting from the removal of the uncertainty in the level of contamination received in the MRF, the following costs and benefits are estimated:

Costs

S.9(2)(i)



Benefits

S.9(2)(i)

Example:

The table below provides an example of a contamination band pricing schedule. The contamination pricing is based on periodic audits undertaken by an independent auditor.

Contamination Band	Penalty
0 - 5.0%	Nil
5.1 - 10.0%	\$4 per tonne
10.1 - 15.0%	\$8 per tonne
15.1 - 20.0%	\$15 per tonne
20.1 - 25%	\$20 per tonne
25.1 - 30%	\$30 per tonne
>30%	Reject load

5.1.4 Commodity price risk-sharing arrangement (buffers)

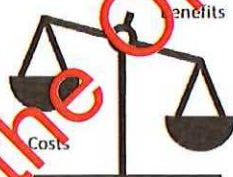
A commodity price risk-sharing arrangement shares the costs and benefits associated with commodity price falls and rises between contract partners. Contracts are linked to an indexed commodity price. Buffers can be established to reduce the contract management requirements such that only commodity price movements outside of an agreed band generates a contract price variation.

PROS	CONS
<ul style="list-style-type: none"> ✓ Shares commodity movement risks outside of an agreed band ✓ Allocates risk and reward between council and MRF in an increasingly volatile market environment ✓ Reduces gate fee risk premium ✓ Applies more upside value to councils 	<ul style="list-style-type: none"> ✗ Applies more downside risk for councils ✗ Shifts risks from MRFs to councils compared with most current arrangements ✗ Requires the development and maintenance of a relevant price index ✗ Requires education of contract managers (council and MRF)

Assuming $S.9(2)(i)$ the price of the average MRF gate fee resulting from the removal of the downside risks in commodity movements, the following costs and benefits are estimated:

Costs

$S.9(2)(i)$



Benefits

$S.9(2)(i)$

Example:

Changes in gate fees reflecting commodity prices can be quantified by using a formula analogous to a rise and fall formula illustrated as follows:

$$\text{Revised gate fee price} \left(\frac{\$ \text{ excl. GST}}{\text{tonnes}} \right) = \text{Base gate fee price} \left(\frac{\$ \text{ excl. GST}}{\text{tonnes}} \right) - \Delta \text{ gate fee price}$$

If required, the gate fee change can be made subject to upper and/or lower bounds.

The gate fee price change is calculated based on movements in the industry index representative export price for the commodity in question, together with an agreed portion of the price movement to be shared with Council:

$$\Delta \text{ gate fee price} = \text{SHARE \%} \times \sum \left[\left(\text{Current Commodity Price} - \text{Base Commodity Price} \right) \times \% \text{ Composition Weight} \right]$$

5.1.5 Improve quality of MRF output

Improved source separation and enhanced MRF performance will reduce the contamination rate and improve the quality of exported materials.

To reduce export contamination, MRF operators will need to:

1. Slow down the processing speed;
2. Install additional screens and bounce conveyors to remove small items and install enhanced optical sorting equipment to detect and remove contaminants in fibre and plastic streams; or
3. Employ additional workers as manual sorters on the major lines to remove contamination.

PROS	CONS
<ul style="list-style-type: none"> ✓ Increases market opportunities for higher quality product ✓ Improves sales revenue of sales to export markets ✓ Lowers market risk 	<ul style="list-style-type: none"> ✗ Incurs cost to MRF operators and/or government (in form of grants) ✗ Marginally increases waste to landfill

The costs and benefits estimations are based on the following assumptions:

- The three scenarios listed above each achieve improved fibre and plastic stream from the MRF and increase the value of MRF outputs to $S9(2)(i)$ of the fall in mixed plastic value $S9(2)(i)$ the fall in mixed paper value;
- Slowing the MRF by a certain percentage increases the gate fee by the same percentage.

Costs

Scenario 1

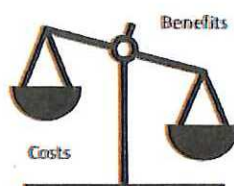
$S9(2)(i)$

Scenario 2

$S9(2)(i)$

Scenario 3

$S9(2)(i)$



Benefits

All scenarios

$S9(2)(i)$



Intervention at Secondary Reprocessing Level

5.1.6 Develop database of domestic re-processors

Understanding New Zealand's current capacity to reprocess the materials affected by China's National Sword is key to identifying where and how this capacity can be grown in the short to medium term. This should aim to uncover the less well-known re-processors who may only be using small quantities of material. This then provides the opportunity to identify incentives for these businesses to upscale their operations.

