Australian Packaging Consumption & Recovery Data 2021–22

Version 1

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Disclaimer

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Acknowledgements

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Authors

Report prepared by Blue Environment and IndustryEdge on behalf of APCO.

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EXECUTIVE SUMMARY

Background

In 2018, all levels of Australian government, including representatives from local, state and territory and federal governments, came together with industry to launch Australia's 2025 National Packaging Targets (2025 Targets).

This report provides packaging consumption and recovery data for Australia for financial year 2021–22, to inform the measurement of progress towards the 2025 Targets. This is the fifth iteration of the annual report, which began with a 2017–18 base year.

The data in this report is also intended to improve the sustainability of packaging by supporting strategic planning across the lifecycle of packaging – design, manufacturing, use, disposal, and end-of-life.

Please note: In the tables presented in this report, minor discrepancies may occur between summed totals and the apparent sums of the component items in tables; this is because summed totals and percentage values are calculated using component item values prior to rounding.

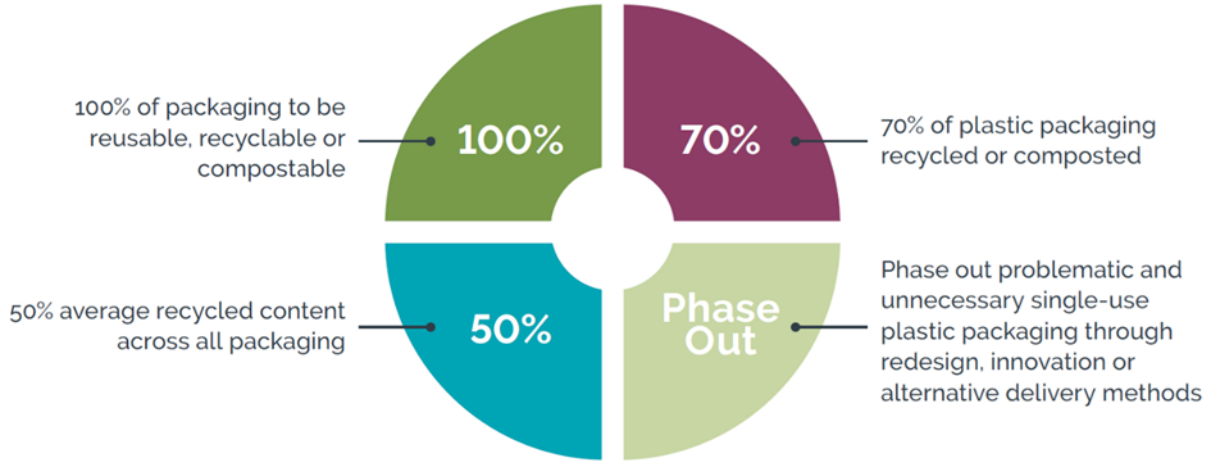

Figure ES-1 – Australia's 2025 National Packaging Targets.

Packaging consumption

2021–22

Total packaging placed on market (POM) in Australia in 2021–22 is estimated at 6.98 million tonnes (±11%). POM means that the packaging has been made available to the end-consumer (including business users). It includes locally manufactured and imported packaging (filled or unfilled).

The materials making up the 6.98 million tonnes of packaging POM in 2021–22 were paper & paperboard (52.3%), plastic packaging (18.3%), glass packaging (16.4%), wood packaging (8.8%), and metal packaging (4.3%).

Estimates for packaging POM by material group are provided in **Table ES-1** and **Figure ES-2**. The aggregated accuracy range estimates for each of the material groups are also provided as error bars in **Figure ES-2**.

Table ES-1 – Packaging POM in 2021–22, by material group.

Material group	POM			Accuracy range
	(tonnes)	(%)	(kg/person)	(±%)
Paper & paperboard	3,654,000	52.3%	141	7%
Glass	1,143,000	16.4%	44	15%
Plastic	1,277,000	18.3%	49	17%
Metal	298,000	4.3%	11	13%
Wood	612,000	8.8%	24	12%
Total	**6,984,000**	**100.0%**	**269**	**11%**

The accuracy ranges are weighted sum averages of packaging manufacturer reported estimates of the level of accuracy (±%) of the tonnages of packaging POM. The accuracy range provides an estimate of the range within which the true value can be found, with the reported value being the best estimate of the true value.

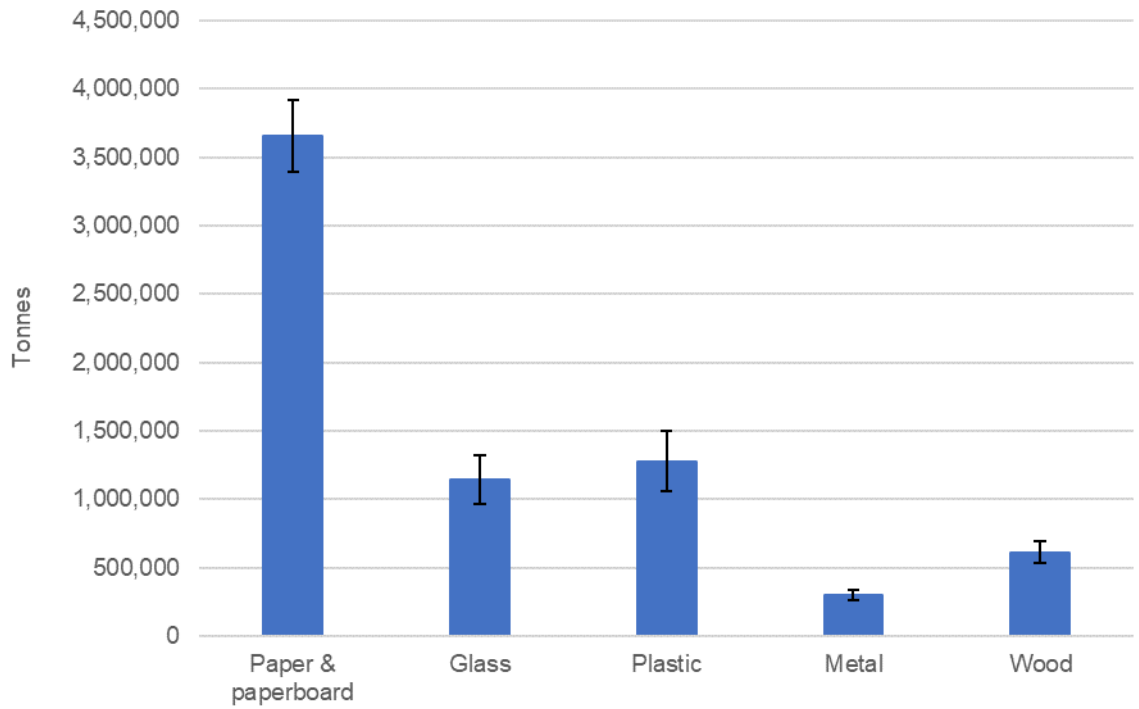

Figure ES-2 – Packaging POM in 2021–22, by material group.

Progress from 2017–18 to 2021–22

In 2021–22, the estimated packaging POM was 4% higher than the 2020–21 estimate of 6.74 million tonnes. **Table ES-2** compares POM data by material group from 2017–18 to 2021–22.

The most significant changes in packaging POM were an 8% increase in paper & paperboard packaging POM (up 287,000 tonnes), an 11% decrease in glass packaging POM (down 140,000 tonnes), and an 8% increase in plastic packaging POM (up 98,000 tonnes).

Table ES-2 – Packaging POM from 2017–18 to 2021–22, by material group, including the percentage change between 2020–21 and 2021–22.

Material group	2017–18	2018–19	2019–20	2020–21	2021–22	Change 2020–21 to 2021–22
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Paper & paperboard	2,901,000	3,262,000	3,277,000	3,387,000	3,654,000	8%
Glass	1,273,000	1,283,000	1,156,000	1,283,000	1,143,000	-11%
Plastic	1,067,000	1,000,000	1,124,000	1,179,000	1,277,000	8%
Metal	213,000	246,000	248,000	254,000	298,000	17%
Wood[a]	NR[a]	124,000	462,000	638,000	612,000	-4%
Total (tonnes)	**5,453,000**	**5,916,000**	**6,266,000**	**6,740,000**	**6,984,000**	**4%**
Total (kg/person)	**218**	**234**	**244**	**262**	**269**	**2%**

a) NR (not reported) – Wood packaging data was not collected in 2017–18.

Packaging recovery

2021–22

Total Australian post-consumer packaging recovery in 2021–22 is estimated at 3.91 million tonnes (±12%). This recovery estimate is measured at the out-going gate of the secondary processing facility for the used packaging.

Of the packaging recovered in 2021–22, nearly two thirds were paper & paperboard packaging (64.0%), followed by glass packaging (18.4%), wood packaging (7.1%), plastic packaging (6.6%) and metal packaging (3.9%).

Estimates for post-consumer packaging recovery by material group are provided in **Table ES-3** and **Figure ES-3**. The estimates include post-consumer packaging collected through municipal solid waste (MSW), commercial and industrial (C&I), and container deposit scheme (CDS) collection services.

Table ES-3 – Post-consumer packaging recovery in 2021–22, by material group.

Material group	Recovery			Accuracy range
	(tonnes)	(%)[a]	(kg/person)	(±%)
Paper & paperboard	2,502,000	64.0%	96	11%
Glass	718,000	18.4%	28	12%
Plastic	258,000	6.6%	10	10%
Metal	151,000	3.9%	6	20%
Wood	277,000	7.1%	11	20%
Total	**3,907,000**	**100.0%**	**150**	**12%**

a) Percent contribution to the total amount of packaging recovered, not the individual material recovery rate.

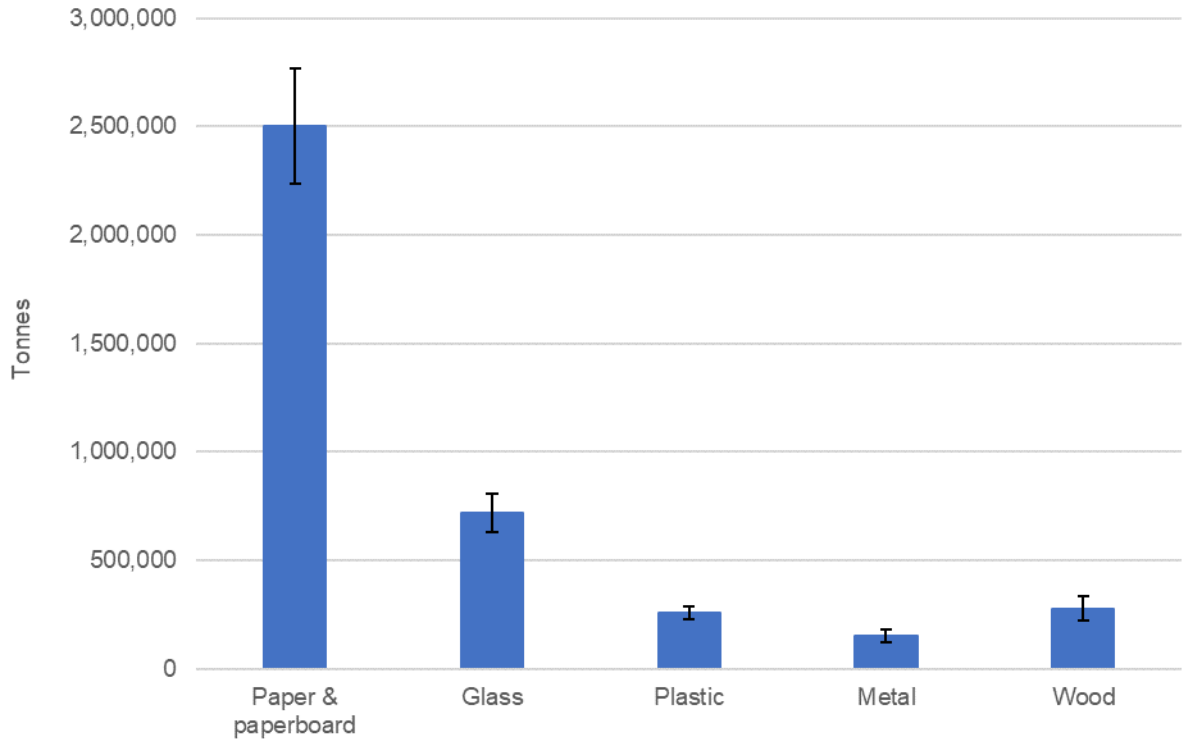

Figure ES-3 – Post-consumer packaging recovery in 2021–22, by material group.

Progress from 2017–18 to 2021–22

Table ES-4 compares recovery data by material group from 2017–18 to 2021–22. Packaging recovery in 2021–22 was 3.91 million tonnes, which was a 3% increase on the 2020–21 packaging recovery estimate of 3.79 million tonnes.

The increase in recovery is primarily due to growth in recovery of paper & cardboard and plastic, which also occurred between 2019–20 and 2020–21.

Table ES-4 – Post-consumer packaging recovery from 2017–18 to 2021–22, by material group, including the percentage change between 2020–21 and 2021–22.

Material group	2017–18	2018–19	2019–20	2020–21	2021–22	Change 2020–21 to 2021–22
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Paper & paperboard	1,817,000	2,045,000	2,229,000	2,370,000	2,502,000	6%
Glass	582,000	574,000	699,000	805,000	718,000	-11%
Plastic	173,000	182,000	179,000	207,000	258,000	25%
Metal	102,000	137,000	139,000	147,000	151,000	3%
Wood[a]	NR[a]	44,000	171,000	260,000	277,000	6%
Total (tonnes)	**2,673,000**	**2,982,000**	**3,416,000**	**3,788,000**	**3,907,000**	**3%**
Total (kg/person)	**107**	**118**	**133**	**147**	**150**	**2%**

a) NR (not reported) – Wood packaging data was not collected in 2017–18.

Packaging recovery rates

2021–22

The Australian post-consumer packaging recovery rate in 2021–22 is estimated at 56%. This is based on the recovery measured at the out-going gate of the secondary processing facility for the used packaging, divided by the packaging POM.

Paper & paperboard had the highest recovery rate at 68%, followed by glass packaging (63%), metal packaging (51%), wood packaging (45%), and plastic packaging (20%).

Table ES-5 – Post-consumer packaging recovery rates in 2021–22, by material group.

Material group	POM	Recovery	Recovery rate
	(tonnes)	(tonnes)	(%)
Paper & paperboard	3,654,000	2,502,000	68%
Glass	1,143,000	718,000	63%
Plastic	1,277,000	258,000	20%
Metal	298,000	151,000	51%
Wood	612,000	277,000	45%
Total	**6,984,000**	**3,907,000**	**56%**

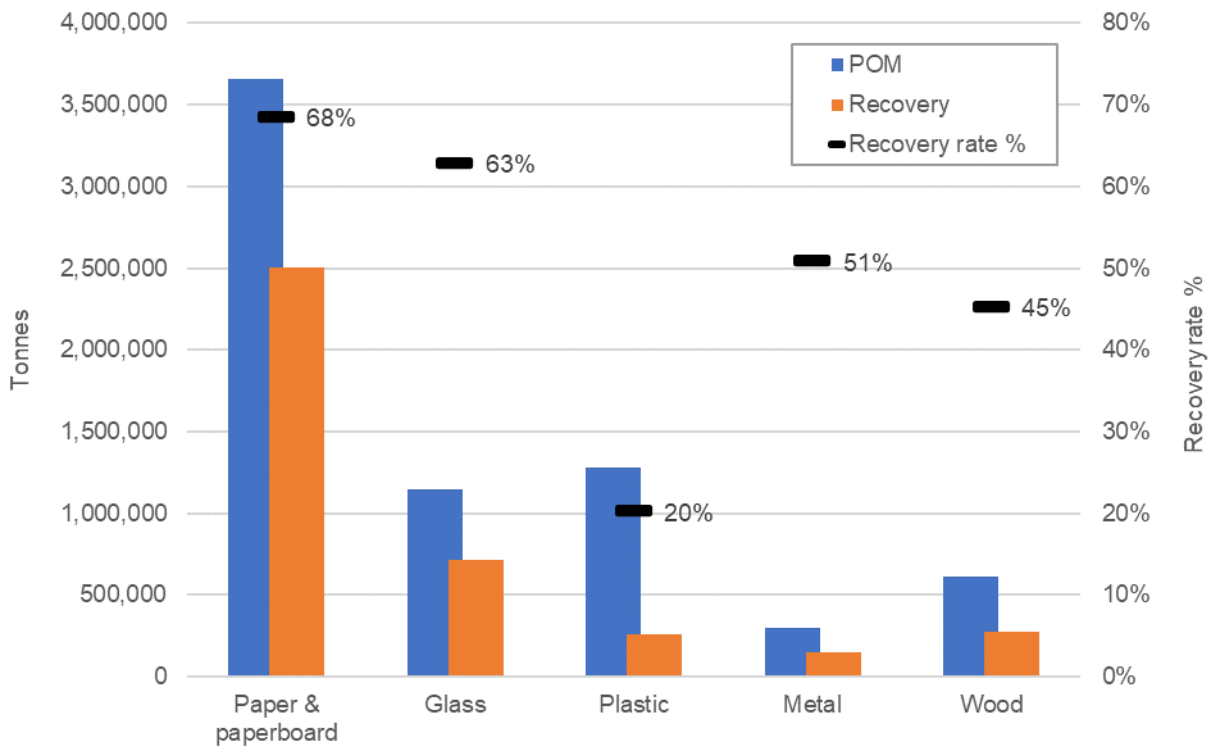

Figure ES-4 – Comparison of packaging POM, packaging recovery and post-consumer packaging recovery rates in 2021–22, by material group.

Progress from 2017–18 to 2021–22

Table ES-6 and **Figure ES-5** compare recovery rates by material group from 2017–18 to 2021–22. In 2021–22 there were increases in recovery rates for plastic and wood, but decreases for paper & paperboard and metal, and glass was steady. Overall, the total national post-consumer packaging recovery rate was steady across 2020–21 and 2021–22.

Table ES-6 – Post-consumer packaging recovery rates from 2017–18 to 2021–22, by material group.

Material group	2017–18	2018–19	2019–20	2020–21	2021–22	% change[a] 2020–21 to 2021–22
	(%)	(%)	(%)	(%)	(%)	(%)
Paper & paperboard	63%	63%	68%	70%	68%	-1%
Glass	46%	45%	60%	63%	63%	0%
Plastic	16%	18%	16%	18%	20%	3%
Metal	48%	56%	56%	58%	51%	-7%
Wood	NR[b]	36%	37%	41%	45%	4%
Total	**49%**	**50%**	**55%**	**56%**	**56%**	**0%**

a) % change values are calculated prior to rounding the annual values.
b) NR (not reported) – Wood packaging data was not collected in 2017–18.

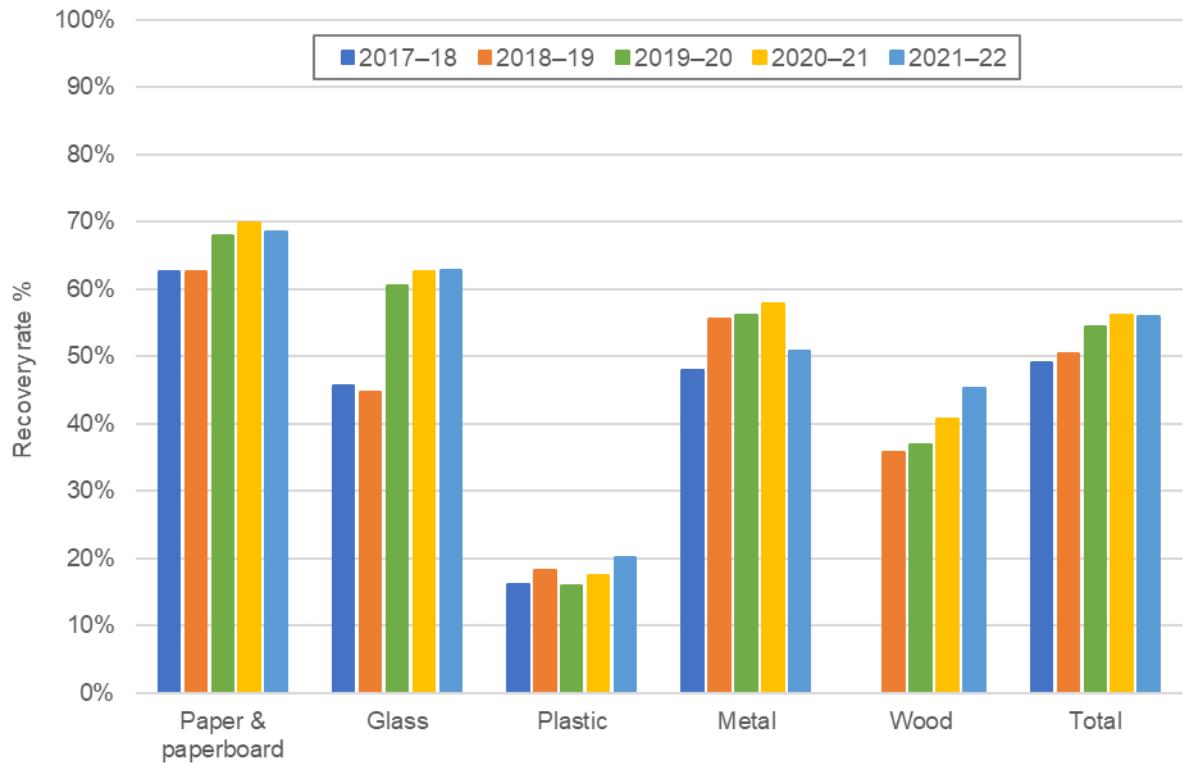

Figure ES-5 – Post-consumer packaging recovery rates from 2017–18 to 2021–22, by material group.

