

Container Return Scheme: Financial modelling report

Ministry for the Environment

March 2022



Introduction



Container Return Scheme: Financial Modelling report

This report sets out an overview of the latest financial modelling for the New Zealand Container Return Scheme (CRS).

This report has been prepared for the Ministry for the Environment (MfE), to help MfE understand the costs associated with the design options of a CRS.

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Important Notice

This report been prepared for the Ministry for the Environment (MfE), to help MfE understand the scheme costs associated with the design options for a container return scheme (CRS) for New Zealand. The report has been prepared solely for this purpose and should not be relied upon for any other purpose. We accept no liability to any party should it be used for any purpose other than that for which it was prepared.

The report and has been prepared solely for use by MfE.

To the fullest extent permitted by law, PwC accepts no duty of care to any third party in connection with the provision of this report and Model and/or any related information or explanation (together, the “Information”). Accordingly, regardless of the form of action, whether in contract, tort (including without limitation, negligence) or otherwise, and to the extent permitted by applicable law, PwC accepts no liability of any kind to any third party and disclaims all responsibility for the consequences of any third party acting or refraining to act in reliance on the Information.

In the course of our assessment we have had access to information provided by MfE, but we have not carried out anything in the nature of an audit. Accordingly, we express no opinion on the reliability, accuracy or completeness of the information provided to us and upon which we have relied. Responsibility for the reliability, accuracy and completeness of such information therefore remains with MfE. Certain inputs have been supplied by PwC. PwC accepts no responsibility for the accuracy of the assumptions we have supplied. We reserve the right, but will be under no obligation, to review our analysis and if we consider it necessary, to revise the report, if any additional information, which was in existence on the date of this report, was not brought to our attention, or subsequently comes to light.

We have relied on forecasts and assumptions about future events which, by their nature, are not able to be independently verified. Inevitably, some assumptions may not materialise, and unanticipated events and circumstances are likely to occur. Therefore, actual results in the future will vary from the forecasts upon which we have relied. These variations may be material.

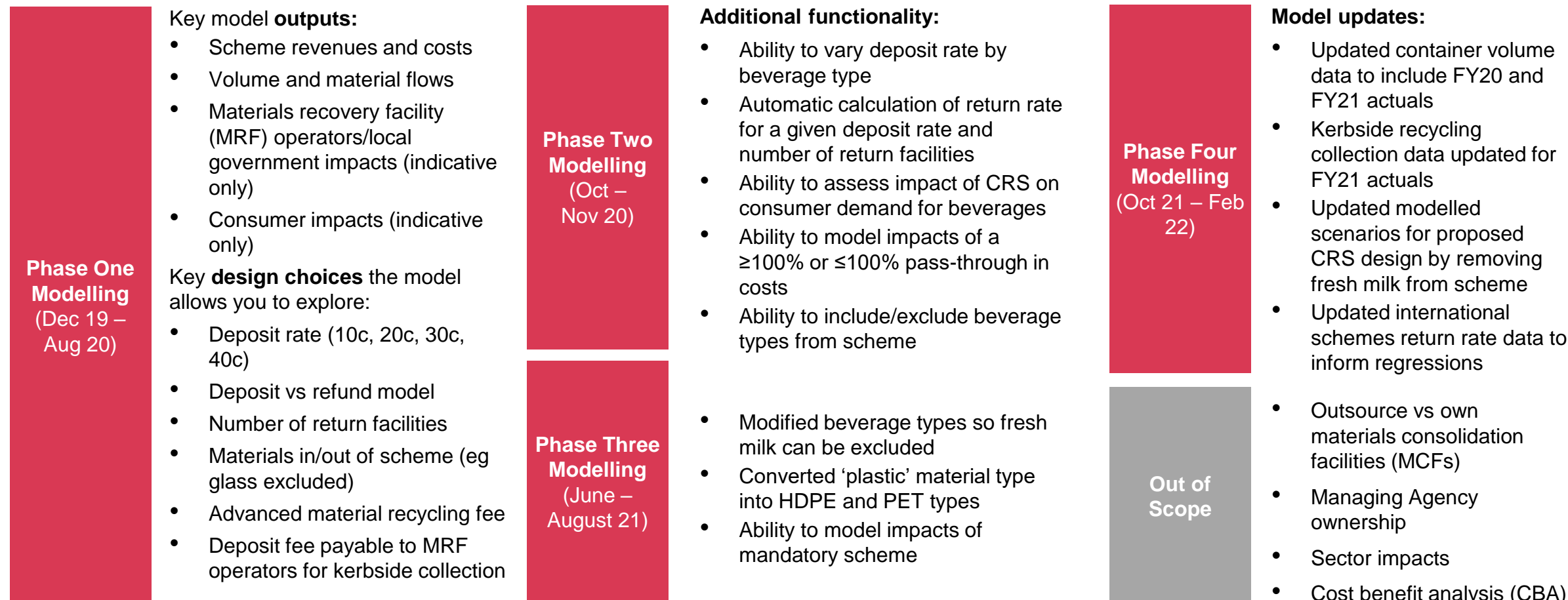


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The Model projects the cashflows (revenues and costs) of operating a CRS in New Zealand

Overview of model and iterations



The following funding & material flows are modelled



Source: Envision (2015)

The Model allows for the beverage producer to pay the Managing Agency:

- Deposit fee
- Scheme fee
- Advanced material recycling fee (if applicable)

The following assumptions are held constant for the scenarios modelled in this report

Key characteristics

Cost neutral model (refund/deposit)	Refund
Material included	PET Liquid paperboard Metal Glass
Return facility handling fee	6.3c per container
Proportion of containers returned via return facility type	5% over the counter (OTC) 10% automated depot 85% reverse vending machine (RVM)
Number of return facilities (2021 estimate)	645 RVMs 100 OTCs 50 automated depots
Scheme start date	1 July 2023
Starting return rate	90% of maximum return rate
Beverages excluded from scheme	Fresh milk

Note: the modelling includes inflation adjustments

Container Return Scheme – Financial Modelling

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Number of years to reach maximum return rate 3 years

Expected reduction in demand for beverage containers through introduction of a CRS 6.5%

Deposit fee payments given to MRF operators for kerbside collection? Yes

Proportion of costs passed through to consumer 100%

- For the purposes of modelling costs of the scheme, **the refund scenario is used** so Managing Agency revenue is equal to costs. In practice this can also be achieved under a deposit model.
- It is expected that **return rates will peak at the end of the third year** of the scheme operating as consumer awareness and habits change.
- **A 6.5% decrease in the volume of containers consumed is assumed upon CRS commencement**, based on experience from similar Australian schemes.
- **Councils and/or recyclers receive a deposit fee per container** through kerbside recycling.
- Modelling in the body of this report is based on **return rates drawn from a review of global schemes (both mandatory and voluntary schemes)**. Appendix B presents the results of return rates based on **mandatory schemes only**.

International evidence suggests the deposit rate has the greatest impact on returns

Estimated return rate for a given deposit rate and return facility concentration

Population per return facility

Deposit rate	>12,500	12,500 - 10,000	10,000 - 7,500	7,500 - 5,000	5,000 - 2,500
10c	75%	76%	77%	78%	79%
15c	78%	79%	80%	81%	82%
20c	81%	82%	83%	84%	85%
30c	87%	88%	89%	90%	91%
40c	93%	94%	95%	96%	97%

- A 10c deposit at 7,500 - 5,000 return facilities to people is likely to achieve a return rate of ~78% and a 20c deposit is likely to achieve a return rate of ~84%.
- In contrast, there is less of an improvement in the return rate as facility concentration increases >1:12,500.
- Other factors such as scheme awareness and education will also impact return rates.
- The results are intended to be indicative only.

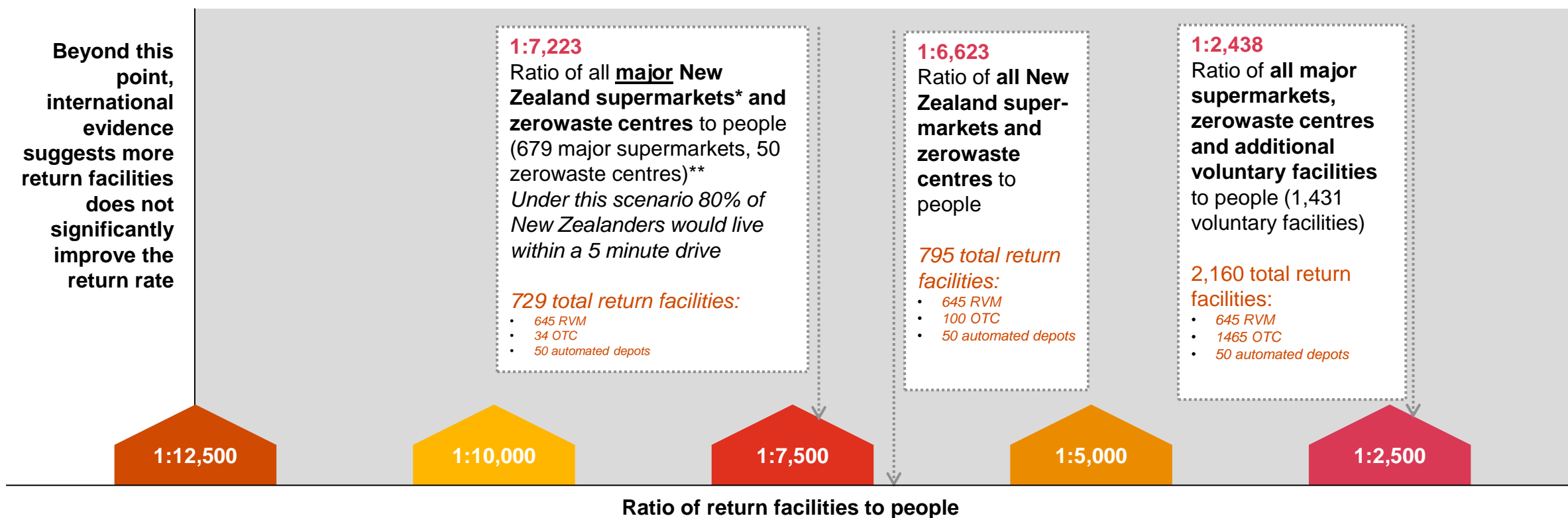
Notes: Return rate = proportion of containers sent to return facilities and kerbside recycling. Return rates based on regression analysis of international schemes with information available on deposit rates, return facility information, return rates and median income (33 schemes in total). This return rate regression analysis has been prepared in conjunction with MfE.