PROS	CONS
<ul style="list-style-type: none">✓ Opens up new reprocessing opportunities✓ Expands options✓ Maximises diversion and re-use in New Zealand	<ul style="list-style-type: none">✗ Cost of development

Costs

S9(2)(i)



Benefits

S9(2)(i)

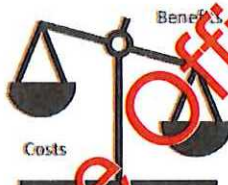
5.1.8 Investigate growth on-shore fibre processing

As one of the largest streams collected and exported for recycling and exposed to China National Sword, increasing the level of onshore fibre reprocessing (from about 50%) presents a significant opportunity for New Zealand's resource recovery sector. A study into the current constraints and level of investment required to move beyond the current performance would reveal practical pathways to increase the amount of fibre reprocessed within New Zealand.

PROS	CONS
<ul style="list-style-type: none"> ✓ Growth of employment opportunities ✓ Growth in MRF revenue ✓ 120,000 tonnes in potential increased domestic processing ✓ S9(2)(i) 	<ul style="list-style-type: none"> ✗ Cost of development

Costs

S9(2)(i)



Benefits

S9(2)(i)

Example:

MRA have undertaken preliminary research into technologies which provide a secondary processing option for mixed fibre.

A pulp produced from the recovered paper is often referred to as Recycled Paper Pulp. Another term for the product is Recycled Fibre Pulp. There is an intermediate product in the paper making industry which is known as "Wet Lap". Wet Lap is a sheet of pulp removed from a wet machine with about 50% moisture content. Wet lap can be wired and baled which makes it ideal for storage and transportation purposes. It might well-suit the situation where "in-line" processing of paper is out of reach or uneconomic. In this scenario the whole process of paper manufacturing does not take place in the same facility. Additionally, when the supply outstrips the demand, this product helps manufacturer be able to store the pulp and postpone the production of final product. In the process of paper manufacturing wet lap is produced at the stage of "pulp preparation" (Figure 4). However, it can also take place before de-inking and bleaching process.



Figure 4 Paper processing flow

Further details are provided in 6.

5.1.9 Investigate growth of on-shore plastic reprocessing

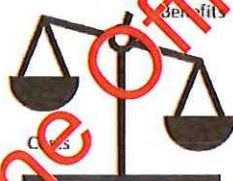
A study into the barriers of plastic reprocessing in New Zealand would reveal opportunities to increase the amount of plastic reprocessed onshore and reduce New Zealand's exposure to the market risks associated with exporting recovered plastic.

The establishment of new plastic reprocessing facilities is more likely to occur compared with new fibre reprocessing facilities due to the lower capital requirements for plastic reprocessing facilities and the greater feasibilities of processing at smaller scales.

PROS	CONS
<ul style="list-style-type: none">✓ Growth of employment opportunities✓ Growth in MRF revenue✓ 10,000 tonnes in potential increased domestic processing✓ S.9(2)(i)	<ul style="list-style-type: none">✗ Cost of development

Costs

S.9(2)(i)



Benefits

S.9(2)(i)

Example:

The Australian Packaging Covenant Organisation (APCO) has compiled a comprehensive gap analysis on the market barriers to recovering soft plastics. The analysis includes definitions and scope, future goals, data on consumption and recovery and preliminary notes on stakeholders and barriers.

With a focus on packaging design, infrastructure, end markets and consumer education, the gap analysis highlights the challenges soft plastics present, including increasing levels of consumption and waste, limited consumer access to, and awareness of, kerbside collection or drop-off facilities and finite markets for certain types of soft plastics. A draft action plan is expected to be completed by the end of 2018 as APCO's Soft Plastics Working Group goes through its next phase.



Intervention at Government Level

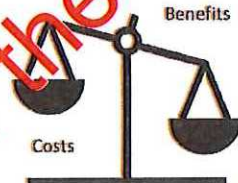
5.1.10 National waste data recording system

A common national platform for reporting and recording data on waste and resource recovery, while not directly resolving issues arising from China's National Sword, would provide context and accessible information on the scale of the problem. Greater visibility and understanding of the material flows within the sector would also allow for improved decision-making and benchmarking of performance.