Packaging recycled content

2021–22

Estimates of the recycled content incorporated into packaging POM in 2021–22, by material group, are provided in **Table ES-7** and **Figure ES-6**. The post-consumer recycled (PCR) content across all packaging (excluding wood) was 2.57 million tonnes (40% of total packaging POM), the pre-consumer recycled content was 0.65 million tonnes (10%), and 3.15 million tonnes (49%) was sourced from virgin (primary) feedstocks.

Table ES-7 – Packaging POM in 2021–22, by material group (excluding wood) and recycled content.

Material group	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)
Paper & paperboard	1,990,000	54%	487,000	13%	1,177,000	32%	3,654,000
Glass	469,000	41%	76,000	7%	599,000	52%	1,143,000
Plastic	74,000	6%	23,000	2%	1,179,000	92%	1,277,000
Metal	40,000	13%	67,000	22%	192,000	64%	298,000
Total	**2,572,000**	**40%**	**654,000**	**10%**	**3,146,000**	**49%**	**6,372,000**

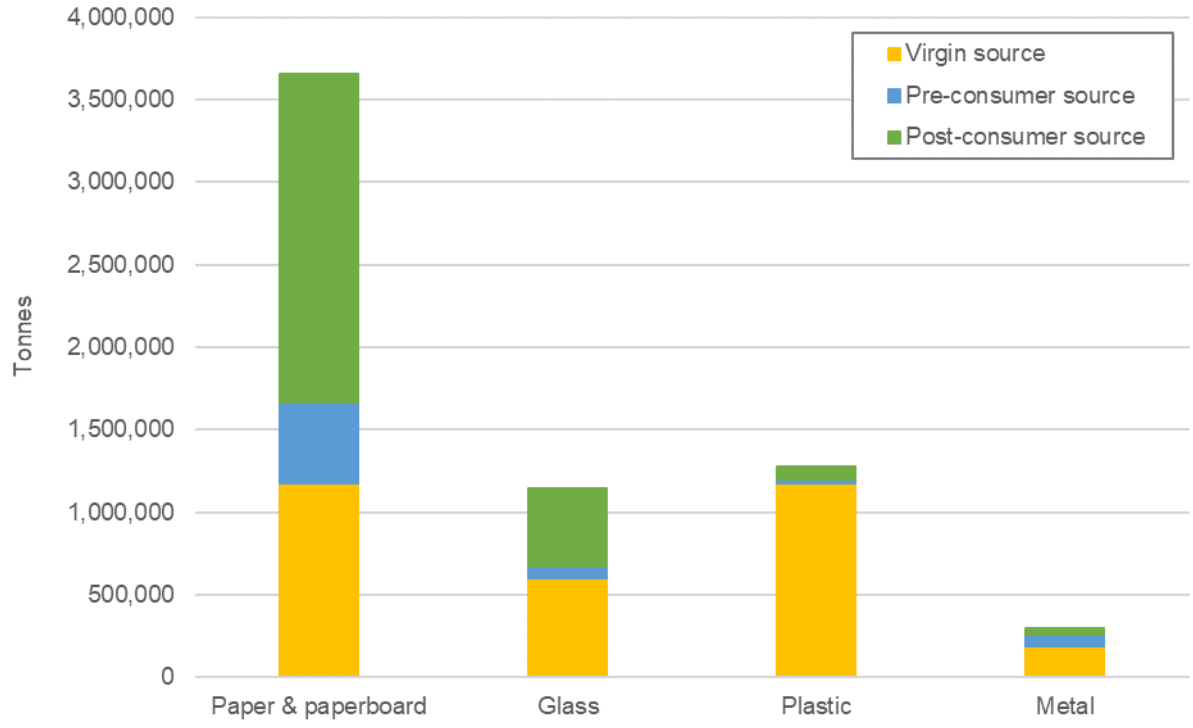

Figure ES-6 – Packaging POM in 2021–22, by material group (excluding wood) and recycled content.

Progress from 2017–18 to 2021–22

Table ES-8 compares the estimated PCR content of packaging by material group from 2017–18 to 2021–22.

In 2021–22 the total quantity of PCR content in packaging increased by an estimated 218,000 tonnes (9%) compared to the previous year. The PCR content of packaging, excluding wood, was 40% in 2021–22 compared with 39% in 2020–21.

Table ES-8 – Packaging PCR content from 2017–18 to 2021–22, as a percentage of packaging POM, by material group (excluding wood).

Material group	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)
Paper & paperboard	1,421,000	49%	1,667,000	51%	1,768,000	54%	1,801,000	53%	1,990,000	55%
Glass	407,000	32%	474,000	37%	428,000	37%	480,000	37%	469,000	41%
Plastic	23,000	2%	37,000	4%	36,000	3%	36,000	3%	74,000	6%
Metal	64,000	30%	59,000	24%	28,000	11%	37,000	15%	40,000	13%
Total	**1,915,000**	**35%**	**2,237,000**	**38%**	**2,260,000**	**39%**	**2,354,000**	**39%**	**2,572,000**	**40%**

Packaging recycling potential

Estimates of packaging recycling potential classified by material group are provided in **Table ES-9** and **Figure ES-7**. Throughout the report the term *packaging recycling potential* is used as an umbrella term for reusable, recyclable, or compostable packaging.

The method for determining packaging recycling potential uses a scoring framework based on three criteria:

- the availability of a collection system,
- whether the material is technically recyclable, i.e., it can be sorted and recycled, and
- the availability of end markets.

Using this framework, each packaging format was classified as having either good recycling potential, poor (limited) recycling potential or being not recyclable. Packaging classified as having poor recycling potential does not meet, or only slightly meets, one or more criteria.

2021–22

It is estimated that 5.85 million tonnes (84%) of packaging POM in 2021–22 had good recycling potential. This was dominated by paper & paperboard (of which 93% had good recycling potential) and glass (of which 100% had good recycling potential). Effectively all metal packaging (99.7%) was classified as having good recycling potential. Wood packaging had 75% classified as having good recycling potential.

Only 42% of plastic packaging was classified as having good recycling potential. This was a sharp decrease from 60% in 2020–21. This was caused by changes in the recycling potential classification scores for flexible B2C plastic packaging calculated as of 30 June 2022, which relate to the subsequent closure of the REDcycle program. As of 30 June 2022, while the REDcycle **collection** system was still in operation, both the reprocessing capacity and end-markets were considered poor, which changed the overall recycling potential score for flexible B2C plastic packaging from ‘good’ to ‘poor’.

Around 1.00 million tonnes (14%) of packaging was classified as having poor recycling potential or not being recyclable.

The recycling potential status of another 0.14 million tonnes of packaging, which was entirely plastic packaging, could not be determined. It is likely that most of this packaging would tend towards having poor recycling potential or not being recyclable.

Table ES-9 – Packaging POM in 2021–22, by recycling potential classification and material group.

Material group	Good recycling potential		Poor recycling potential		Not recyclable		Unknown		Total	
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)
Paper & paperboard	3,410,000	93.3%	186,000	5.1%	58,000	1.6%	0	0.0%	3,654,000	100.0%
Glass	1,143,000	100.0%	0	0.0%	0	0.0%	0	0.0%	1,143,000	100.0%
Plastic	533,000	41.7%	457,000	35.8%	152,000	11.9%	136,000	10.6%	1,277,000	100.0%
Metal	297,000	99.7%	0	0.1%	1,000	0.2%	0	0.0%	298,000	100.0%
Wood	459,000	75.0%	85,000	13.9%	68,000	11.1%	0	0.0%	612,000	100.0%
Total	**5,842,000**	**83.6%**	**729,000**	**10.4%**	**278,000**	**4.0%**	**136,000**	**1.9%**	**6,984,000**	**100.0%**

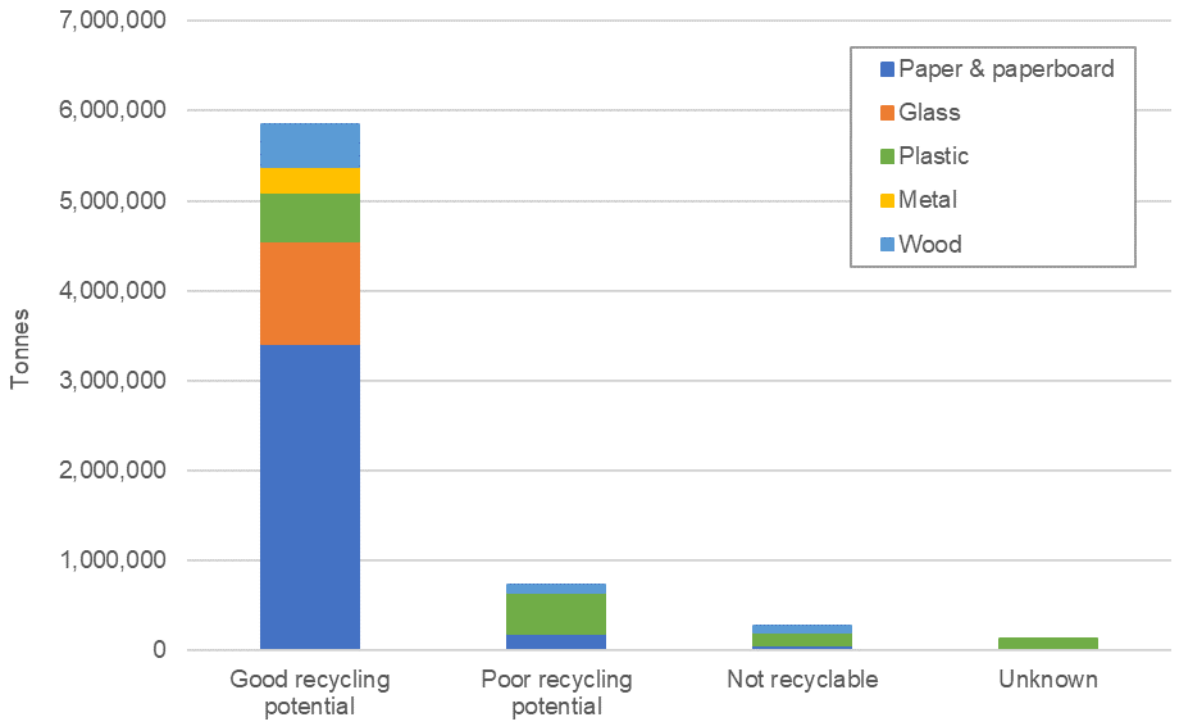

Figure ES-7 – Packaging POM in 2021–22, by recycling potential classification and material group.

Progress from 2017–18 to 2021–22

Table ES-10 compares the 2017–18 to 2021–22 quantities of packaging with a good recycling potential classification. The most noteworthy change was the sharp fall in the good recycling potential classification of plastic packaging, as discussed on the previous page.

For reference, if the REDcycle related recycling potential score changes had not been applied to the 2021–22 data, then the good recycling potential classification percentage would have been 88%.

Table ES-10 – Packaging with a 'good recycling potential' classification from 2017–18 to 2021–22, by material group.

Material group	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)
Paper & paperboard	2,682,000	92%	2,962,000	91%	2,961,000	90%	3,147,000	93%	3,410,000	93%
Glass	1,273,000	100%	1,283,000	100%	1,156,000	100%	1,283,000	100%	1,143,000	100%
Plastic	627,000	59%	663,000	66%	676,000	60%	710,000	60%	533,000	42%
Metal	201,000	95%	243,000	99%	240,000	97%	253,000	100%	297,000	100%
Wood	NR[a]	NR[a]	121,000	98%	359,000	78%	427,000	67%	459,000	75%
Total	**4,783,000**	**88%**	**5,273,000**	**89%**	**5,392,000**	**86%**	**5,820,000**	**86%**	**5,842,000**	**84%**

a) NR (not reported) – Wood packaging data was not collected in 2017–18.

Packaging projections

As part of the study, projections of the following have been undertaken:

- **Packaging POM estimates from 2021–22 to 2026–27 by material group** – These projections are generally based on manufacturer reported market growth estimates at the packaging material type and component group levels.
- **Packaging reprocessing capacity estimates from 2021–22 to 2026–27 by material group** – These projections are based on reprocessor reported capacity in 2021–22 and committed new capacity.

Presented in **Table ES-11** and **Figure ES-8** are packaging POM estimates from 2021–22 to 2026–27 by material group. Data for 2021–22 is survey data, and data from 2022–23 is projected data. The estimated five-year compound annual growth rate (CAGR) for packaging POM from 2021–22 to 2026–27 is 2.8% per year.

Table ES-11 – Packaging POM from 2021–22 to 2026–27, by material group.

Material group	2021–22[a]	2022–23	2023–24	2024–25	2025–26	2026–27	5-year CAGR[b]
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(% per yr)
Paper & paperboard	3,654,000	3,766,000	3,882,000	4,002,000	4,125,000	4,252,000	3.1%
Glass	1,143,000	1,171,000	1,200,000	1,229,000	1,260,000	1,291,000	2.5%
Plastic	1,277,000	1,308,000	1,340,000	1,374,000	1,409,000	1,446,000	2.5%
Metal	298,000	304,000	310,000	316,000	322,000	328,000	1.9%
Wood	612,000	631,000	651,000	672,000	694,000	717,000	3.2%
Total	**6,984,000**	**7,180,000**	**7,383,000**	**7,593,000**	**7,809,000**	**8,034,000**	**2.8%**

a) 2021–22 data is actual year data. Data for 2022–23 to 2026–27 are projections.
b) CAGR – Compound annual growth rate.

Between 2021–22 and 2026–27 packaging POM is projected to grow by 1.05 million tonnes (+15%). Of this, 57% is projected to be paper & paperboard packaging, 16% plastic packaging, 14% glass packaging, 10% wood packaging and 3% metal packaging.

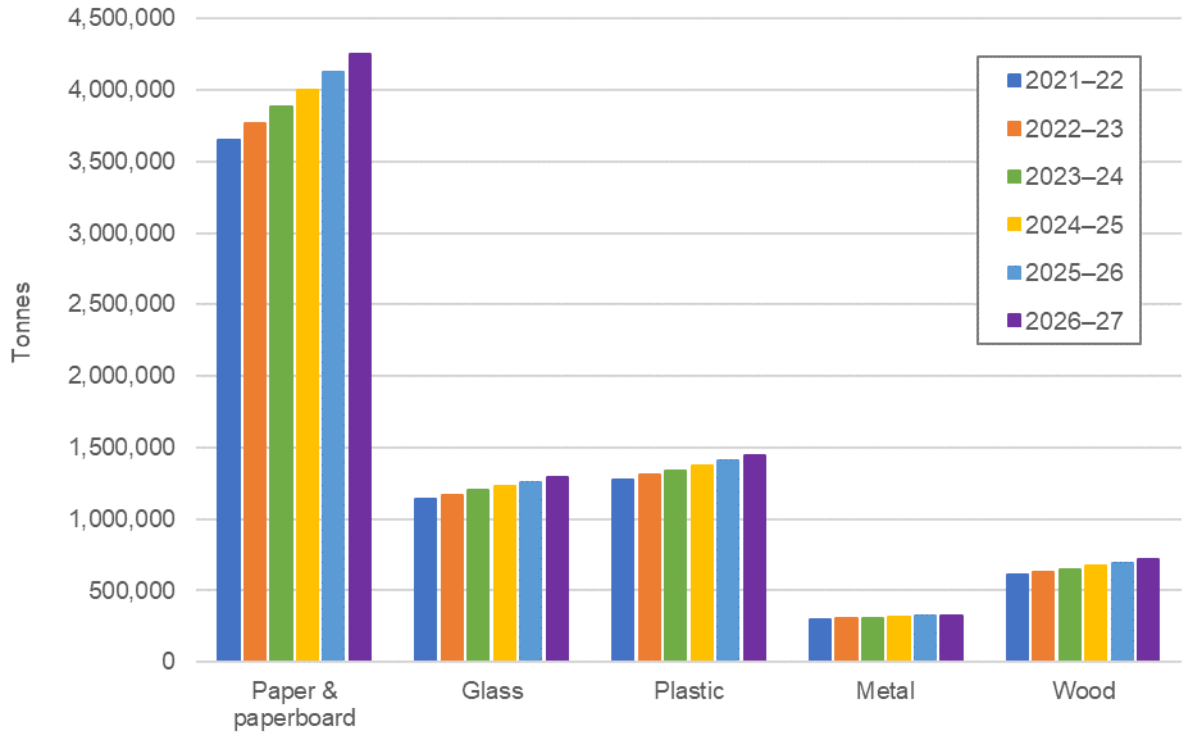

Figure ES-8 – Packaging POM from 2021–22 to 2026–27, by material group.

Presented in **Table ES-12** and **Figure ES-9** are packaging reprocessing capacity projections from 2021–22 to 2026–27 by material group. Data for 2021–22 is survey data, and data from 2022–23 is projected data. The estimated five-year CAGR for reprocessing capacity from 2021–22 to 2026–27 is 7.5% per year, which is notably higher than that for packaging POM.

Between 2021–22 and 2026–27 packaging reprocessing capacity is projected to grow by 1.21 million tonnes (+43%). Of this, 45% is projected to be targeting glass packaging, 33% plastic packaging, 21% paper & paperboard packaging, and 0% for both metal and wood packaging.

The projected reprocessing capacity for 2026–27 is equivalent to around 50% of projected POM in the same year. The projected reprocessing capacity for plastic packaging will be equivalent to 52% of projected packaging POM.

Table ES-12 – Packaging reprocessing capacity projections from 2021–22 to 2026–27, by material group.

Material group	2021–22[a]	2022–23	2023–24	2024–25	2025–26	2026–27	5-year CAGR[b]
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(% per yr)
Paper & paperboard	1,359,000	1,410,000	1,461,000	1,512,000	1,563,000	1,613,000	3.5%
Glass	805,000	915,000	1,025,000	1,135,000	1,245,000	1,355,000	11.0%
Plastic	341,000	421,000	502,000	583,000	664,000	745,000	16.9%
Metal	2,000	2,000	2,000	2,000	2,000	3,000	8.0%
Wood	277,000	277,000	277,000	277,000	277,000	277,000	0.0%
Total	**2,784,000**	**3,026,000**	**3,268,000**	**3,509,000**	**3,751,000**	**3,993,000**	**7.5%**

a) 2021–22 data is actual year data. Data for 2022–23 to 2026–27 are projections.

b) CAGR – Compound annual growth rate.