The return rate regression analysis has been performed controlling for the population per return facilities, the schemes mid point deposit fee and the countries median income. Regression analysis was also undertaken on international schemes with deposit and return rate information only (37 schemes in total), and this analysis yields similar results (10c = 76% return rate; 20c = 83%; 30c = 91%; 40c = 99%). Data is based on returns once scheme fully established. Results may be skewed by European CRS models.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

1:7,223 concentration occurs if all major supermarkets and 50 zerowaste centres offer return facilities

Concentration of potential NZ return facilities



*Major New Zealand supermarkets include all Countdown, New World, Pak'nSave, Fresh Choice, Supervalu and Four Square stores

**Zerowaste centres are a proxy for automated depot return facilities which are used for commercial returns

Source: Information provided by MfE, PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

A stronger performing scheme involves higher scheme cost

CRS costs in first five years of scheme (per annum)

Deposit rate	Return rate	CRS fee (deposit + scheme fee per container)	Total cost of CRS (\$m pa)	-	Deposits refunded (\$m pa)	=	Net cost of CRS (\$m pa)
10c	*70-78% ~1.6-1.9bn containers	14-15c 10c deposit; 4-5c scheme fee	\$342m - 384m		\$162m - 187m		\$180m - 197m
15c	*73-81% ~1.7-1.9bn containers	18-20c 15c deposit; 3-5c scheme fee	\$445m - 498m		\$253m - 291m		\$192m - 207m
20c	*76-84% ~1.7-2.0bn containers	23-25c 20c deposit; 3-5c scheme fee	\$553m - 619m		\$349m - 402m		\$204m - 217m

- A **higher return rate drives higher CRS costs** because the majority of CRS costs are variable.
- While the financial model shows the costs of higher scheme performance, it **does not demonstrate the benefits of higher performance, or whether those benefits outweigh the costs – these are captured within the CBA.**
- The correlation between scheme performance and cost is an **important consideration for scheme design, as it affects incentives.**

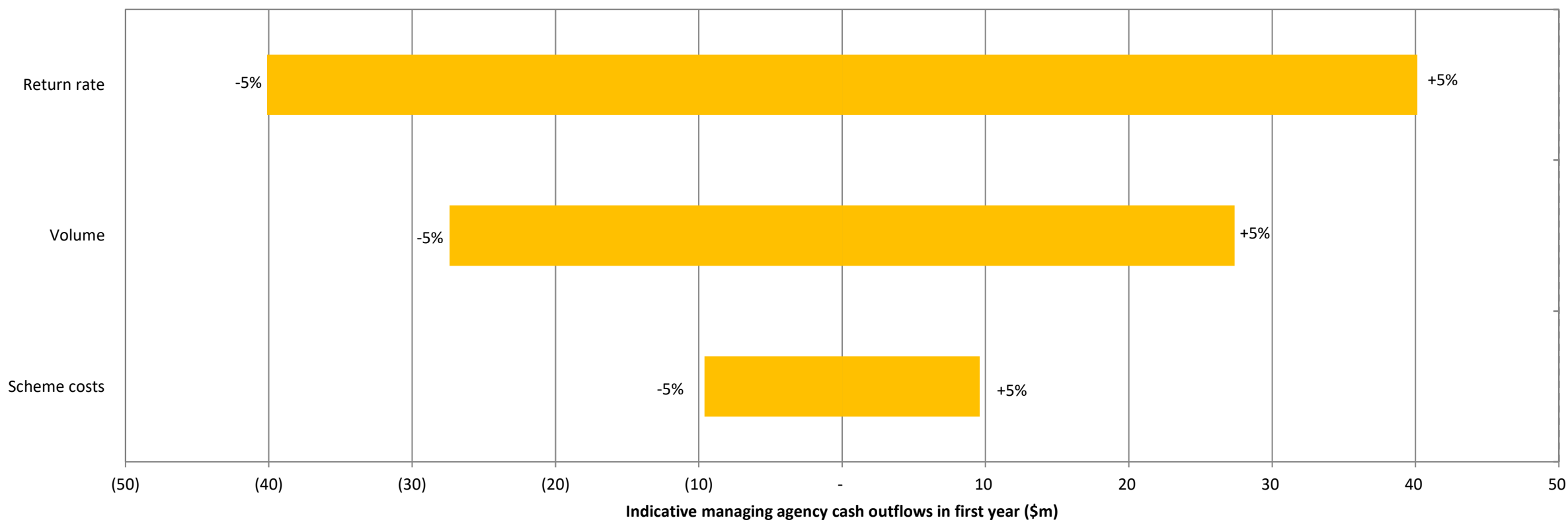
All costs are GST exclusive unless otherwise stated.

*Starting return rate in year one is calculated as 90% of the maximum return rates as seen on page 7.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Return rate is the biggest cost driver of a CRS as the majority of scheme costs are variable (1 of 2)

Scheme cost sensitivity in first year of scheme - 20c cost neutral model

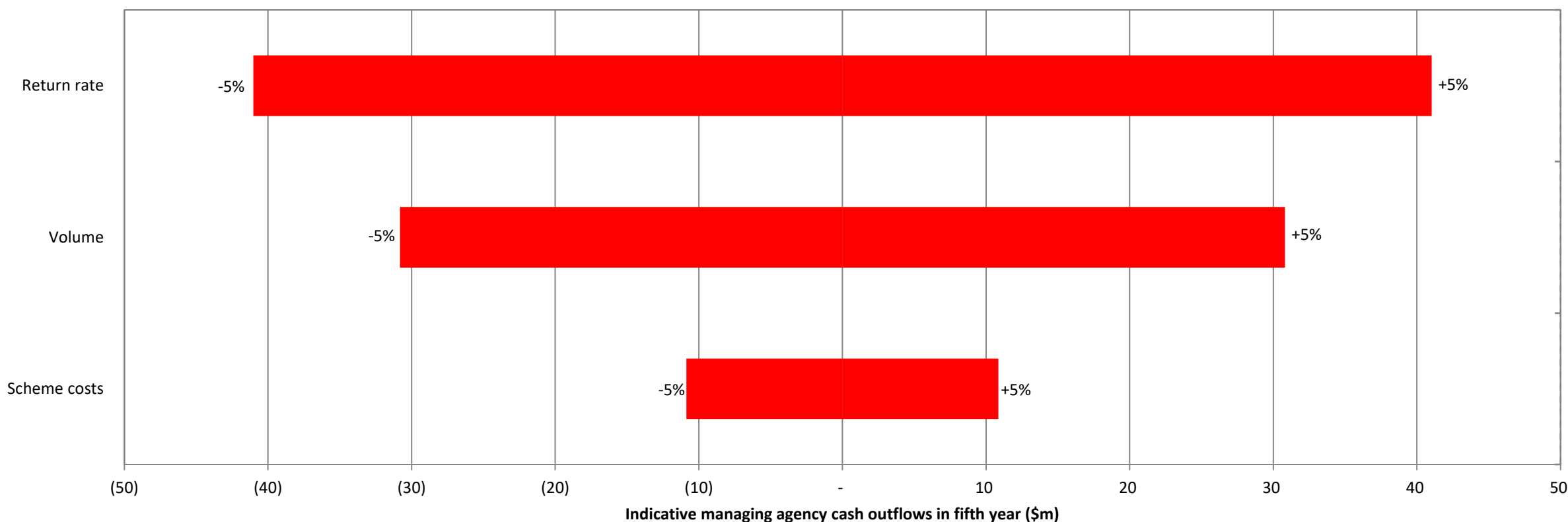


Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

The return rate sensitivity is additive, and the volume and scheme costs sensitivities are multiplicative. The 'volume' refers to the total volume of containers sold, and the 'Scheme costs' refers to the total scheme cost including the handling fee, operating costs and capex.