PROS	CONS
<ul style="list-style-type: none">✓ Ensures national data set✓ Improves planning and policy making✓ Improves investment environment and reduces investment uncertainty✓ Allows for benchmarking and performance measurement	<ul style="list-style-type: none">✗ Cost of infrastructure development✗ Cost of data capture

Costs

$SA(2)(i)$



Benefits

$SA(2)(i)$

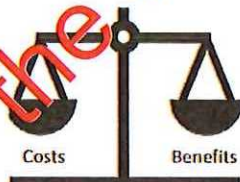
5.1.11 Positive procurement policy

There are a range of existing potential markets for recovered materials e.g. fibre can be used in insulation and building products, plastic in asphalt and construction products. To develop viable domestic secondary markets for fibre and plastic, New Zealand needs to develop and institutionalise 'positive procurement' policies, which include minimum percentage inclusion, specifications and accreditation certificates. Recycled-content mandates present an opportunity for stakeholders to stimulate increased domestic investment in recycling infrastructure by providing assurance to sorters and recyclers that government is committed to promoting recycling, improving quality and efficiency, and increasing capacity. There are opportunities at both national and local government level procurement to increase the use of recycled content in New Zealand. Recycling targets can be set, but recovery efforts will be stymied if no market can be found for the material that's collected.

PROS	CONS
<ul style="list-style-type: none"> ✓ Growth in domestic market demand for recycled commodities ✓ De-risks kerbside recycling ✓ Coordination and leadership shown by government ✓ Some reduction in National Sword subsidy 	<ul style="list-style-type: none"> ✗ Cost of coordination ✗ Imposition of purchasing policy on government departments ✗ Use of secondary resources instead of virgin material – quality not always guaranteed

Costs

S9 (2)(i)



Benefits

S9 (2)(i)

Examples:

Recycled content laws have been enacted in a handful of American states and require a certain percentage of recycled material be included in certain new products and packaging. One example of this is California's Rigid Plastic Packaging Container Law. Passed in 1991, the law mandates that product manufacturers use 25 percent post-consumer recycled content in rigid plastic containers unless the containers are reused or refilled at least five times, or if they are light-weighted by 10 percent. Penalties for non-compliance range up to \$50,000 per violation for a maximum of \$100,000 per product manufacturer.

California also requires post-consumer content in plastic trash bags. Manufacturers have two compliance options: either 10 percent recycled content or at least 30 percent recycled content of all the plastic products they put on the Californian market.

Most legitimate recyclers operate under a standard, like EuCertplast in Europe and/or ISO9001/14001, which require a formal statement by external accountants as well and un-announced checks by auditors. Other measures of compliance are national labelling and certification of product programs.

5.2 Possible Responses – Require Further Investigation



Intervention at Household Level

5.2.1 Education to reduce contamination

Education and engagement of the public is an important step in improving the performance of the resource recovery sector. Not only will this encourage greater recycling rates, but done effectively will have the effect of decreasing the amount of contamination and increasing the efficiency of the system.

A key element in China's policy has been the reduction and enforcement of contamination standards to 0.5% for recyclable paper and plastics received into the country. While MRA does not believe that the primary sorting techniques employed in Material Recovery Facilities (MRFs) can achieve this low level of contamination, a reduction in contamination received by MRFs will go some way to increasing the efficiency of MRF operations, reduce MRF costs for the disposal of the contamination received and improve the financial situation.

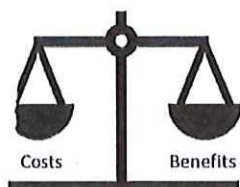
Consistent national messaging aimed at the common recycling behaviours desired across the country should be supported by local education campaigns, including bin sticker and the '3 strikes rule'.

PROS	CONS
<ul style="list-style-type: none">✓ Simple✓ Readily applicable✓ Common national advertising✓ Raises China issue profile✓ In line with government policy✓ Will assist MRF performance	<ul style="list-style-type: none">✗ Uncertain contamination reduction effect✗ Requires national consensus and/or Ministry leadership✗ Effect on export value not necessarily a direct relationship

Assuming $S9(2)(i)$ per household, the following costs and benefits are estimated:

Costs

$S9(2)(i)$



Benefits

$S9(2)(i)$

5.2.2 Review domestic kerbside collections systems - Stop collection of plastic grades 3-7

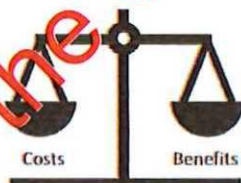
A lack of, or limited, viable markets for recycling plastic grades 3-7, means that this material has minimal value and the costs of collection and sorting could be better allocated to materials with value. Stopping collection of plastic grades 3-7 would mean a change in service to households and require associated education costs.