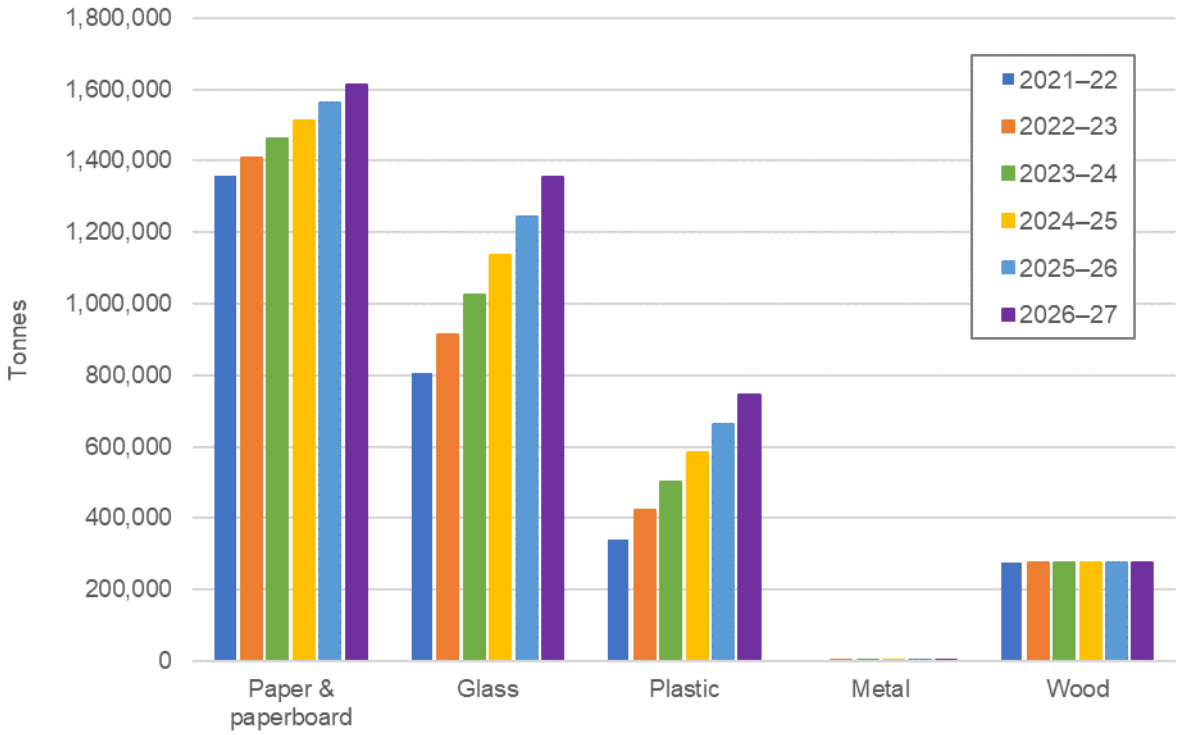

Figure ES-9 – Packaging reprocessing capacity projections from 2021–22 to 2026–27, by material group.

Packaging reuse

The flows of eight reusable packaging systems have been quantified as part of the project, which are the same eight that were quantified in 2020–21. These reusable packaging flows are:

- **Kegs** – Beer kegs only.
- **Drums (200–205 litre)** – All reusable steel and plastic drums in the 200–205 litre volumetric capacity range (44-gallon UK or 55-gallon US).
- **Intermediate bulk containers (IBCs)** – All rigid IBCs are assumed to be reusable (rather than single-use) packaging.
- **Milk crates** – Non-collapsible plastic crates. Limited to dairy applications only.
- **Pallets** – Reusable timber and plastic pallets only, including display pallets. Single-use pallets are excluded.
- **Returnable plastic crates (RPCs)** – Collapsible plastic crates. Limited to major supermarket systems only (e.g.., ALDI, Coles and Woolworths).
- **Reusable shopping bags** – Reusable non-woven PP bags, and reusable HDPE and LDPE bags (supermarket type).
- **Reusable coffee cups** – Reusable coffee cups used in an away-from-home (AfH) setting where they could be reasonably expected to have avoided the use of a single-use coffee cup.

The quantified reusable packaging systems avoided the use of an estimated 2.81 million tonnes of single-use packaging. Approximately 91% of the avoided single-use packaging consumption benefit is provided by reusable pallets and plastic crates. The net theoretical reduction in packaging use was 2.64 million tonnes, as there were 171,000 tonnes of reusable packaging inputs in 2020–21.

Progress towards the 2025 National Packaging Targets

Table ES-13 provides a summary of the 2025 Targets and the 2017–18 to 2021–22 results against each target.

Table ES-13 – Summary of the 2025 National Packaging Targets and progress to 2021–22.

Target	Target	2017–18 result	2018–19 result	2019–20 result	2020–21 result	2021–22 result
100% of all Australia's packaging will be reusable, recyclable or compostable	**100%**	88%	89%	86%	86%	84%
70% of Australia's plastic packaging will be recycled or composted	**70%**	16%	18%	16%	18%	20%
50% average recycled content will be included across packaging[a]	**50%**	35%	38%	39%	39%	40%
Problematic and unnecessary single-use plastic packaging will be phased out[b,c]	**Reduction in priority items**	Baseline	-41%	-31%	-28%	-33%

a) Post-consumer recycled content only. Does not include wood or manufacturing scrap (pre-consumer) recycled content.

b) Priority items considered include PVC, PS, EPS, oxo-degradable plastics, and retail shopping bags POM.

c) These estimates are subject to a relatively large accuracy range and high year-on-year reporting volatility. Estimated value is relative to the baseline year (2017–18).

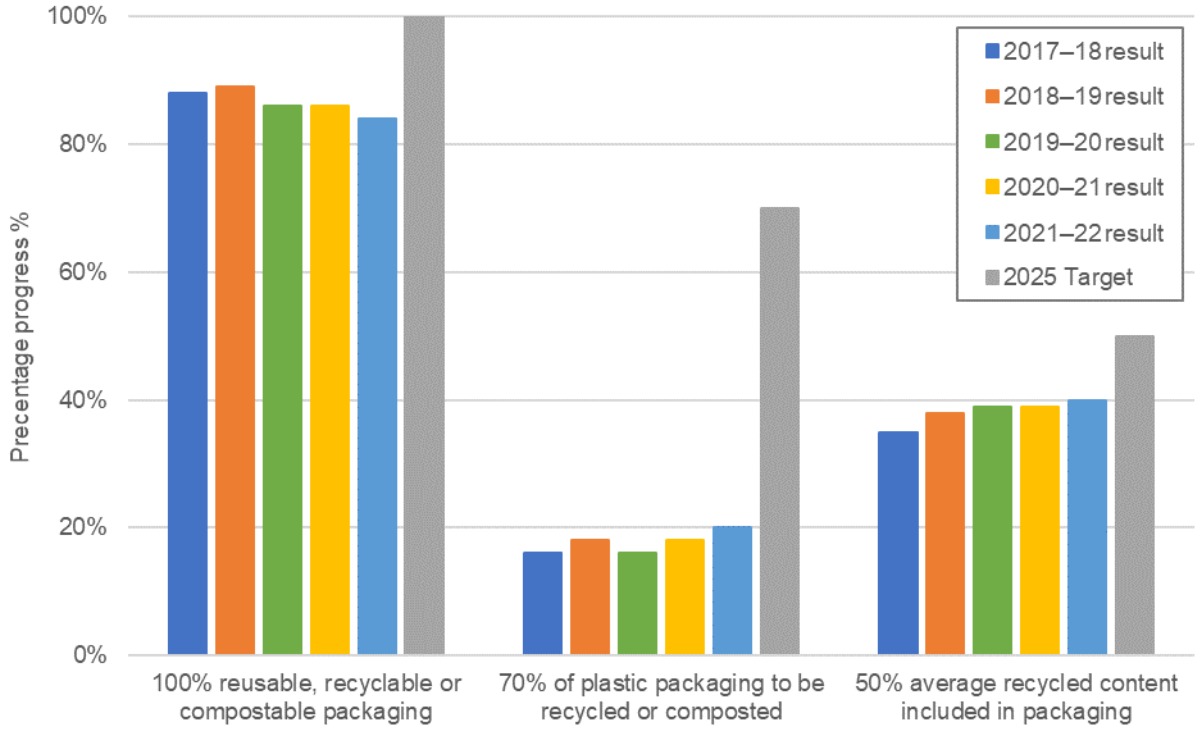

Figure ES-10 – Summary of the 2025 Targets and progress to 2021–22.

Project method

Consumption quantification

Locally manufactured Australian packaging consumption was determined through a national survey of packaging manufacturers and importers. Data was estimated for all survey non-respondents based on publicly available data or through consultation with others in the industry.

Imported and exported new packaging has been determined through analysis of Australian Harmonized Tariff Item Statistical Code data.

Packaging consumption is measured in terms of packaging POM.

Recovery quantification

Australian packaging recovery was determined through a national survey of packaging reprocessors, with recovery data estimated for all significant survey non-respondents.

Exported scrap packaging was determined through analysis of Australian Harmonized Export Commodity Classification data, and the survey of reprocessors and exporters.

Recovery is measured at the out-going gate of the secondary processing facility for the used packaging. This is the point at which the processed material is typically ‘input ready’ for the manufacture of new packaging or other products. Examples of secondary processing facilities include paper mills, glass beneficiation facilities, plastics flaking and washing facilities, and metal smelting facilities.

The overseas processing losses associated with the export of sorted but unprocessed materials were estimated based on losses reported by local operators of secondary processing facilities.

Survey response rate

Across the 5 main cohorts of those surveyed for this study, a total of 88% of those contacted responded to the survey request. Responses for another 8% were estimated based on publicly available data or through consultation with others in the industry. Refer to Section 1.2 for more details on response rates and on the management of data gaps.

1 INTRODUCTION

1.1 This project

This report provides packaging consumption and recovery data for Australia for the 2021–22 financial year. This is the fifth iteration of the Packaging Consumption and Recovery Data Report published by the Australian Packaging Covenant Organisation (APCO). The previous reports are for the 2017–18 (baseline), 2018–19, 2019–20 and 2020–21 financial years (APCO, 2019; APCO, 2020; APCO, 2021; APCO, 2023a).

This report quantifies packaging placed on market (POM), packaging recovery rates, recycling potential, reuse, losses in the system and projections. The data helps to inform progress towards the 2025 National Packaging Targets (2025 Targets) and support strategic planning across all levels of the lifecycle of packaging, across design, manufacturing, use, disposal and end-of-life.

The 2025 Targets are:

- 100% reusable, recyclable or compostable packaging.
- 70% of plastic packaging will be recycled or composted.
- 50% average recycled content included in packaging.
- Phase out of problematic and unnecessary single-use plastic packaging.

This report also provides forecasts for key packaging flow quantities out to 2025.

Additional data is provided in the following appendices:

- **Appendix A** – Glossary of terms and abbreviations used throughout this report.
- **Appendix B** – Packaging material and component lists.
- **Appendix C** – Consumption and recovery data by state and territory.
- **Appendix D** – Employment and facility capacity data.
- **Appendix E** – Container deposit eligible packaging data.

Please note: In the tables presented in this report, minor discrepancies may occur between summed totals and the apparent sums of the component items in tables, as summed totals and percentage values are calculated using component item values prior to rounding.

1.2 Project method

Data sources

Packaging consumption and recovery data was obtained from a combination of sources. The main data sources and the related reporting contributions are summarised in Table 1.

Table 1 – Data sources and reporting outputs.

Data source	Data collection method	Primary reporting contributions
Packaging manufacturers and importers	National survey undertaken as part of this project.	• Packaging POM. • Recycled content. • Recovery rate. • Packaging POM projections.
Packaging reprocessing facility operators	National survey undertaken as part of this project.	• Packaging recovery. • Recovery rate. • Packaging recovery projections.
Container deposit scheme (CDS) operators	National survey undertaken as part of this project.	• National CD eligible packaging dataset (Appendix E). • Quantification of CDS recovery collection services.
Reusable packaging system operators and users	Selective survey undertaken as part of this project.	• Packaging reuse (Section 9).
Organics recyclers and energy recovery facility operators interview form	Selective survey undertaken as part of this project.	• Packaging recovery. • Recovery rate.
Australian import and export data	Australian Customs import/export[1] data extracts (ABS & IndustryEdge, 2023a; 2023b).	• Packaging POM. • Packaging recovery. • Recovery rate.
Population (census) data	Australian Bureau of Statistics published population data (ABS, 2023).	• Per capita estimates of packaging POM and recovery.

1. Australian Harmonized Tariff Item Statistical Code data (imports) / Australian Harmonized Export Commodity Classification data (exports).

Data collection and stakeholder consultation

Survey forms were prepared for the stakeholder groups listed above. Copies of the packaging survey forms can be provided upon request.

Stakeholders to be surveyed were identified through previous survey contacts, APCO Membership lists and the project team's industry knowledge. A summary of the packaging manufacturer and reprocessor survey outcomes by organisation type is provided in Table 2. All manufacturers and reprocessors that were identified were contacted.

Table 2 – Packaging manufacturer, reprocessor and other survey responses (facility count).

Organisation type	Complete – interview /phone/e-mail	Complete – estimated	No response or decline	Total
Manufacturer – fibre	10	0	0	10
Manufacturer – glass	5	1	0	6
Manufacturer – metals	14	1	0	15
Manufacturer – plastics	50	5	20	75
Manufacturer – wood	0	1	0	1
Reprocessor – fibre	9	2	0	11
Reprocessor – glass	11	5	1	17
Reprocessor – metals	4	1	1	6
Reprocessor – plastics	85	1	2	88
Reprocessor – organics	0	1	1	2
Container deposit scheme (CDS) operator	6	1	0	7
Energy recovery – WtE[a] fuel manufacturer	0	1	0	1
Industry group	2	0	0	2
Reusable packaging system operator	12	1	5	18
Reusable packaging system user	2	0	1	3
Total	**210**	**21**	**31**	**262**
Total (%)	**80%**	**8%**	**12%**	**100%**

a) WtE – Waste-to-energy.

Generally, where a significant organisation declined to provide a response, or did not respond within the survey period, it was possible to estimate the level of activity based on publicly available data or through consultation with others in the industry.

It was not possible to estimate production for 20 non-responding plastic packaging manufacturers. However, estimates of packaging POM were scaled based on whole of market estimates of packaging consumption in 2021–22 available through the Australian Plastics Flows and Fates Study 2021–22 (Blue Environment, 2023a).

Determination of packaging consumption

Australian packaging consumption from local sources was determined through a national survey of packaging manufacturers to obtain data on the following packaging attributes:

- Packaging POM by material type – see Appendix B for the consumption related material types list.
- Estimated accuracy range of reported POM, by material type.
- Location of material source – local or overseas.
- Packaging manufacturing losses to recycling or landfill.
- Packaging component group – bottle or jar, carton or box, closure or label, etc.
- Single-use / reusable packaging allocation.
- Degradability rating.
- Recycled content source – post-consumer, pre-consumer or virgin (primary).

- Potential future post-consumer recycled content – easily achievable and maximum achievable.
- Packaging jurisdiction of use.
- Packaging sector of use, allocated to:
    - Business-to-consumer (B2C) – At home.
    - B2C – Away-from-home (AfH).
    - Business-to-business (B2B).
- Packaging suitability for food contact applications.
- Market growth and capacity change estimates.

POM means that the packaging has been made available to the end-consumer (including business users). The subsequent disposal is following the intended use of the packaging and is considered 'post-consumer' disposal. Packaging losses prior to the point of POM are considered ‘pre-consumer’ losses.

Australian consumption of packaging through the import of finished goods and the import of semi-finished packaging (e.g. sheets of paperboards and rolls of plastic film for local filling) were determined through an extensive analysis of Australian import and export data for the 2021–22 financial year. This was based on the review and analysis of 3,900 Customs import codes and 2,600 export codes.

Codes over threshold values for either quantity or dollar value were allocated on a line-by-line basis to packaging material types and components and converted to an estimated equivalent packaging mass basis.

These allocations were based on code descriptors, or where this did not provide sufficient detail, on supporting research (online and instore) and manufacturer reports of their quantities of imported and exported packaging. Where no other data was available, standard conversions were applied to convert imports/exports of products into equivalent packaging quantities.

There were two main categories of codes that were allocated through the quantification framework:

- **Codes where the imported/exported product is the packaging** – Allocations were undertaken of the (packaging) product to: material type, packaging component, sector of use, data accuracy rating and other data attributes. These codes were also assessed under the following category.
- **Codes where the imported/exported product is contained in primary, secondary and tertiary packaging** – Allocations were undertaken of the packaging (on the product) to: material type, packaging component, sector of use, data accuracy rating and other data attributes.

Due to the relatively sparse information that was available to support many code allocations, the data accuracy rating for these allocations was often low to very low, which is quantified in the aggregated accuracy range estimates that are reported.

Determination of packaging recovery

Australian packaging recovery was determined through a national survey of packaging reprocessors to obtain data on the following packaging attributes:

- Recovery by material type – see Appendix B for the list of recovery related material types.

- Estimated accuracy range of reported recovery, by material type.
- Level of reprocessing undertaken by facility.
- Packaging reprocessing losses to (downstream) recycling or landfill.
- Post-consumer or pre-consumer material source.
- Waste source sector by collection service: municipal solid waste (MSW), commercial and industrial (C&I) waste, construction and demolition (C&D) waste, and container deposit scheme (CDS) collection services.
- Rigid/flexible classification for reprocessed plastic packaging.
- Packaging source jurisdiction (state or territory).
- Packaging component group – bottle or jar, carton or box, closure or label, etc.
- Single-use / reusable packaging material source.
- Material use application for processed product – packaging or non-packaging.
- Recovered packaging material suitability for food contact applications.
- Reprocessing capacity – current and planned changes.
- Stockpile estimates.

The location in the value chain at which recovery is measured is stated in all cases. Recovery is generally measured at the out-going gate of the secondary processing facility for the used packaging. This is the point that the processed material is typically 'input ready' for the manufacture of new packaging or other products. Examples of secondary processing facilities include paper mills, glass beneficiation facilities, plastics washing and flaking facilities, and metal smelting facilities.

For materials other than metals, overseas processing losses associated with the export of sorted but unprocessed materials have been estimated based on the losses reported by local operators of secondary processing facilities.

For metals, overseas processing losses associated with the export of sorted but unprocessed materials have been estimated based on advice by local aluminium reprocessors and information from Antrekowitsch, et al. (2014) for aluminium and steel packaging losses respectively.

Packaging recovery includes quantities of post-consumer plastic and wood packaging sent to energy recovery in 2021–22.

Packaging recovery also includes estimates of recovery through composting facilities. This is primarily single-use wood packaging, fibre-based packaging (e.g. cardboard), and very small quantities of compostable plastics packaging.

Determination of packaging recovery rates

The packaging recovery rates determined in this report are generally based on the post-consumer packaging recovery measured at the out-going gate of the secondary processing facility (including WtE fuel manufacturers) for the used packaging, divided by packaging POM by material group/type.

The exception to this is packaging to organics reprocessing, for which the post-consumer packaging recovery is measured at the in-coming gate of the secondary processing facility.

It is important to note that in the determination of recovery rates, packaging POM is assumed to be equivalent to post-consumer used packaging. That is, all packaging POM in 2021–22, also

reached end-of-life and was made available for recovery in 2021–22. This is largely the case for single-use packaging, but is less applicable to some forms of longer lived packaging in reusable packaging systems.

Determination of packaging recycling potential

The determination of packaging recycling potential supports the evaluation of progress against the following 2025 Target:

- 100% reusable, recyclable or compostable packaging.

Throughout the report the term *packaging recycling potential* is used as an umbrella term for reusable, recyclable, or compostable packaging.

The method for determining packaging recycling potential uses scores based on the Packaging Recycling potential Evaluation Portal (PREP) assessment framework. Generalised PREP extracted scores have been developed for each packaging material type and packaging component combination.

A recycling potential classification scoring framework has been developed for both B2C and B2B packaging sectors of use. The assessment framework is based on scoring against the following three criteria:

- Collection system widely available (C).
- Sortable and technically recyclable (S/T).
- End-market available for recovered material (M).

An overall 'recycling potential' classification score has been determined for each packaging format, based on the scores for the three criteria above. The overall score is simply the lowest of the three criteria scores.

The B2C and B2B packaging sector scoring frameworks are summarised in the following tables. The primary difference is in the description of the collection system criteria.

Table 3 – Recycling potential classification score basis for each criterion – B2C packaging.

Classification (score)	**C**	**S/T**	**M**
Good recycling potential (2)	The material is widely collected at kerbside (>80% of the kerbside population has access to a council service), or is a certified compostable plastic.	The material can be readily sorted at a MRF and causes no significant issues for reprocessors, or is a certified compostable plastic.	There is a well-established market for the use of the recycled material, or is a certified compostable plastic.
Poor recycling potential (1)	The material is less widely accepted at kerbside (between 60–80% of the kerbside population has access to a council service).	The material can be readily sorted at a MRF but will cause some issues for reprocessors leading to a loss of value.	The material will be classified as an outthrow or it will have a reduced market value that makes its recovery marginal.
Not recyclable (0)	The material is not widely accepted at kerbside (<60% of the kerbside population has access to a council service).	The material can either not be readily sorted at a MRF or it impacts on the recovery of other materials at the reprocessor.	It is not economical to separate this material for use in other applications.