Return rate is the biggest cost driver of a CRS as the majority of scheme costs are variable (2 of 2)

Scheme cost sensitivity in fifth year of scheme - 20c cost neutral model



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

The return rate sensitivity is additive, and the volume and scheme costs sensitivities are multiplicative. The 'volume' refers to the total volume of containers sold, and the 'Scheme costs' refers to the total scheme cost including the handling fee, operating costs and capex.

Container Return Scheme – Financial Modelling

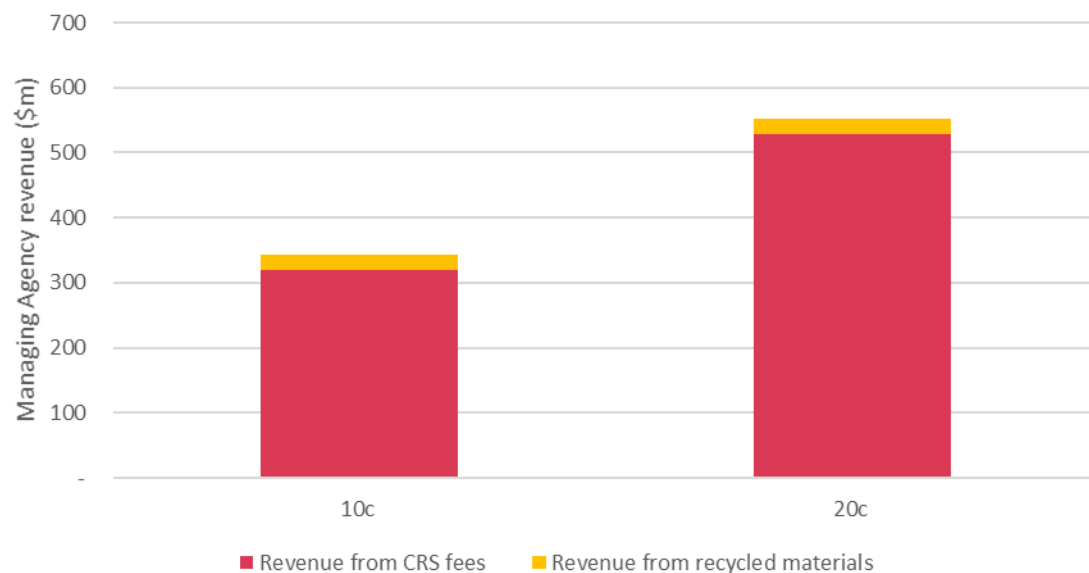
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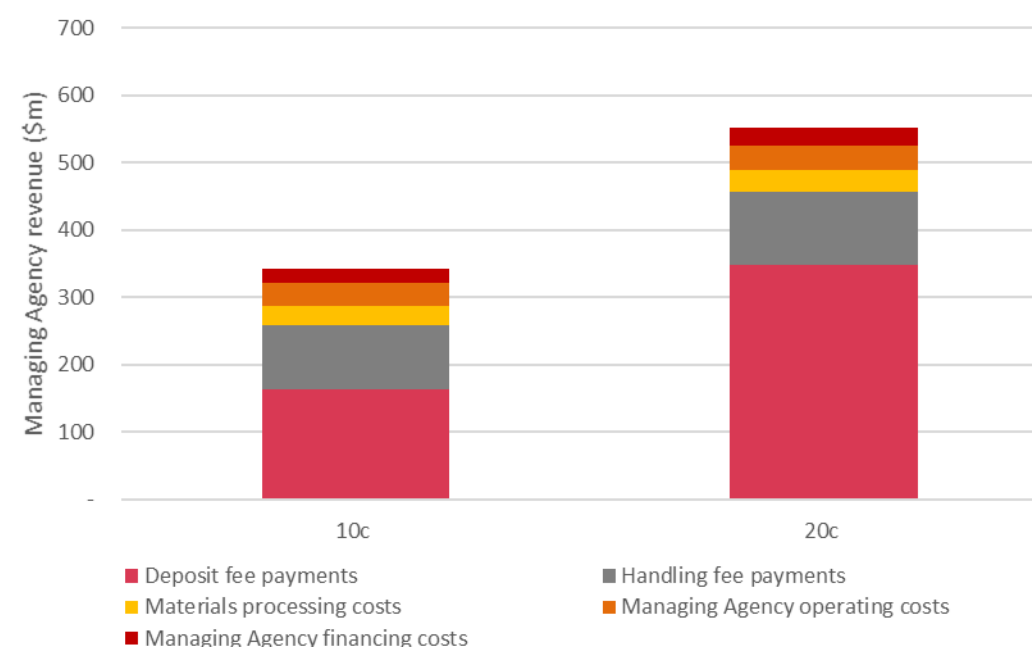
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Deposit fee and handling fee payments are the biggest contributor to scheme costs (1 of 2)

Scheme revenue in first year of scheme – 20c cost neutral model



Scheme costs in first year of scheme – 20c cost neutral model



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Container Return Scheme – Financial Modelling

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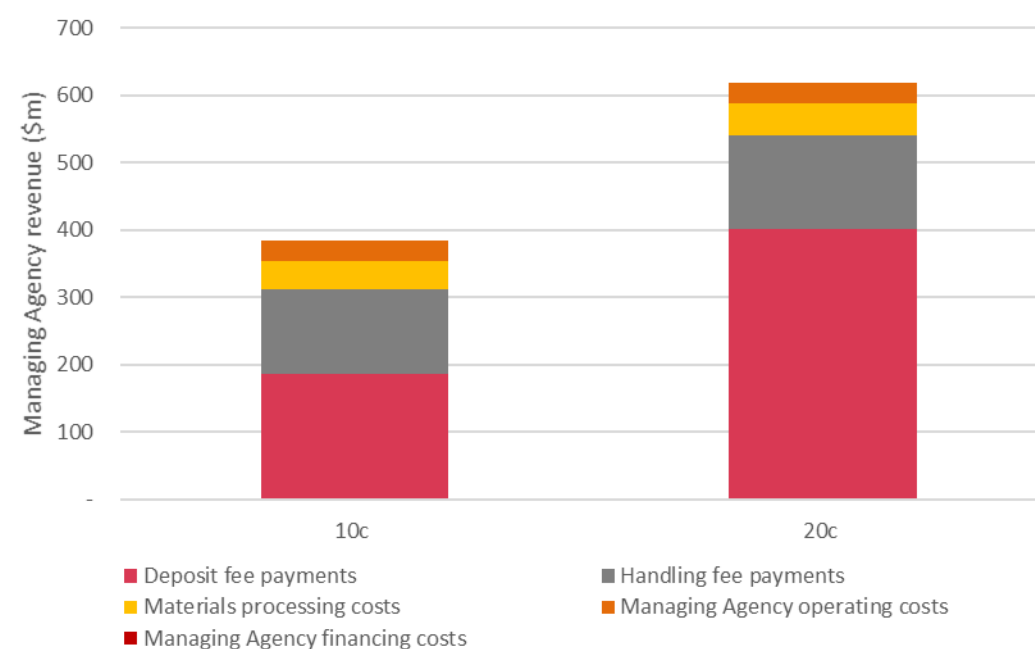
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Deposit fee and handling fee payments are the biggest contributor to scheme costs (2 of 2)

Scheme revenue in fifth year of scheme – 20c cost neutral model



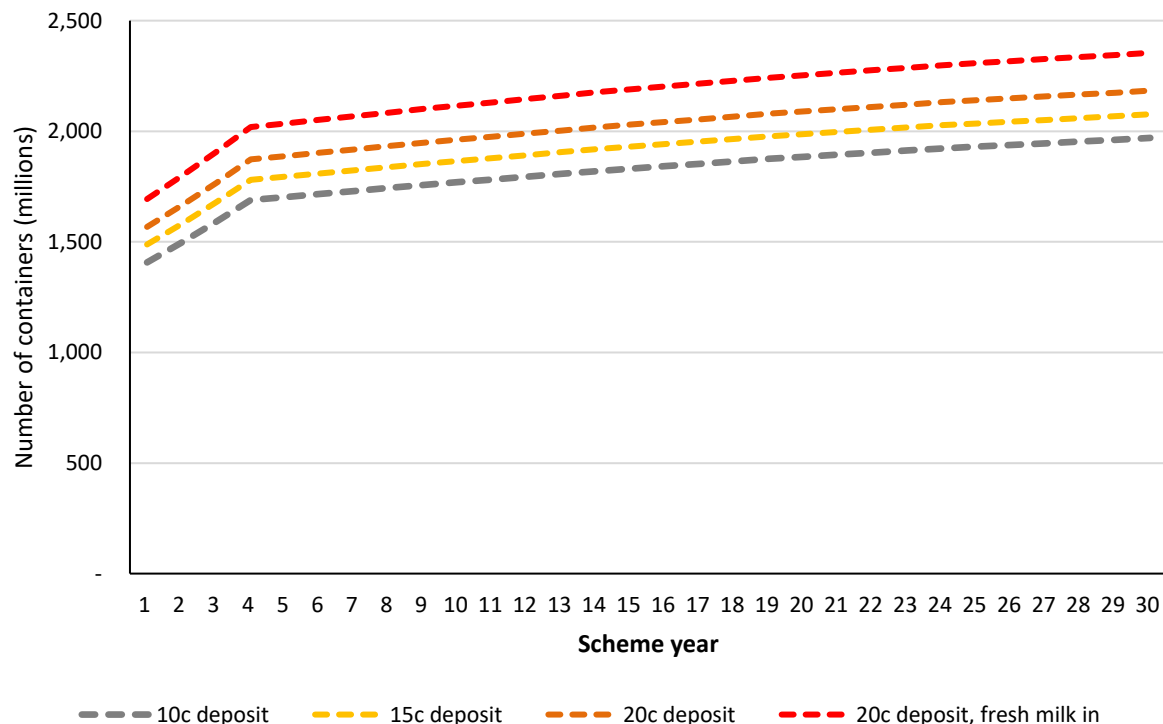
Scheme costs in fifth year of scheme – 20c cost neutral model