PROS	CONS
<ul style="list-style-type: none"> ✓ Cleaner MRF stream ✓ Less sorting labour required ✓ May drive alternative packaging solutions 	<ul style="list-style-type: none"> ✗ Reduction in service to households ✗ Significant education investment required ✗ Lower diversion from landfill ✗ Higher environmental footprint

Assuming the reduction of one full-time sorter for each MRF, the following costs and benefits are estimated:

Costs

$5,9(2)(i)$



Benefits

$5,9(2)(i)$

Examples:

With the lack of available markets for certain materials, and for others the strict contamination specification for shipping to China, there are reports that small municipalities in the state of Oregon, USA are taking the unprecedented step of informing residents that they can no longer put any plastic items or cartons in their kerbside bins. The waste management company's rationale behind this move was that the contamination risk and low market value no longer made it viable to collect these materials. Similarly, in Madison, Wisconsin, USA, the council announced that it would stop accepting rigid plastics for recycling because of the ban¹³. Reports of recyclables stockpiling in the USA are widespread¹⁴.

¹³ <http://www.cityofmadison.com/streets/recycling/plastic.cfm>

¹⁴ <https://www.usatoday.com/story/news/world/2018/01/02/mountains-u-s-recycling-pile-up-china-restricts-imports/995134001/>



Intervention at MRF Level

5.2.3 National facility licence limits

Similarly to Section 5.1.10, developing consistent facility licence limits would improve the data received for the resource recovery sector by capturing more facilities within the reporting requirement framework.

PROS	CONS
<ul style="list-style-type: none">✓ Improves data capture✓ Reduces environmental risk✓ Maximises MRF coordination✓ Allows coordination in response to China	<ul style="list-style-type: none">✗ Imposes cost of reporting on small MRFs✗ Imposes cost of licensing on small operations

Assuming S9(2)(i) the following costs and benefits are estimated:

Costs

S9(2)(i)



Benefits

S9(2)(i)



Intervention at Government Level

5.2.4 Regulate recyclability of packaging

Government mandate for packaging to be recyclable or reusable by a certain period.

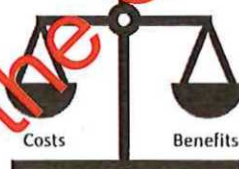
PROS	CONS
✓ Drives pull through for plastic products	✗ Does not assist with the China issue in the short term ✗ Recyclable is recycled

Assuming S9(2)(i) costs and benefits are estimated:

MRF material savings through domestic purchase, the following

Costs

S9(2)(i)



Benefits

S9(2)(i)

Example:

The EU plans to make all plastic packaging across Europe recyclable or reusable by 2030. This is part of a Europe-wide strategy on plastics and part of a transition towards a more circular economy.

5.2.5 Regulate recycled content of packaging

Government mandate for packaging to be made from a percentage recycled content by a certain period.

PROS	CONS
✓ Guaranteed pull through for recycled content	<ul style="list-style-type: none"> ✗ Requires regulation ✗ Difficult to implement on imported product ✗ Discriminates against local producers ✗ Unknown tonnage effect

Assuming *S9(2)(i)* costs and benefits are estimated:

: MRF material savings through domestic purchase, the following

Costs

Benefits

S9(2)(i)



S9(2)(i)

Example:

France plans to introduce a penalty system that would increase the cost of packaging made of non-recycled plastic. It is part of a plan towards the use of only recycled plastic nationwide by 2025. Under the new plan, products with recycled plastic packaging could cost up to 10 percent less the products with non-recycled plastic. The French government has pledged to transition the country to recycling 100 percent of its plastic by 2025 to reduce the vast amount of plastic finding its way into oceans.

6 Conclusion

MRA have analysed a number of potential actions for New Zealand and its resource recovery industry to pursue in response to China National Sword and the resulting market downturn for several key recyclable material streams. These potential responses were presented at workshops in Wellington, New Zealand with the Ministry, the Working Group and the Local Government Group. Incorporating feedback from these workshops, MRA have developed a short-list of 10 recommended responses, as well as an additional list of 5 responses which require further investigation or reassessment upon future changes in market conditions. These responses include interventions at levels spanning across the recycling supply chain.

A summary of these responses proposed can be found below.

Table 4 Summary of proposed responses

	Response	Supply Chain Intervention Level	Proposal
1	Short-term gate fee variations	MRF	Recommended
2	Model contract development	MRF	Recommended
3	Contamination bands	MRF	Recommended
4	Commodity price risk-sharing arrangements	MRF	Recommended
5	Improve quality of MRF output	MRF	Recommended
6	Develop database of domestic re-processors	Secondary Reprocessing	Recommended
7	Investigate growth of on-shore fibre processing	Secondary Reprocessing	Recommended
8	Investigate growth of on-shore plastic processing	Secondary Reprocessing	Recommended
9	National waste data recording system	Government	Recommended
10	Positive procurement policy	Government	Recommended
11	Education to reduce contamination	Household	Requires further investigation
12	Stop collection of plastic grades 3-7	Household	Requires further investigation
13	National facility licence limits	MRF	Requires further investigation
14	Regulate recyclability of packaging	Government	Requires further investigation
15	Regulate recycled content of packaging	Government	Requires further investigation

Appendix A Recycled Paper Pulp

The Issue

As a result of newly introduced ban on series of waste commodities, China only accepts paper wastes with less than 0.5% contamination level. The industry seeks novel and economically viable solutions to meet stringent standards required by China.