Table 4 – Recycling potential classification score basis for each criterion – B2B packaging.

Classification (score)	C	S/T	M
Good recycling potential (2)	Collection services for the material (to recovery) are offered by the major commercial collectors in metropolitan areas, at a similar or lower cost than landfill services.	The material can be readily sorted at a C&I MRF and causes no significant issues for reprocessors.	There is a well-established market for the use of the recycled material.
Poor recycling potential (1)	Collection services for the material (to recovery) might be offered by major commercial collectors but at higher cost than landfill services or availability of services is more limited.	The material can be readily sorted at a C&I MRF but will cause some issues for reprocessors leading to a loss of value.	The material will be classified as an outthrow or it will have a reduced market value that makes its recovery marginal.
Not recyclable (0)	No collection services for the material (to recovery) are offered by the major commercial collectors.	The material can either not be readily sorted at a C&I MRF or it impacts on the recovery of other materials at the reprocessor.	It is not economical to separate this material for use in other applications.

Determination of reusable packaging

This year a quantification of the following eight reusable packaging systems was undertaken:

- **Kegs** – Beer kegs only.
- **Drums (200–205 litre)** – All reusable steel and plastic drums in the 200–205 litre volumetric capacity range (44-gallon UK or 55-gallon US).
- **Intermediate bulk containers (IBCs)** – All rigid IBCs are assumed to be reusable (rather than single-use) packaging.
- **Milk crates** – Non-collapsible plastic crates. Limited to dairy applications only.
- **Pallets** – Reusable timber and plastic pallets only, including display pallets. Single-use pallets are excluded.
- **Returnable plastic crates (RPCs)** – Collapsible plastic crates. Limited to major supermarket systems only (e.g. ALDI, Coles and Woolworths).
- **Reusable shopping bags** – Reusable non-woven PP bags, and reusable HDPE and LDPE bags (supermarket type).
- **Reusable coffee cups** – Reusable coffee cups used in an AfH setting where they could be reasonably expected to have avoided the use of a single-use coffee cup.

Refer to **Section 9.1** for more detail on the reusable packaging systems quantification method.

1.3 Comparability of 2021–22 data with previous years

The scope and calculation methods have been applied as consistently as possible across all packaging material types and components. However, it is important to note that there are a number of changes that have been adopted that may impact the comparability between the 2017–18 to 2021–22 datasets. The changes have all been adopted to improve the utility, quality and depth of the packaging quantification dataset.

Scope or method changes between 2020–21 and 2021–22

The noteworthy changes this year include:

- **More granular material types have been introduced for the 2021–22 dataset for plastics and paper and paperboard** – For the first time this year, data for PET, HDPE and PP have been collected using the following colour-based types: PET (1) – Natural, PET (1) – Coloured – Transparent, PET (1) – Coloured – Opaque, HDPE (2) – Natural, HDPE (2) – Coloured, PP (5) – Natural, and PP (5) – Coloured. In addition, the list of recovery related material types for paper and paperboard has been expanded to align with the POM material types.
- **Data on food contact suitability of packaging has been collected for the first time in 2021–22** – Both packaging manufacturers and reprocessors were surveyed on the suitability of both packaging POM and recovered for food contact versus non-food contact applications.
- **Packaging manufacturers were surveyed on the potential recycled content that can be incorporated into packaging POM** – The manufacturer survey was expanded this year to include a set of questions on the easily achievable and maximum achievable potential recycled content in packaging.
- **ANZSIC division source level data has not been collected from packaging manufacturers in 2021–22** – The survey question on the ANZSIC division source of packaging that is received was removed for packaging reprocessors in 2020–21, and this year it was removed for packaging manufacturers. ANZSIC industry division level data collection may be reinstated in future years.
- **In 2021–22 the '*Sortable and technically recyclable*' and '*End-market available for recovered material*' recycling potential classification scores for flexible B2C plastic packaging, that was accepted by the REDcycle program, have been changed from 'Good recycling potential (2)' to 'Poor recycling potential (1)'.**

Refer to previous reports for details on scope or method changes between 2017–18, 2018–19, 2019–20 and 2020–21.

Other scope limitations

Other ongoing scope limitations include:

- There are other reusable packaging systems that are not yet included in the project scope. See Table B-4 in Appendix B for a list of all identified reusable packaging systems and their status with respect to scope inclusion/exclusion in the 2021–22 packaging data.

1.4 Data limitations and interpretation

In the tables presented in this report, minor discrepancies may occur between summed totals and the apparent sums of the component items in tables, as summed totals and percentage values are calculated using component item values prior to rounding.

Data in this report should be interpreted as having a maximum of three significant figures. However, to obtain a balance between the proper statement of the accuracy of the data, while minimising the apparent summation discrepancies previously mentioned, mass data in this report has generally been rounded to the nearest 1,000 tonnes.

The accuracy ranges provided in this report are weighted sum averages of the estimated levels of accuracy (±%) reported by packaging manufacturers and reprocessors about their reported packaging material POM or total amount reprocessed. The accuracy range provides an estimate

of the range within which the true value can be found, with the reported value being the best estimate of the true value.

In essence, small year-on-year changes in data may be based on data volatility, and so the underlying data uncertainties mean that care should be taken with assigning too much weight to these small movements. However, more weight can be placed on larger year-on-year shifts or consistent trends over a number of years, especially where these shifts or trends are consistent with known significant movements in the market.

2 PACKAGING FLOWS BY MATERIAL GROUP

2.1 Consumption

Packaging POM for 2021–22

Total packaging POM in Australia in 2021–22 is estimated at 6.98 million tonnes (±11%). Estimates for packaging POM by material group are provided in Table 5 and **Figure 1**. The aggregated accuracy range estimates for each of the material groups are also provided as error bars in **Figure 1**. The estimates include B2C and B2B packaging.

Of the 6.98 million tonnes of packaging POM in 2021–22, around half was paper & paperboard packaging (52.3%), followed by plastic packaging (18.3%), glass packaging (16.4%), wood packaging (8.8%), and metal packaging (4.3%).

Refer to **Appendix A** for the glossary of terms and abbreviations used throughout this report.

Table 5 – Packaging POM in 2021–22, by material group.

Material group	POM			Accuracy range
	(tonnes)	(%)	(kg/person)	(±%)
Paper & paperboard	3,654,000	52.3%	141	7%
Glass	1,143,000	16.4%	44	15%
Plastic	1,277,000	18.3%	49	17%
Metal	298,000	4.3%	11	13%
Wood	612,000	8.8%	24	12%
Total	**6,984,000**	**100.0%**	**269**	**11%**

POM means that the packaging has been made available to the end-consumer (including business users), and the subsequent disposal follows the intended use of the packaging, also known as 'post-consumer' disposal. Packaging losses prior to the point of POM are considered ‘pre-consumer’ losses and are not included in Table 5.

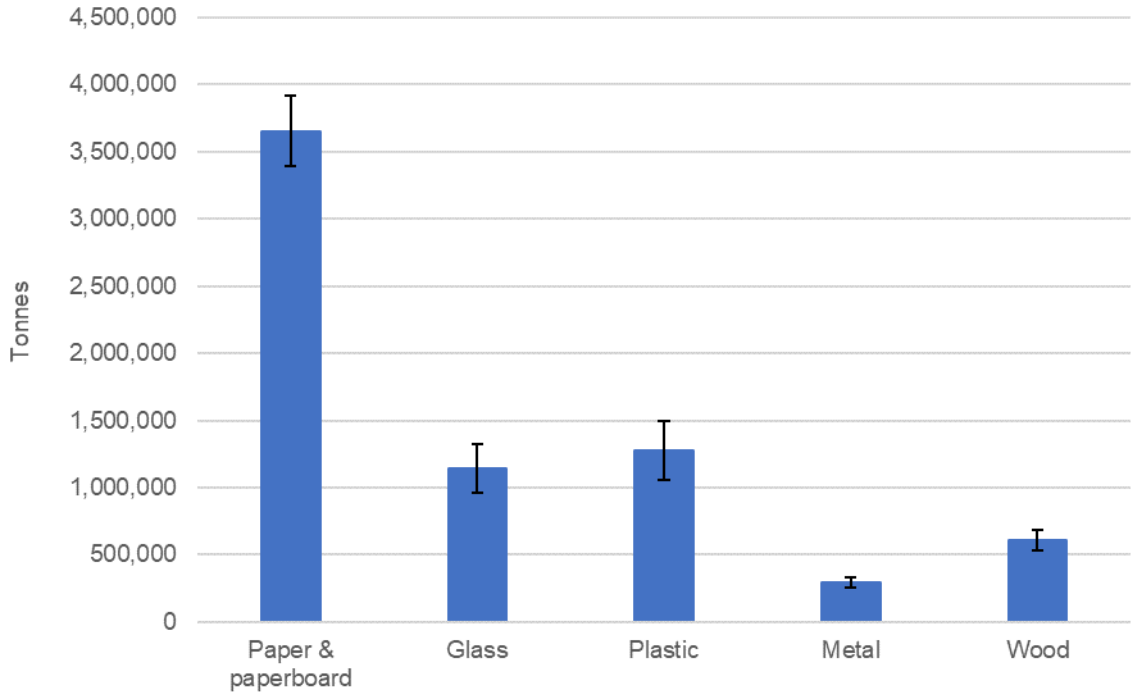

Figure 1 – Packaging POM in 2021–22, by material group.

Time-series POM data from 2017–18 to 2021–22

Table 6 and **Figure 2** compare the POM data by material group from 2017–18 to 2021–22. In 2021–22, packaging POM increased by 4% compared to the 2020–21 estimate of 6.74 million tonnes. The increase in packaging POM per person was 2%.

The most significant changes in packaging POM were an 8% increase in paper & paperboard packaging POM (up 287,000 tonnes), an 11% decrease in glass packaging POM (down 140,000 tonnes), and an 8% increase in plastic packaging POM (up 98,000 tonnes).

Table 6 – Packaging POM from 2017–18 to 2021–22, by material group, including the percentage change between 2020–21 and 2021–22.

Material group	2017–18	2018–19	2019–20	2020–21	2021–22	Change 2020–21 to 2021–22
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Paper & paperboard	2,901,000	3,262,000	3,277,000	3,387,000	3,654,000	8%
Glass	1,273,000	1,283,000	1,156,000	1,283,000	1,143,000	-11%
Plastic	1,067,000	1,000,000	1,124,000	1,179,000	1,277,000	8%
Metal	213,000	246,000	248,000	254,000	298,000	17%
Wood[a]	NR[a]	124,000	462,000	638,000	612,000	-4%
Total (tonnes)	**5,453,000**	**5,916,000**	**6,266,000**	**6,740,000**	**6,984,000**	**4%**
Total (kg/person)	**218**	**234**	**244**	**262**	**269**	**2%**

a) NR (not reported) – Wood packaging data was not collected in 2017–18.

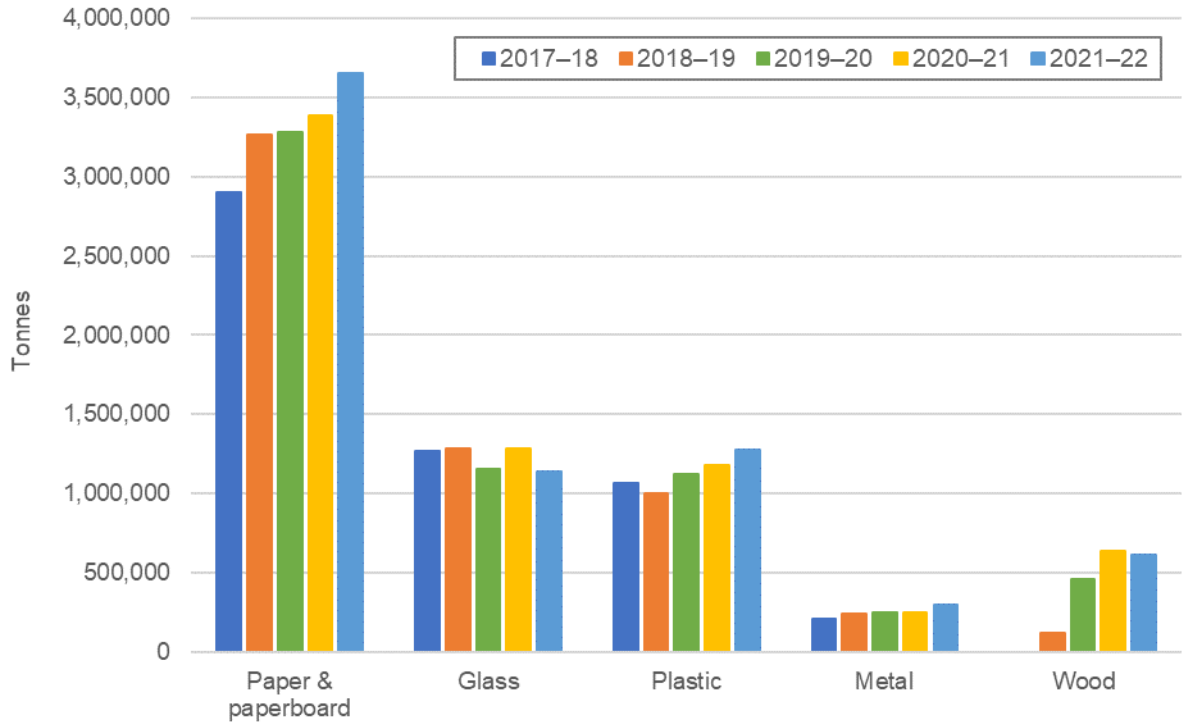

Figure 2 – Packaging POM from 2017–18 to 2021–22, by material group.

There is a strong general trend in the increased use of paper & paperboard and plastic, and a lesser trend in the increase of metal packaging. However, there is no particularly strong discernible trends in the use of glass packaging. Wood packaging shows strong year on year increases prior to 2020–21, but this is most likely due to improved survey coverage. Note that wood packaging data was not collected in 2017–18.

2.2 Recovery

Packaging recovery for 2021–22

Total Australian post-consumer packaging recovery in 2021–22 is estimated at 3.91 million tonnes (±12%).

Of the packaging recovered in 2021–22, nearly two thirds was paper & paperboard packaging (64.2%), followed by glass packaging (18.4%), wood packaging (7.1%), plastic packaging (6.6%) and metal packaging (3.9%).

Estimates for post-consumer packaging recovery by material group are provided in Table 7 and **Figure 3**. The aggregated accuracy range estimates for each of the material groups are also provided. The estimates include post-consumer packaging collected through MSW, C&I and CDS collection services, and are presented by collection service in Table 8.

Table 7 – Post-consumer packaging recovery in 2021–22, by material group.

Material group	Recovery			Accuracy range
	(tonnes)	(%)[a]	(kg/person)	(±%)
Paper & paperboard	2,502,000	64.0%	96	11%
Glass	718,000	18.4%	28	12%
Plastic	258,000	6.6%	10	10%
Metal	151,000	3.9%	6	20%
Wood	277,000	7.1%	11	20%
Total	**3,907,000**	**100.0%**	**150**	**12%**

a) Percent contribution to the total amount of packaging recovered, not the individual material recovery rate.

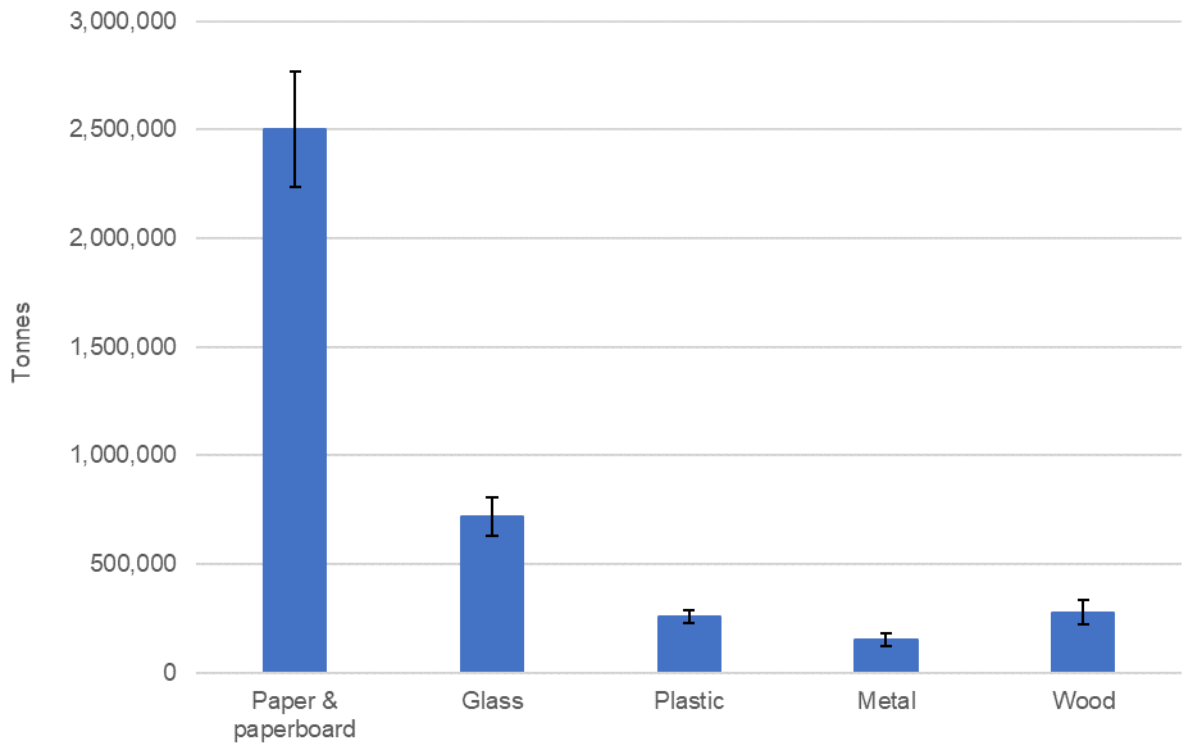

Figure 3 – Post-consumer packaging recovery in 2021–22, by material group.

Table 8 – Post-consumer packaging recovery in 2021–22, by material group and collection service.

Material group	Collection service					Total
	MSW[a]	C&I[a]	C&D[a]	CDS[a]	Other	
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Paper & paperboard	1,103,000	1,372,000	0	2,000	26,000	2,502,000
Glass	458,000	0	0	260,000	0	718,000
Plastic	146,000	78,000	0	32,000	2,000	258,000
Metal	97,000	18,000	1,000	36,000	0	151,000
Wood	0	277,000	0	0	0	277,000
Total (tonnes)	**1,803,000**	**1,744,000**	**1,000**	**331,000**	**28,000**	**3,907,000**
Total (%)	**46.2%**	**44.6%**	**0.0%**	**8.5%**	**0.7%**	**100.0%**

a) MSW – municipal solid waste / C&I – commercial and industrial / C&D – construction and demolition / CDS – container deposit scheme.

Time-series recovery data from 2017–18 to 2021–22

Table 9 and **Figure 4** compare recovery data by material group from 2017–18 to 2021–22. Packaging recovery in 2021–22 was 3.91 million tonnes, which was a 3% increase on the 2020–21 packaging recovery estimate of 3.79 million tonnes.

The increase in recovery is primarily due to solid growth in recovery of paper & cardboard and plastic, which also occurred between 2019–20 and 2020–21.

Table 9 – Post-consumer packaging recovery from 2017–18 to 2021–22, by material group, including the percentage change between 2020–21 and 2021–22.

Material group	2017–18	2018–19	2019–20	2020–21	2021–22	Change 2020–21 to 2021–22
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Paper & paperboard	1,817,000	2,045,000	2,229,000	2,370,000	2,502,000	6%
Glass	582,000	574,000	699,000	805,000	718,000	-11%
Plastic	173,000	182,000	179,000	207,000	258,000	25%
Metal	102,000	137,000	139,000	147,000	151,000	3%
Wood	NR[a]	44,000	171,000	260,000	277,000	6%
Total (tonnes)	**2,673,000**	**2,982,000**	**3,416,000**	**3,788,000**	**3,907,000**	**3%**
Total (kg/person)	**107**	**118**	**133**	**147**	**150**	**2%**

a) NR (not reported) – Wood packaging data was not collected in 2017–18.