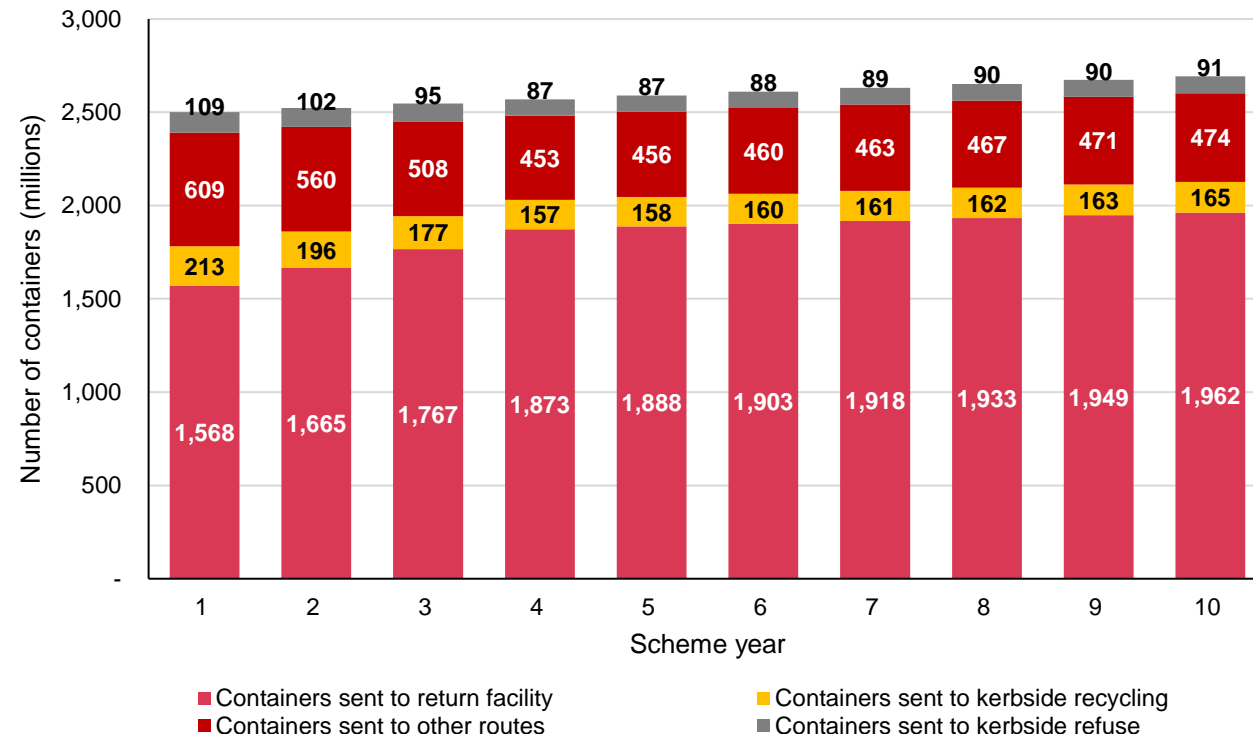
Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

By year 10, between 1.8-2.1 billion containers p.a. could be returned depending on scheme design choice

Number of containers sent to return facilities under different deposit rates



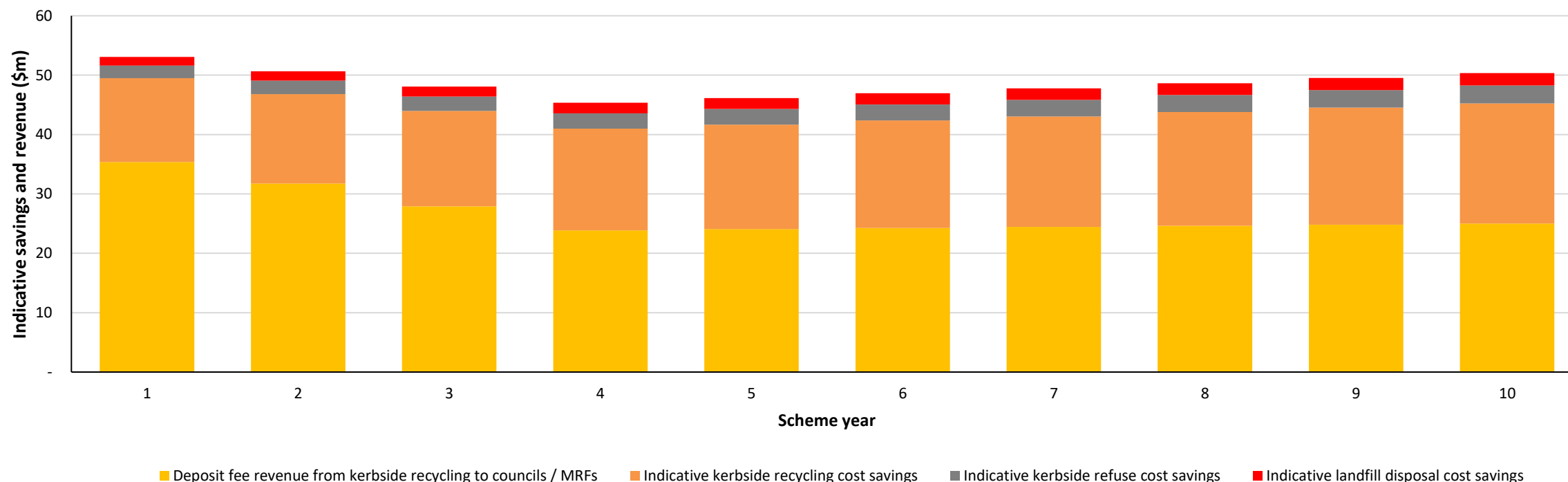
Estimated container flow - 20c cost neutral model (milk out)



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

MRF operators / local government will benefit from the scheme through reduced costs and deposit fee revenue

Indicative savings and revenue for local governments / MRF operators – 20 cost neutral model



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

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The average household participating in the scheme may pay a net scheme fee between \$78-\$103 per year*

Average participating household cost in first five years of scheme (per annum)

Deposit rate	CRS fees paid (\$ pa)	+	GST (\$ pa)	=	Total cost (\$ pa)	-	Estimated deposit refund available (\$ pa)	=	Net cost (\$ pa)
10c (70-78% return)	\$171 - 184		\$26 - 28		\$197 - 212		\$124		\$73 - 88
15c (73-81% return)	\$225- 243		\$34- 36		\$259 - 279		\$186		\$73 - 93
20c (76-84% return)	\$283 - 305		\$42 – 46		\$325 - 351		\$248		\$78 - 103

*Please note the 'Net cost' to households is an indicative estimate for an average household. In reality the net cost between households will vary depending on consumer behaviour. The above analysis assumes a 6.5% reduction in household container consumption in response to the change in price. The model and analysis of "net scheme costs to households" does not include the savings to households from the modelled 6.5% reduction which includes the total product purchase price, in addition to scheme fees. This 6.5% assumption is consistent with estimated consumption reduction in non-alcoholic drinks as per the Queensland Productivity Commission: container refund scheme, price monitoring review. Actual market response will vary.

Estimated deposit refund available is constant throughout the five years as the average containers purchased per household and the deposit fee remains constants.

Benefits to the average household of higher performance are captured within the CBA

Note: Averages are calculated based on the total New Zealand population. 'Estimated deposit refund available' assumes a given consumer returns containers all containers purchased.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Including fresh milk in the scheme could increase the net scheme fees to participating household by \$3-\$4 pa

Implications of varying deposit rates by beverage type (10c, 15c and 20c, and 20c milk in) in first five years of scheme (per annum)

Scenario	Scheme impacts			Average participating household impacts								
	Return rate	CRS fee (deposit + scheme fee per container)	Net cost of CRS (\$m pa)	CRS fees paid (\$ pa)	+	GST (\$ pa)	=	Total cost (\$ pa)	-	Est. deposit refund available (\$ pa)	=	Net cost (\$ pa)
10c	70-78%	14-15c	\$180-197m	\$171-184		\$26-28		\$197-212		\$124		\$73-88
15c	73-81%	18-20c	\$192-207m	\$225-243		\$34-36		\$259-279		\$186		\$73-93
20c	76-84%	23-25c	\$204-217m	\$285-305		\$42-46		\$325-351		\$248		\$78-103
20c, milk in	76-84%	23-24c	\$219-232m	\$303-325		\$45-49		\$348-374		\$267		\$81-107

The above analysis assumes a 6.5% reduction in household container consumption in response to the change in price. The model and analysis of “net scheme costs to households” does not include the savings to households from the modelled 6.5% reduction which includes the total product purchase price, in addition to scheme fees. This 6.5% assumption is consistent with estimated consumption reduction in non-alcoholic drinks as per the Queensland Productivity Commission: container refund scheme, price monitoring review. Actual market response will vary.