An intermediate, decontaminated and transportable product for recovered fibre could moderate the substantial pressure on recycling industry in Australia and New Zealand.

Recycled Paper Pulp

A pulp produced from the recovered paper is often referred to as Recycled Paper Pulp. Another term for the product is Recycled Fibre Pulp. There is an intermediate product in the paper making industry which is known as "Wet Lap". Wet lap is a sheet of pulp removed from a wet machine with about 50% moisture content. Wet lap can be wired and baled which makes it ideal for storage and transportation purposes. It might well-suit the situation where "in-line" processing of paper is out of reach or uneconomic. In this scenario the whole process of paper manufacturing does not take place in the same facility. Additionally, when the supply outstrips the demand, this product helps manufacturer be able to store the pulp and postpone the production of final product. In the process of paper manufacturing wet lap is produced at the stage of "pulp preparation". However, it can also take place before the de-inking and bleaching process.



Figure 5 Paper processing flow

Wet Lap

In the wet lap manufacture process, semi-dewatered fibre pulps are cut into sheets. The sheets are then stacked onto wooden pallets (Figure 6). In the next stage they are wired and baled and transported to storage area. The feedstock for wet lap processing can be both virgin and recycled pulp. The wet lap sheets can then be used to manufacture either paper or sanitary products.



Figure 6 Wet lap sheets (left) and wet lap fluff (right)

Equipment Manufacturers

ANDRITZ

Country: Austria

System name: ANDRITZ wet lap systems

A modern wet lap system for wet pulp storage consists of an ANDRITZ Twin Wire Press for pulp dewatering (see Figure 7), an ANDRITZ wet sheet cutter, and an ANDRITZ baling line (or a pallet conveyor line for wet pulp storage).

Some advantages of the equipment claimed by the manufacturer are:

- Maximum dry content for minimum transport weight
- Gentle dewatering facilitates re-pulping
- Suitable for all types of pulps – even for difficult-to-handle sheets
- Accurately cut and positioned sheets facilitate handling and wet pulp storage

In this process after dewatering, an electro-mechanical tail cutter and a pneumatically actuated flap transfer the trimmed pulp mat automatically to the belt guide system. High-pressure jets slit the sheet lengthwise where required. Exact cross-cutting is ensured by a knife roll working against a stationary knife. Fragile pulp sheets (mechanical or recovered fibres) are piled up via a vacuum belt.

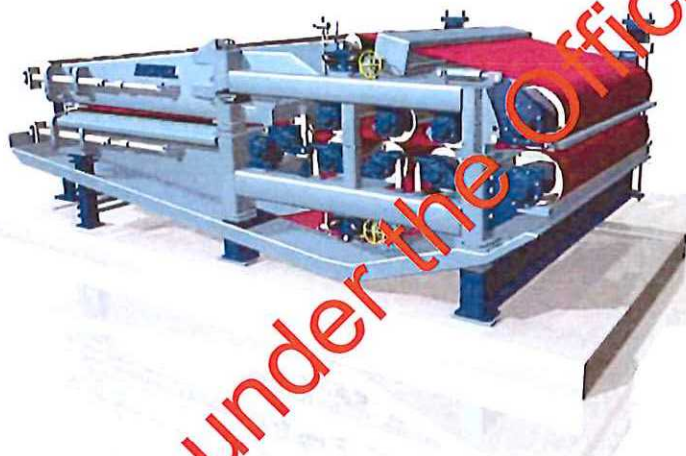


Figure 7 ANDRITZ Twin Wire Press for pulp dewatering, Schematic drawing

Valmet Forward

Country: Finland

This company specialises in manufacturing wet lap baling units. Valmet's wet-end technology comprises both Fourdrinier-type solutions and double-wire technology with two-sided dewatering and wire pressing. Wet-lap bales are sensitive to pressing due to weak fibre-bondings in the wet pulp. The Robopress presses the wet-lap bales to optimized density without jeopardizing the internal strength of the wet lap bales. The Robopalletizer then automatically moves pallets to the baling line. It is used in lines where one or more pulp bales are to be transported on pallets. Bale stacking on pallets is carried out by the subsequent stacking machine.

Cost estimates for the wet lap technology have not yet been received.