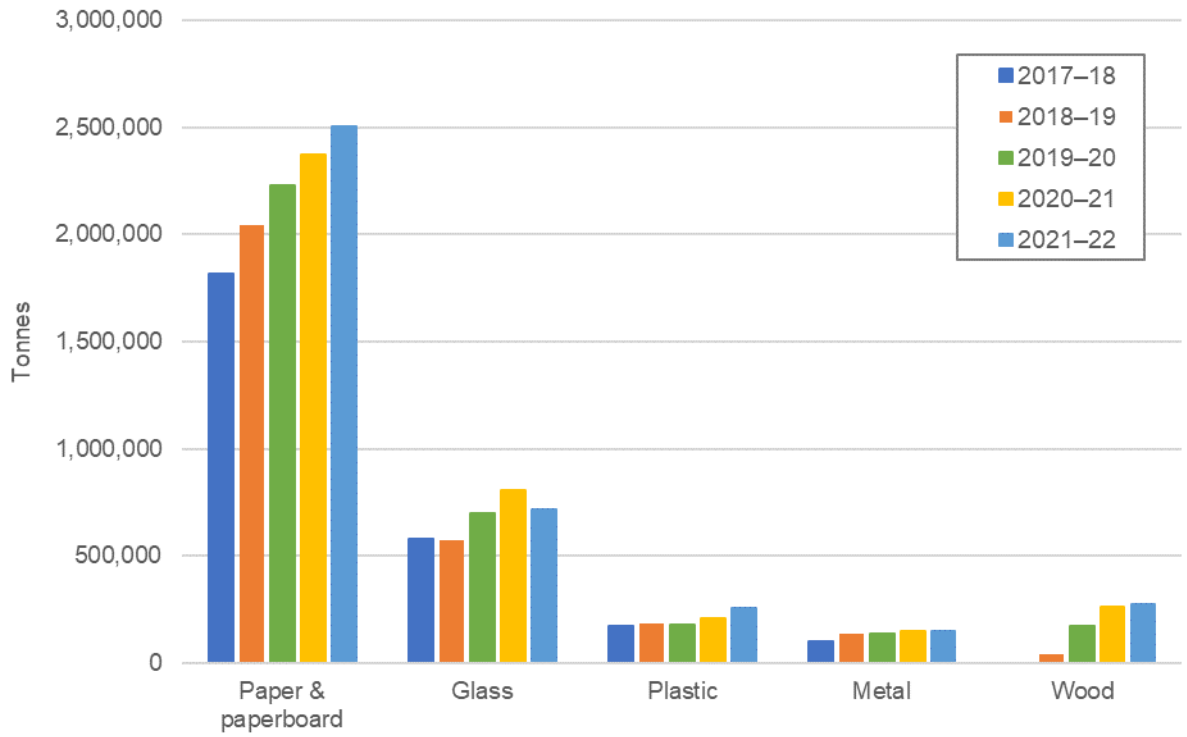

Figure 4 – Post-consumer packaging recovery from 2017–18 to 2021–22, by material group.

Recovery rates

Estimates for post-consumer packaging recovery rates by material group are provided in Table 10 and **Figure 5**.

The post-consumer packaging recovery rate for all packaging in 2021–22 is estimated to be 56%. This is based on recovery as measured at the out-going gate of the secondary processing facility for the used packaging as a percentage of packaging POM in the same year.

Paper & paperboard had the highest recovery rate at 68%, followed by glass packaging (63%), metal packaging (51%), wood packaging (45%), and plastic packaging (20%).

Table 10 – Packaging POM, post-consumer packaging recovery and post-consumer packaging recovery rates in 2021–22, by material group.

Material group	POM	Recovery	Recovery rate
	(tonnes)	(tonnes)	(%)
Paper & paperboard	3,654,000	2,502,000	68%
Glass	1,143,000	718,000	63%
Plastic	1,277,000	258,000	20%
Metal	298,000	151,000	51%
Wood	612,000	277,000	45%
Total	**6,984,000**	**3,907,000**	**56%**

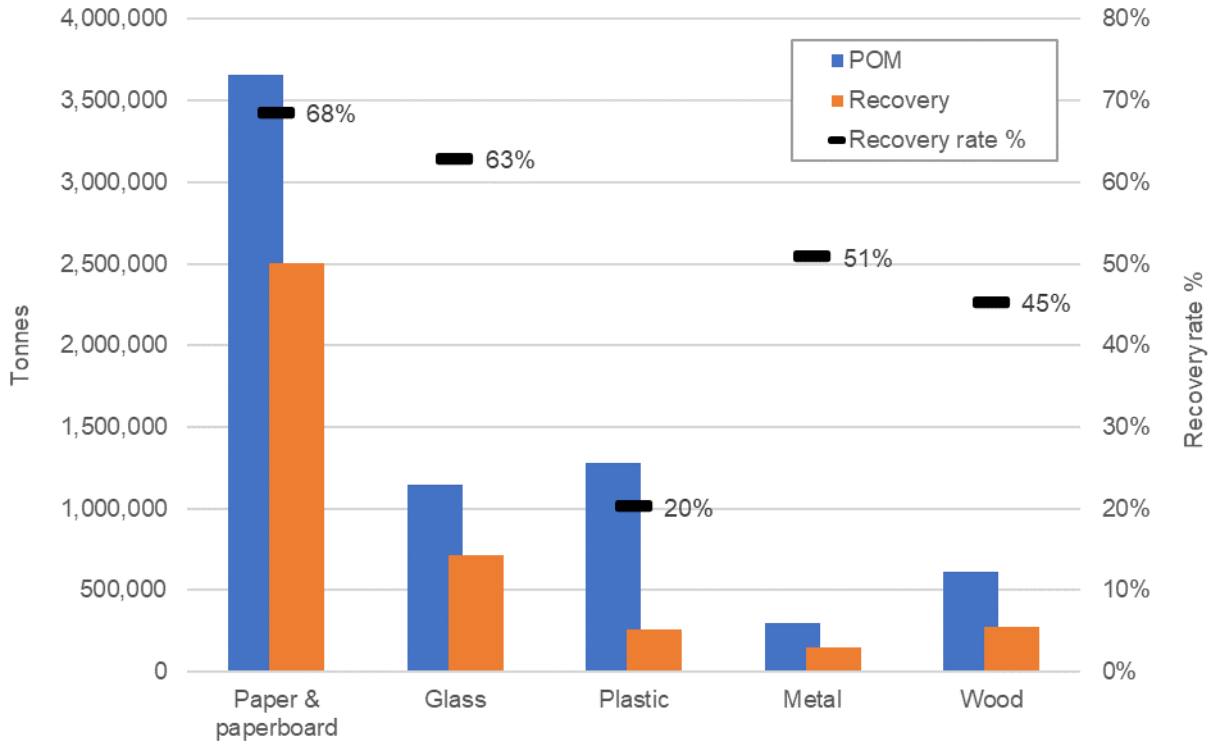

Figure 5 – Packaging POM, post-consumer packaging recovery and post-consumer packaging recovery rates in 2021–22, by material group.

Time-series recovery rates from 2017–18 to 2021–22

Table 11 and Figure 57 compare recovery rates by material group from 2017–18 to 2021–22. In 2021–22 there were increases in recovery rates for plastic and wood, but decreases for paper & paperboard and metal, and glass was steady. Overall, the total national post-consumer packaging recovery rate was steady across 2020–21 and 2021–22.

The underlying accuracy ranges for the POM and recovery estimates mean that it is possible to state with some certainty that a real increase in the recovery rate for plastic packaging has occurred between the two years, and that a real decrease in the recovery rate for metal packaging has also occurred.

Table 11 – Post-consumer packaging recovery rates from 2017–18 to 2021–22, by material group, including the percentage change between 2020–21 and 2021–22.

Material group	2017–18	2018–19	2019–20	2020–21	2021–22	% change[a] 2020–21 to 2021–22
	(%)	(%)	(%)	(%)	(%)	(%)
Paper & paperboard	63%	63%	68%	70%	68%	-1%
Glass	46%	45%	60%	63%	63%	0%
Plastic	16%	18%	16%	18%	20%	3%
Metal	48%	56%	56%	58%	51%	-7%
Wood	NR[b]	36%	37%	41%	45%	4%
Total	**49%**	**50%**	**55%**	**56%**	**56%**	**0%**

a) % change values are calculated prior to rounding the annual values.

b) NR (not reported) – Wood packaging data was not collected in 2017–18.

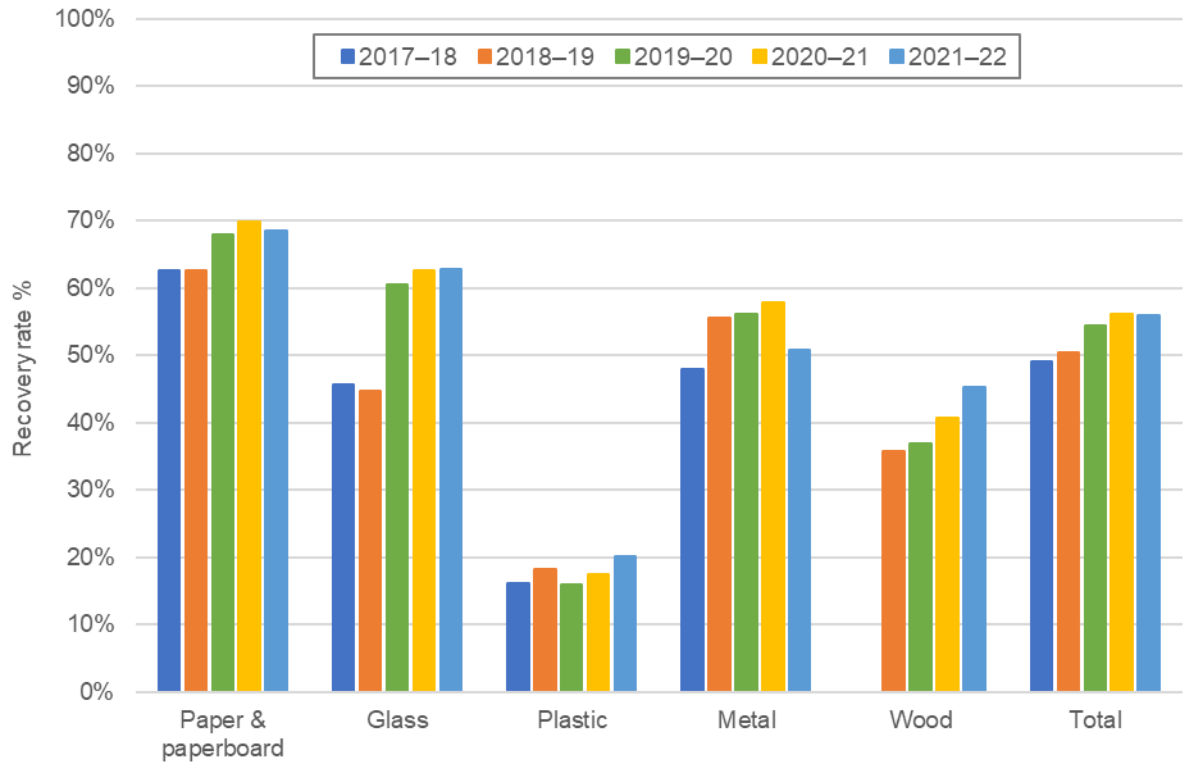

Figure 6 – Post-consumer packaging recovery rates from 2017–18 to 2021–22, by material group.

2.3 Recycled content

Packaging recycled content for 2021–22

Estimates of the recycled content incorporated into packaging POM in 2021–22, by material group, are provided in Table 12 and **Figure 7**. The post-consumer recycled (PCR) content across all packaging (excluding wood) was 2.57 million tonnes, or 40% of total packaging POM; the pre-consumer recycled content was 0.65 million tonnes (10%); and 3.15 million tonnes (49%) was sourced from virgin (primary) feedstocks.

Table 12 – Packaging POM in 2021–22, by material group (excluding wood) and recycled content.

Material group	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)
Paper & paperboard	1,990,000	54%	487,000	13%	1,177,000	32%	3,654,000
Glass	469,000	41%	76,000	7%	599,000	52%	1,143,000
Plastic	74,000	6%	23,000	2%	1,179,000	92%	1,277,000
Metal	40,000	13%	67,000	22%	192,000	64%	298,000
Total	**2,572,000**	**40%**	**654,000**	**10%**	**3,146,000**	**49%**	**6,372,000**

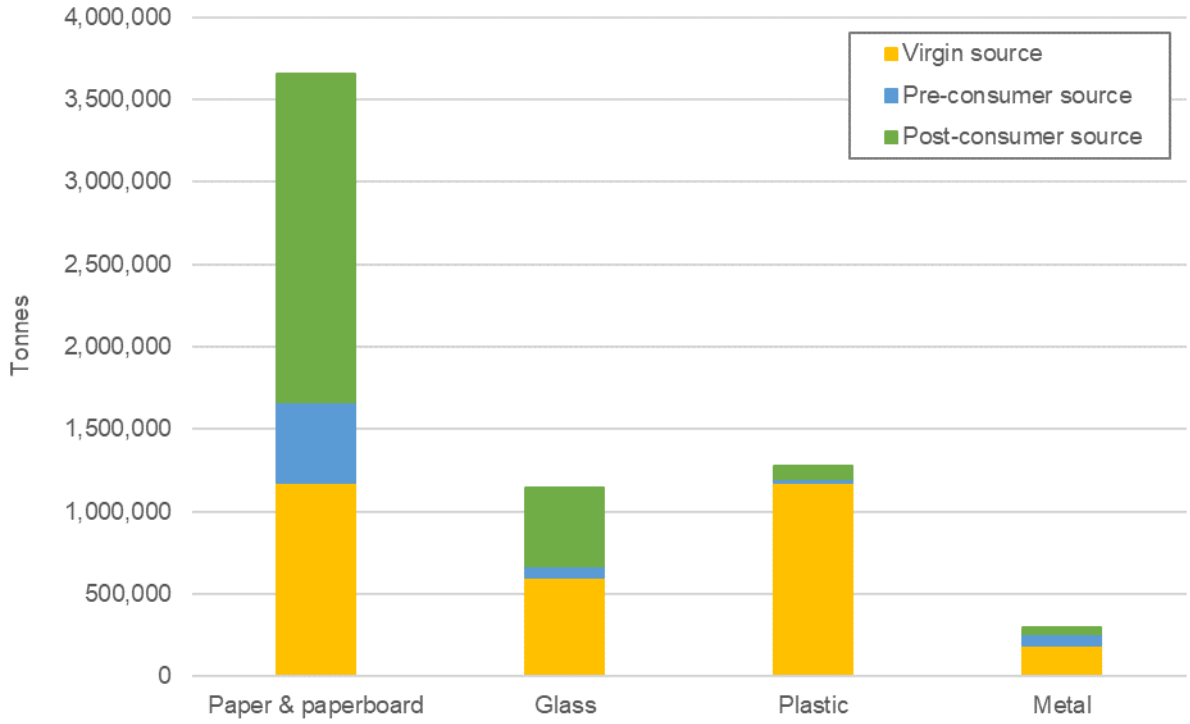

Figure 7 – Packaging POM in 2021–22, by material group (excluding wood) and recycled content.

Time-series recycled content data from 2017–18 to 2021–22

Table 13 and **Figure 8** compare the PCR content of packaging by material group from 2017–18 to 2021–22. In 2021–22 the total quantity of PCR content in packaging increased by an estimated 218,000 tonnes (9%) compared to the previous year. The PCR content of packaging, excluding wood, was 40% in 2021–22 compared with 39% in 2020–21.

Table 13 – Packaging PCR content from 2017–18 to 2021–22, as a percentage of packaging POM, by material group (excluding wood).

Material group	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)
Paper & paperboard	1,421,000	49%	1,667,000	51%	1,768,000	54%	1,801,000	53%	1,990,000	54%
Glass	407,000	32%	474,000	37%	428,000	37%	480,000	37%	469,000	41%
Plastic	23,000	2%	37,000	4%	36,000	3%	36,000	3%	74,000	6%
Metal	64,000	30%	59,000	24%	28,000	11%	37,000	15%	40,000	13%
Total	**1,915,000**	**35%**	**2,237,000**	**38%**	**2,260,000**	**39%**	**2,354,000**	**39%**	**2,572,000**	**40%**

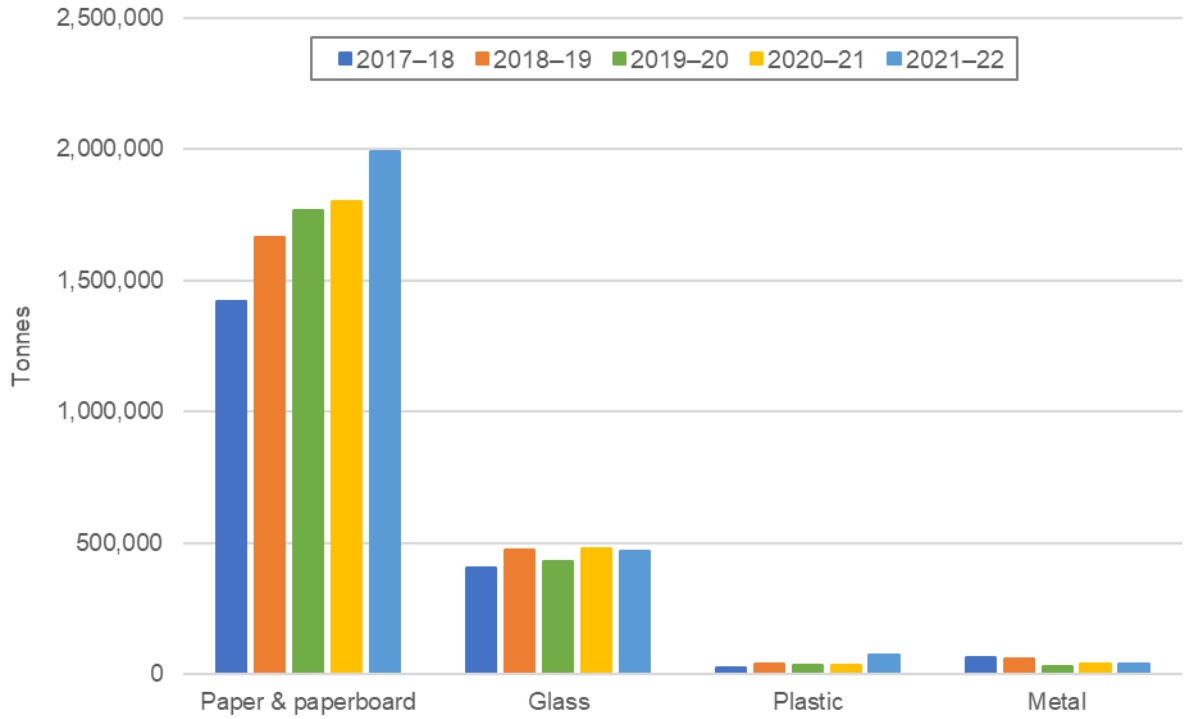

Figure 8 – Packaging PCR content from 2017–18 to 2021–22, by material group (excluding wood).

2.4 Recycling potential

Packaging recycling potential in 2021–22

In this section of the report packaging POM in 2021–22 is classified according to recycling potential. The detailed method for determining recycling potential is outlined in **Section 1.2**. Throughout the report the term *packaging recycling potential* is used as an umbrella term for reusable, recyclable or compostable packaging.

Packaging recycling potential by material group is provided in Table 14 and **Figure 9**. It is estimated that 5.84 million tonnes (84%) of packaging POM in 2021–22 had good recycling potential. This was dominated by paper & paperboard (of which 93% had good recycling potential) and glass (of which 100% had good recycling potential). Effectively all metal packaging (99.7%) was classified as having good recycling potential. Wood packaging had 75% classified as having good recycling potential.

Only 42% of plastic packaging was classified as having good recycling potential. This was a sharp decrease from 60% in 2020–21. This was caused by changes in the recycling potential classification scores for flexible B2C plastic packaging calculated as of 30 June 2022, which relate to the subsequent closure of the REDcycle program. As of 30 June 2022, while the REDcycle **collection** system was still in operation, both the reprocessing capacity and end-markets were considered poor, which changed the overall recycling potential score for flexible B2C plastic packaging from ‘good’ to ‘poor’.

Around 1.00 million tonnes (14%) of packaging was classified as having poor recycling potential or not being recyclable.

The recycling potential status of another 0.14 million tonnes of packaging, which was entirely plastic packaging, could not be determined. It is likely that most of this packaging would tend towards having poor recycling potential or not being recyclable.

Table 14 – Packaging POM in 2021–22, by recycling potential classification and material group.