The return rates across the different schemes relate to containers that are eligible for the scheme, therefore the same return rate is observed whether fresh milk is in or out.

Note: Averages are calculated based on the total New Zealand population. ‘Estimated deposit refund available’ assumes a given consumer returns containers all containers purchased.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Price implications are dependent on the containers per unit and the consumers participation in the scheme

Theoretical price increase for beverage products in first year of scheme - 20c cost neutral model

Example Product	Costs and refunds			Price impact	
	A. Theoretical cost before CRS fees (\$ per unit)	B. CRS fees *(incl. GST) (\$ per unit)	C. Refund available (\$ per unit)	Total cost price impact (B ÷ A)	Net cost price impact ((B-C) ÷ A)
Milk (1 container)	3.50	0.26	0.20	7.6%	1.8% (6 cents)
Wine (1 container)	20.00	0.26	0.20	1.3%	0.3% (6 cents)
Beer (6 containers)	20.00	1.59	1.20	7.9%	1.9% (39 cents)
Carbonated beverages (6 containers)	10.00	1.59	1.20	15.9%	3.9% (39 cents)

*The above analysis assumes 100% of the CRS cost per unit will be passed through to customers.

*As the price of the product increases, the GST applicable to the product will increase.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

The majority of containers are expected to be returned at RVMs for both return facility concentration scenarios

Average revenue per return facility in first five years of scheme (per annum) - 20c cost neutral model

Return facility concentration:	Type of return facility	Handling fees paid to return facilities (\$m pa)	Number of return facilities	Average revenue per return facility (pa)
1. Major supermarkets + zero waste centres	OTC	\$5m-7m	104-107	\$52,000 - \$65,000
	Automated depot	\$11m-14m	52-54	\$206,000 - \$260,000
	RVM	\$91m-118m	668-692	\$136,000 - \$171,000
2. Scenario 1 + additional voluntary return facilities	OTC	\$11m-14m	1,585-1,641	\$7,000 - \$9,000
	Automated depot	\$11m-14m	52-54	\$210,000 - \$263,000
	RVM	\$87m-113m	668-692	\$130,000 - \$163,000

- Stores are compensated for operating return facilities by receiving a handling fee per container.
- **The majority of containers (80-85%) are expected to be returned at major supermarkets operating RVMs, 5-10% are assumed to be returned at OTC facilities.**
- Assuming a 6.3c handling fee, **OTC retailers could receive \$52,000 - \$65,000 p.a. under scenario 1 and \$7,000 - \$9,000 p.a. under scenario 2 (dependant on return facility density).**
- **Average revenue for RVMs and automated depots is less sensitive to return facility density.**

Analysis assumes that the number of return facilities increase at population growth rate and handling fees grow at inflation

Scenario 1 assumes the following proportions of containers returned: 5% OTC, 10% Automated depot, 85% RVM

Scenario 2 assumes the following proportions of containers returned: 10% OTC, 10% Automated depot, 80% RVM; assumes an additional 1,431 voluntary return facilities based on some European schemes

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Appendix A: Managing agency revenue and costs

Managing agency revenue and costs (FY23-FY32) - 10c neutral model

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	231.1	233.2	235.3	237.4	239.3	241.2	243.1	245.1	247.0
Scheme fees	-	87.9	98.9	116.2	112.3	116.3	120.6	125.0	129.7	134.2
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
Funding from loan	58.2	-	-	-	-	-	-	-	-	-
Total revenue	58.2	319.0	332.1	351.5	349.7	355.6	361.8	368.1	374.8	381.2
Direct costs										
Handling fees for return facilities	-	95.9	104.0	112.8	122.1	125.6	129.1	132.7	136.5	140.3
Deposit fee payments	-	162.3	169.6	177.2	185.2	186.7	188.2	189.7	191.2	192.7
Net cost to recycle materials	-	5.1	7.3	9.6	12.2	12.7	13.3	13.8	14.4	15.0
Capex	25.0	-	-	-	0.2	-	-	-	0.2	-
Total direct costs	25.0	263.3	280.9	299.6	319.7	325.0	330.6	336.3	342.3	348.1
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	36.7	296.3	309.4	328.6	349.3	355.2	361.3	367.7	374.4	380.8
Other cash outflows										
Change in working capital	21.5	1.3	1.4	1.4	0.4	0.4	0.4	0.4	0.4	0.4
Loan repayments	-	21.4	21.4	21.4	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix A: Managing agency revenue and costs

Managing agency revenue and costs (FY23-FY32) - 15c cost neutral model

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	346.6	349.8	352.9	356.1	358.9	361.8	364.7	367.6	370.6
Scheme fees	-	73.7	88.3	109.3	105.7	109.8	114.2	118.7	123.6	128.2
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	-	-	-	-	-	-	-	-	-
Funding from loan	67.3	-	-	-	-	-	-	-	-	-
Total revenue	67.3	420.4	438.1	462.2	461.8	468.7	476.0	483.4	491.3	498.8
Direct costs										
Handling fees for return facilities	-	101.4	109.9	119.0	128.8	132.4	136.1	140.0	143.9	147.9
Deposit fee payments	-	252.6	264.0	275.9	288.3	290.6	292.9	295.3	297.6	300.0
Net cost to recycle materials	-	7.0	9.3	11.7	14.4	15.0	15.6	16.3	16.9	17.6
Capex	26.2	-	-	-	0.2	-	-	-	0.2	-
Total direct costs	26.2	361.0	383.1	406.6	431.7	438.0	444.7	451.5	458.7	465.6
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	37.8	394.0	411.6	435.6	461.3	468.2	475.5	482.9	490.7	498.3
Other cash outflows										
Change in working capital	29.5	1.7	1.8	1.8	0.5	0.5	0.5	0.5	0.5	0.5
Loan repayments	-	24.7	24.7	24.7	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix A: Managing agency revenue and costs

Managing agency revenue and costs (FY23-FY32) - 20c cost neutral model

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	462.2	466.4	470.6	474.8	478.6	482.4	486.3	490.2	494.1
Scheme fees	-	65.9	84.3	109.3	106.1	110.3	114.9	119.7	124.8	129.5
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	0.0	-	-	-	-	-	-	-	-
Funding from loan	77.0	-	-	-	-	-	-	-	-	-
Total revenue	77.0	528.1	550.6	579.9	580.8	588.9	597.3	605.9	614.9	623.6
Direct costs										
Handling fees for return facilities	-	106.9	115.7	125.2	135.4	139.2	143.1	147.2	151.3	155.6
Deposit fee payments	-	349.0	364.8	381.2	398.4	401.6	404.8	408.0	411.3	414.6
Net cost to recycle materials	-	8.8	11.2	13.8	16.7	17.3	18.0	18.7	19.4	20.2
Capex	27.4	-	-	-	0.2	-	-	-	0.2	-
Total direct costs	27.4	464.8	491.7	520.3	550.7	558.1	565.9	573.9	582.3	590.4
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	39.0	497.8	520.2	549.3	580.3	588.3	596.7	605.3	614.3	623.0
Other cash outflows										
Change in working capital	38.0	2.0	2.2	2.3	0.6	0.6	0.6	0.6	0.6	0.6
Loan repayments	-	28.3	28.3	28.3	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix A: Managing agency revenue and costs

Managing agency revenue and costs (FY23-FY32) - 20c cost neutral model, fresh milk in

Nominal \$m	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	497.7	502.2	506.7	511.2	515.3	519.5	523.6	527.8	532.0
Scheme fees	-	67.0	86.7	113.2	107.7	112.0	116.8	121.7	127.1	131.9
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	-	-	-	-	-	-	-	-	-
Funding from loan	87.1	-	-	-	-	-	-	-	-	-
Total revenue	87.1	564.7	588.9	619.9	618.9	627.4	636.2	645.3	654.9	664.0
Direct costs										
Handling fees for return facilities	-	115.4	124.9	135.1	146.0	150.1	154.4	158.7	163.2	167.8
Deposit fee payments	-	375.8	392.8	410.5	429.0	432.4	435.9	439.4	442.9	446.4
Net cost to recycle materials	-	6.2	8.4	10.8	13.4	14.0	14.6	15.2	15.8	16.5
Capex	34.6	-	-	-	0.3	-	-	-	0.3	-
Total direct costs	34.6	497.5	526.1	556.4	588.7	596.5	604.8	613.2	622.2	630.7
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	46.2	530.5	554.6	585.4	618.3	626.7	635.6	644.7	654.2	663.3
Other cash outflows										
Change in working capital	40.9	2.2	2.3	2.5	0.6	0.6	0.7	0.7	0.7	0.6
Loan repayments	-	32.0	32.0	32.0	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix B: There is evidence a mandatory scheme may achieve higher return rates, leading to higher costs

CRS costs in first five years of scheme (per annum)

Deposit rate	Return rate	CRS fee (deposit + scheme fee per container)	Total cost of CRS (\$m pa)	-	Deposits refunded (\$m pa)	=	Net cost of CRS (\$m pa)
10c	*74-82% ~1.7-2.0bn containers	15-16c 10c deposit; 5-6c scheme fee	\$364m - 409m		\$171m - 197m		\$193m - 212m
15c	*76-84% ~1.8-2.0bn containers	19-21c 15c deposit; 4-6c scheme fee	\$465m - 521m		\$263m - 302m		\$202m - 219m
20c	*78-86% ~1.8-2.1bn containers	24-25c 20c deposit; 4-5c scheme fee	\$570m - 639m		\$359m - 413m		\$211m - 226m

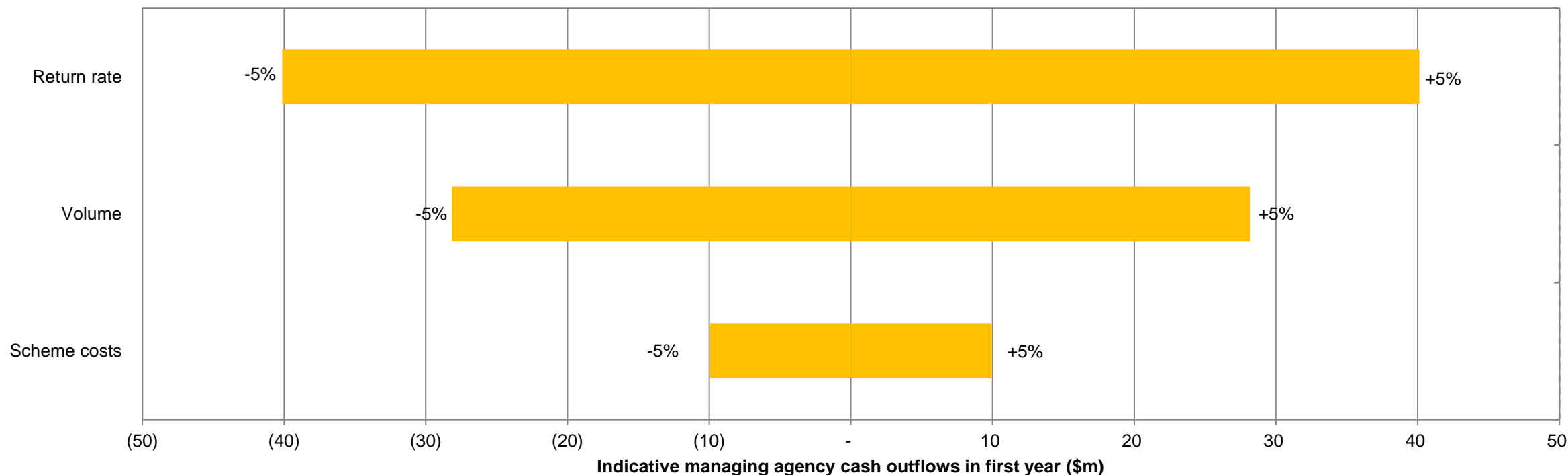
- There is the ability to mandate participation within a scheme.
- Based on regression analysis of international schemes (with information available on deposit rates and return rates only), **there is evidence return rates are higher for mandatory schemes.**
- Further analysis on scheme costs for mandatory schemes is shown in Appendix B.

*Starting return rate in year one is calculated as 90% of the maximum return rates as seen on page 7.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Appendix B: Model outputs when return rates are based on mandatory schemes only

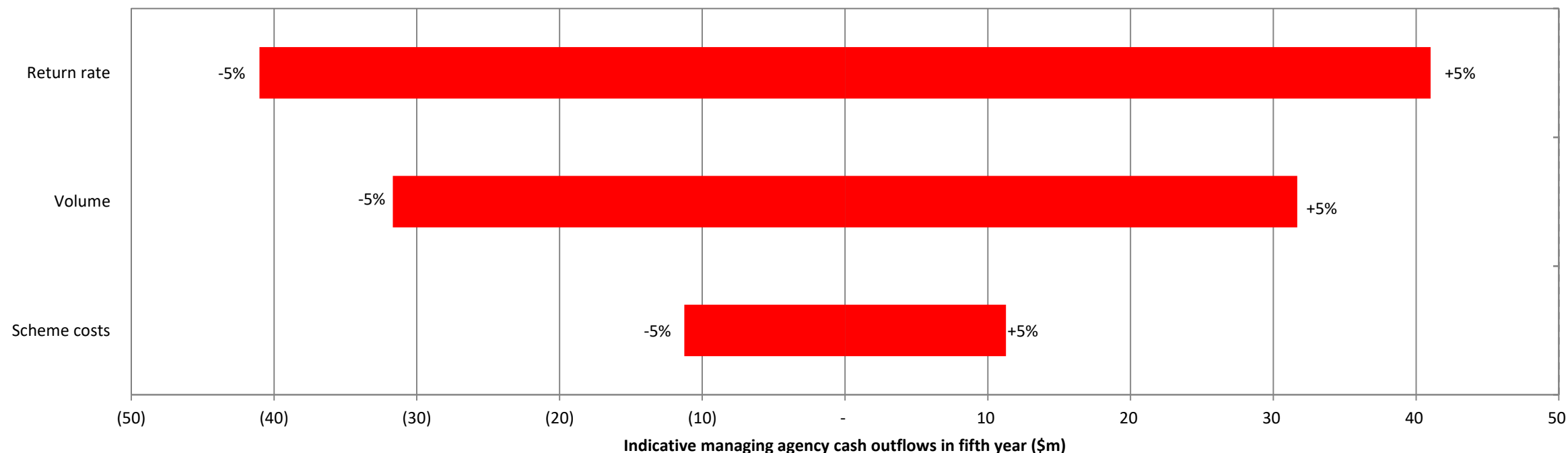
Scheme cost sensitivity in first year of scheme (20c cost neutral model)



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model "CRS Cashflow Model - Phase Four (10.11.2021).xlsm" provided to MfE. Should the underpinning inputs and assumptions change the above results may change. The return rate sensitivity is additive, and the volume and scheme costs sensitivities are multiplicative. The 'volume' refers to the total volume of containers sold, and the 'Scheme costs' refers to the total scheme cost including the handling fee, operating costs and capex.

Appendix B: Model outputs when return rates are based on mandatory schemes only

Scheme cost sensitivity in fifth year of scheme (20c cost neutral model)



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

The return rate sensitivity is additive, and the volume and scheme costs sensitivities are multiplicative. The 'volume' refers to the total volume of containers sold, and the 'Scheme costs' refers to the total scheme cost including the handling fee, operating costs and capex.

Container Return Scheme – Financial Modelling

PwC

March 2022

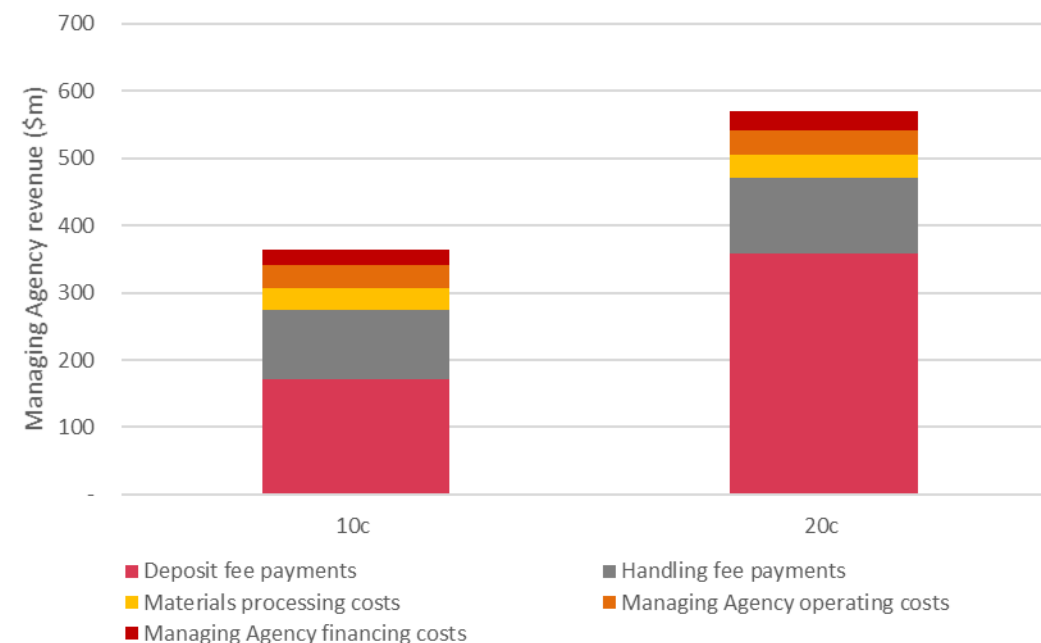
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Appendix B: Model outputs when return rates are based on mandatory schemes only