Material group	Good recycling potential		Poor recycling potential		Not recyclable		Unknown		Total	
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)
Paper & paperboard	3,410,000	93.3%	186,000	5.1%	58,000	1.6%	0	0.0%	3,654,000	100.0%
Glass	1,143,000	100.0%	0	0.0%	0	0.0%	0	0.0%	1,143,000	100.0%
Plastic	533,000	41.7%	457,000	35.8%	152,000	11.9%	136,000	10.6%	1,277,000	100.0%
Metal	297,000	99.7%	0	0.1%	1,000	0.2%	0	0.0%	298,000	100.0%
Wood	459,000	75.0%	85,000	13.9%	68,000	11.1%	0	0.0%	612,000	100.0%
Total	**5,842,000**	**83.6%**	**729,000**	**10.4%**	**278,000**	**4.0%**	**136,000**	**1.9%**	**6,984,000**	**100.0%**

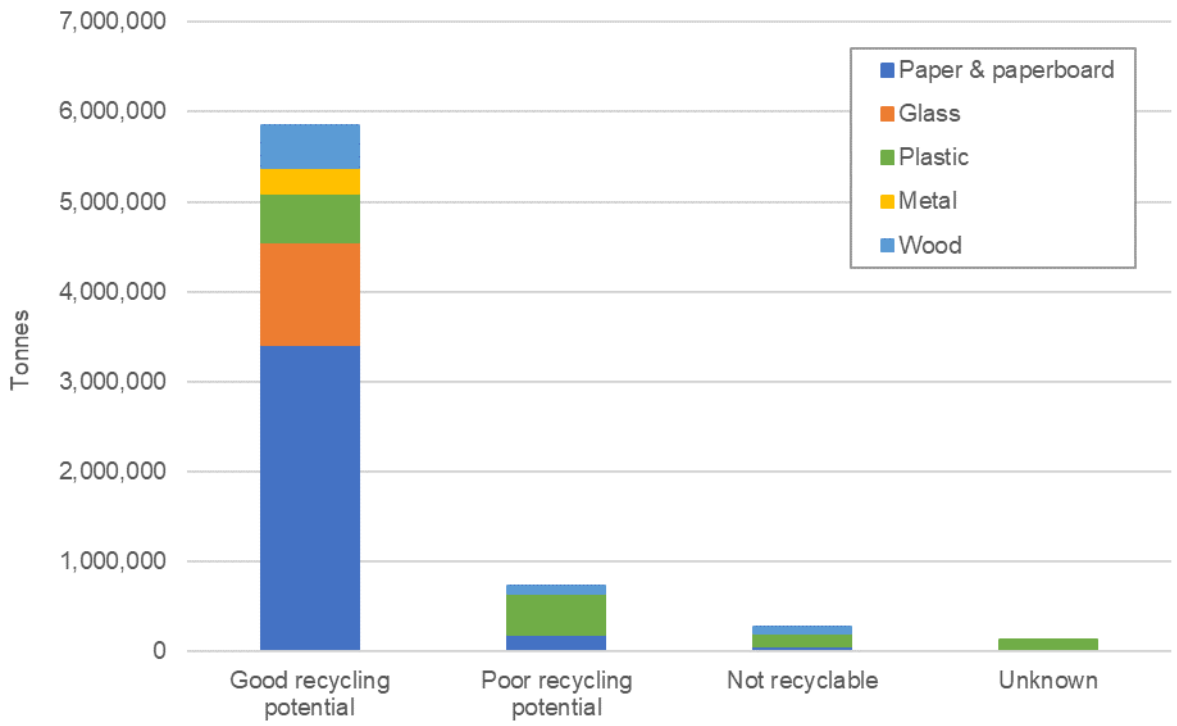

Figure 9 – Packaging POM in 2021–22, by recycling potential classification and material group.

Time-series recycling potential data from 2017–18 to 2021–22

Table 15 and **Figure 10** compare the 2017–18 to 2021–22 quantities of packaging with a good recycling potential classification. The most noteworthy change was the sharp fall in the good recycling potential classification of plastic packaging due to the closure of the REDcycle program.

For reference, if the REDcycle related recycling potential score changes had not been applied to the 2021–22 data, then the good recycling potential classification percentage across all materials would have been 88%.

Table 15 – Packaging POM with a 'good recycling potential' classification from 2017–18 to 2021–22, including a percentage relative to total POM, by material group.

Material group	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)	(tonnes)	(% POM)
Paper & paperboard	2,682,000	92%	2,962,000	91%	2,961,000	90%	3,147,000	93%	3,410,000	93%
Glass	1,273,000	100%	1,283,000	100%	1,156,000	100%	1,283,000	100%	1,143,000	100%
Plastic	627,000	59%	663,000	66%	676,000	60%	710,000	60%	533,000	42%
Metal	201,000	95%	243,000	99%	240,000	97%	253,000	100%	297,000	100%
Wood	NR[a]	NR[a]	121,000	98%	359,000	78%	427,000	67%	459,000	75%
Total	**4,783,000**	**88%**	**5,273,000**	**89%**	**5,392,000**	**86%**	**5,820,000**	**86%**	**5,842,000**	**84%**

a) NR (not reported) – Wood packaging data was not collected in 2017–18.

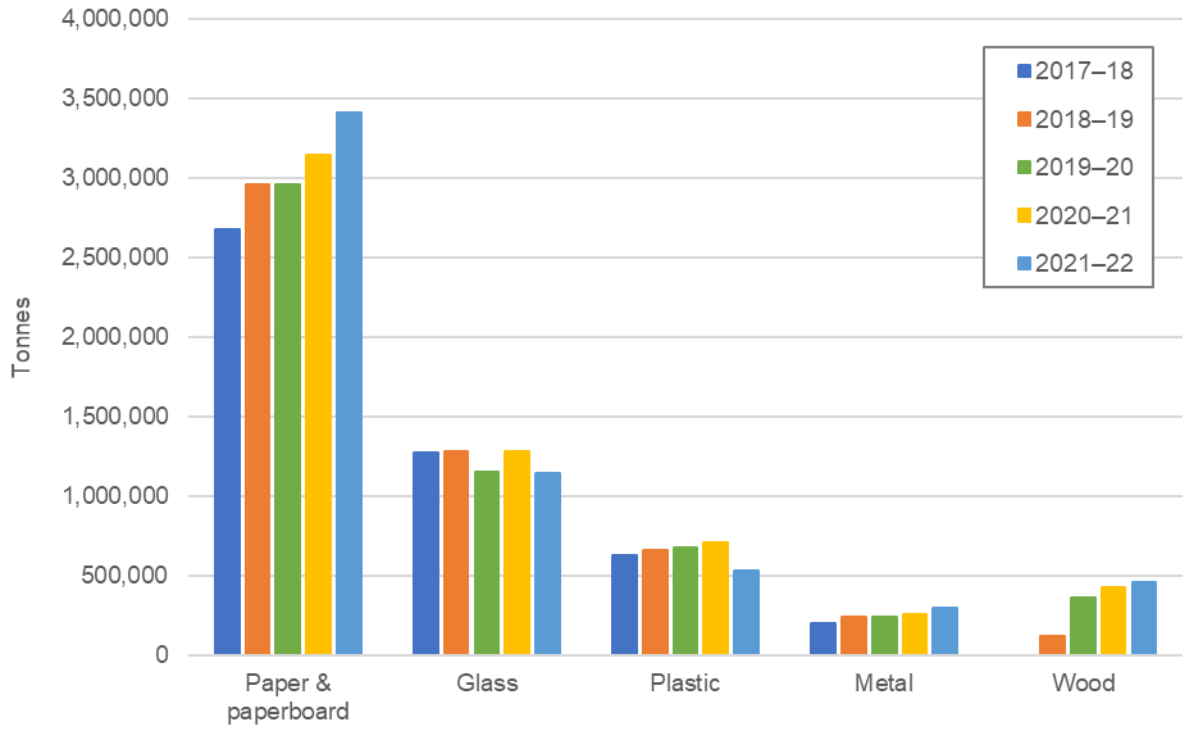

Figure 10 – Packaging POM with a 'good recycling potential' classification from 2017–18 to 2021–22, by material group.

3 PAPER & PAPERBOARD PACKAGING IN 2021–22

3.1 Placed on market

Trends

Paper & paperboard packaging POM in Australia in 2021–22 is estimated at 3.65 million tonnes (±7%), which was 52.3% of all packaging POM. Five-year trends for paper & paperboard packaging POM are provided in Table 16 and Figure 11 (mass basis), and four-year trends are provided in Table 17 and **Figure 12** (count basis). Note that 2017–18 count basis data is not available.

Between 2020–21 and 2021–22 there was an increase in paper & paperboard packaging POM of 267,000 tonnes (+8%).

Table 16 – Paper & paperboard packaging POM (mass and per capita bases) from 2017–18 to 2021–22, by material type.

Material type	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Boxboard/ Cartonboard	181,000	7.3	288,000	11.3	316,000	12.3	315,000	12.2	320,000	12.3
Corrugated cardboard	2,408,000	96.4	2,544,000	100.4	2,513,000	98.0	2,539,000	98.8	2,772,000	106.6
HWS[b] carrierboard	15,000	0.6	20,000	0.8	25,000	1.0	31,000	1.2	25,000	1.0
Kraft paper	63,000	2.5	195,000	7.7	180,000	7.0	246,000	9.6	290,000	11.2
Moulded fibreboard	50,000	2.0	51,000	2.0	56,000	2.2	63,000	2.4	65,000	2.5
PCPB[c] – Aseptic	38,000	1.5	38,000	1.5	40,000	1.6	49,000	1.9	51,000	2.0
PCPB – Gable top	12,000	0.5	12,000	0.5	12,000	0.5	15,000	0.6	16,000	0.6
PCPB – Cold cup	6,000	0.2	6,000	0.2	13,000	0.5	8,000	0.3	8,000	0.3
PCPB – Hot cup	12,000	0.5	12,000	0.5	23,000	0.9	18,000	0.7	20,000	0.7
PCPB – Other	4,000	0.1	4,000	0.1	4,000	0.2	4,000	0.1	6,000	0.2
Polymer coated paper	112,000	4.5	94,000	3.7	1,000	0.1	1,000	0.1	1,000	0.1
Other fibre packaging[d]	0	0.0	0	0.0	95,000	3.7	99,000	3.9	80,000	3.1
Total	**2,901,000**	**116.2**	**3,262,000**	**128.8**	**3,277,000**	**127.8**	**3,387,000**	**131.9**	**3,654,000**	**140.5**

a) kg/p – kilograms per person.
b) HWS – High wet strength.
c) PCPB – Polymer coated paperboard.
d) Examples of other fibre packaging include paper bags and food wraps.

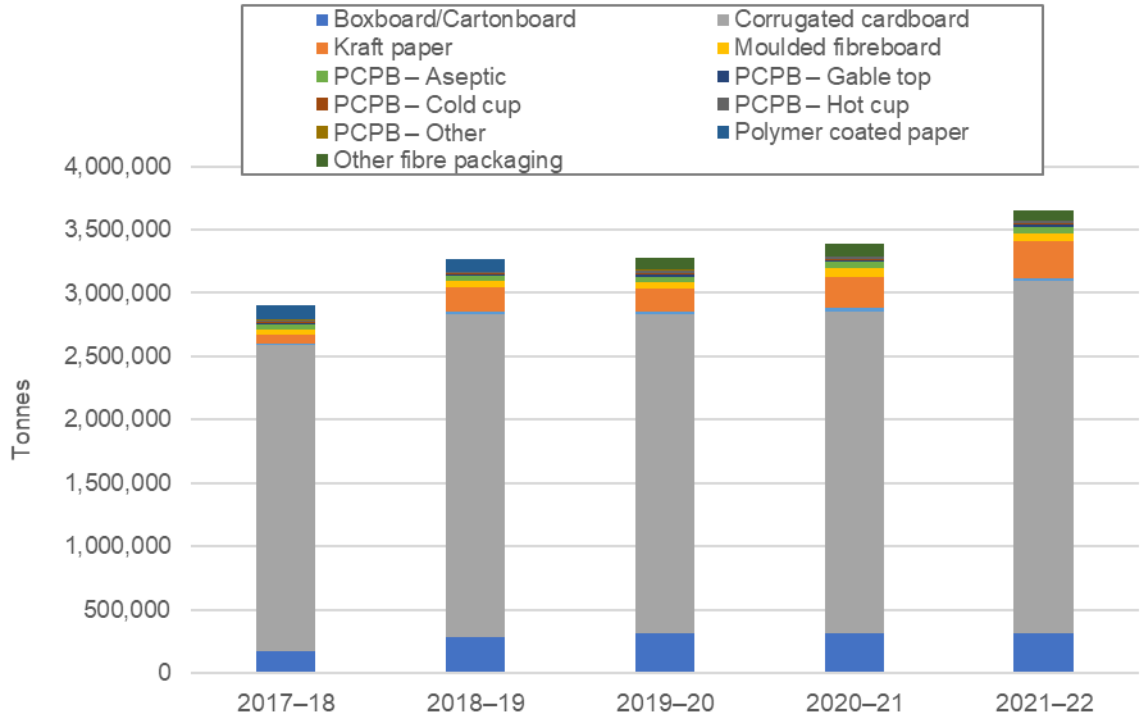

Figure 11 – Paper & paperboard packaging POM (mass basis) from 2017–18 to 2021–22, by material type.

Table 17 – Paper & paperboard packaging POM (count and per capita bases) from 2018–19 to 2021–22, by material type.

Material type	2018–19		2019–20		2020–21		2021–22	
	(million units)	(units/p)[a]	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)
Boxboard/ Cartonboard	8,000	302	10,000	379	9,000	364	10,000	395
Corrugated cardboard	8,000	298	7,000	291	8,000	293	8,000	291
HWS carrierboard	0	13	0	16	1,000	20	0	16
Kraft paper	22,000	866	20,000	789	29,000	1,122	27,000	1,042
Moulded fibreboard	2,000	64	2,000	68	2,000	73	1,000	46
PCPB – Aseptic	1,000	52	1,000	54	2,000	66	2,000	68
PCPB – Gable top	1,000	21	1,000	21	1,000	26	1,000	28
PCPB – Cold cup	0	14	1,000	33	1,000	21	1,000	21
PCPB – Hot cup	1,000	48	2,000	90	2,000	73	2,000	77
PCPB – Other	0	15	0	15	0	15	0	7
Polymer coated paper	0	0	0	2	0	2	0	2
Other fibre packaging	22,000	851	28,000	1,107	28,000	1,101	33,000	1,264
Total	**64,000**	**2,545**	**73,000**	**2,865**	**82,000**	**3,176**	**85,000**	**3,257**

a) units/p – units (count) per person.

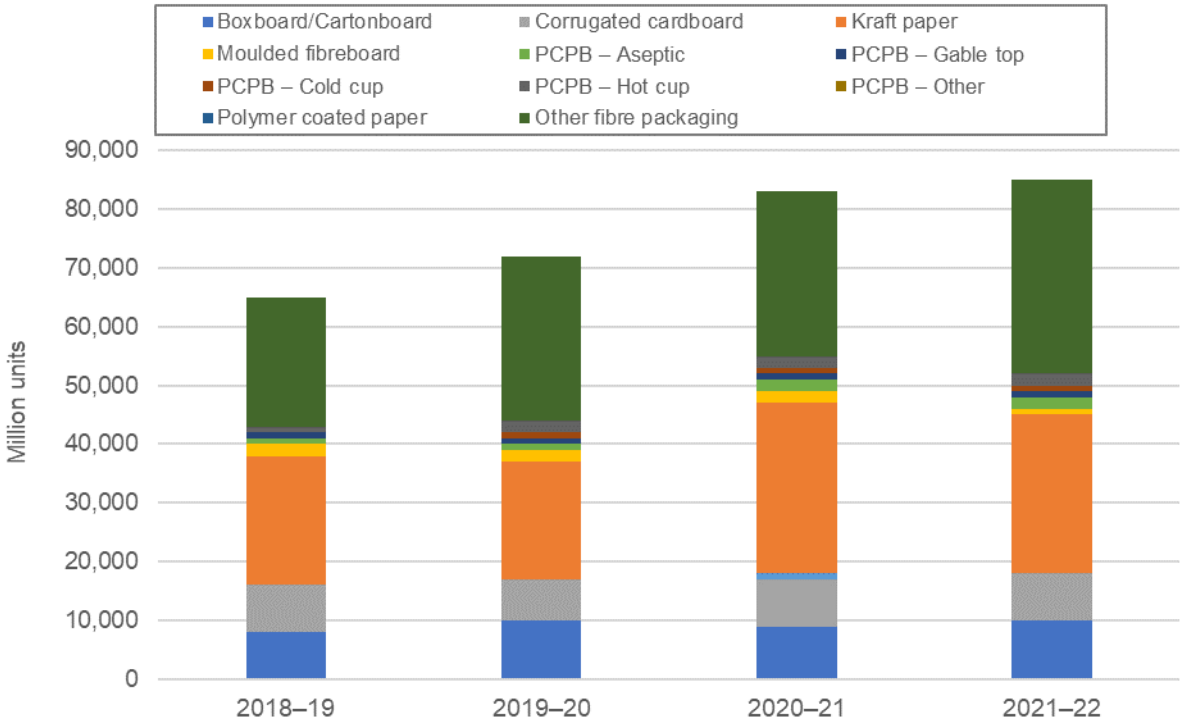

Figure 12 – Paper & paperboard packaging POM (count basis) from 2018–19 to 2021–22, by material type.

Sector of use

Estimates for paper & paperboard packaging POM by material type and sector of use are provided in Table 18 and **Figure 13**.

In 2021–22 an estimated 75.9% of paper & paperboard packaging was corrugated cardboard, with the remainder mostly boxboard/cartonboard (8.8%) or kraft paper (7.9%).

Around 56% of paper and paperboard packaging was used in the B2B sector, and 42% was used in B2C applications. The sector of use of the other 2% could not be identified.

Table 18 – Paper & paperboard packaging POM in 2021–22, by material type and sector of use.

Material type	B2C – At home[a]	B2C – AfH[a]	B2B[a]	Other or unknown	Total[b]	
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Boxboard/Cartonboard	250,000	15,000	56,000	0	320,000	8.8%
Corrugated cardboard	545,000	429,000	1,780,000	18,000	2,772,000	75.9%
HWS carrierboard	12,000	13,000	0	0	25,000	0.7%
Kraft paper	121,000	37,000	129,000	4,000	290,000	7.9%
Moulded fibreboard	35,000	3,000	27,000	0	65,000	1.8%
PCPB – Aseptic	31,000	5,000	13,000	3,000	51,000	1.4%
PCPB – Gable top	10,000	2,000	4,000	1,000	16,000	0.4%
PCPB – Cold cup	1,000	6,000	1,000	0	8,000	0.2%
PCPB – Hot cup	3,000	14,000	2,000	1,000	20,000	0.5%
PCPB – Other	1,000	2,000	2,000	0	6,000	0.2%
Polymer coated paper	0	1,000	0	0	1,000	0.0%
Other fibre packaging	1,000	2,000	46,000	31,000	80,000	2.2%
Total (tonnes)	**1,010,000**	**529,000**	**2,059,000**	**56,000**	**3,654,000**	-
Total (%)	**27.6%**	**14.5%**	**56.3%**	**1.5%**	**100.0%**	**100.0%**

a) Business-to-consumer (B2C) – At home | Business-to-consumer (B2C) – Away-from-home (AfH) | Business-to-business (B2B).