Scheme revenue in first year of scheme



Scheme costs in first year of scheme



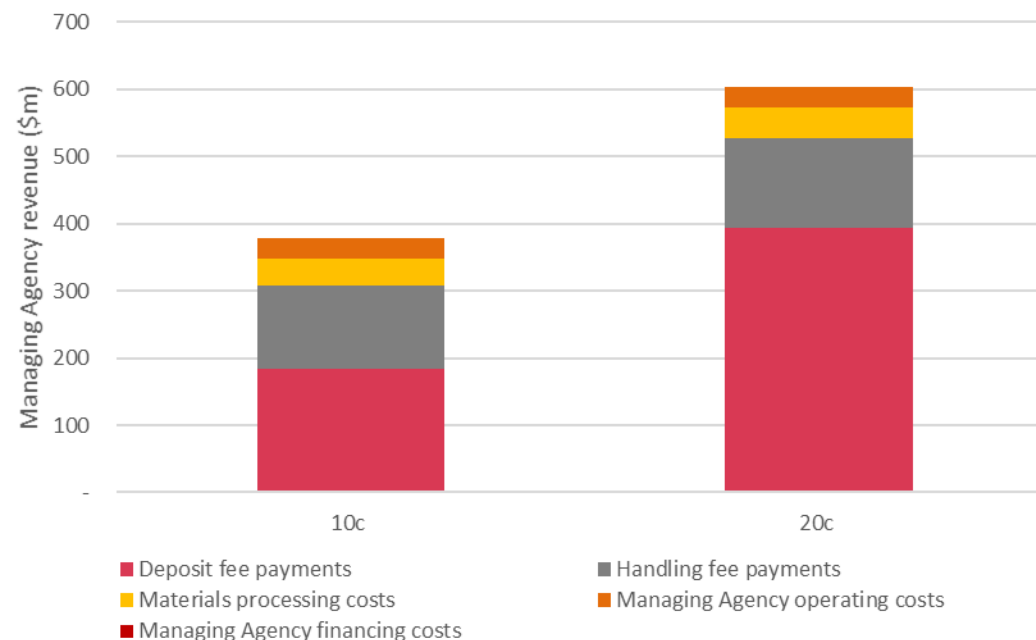
Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model "CRS Cashflow Model - Phase Four (22.11.2021).xlsm" provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Appendix B: Model outputs when return rates are based on mandatory schemes only

Scheme revenue in fifth year of scheme



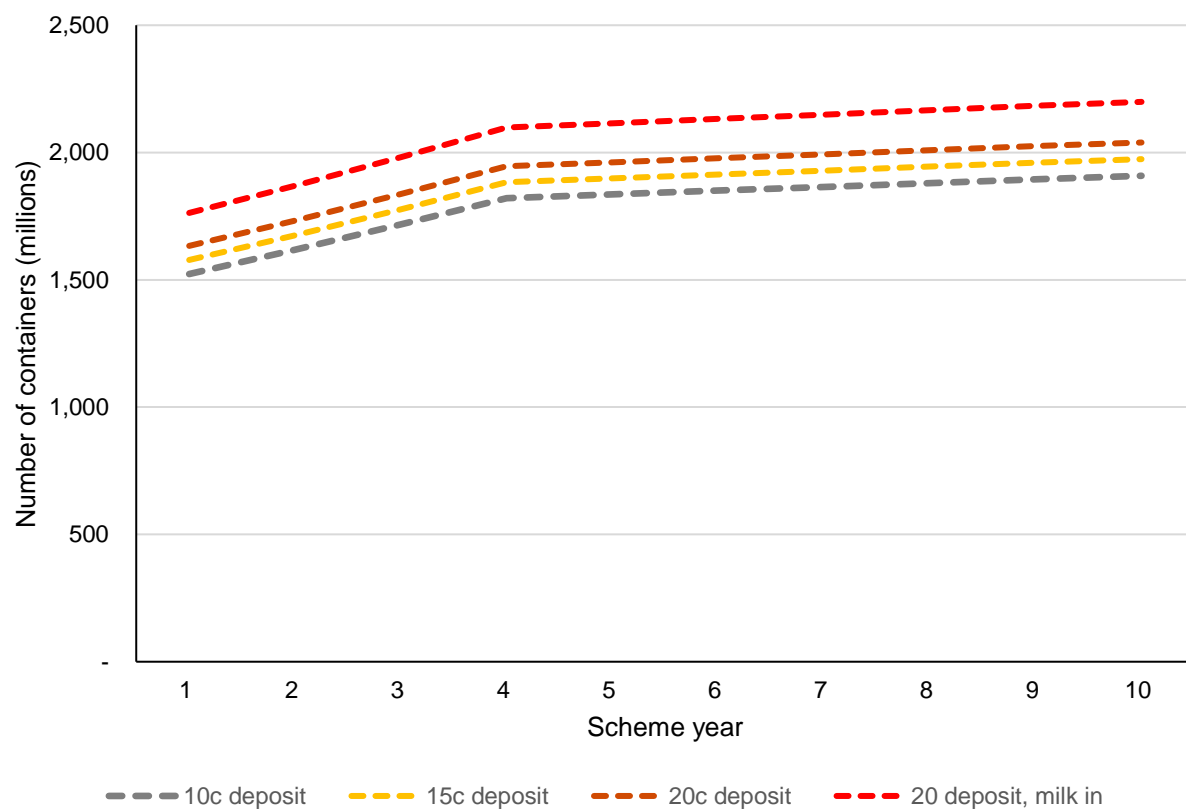
Scheme costs in fifth year of scheme



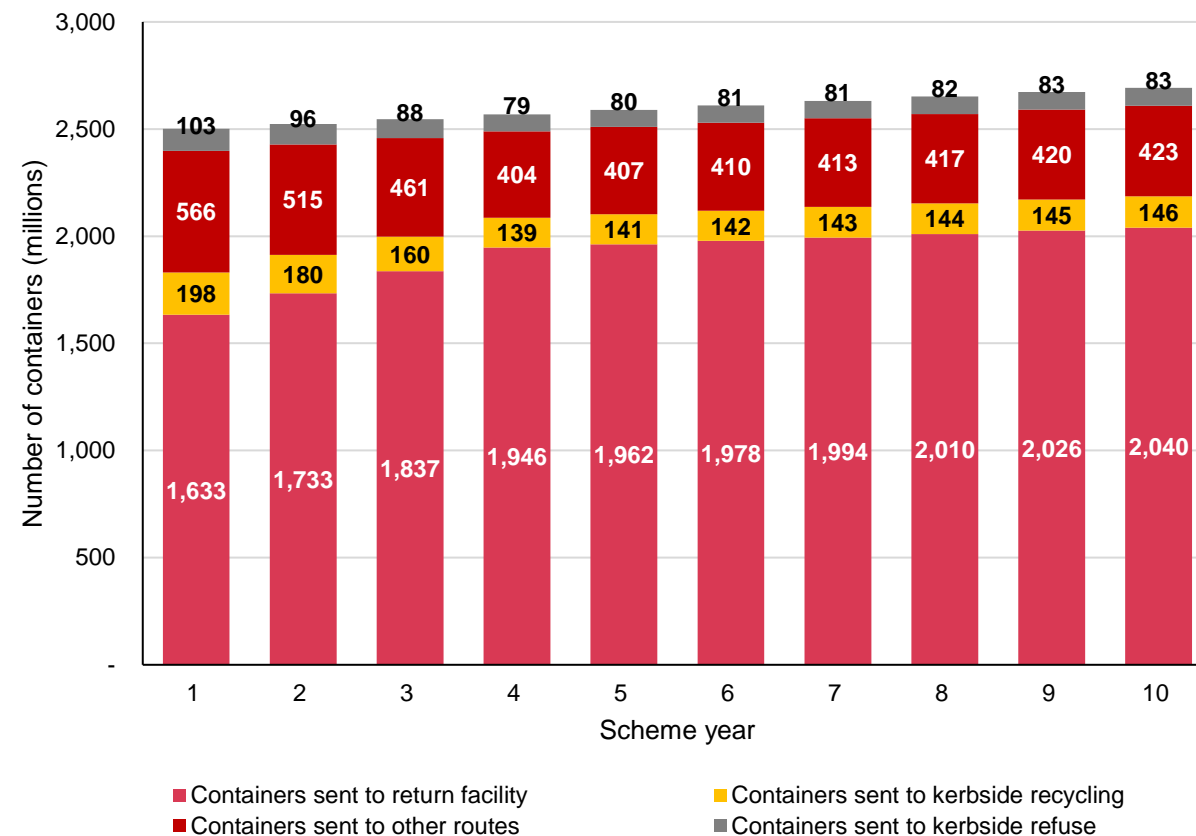
Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Appendix B: Model outputs when return rates are based on mandatory schemes only

Number of containers sent to return facilities under different deposit rates



Estimated container flow under a 20c deposit scheme (milk out)



Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Container Return Scheme – Financial Modelling

PwC

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Appendix B: Model outputs when return rates are based on mandatory schemes only

Implications of varying deposit rates by beverage type (10c, 15c and 20c for all products with milk out, and 20c milk in) in first five years of scheme (per annum)

Scenario	Scheme impacts			Average household impacts								
	Return rate	CRS fee (deposit + scheme fee per container)	Net cost of CRS (\$m pa)	CRS fees paid (\$ pa)	+	GST (\$ pa)	=	Total cost (\$ pa)	-	Est. deposit refund available (\$ pa)	=	Net cost (\$ pa)
10c	74-82%	15-16c	\$193-212m	\$182-196		\$27-29		\$209-226		\$124		\$85-102
15c	76-84%	19-21c	\$202-219m	\$236-254		\$35-38		\$271-292		\$186		\$85-106
20c	78-86%	24-25c	\$211-226m	\$292-315		\$44-47		\$336-362		\$248		\$88-114
20c, milk in	78-86%	23-25c	\$228-241m	\$312-335		\$47-50		\$359-385		\$267		\$92-119

Note: Averages are calculated based on the total New Zealand population. 'Estimated deposit refund available' assumes a given consumer returns containers all containers purchased.

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Appendix B: Model outputs when return rates are based on mandatory schemes only

Average revenue per return facility in first five years of scheme (per annum) - 20c deposit

Return facility concentration:	Type of return facility	Handling fees paid to return facilities (\$m pa)	Number of return facilities	Average revenue per return facility (\$ pa)
1. Major supermarkets + zero waste centres	OTC	\$6m-7m	104-107	\$54,000 - \$67,000
	Automated depot	\$11m-14m	52-54	\$215,000 - \$270,000
	RVM	\$95m-123m	668-692	\$142,000 - \$178,000
2. Scenario 1 + additional voluntary return facilities	OTC	\$11m-14m	1,585-1,641	\$7,000 - \$9,000
	Automated depot	\$11m-14m	52-54	\$215,000 - \$270,000
	RVM	\$89m-116m	668-692	\$133,000 - \$167,000

Analysis assumes that the number of return facilities increase at population growth rate and handling fees grow at inflation

Scenario 1 assumes the following proportions of containers returned: 5% OTC, 10% Automated depot, 85% RVM

Scenario 2 assumes the following proportions of containers returned: 10% OTC, 10% Automated depot, 80% RVM, assumes 1,431 voluntary return facilities based on some European schemes

Source: PwC analysis based on inputs and assumptions in the Excel spreadsheet model provided to MfE. Should the underpinning inputs and assumptions change the above results may change.

Container Return Scheme – Financial Modelling

PwC

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Appendix B: Model outputs when return rates are based on mandatory schemes only

Managing agency revenue and costs (FY23-FY32) - 10c cost neutral model

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	231.1	233.2	235.3	237.4	239.3	241.2	243.1	245.1	247.0
Scheme fees	-	108.5	120.6	139.0	135.2	139.6	144.3	149.2	154.4	159.3
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	-	0.0	0.0	0.0	0.0	0.0	-	-	-
Funding from loan	61.3	-	-	-	-	-	-	-	-	-
Total revenue	61.3	339.6	353.8	374.3	372.6	378.9	385.5	392.3	399.5	406.4
Direct costs										
Handling fees for return facilities	-	103.8	112.4	121.7	131.7	135.4	139.2	143.1	147.1	151.3
Deposit fee payments	-	171.1	178.8	186.9	195.3	196.8	198.4	200.0	201.6	203.2
Net cost to recycle materials	-	7.8	10.1	12.7	15.4	16.0	16.7	17.3	18.0	18.8
Capex	26.7	-	-	-	0.2	-	-	-	0.2	-
Total direct costs	26.7	282.7	301.4	321.2	342.6	348.2	354.3	360.5	367.0	373.3
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	38.4	315.7	329.8	350.3	372.2	378.4	385.1	391.9	399.0	405.9
Other cash outflows										
Change in working capital	22.9	1.4	1.4	1.5	0.4	0.4	0.5	0.5	0.5	0.5
Loan repayments	-	22.5	22.5	22.5	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix B: Model outputs when return rates are based on mandatory schemes only

Managing agency revenue and costs (FY23-FY32) - 15c cost neutral model

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	346.6	349.8	352.9	356.1	358.9	361.8	364.7	367.6	370.6
Scheme fees	-	93.3	108.9	131.0	127.5	131.9	136.7	141.6	147.0	151.9
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Funding from loan	70.0	-	-	-	-	-	-	-	-	-
Total revenue	70.0	440.0	458.7	483.9	483.5	490.8	498.5	506.3	514.6	522.5
Direct costs										
Handling fees for return facilities	-	107.5	116.4	126.0	136.2	140.0	144.0	148.0	152.2	156.5
Deposit fee payments	-	262.9	274.8	287.1	300.1	302.5	304.9	307.3	309.8	312.3
Net cost to recycle materials	-	9.1	11.5	14.1	16.9	17.6	18.3	19.0	19.7	20.5
Capex	27.5	-	-	-	0.2	-	-	-	0.2	-
Total direct costs	27.5	379.5	402.7	427.2	453.4	460.1	467.2	474.4	482.0	489.3
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	39.2	412.5	431.1	456.2	483.0	490.3	498.0	505.8	514.0	521.9
Other cash outflows										
Change in working capital	30.9	1.7	1.8	1.9	0.5	0.5	0.5	0.6	0.6	0.5
Loan repayments	-	25.7	25.7	25.7	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix B: Model outputs when return rates are based on mandatory schemes only

Managing agency revenue and costs (FY23-FY32) - 20c cost neutral model

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	462.2	466.4	470.6	474.8	478.6	482.4	486.3	490.2	494.1
Scheme fees	-	82.5	101.7	127.6	124.5	129.0	133.9	139.0	144.4	149.5
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	-	-	-	-	-	-	-	-	-
Funding from loan	79.2	-	-	-	-	-	-	-	-	-
Total revenue	79.2	544.7	568.1	598.2	599.3	607.6	616.3	625.2	634.6	643.6
Direct costs										
Handling fees for return facilities	-	111.3	120.4	130.2	140.7	144.7	148.8	153.0	157.3	161.7
Deposit fee payments	-	358.9	375.1	392.0	409.6	412.9	416.2	419.6	422.9	426.3
Net cost to recycle materials	-	10.3	12.8	15.5	18.5	19.2	19.9	20.7	21.5	22.3
Capex	28.4	-	-	-	0.2	-	-	-	0.2	-
Total direct costs	28.4	480.5	508.3	537.8	569.1	576.8	584.9	593.2	601.9	610.3
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	40.0	513.5	536.8	566.8	598.7	607.0	615.7	624.6	633.9	642.9
Other cash outflows										
Change in working capital	39.2	2.1	2.2	2.3	0.6	0.6	0.6	0.6	0.7	0.6
Loan repayments	-	29.1	29.1	29.1	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-

Appendix B: Model outputs when return rates are based on mandatory schemes only

Managing agency revenue and costs (FY23-FY32) - 20c cost neutral model, fresh milk in

<i>Nominal \$m</i>	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Revenue										
Deposit fees	-	497.7	502.2	506.7	511.2	515.3	519.5	523.6	527.8	532.0
Scheme fees	-	84.7	105.3	132.7	127.2	131.9	136.9	142.2	147.9	153.1
Advanced material recycling fees	-	-	-	-	-	-	-	-	-	-
Interest on cash reserves	-	0.0	-	-	-	-	-	-	-	-
Funding from loan	89.6	-	-	-	-	-	-	-	-	-
Total revenue	89.6	582.4	607.5	639.4	638.5	647.2	656.4	665.8	675.7	685.1
Direct costs										
Handling fees for return facilities	-	120.1	129.9	140.5	151.7	156.0	160.4	164.9	169.6	174.3
Deposit fee payments	-	386.5	403.9	422.1	441.1	444.6	448.2	451.8	455.4	459.0
Net cost to recycle materials	-	7.6	9.9	12.4	15.1	15.7	16.3	17.0	17.7	18.4
Capex	35.8	-	-	-	0.3	-	-	-	0.3	-
Total direct costs	35.8	514.2	543.7	574.9	608.2	616.4	624.9	633.7	643.0	651.8
Indirect costs										
Admin and support services	-	11.7	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0
Professional services	9.6	4.0	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8
Marketing and communication expenses	-	5.9	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5
Employee benefits expense	0.3	3.9	4.0	4.1	4.2	4.2	4.3	4.4	4.5	4.6
Other expenses	1.8	7.3	7.5	7.6	7.8	8.0	8.1	8.3	8.4	8.6
Office lease	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total indirect costs	11.6	33.0	28.4	29.0	29.6	30.2	30.8	31.4	32.0	32.7
Total expenses	47.4	547.2	572.2	604.0	637.8	646.5	655.7	665.1	675.0	684.4
Other cash outflows										
Change in working capital	42.2	2.3	2.4	2.5	0.7	0.7	0.7	0.7	0.7	0.7
Loan repayments	-	32.9	32.9	32.9	-	-	-	-	-	-
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	-