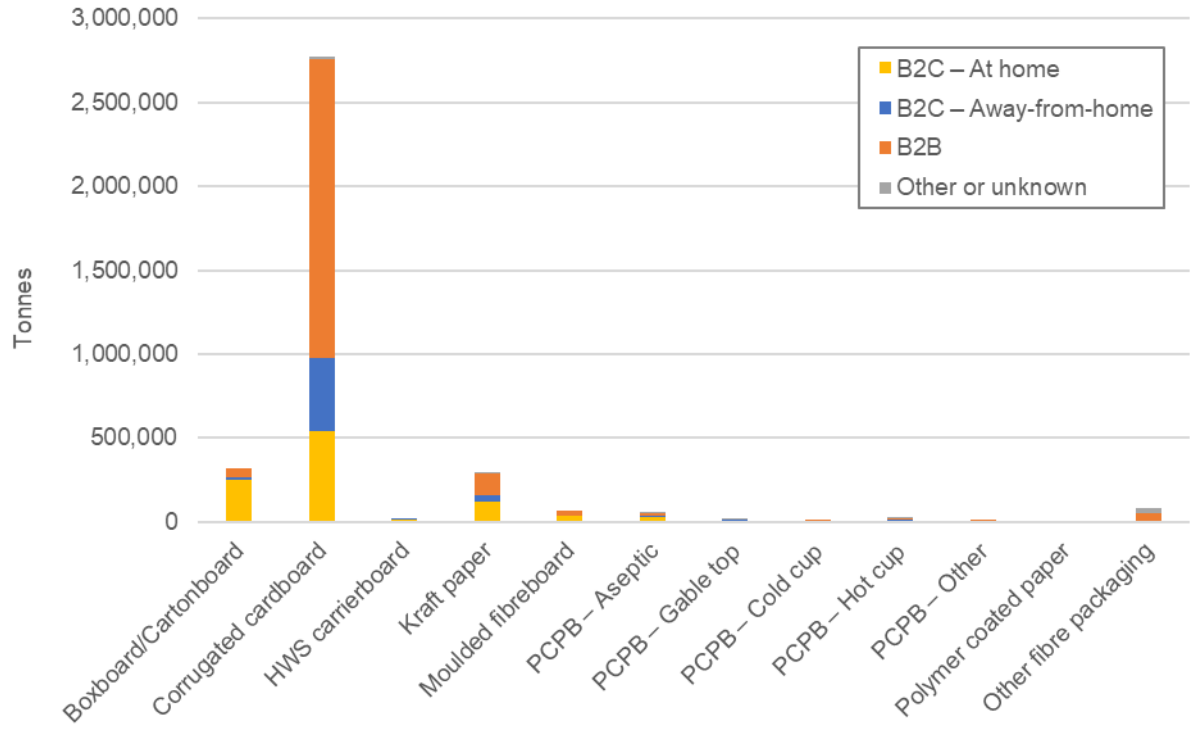

Figure 13 – Paper & paperboard packaging POM for 2021–22, by material type and sector of use.

Component group

Table 19 and **Figure 14** provide paper & paperboard packaging POM in 2021–22 by component group. About 87% of paper & paperboard packaging POM were cartons or boxes, which was mostly made of corrugated cardboard.

Table 19 – Paper & paperboard packaging POM in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Boxboard/Cartonboard	0	0	0	0	305,000	0	0	0	0	8,000	7,000	0	0	0	0	320,000
Corrugated cardboard	0	0	0	0	2,772,000	0	0	0	0	0	0	0	0	0	0	2,772,000
HWS carrierboard	1,000	0	0	0	20,000	0	0	0	0	0	4,000	0	0	0	0	25,000
Kraft paper	126,000	0	0	55,000	0	0	0	0	0	0	0	0	64,000	45,000	0	290,000
Moulded fibreboard	0	0	0	0	0	0	0	0	0	2,000	63,000	0	0	0	0	65,000
PCPB – Aseptic	0	0	0	0	51,000	0	0	0	0	0	0	0	0	0	0	51,000
PCPB – Gable top	0	0	0	0	16,000	0	0	0	0	0	0	0	0	0	0	16,000
PCPB – Cold cup	0	0	0	0	0	0	0	0	0	8,000	0	0	0	0	0	8,000
PCPB – Hot cup	0	0	0	0	0	0	0	0	0	20,000	0	0	0	0	0	20,000
PCPB – Other	1,000	0	0	0	0	0	0	0	0	2,000	1,000	0	0	1,000	0	6,000
Polymer coated paper	1,000	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
Other fibre packaging	1,000	0	0	0	0	0	0	0	0	1,000	0	0	30,000	48,000	0	80,000
Total (tonnes)	**130,000**	**0**	**0**	**55,000**	**3,165,000**	**0**	**0**	**0**	**0**	**40,000**	**76,000**	**0**	**95,000**	**93,000**	**0**	**3,654,000**
Total (%)	**3.6%**	**0.0%**	**0.0%**	**1.5%**	**86.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.1%**	**2.1%**	**0.0%**	**2.6%**	**2.6%**	**0.0%**	**100.0%**

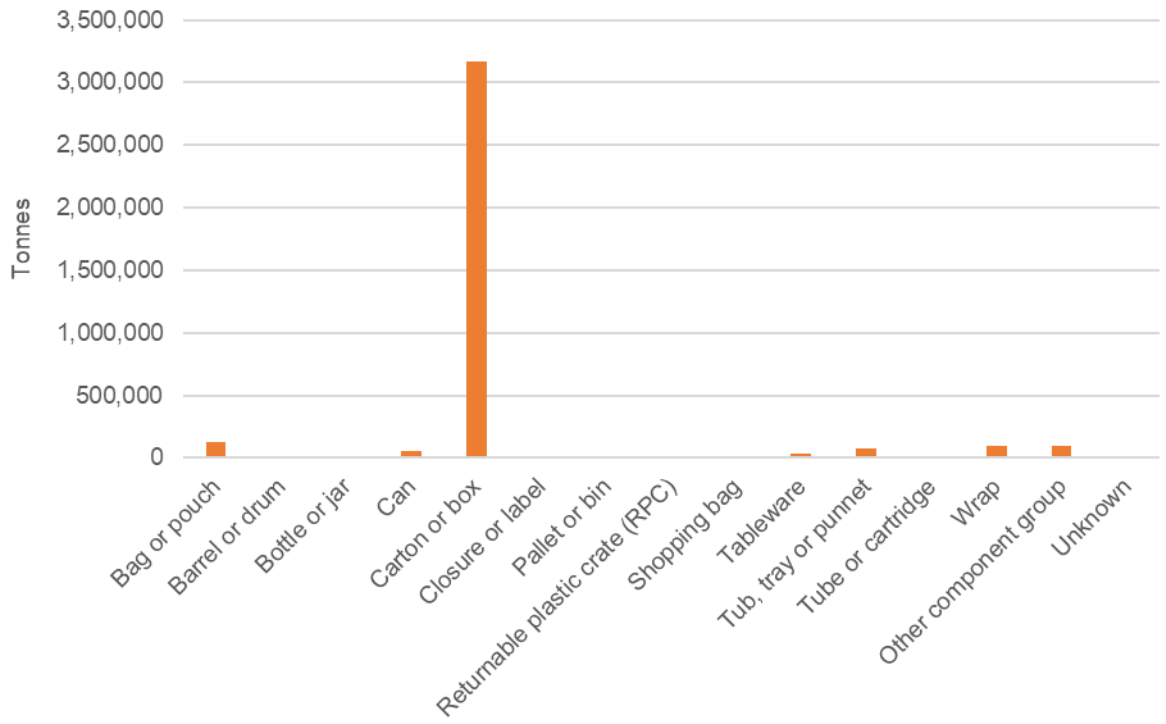

Figure 14 – Paper & paperboard packaging POM in 2021–22, by material type and component group.

Packaging material source location

Paper & paperboard packaging POM in 2021–22 by location of manufacturing and location or material source are provided in Table 20 and **Figure 15**. Packaging POM was generally either locally sourced and locally manufactured (42%) or imported filled packaging (40%).

Table 20 – Paper & paperboard packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Material type	Locally manufactured packaging – locally sourced material	Locally manufactured packaging – overseas sourced material	Overseas manufactured packaging – filled packaging	Overseas manufactured packaging – empty packaging	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Boxboard/ Cartonboard	0	157,000	110,000	53,000	320,000
Corrugated cardboard	1,441,000	93,000	1,200,000	39,000	2,772,000
HWS carrierboard	1,000	14,000	6,000	4,000	25,000
Kraft paper	80,000	49,000	105,000	56,000	290,000
Moulded fibreboard	18,000	11,000	29,000	7,000	65,000
PCPB – Aseptic	0	42,000	0	9,000	51,000
PCPB – Gable top	0	13,000	0	3,000	16,000
PCPB – Cold cup	0	8,000	0	0	8,000
PCPB – Hot cup	0	20,000	0	0	20,000
PCPB – Other	1,000	2,000	0	2,000	6,000
Polymer coated paper	0	1,000	0	0	1,000
Other fibre packaging	51,000	25,000	3,000	1,000	80,000
Total (tonnes)	**1,592,000**	**435,000**	**1,453,000**	**174,000**	**3,654,000**
Total (%)	**43.6%**	**11.9%**	**39.8%**	**4.8%**	**100.0%**

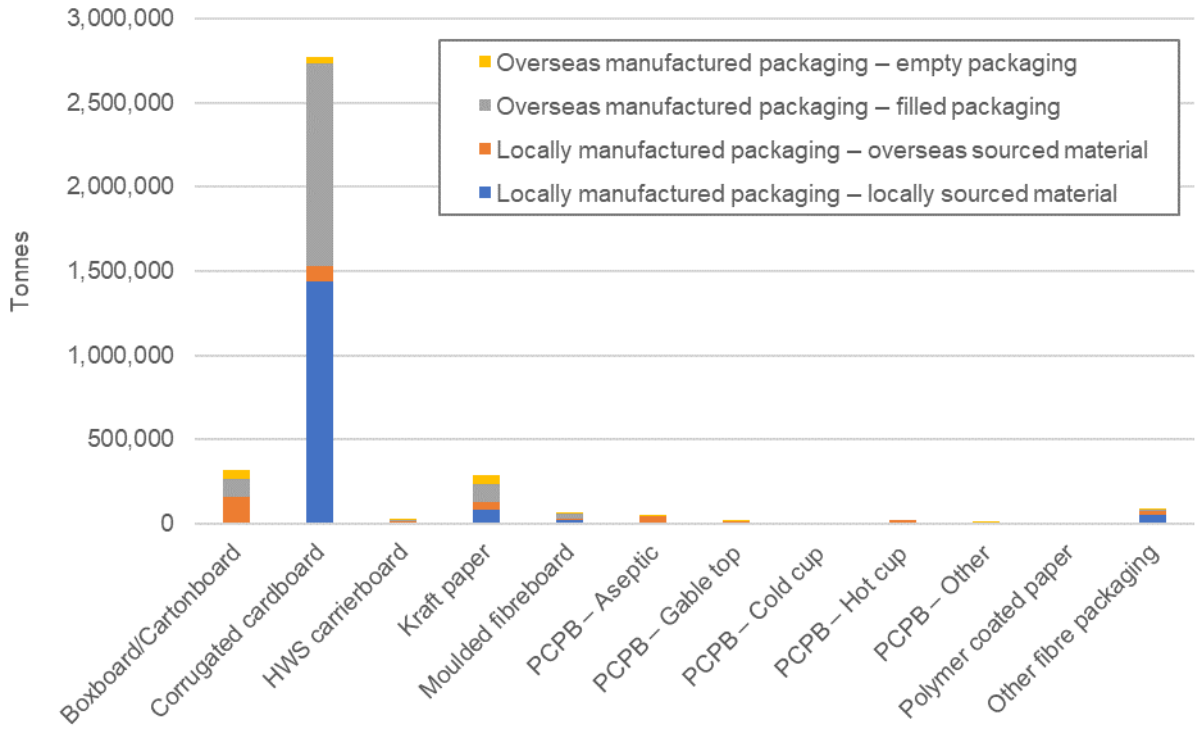

Figure 15 – Paper & paperboard packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Recycled content

Estimates of the recycled content incorporated into paper & paperboard packaging POM in 2021–22 and by material type are provided in Table 23 and Table 16.

The post-consumer recycled (PCR) content of paper & paperboard packaging was 1.99 million tonnes, or 54% of total paper & paperboard packaging POM, an increase from 53% in the previous year**.** The pre-consumer recycled content was 0.49 million tonnes (13%), and 1.18 million tonnes (32%) was sourced from virgin (primary) feedstocks.

Table 21 – Paper & paperboard packaging POM in 2021–22, by material type and recycled content.

Material type	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Boxboard/Cartonboard	115,000	36%	76,000	24%	129,000	40%	320,000
Corrugated cardboard	1,789,000	65%	343,000	12%	639,000	23%	2,772,000
HWS carrierboard	0	0%	2,000	8%	23,000	92%	25,000
Kraft paper	16,000	5%	54,000	19%	221,000	76%	290,000
Moulded fibreboard	55,000	85%	3,000	5%	6,000	10%	65,000
PCPB – Aseptic	0	0%	0	0%	51,000	100%	51,000
PCPB – Gable top	0	0%	0	0%	16,000	100%	16,000
PCPB – Cold cup	0	0%	1,000	7%	8,000	93%	8,000
PCPB – Hot cup	0	0%	2,000	8%	18,000	92%	20,000
PCPB – Other	0	1%	0	1%	6,000	99%	6,000
Polymer coated paper	0	0%	0	0%	1,000	100%	1,000
Other fibre packaging	15,000	18%	6,000	8%	59,000	74%	80,000
Total	**1,990,000**	**54%**	**487,000**	**13%**	**1,177,000**	**32%**	**3,654,000**

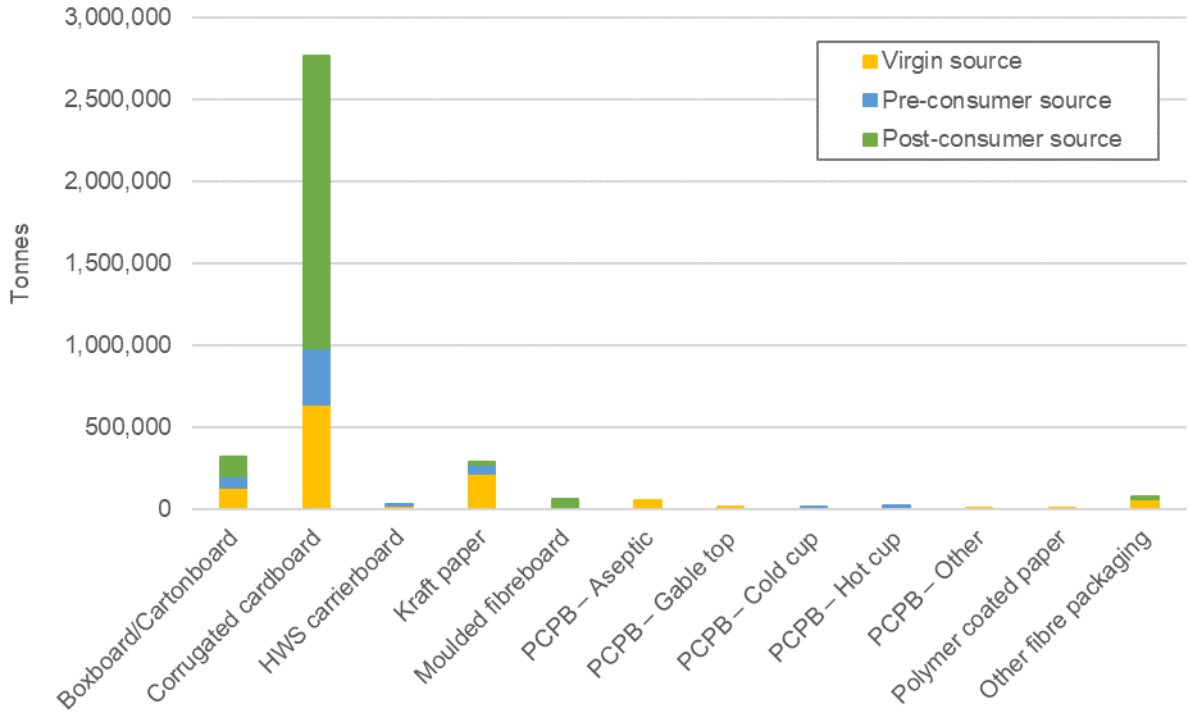

Figure 16 – Paper & paperboard packaging POM in 2021–22, by material type and recycled content.

Packaging manufacturers were requested to provide percentage estimates of the *easily achievable post-consumer recycled content* (without major redesign or manufacturing equipment upgrades), and the *maximum achievable post-consumer recycled content* (with major redesign and/or equipment upgrades).

The potential PCR content percentage values for paper & paperboard packaging POM, as reported by manufacturers, are provided in Table 22. It was reported that the potential maximum PCR content for paper & paperboard packaging is 98%, compared to 54% currently.

Note that data is only reported where packaging manufacturers representing more than 20% of total packaging POM (by material type) responded to the related survey questions.

Table 22 – Potential paper & paperboard packaging post-consumer recycled content, by material type and level of intervention.

Material type	Current	Easily achievable	Maximum achievable
	(%)	(%)	(%)
Boxboard/Cartonboard	36%	65%	100%
Corrugated cardboard	65%	77%	99%
HWS carrierboard	0%	65%	85%
Kraft paper	5%	81%	99%
Moulded fibreboard	85%	89%	100%
PCPB – Aseptic	0%	55%	95%
PCPB – Gable top	0%	55%	95%
PCPB – Cold cup	0%	55%	95%
PCPB – Hot cup	0%	55%	95%
PCPB – Other	1%	Insufficient data	Insufficient data
Polymer coated paper	0%	Insufficient data	Insufficient data
Other fibre packaging	18%	74%	78%
Total	**54%**	**76%**	**98%**

Food contact suitability

Estimates for the suitability for paper & paperboard packaging POM for food contact applications are provided in Table 23, and indicate that 31% of packaging POM in 2021–22 was suitable for food contact applications and 67% was not suitable. The suitability of the remainder was not known.

Table 23 – Paper & paperboard packaging POM in 2021–22, suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Boxboard/Cartonboard	112,000	35%	205,000	64%	2,000	1%	320,000
Corrugated cardboard	714,000	26%	1,993,000	72%	65,000	2%	2,772,000
HWS carrierboard	5,000	19%	20,000	81%	0	0%	25,000
Kraft paper	125,000	43%	147,000	51%	18,000	6%	290,000
Moulded fibreboard	37,000	57%	26,000	40%	2,000	3%	65,000
PCPB – Aseptic	51,000	100%	0	0%	0	0%	51,000
PCPB – Gable top	16,000	100%	0	0%	0	0%	16,000
PCPB – Cold cup	8,000	100%	0	0%	0	0%	8,000
PCPB – Hot cup	20,000	100%	0	0%	0	0%	20,000
PCPB – Other	5,000	94%	0	0%	0	6%	6,000
Polymer coated paper	1,000	100%	0	0%	0	0%	1,000
Other fibre packaging	27,000	33%	45,000	57%	8,000	10%	80,000
Total	**1,121,000**	**31%**	**2,437,000**	**67%**	**96,000**	**3%**	**3,654,000**

3.2 Recovery

Trends

Post-consumer paper & paperboard packaging recovery in Australia in 2021–22 is estimated at 2.50 million tonnes (±11%), which was 64.0% of all post-consumer packaging recovery.

Five-year trends for paper & paperboard recovery are provided in Table 24 and **Figure 17**. Between 2020–21 and 2021–22 there was an increase in paper & paperboard packaging recovery of 132,000 tonnes (+6%).

Table 24 – Paper & paperboard packaging recovery from 2017–18 to 2021–22, by material type.

Material type	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Boxboard/ Cartonboard	98,000	3.9	131,000	5.2	107,000	4.2	108,000	4.2	114,000	4.4
Corrugated cardboard	1,663,000	66.6	1,849,000	73.0	1,988,000	77.5	2,114,000	82.3	2,150,000	82.7
Polymer coated paperboard	14,000	0.6	5,000	0.2	5,000	0.2	2,000	0.1	3,000	0.1
Other fibre packaging[b]	42,000	1.7	60,000	2.4	128,000	5.0	145,000	5.6	236,000	9.1
Total	**1,817,000**	**72.8**	**2,045,000**	**80.7**	**2,229,000**	**86.9**	**2,370,000**	**92.3**	**2,502,000**	**96.2**

a) kg/p – kilograms per person.

b) 'Other fibre packaging' includes packaging types such as wraps, bags, pallet slips and void fill.

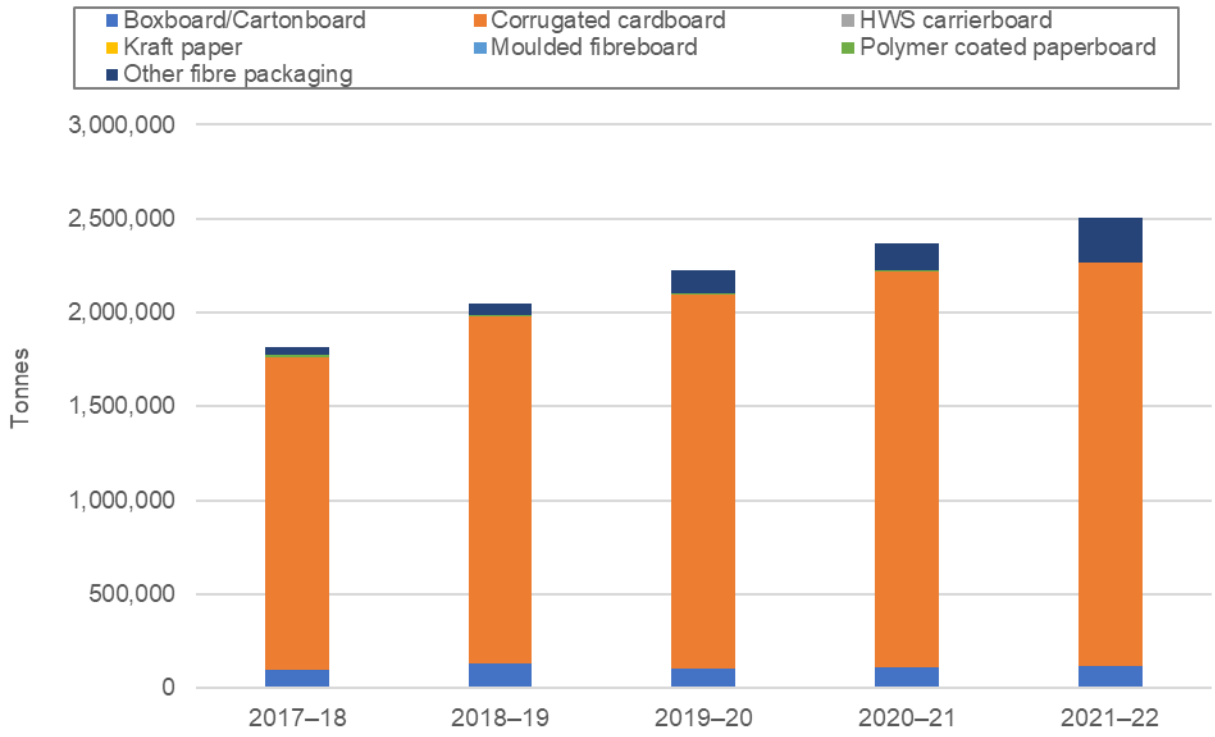

Figure 17 – Paper & paperboard packaging recovery from 2017–18 to 2021–22, by material type.

Collection service

Estimates for paper & paperboard packaging recovery, by material type and collection service, are provided in Table 25 and **Figure 18**. An estimated 2.15 million tonnes (86%) of recovered paper & paperboard packaging was corrugated cardboard. Of this corrugated cardboard around 1.23 million tonnes (55%) was from C&I collections, and 0.90 million tonnes (44%) from municipal solid waste collections (MSW).

Table 25 – Paper & paperboard packaging recovery in 2021–22, by material type and collection service.

Material type	Collection service				Total	
	MSW[a]	C&I[a]	CDS[a]	Other		
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Boxboard/Cartonboard	71,000	43,000	0	0	114,000	4.6%
Corrugated cardboard	897,000	1,228,000	0	25,000	2,150,000	85.9%
Polymer coated paperboard	1,000	0	2,000	1,000	4,000	0.2%
Other fibre packaging	134,000	101,000	0	0	236,000	9.4%
Total (tonnes)	**1,103,000**	**1,372,000**	**2,000**	**26,000**	**2,503,000**	**-**
Total (%)	**44.1%**	**54.8%**	**0.1%**	**1.0%**	**100.0%**	**100.0%**

a) Municipal solid waste (MSW), commercial and industrial (C&I) waste, and container deposit scheme (CDS) collection services.

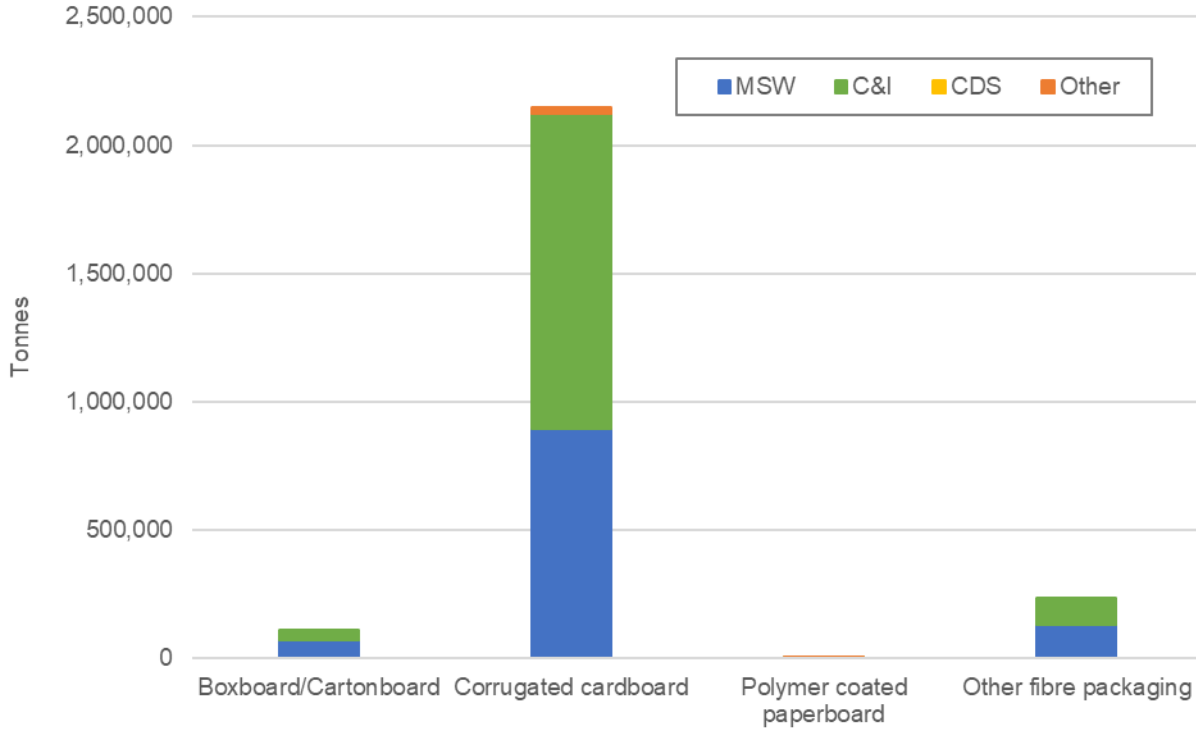

Figure 18 – Paper & paperboard packaging recovery in 2021–22, by material type and collection service.

Component group

Table 26 and **Figure 19** provide paper & paperboard packaging recovery in 2021–22 by component group. The majority (91%) of paper & paperboard packaging recovery was cartons or boxes.

Table 26 – Paper & paperboard packaging recovery in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Boxboard/Cartonboard	0	0	0	0	114,000	0	0	0	0	0	0	0	0	0	0	114,000
Corrugated cardboard	0	0	0	0	2,150,000	0	0	0	0	0	0	0	0	0	0	2,150,000
HWS carrierboard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kraft paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moulded fibreboard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCPB – Aseptic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCPB – Gable top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCPB – Cold cup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCPB – Hot cup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCPB – Other	0	0	0	0	2,000	0	0	0	0	1,000	0	0	0	0	0	3,000
Polymer coated paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other fibre packaging	43,000	0	0	0	8,000	0	0	0	0	0	38,000	0	45,000	101,000	0	236,000
Total (tonnes)	**43,000**	**0**	**0**	**0**	**2,274,000**	**0**	**0**	**0**	**0**	**1,000**	**38,000**	**0**	**45,000**	**101,000**	**0**	**2,502,000**
Total (%)	**1.7%**	**0.0%**	**0.0%**	**0.0%**	**90.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.5%**	**0.0%**	**1.8%**	**4.1%**	**0.0%**	**100.0%**

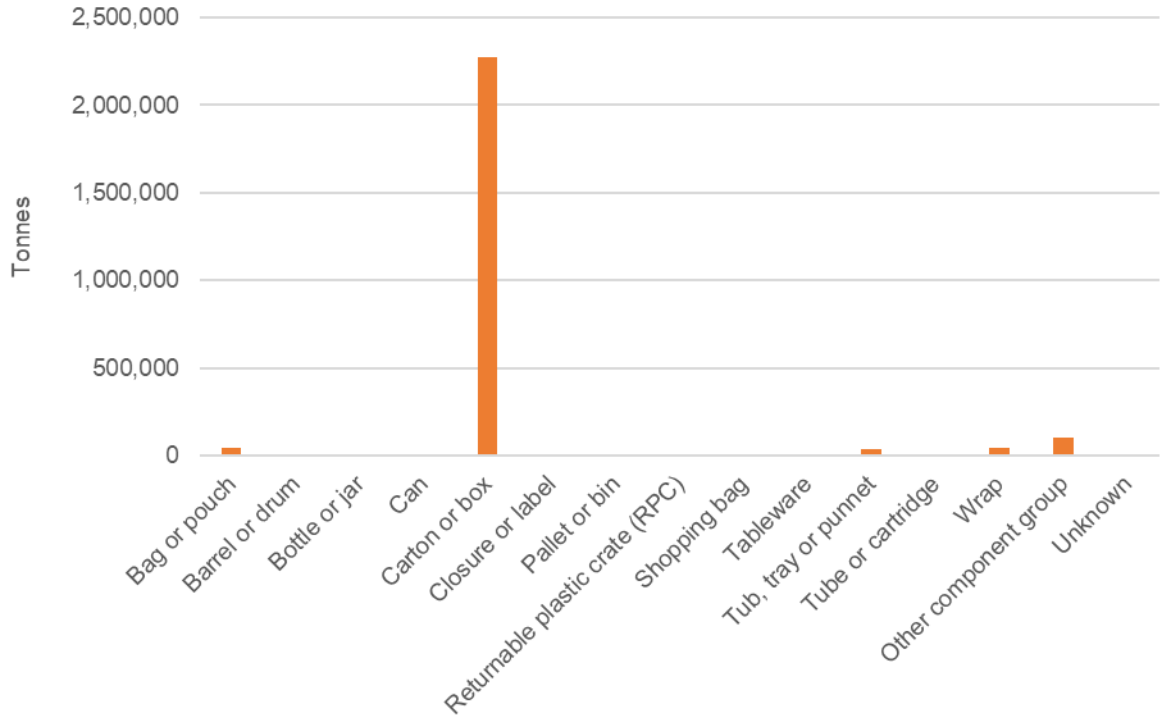

Figure 19 – Paper & paperboard packaging recovery in 2021–22, by material type and component group.

Material use application

Paper & paperboard packaging recovery in 2021–22 by material use application are provided in Table 27 and Figure 20.

Recovered paper & paperboard are largely used in packaging applications. The application of much of the exported scrap paper & paperboard could not be determined with any certainty (accounting for the large 'Unknown' quantity), however, much of this would be used as an input into packaging manufacture overseas, and corrugated cartons in particular.

Table 27 – Paper & paperboard packaging recovery in 2021–22, by material type and material use application.

Material type	Packaging applications	Non-packaging applications	Unknown applications	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Boxboard/Cartonboard	41,000	0	73,000	114,000
Corrugated cardboard	1,407,000	11,000	731,000	2,150,000
HWS carrierboard	0	0	0	0
Kraft paper	0	0	0	0
Moulded fibreboard	0	0	0	0
PCPB – Aseptic	0	0	0	0
PCPB – Gable top	0	0	0	0
PCPB – Cold cup	0	0	0	0
PCPB – Hot cup	0	0	0	0
PCPB – Other	0	0	3,000	3,000
Polymer coated paper	0	0	0	0
Other fibre packaging	182,000	1,000	52,000	236,000
Total (tonnes)	**1,631,000**	**12,000**	**860,000**	**2,502,000**
Total (%)	**65.2%**	**0.5%**	**34.4%**	**100.0%**

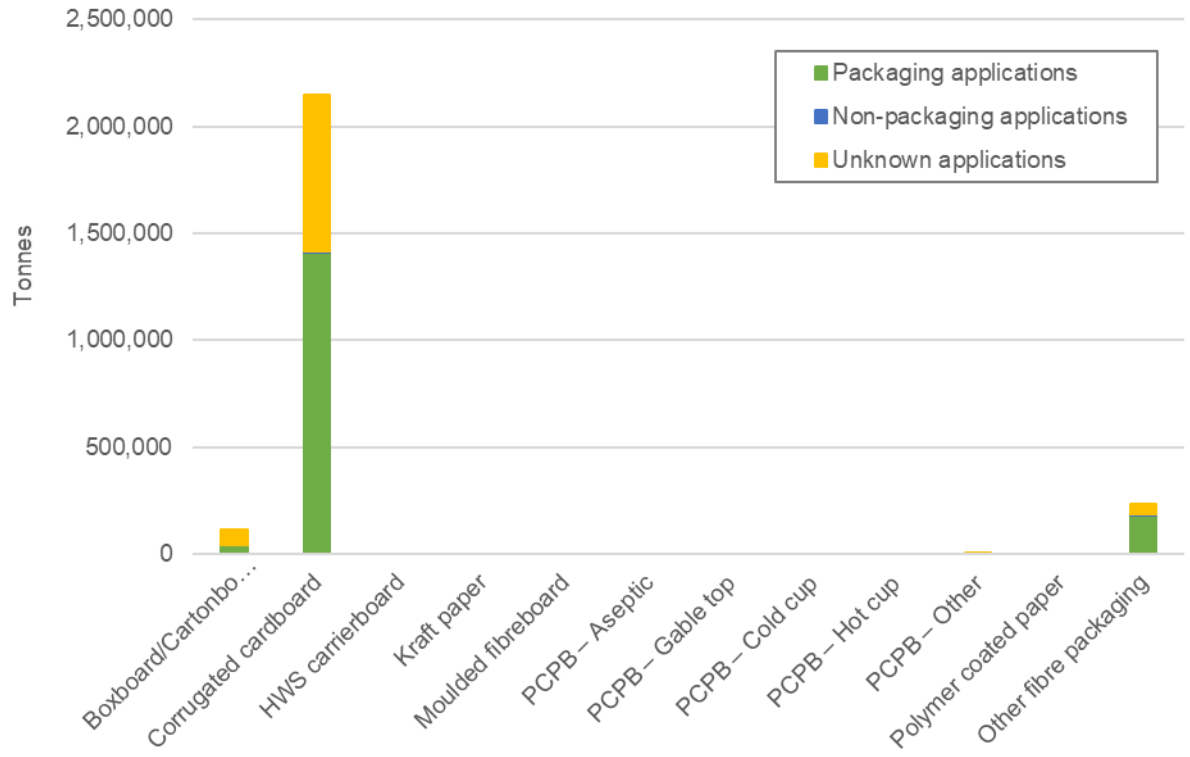

Figure 20 – Paper & paperboard packaging recovery in 2021–22, by material type and material use application.

Material use destination

Paper & paperboard packaging recovery in 2021–22 by material use destination are provided in Table 28 and Figure 21. Material use destination was split fairly evenly for local (53%) and overseas (47%).

Table 28 – Paper & paperboard packaging recovery in 2021–22, by material type and destination of material.

Material type	Local	Overseas	Unknown destinations	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Boxboard/Cartonboard	35,000	78,000	1,000	114,000
Corrugated cardboard	1,131,000	1,018,000	0	2,150,000
HWS carrierboard	0	0	0	0
Kraft paper	0	0	0	0
Moulded fibreboard	0	0	0	0
PCPB – Aseptic	0	0	0	0
PCPB – Gable top	0	0	0	0
PCPB – Cold cup	0	0	0	0
PCPB – Hot cup	0	0	0	0
PCPB – Other	0	3,000	0	3,000
Polymer coated paper	0	0	0	0
Other fibre packaging	157,000	78,000	0	235,000
Total (tonnes)	**1,324,000**	**1,177,000**	**1,000**	**2,502,000**
Total (%)	**52.9%**	**47.1%**	**0.0%**	**100.0%**

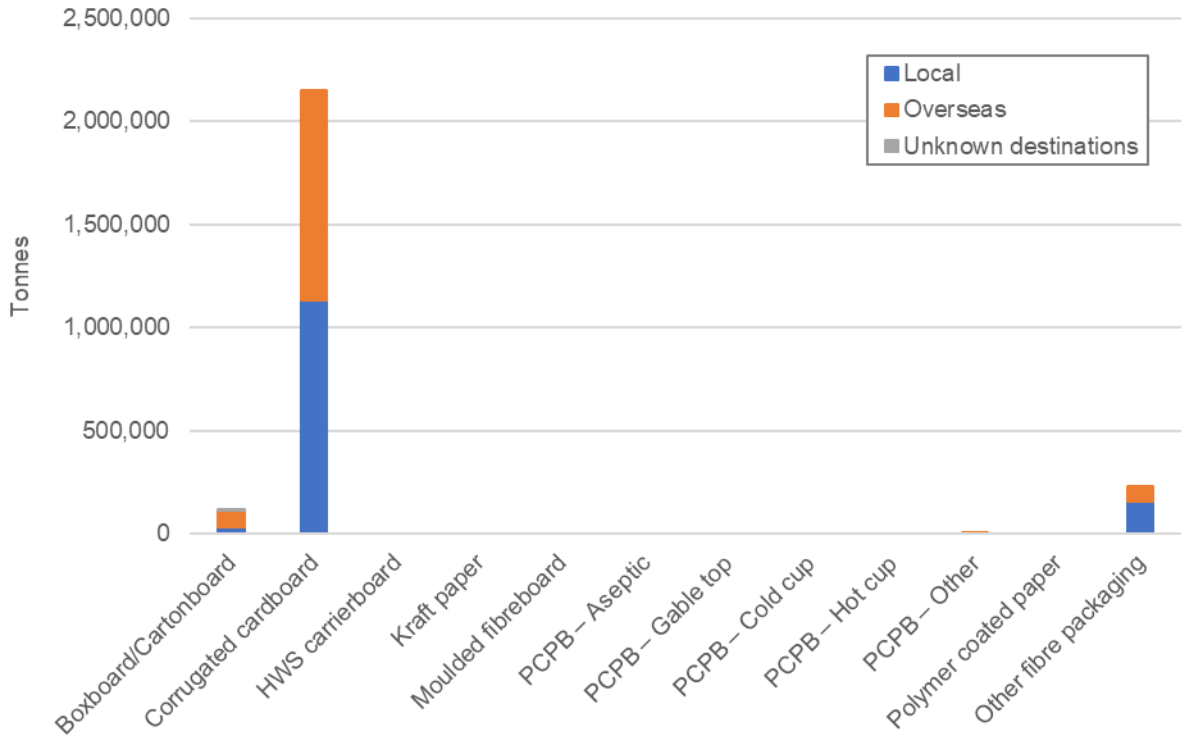

Figure 21 – Paper & paperboard packaging recovery in 2021–22, by material type and destination of material.

Food contact suitability

Estimates for the suitability for paper & paperboard packaging recovery for food contact applications are provided in Table 29, and indicate that 0% of recovered paper & paperboard packaging was suitable for food contact packaging applications in 2021–22.

Table 29 – Paper & paperboard packaging recovery suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Boxboard/Cartonboard	0	0%	42,000	37%	72,000	63%	114,000
Corrugated cardboard	0	0%	1,422,000	66%	728,000	34%	2,150,000
HWS carrierboard	0	0%	0	0%	0	0%	0
Kraft paper	0	0%	0	0%	0	0%	0
Moulded fibreboard	0	0%	0	0%	0	0%	0
PCPB – Aseptic	0	0%	0	0%	0	0%	0
PCPB – Gable top	0	0%	0	0%	0	0%	0
PCPB – Cold cup	0	0%	0	0%	0	0%	0
PCPB – Hot cup	0	0%	0	0%	0	0%	0
PCPB – Other	0	0%	0	10%	3,000	90%	3,000
Polymer coated paper	0	0%	0	0%	0	0%	0
Other fibre packaging	0	0%	184,000	78%	52,000	22%	236,000
Total	**0**	**0%**	**1,648,000**	**66%**	**854,000**	**34%**	**2,502,000**

Recovery rates

Estimates for post-consumer paper & paperboard packaging recovery rates in 2021–22, by material type, are provided in Table 30 and Figure 22.

The relatively high post-consumer paper & paperboard packaging recovery rate of 68% is underpinned by the recovery of corrugated cardboard (78% recovery rate), most of which is B2B material collected through C&I collections.

Table 30 – Post-consumer paper & paperboard packaging recovery rates in 2021–22, by material type.

Material type	POM	Recovery	Recovery rate
	(tonnes)	(tonnes)	(%)
Boxboard/Cartonboard	320,000	114,000	35%
Corrugated cardboard	2,772,000	2,150,000	78%
Polymer coated paper	102,000	3,000	3%
Other fibre packaging	460,000	236,000	51%
Total	**3,654,000**	**2,502,000**	**68%**

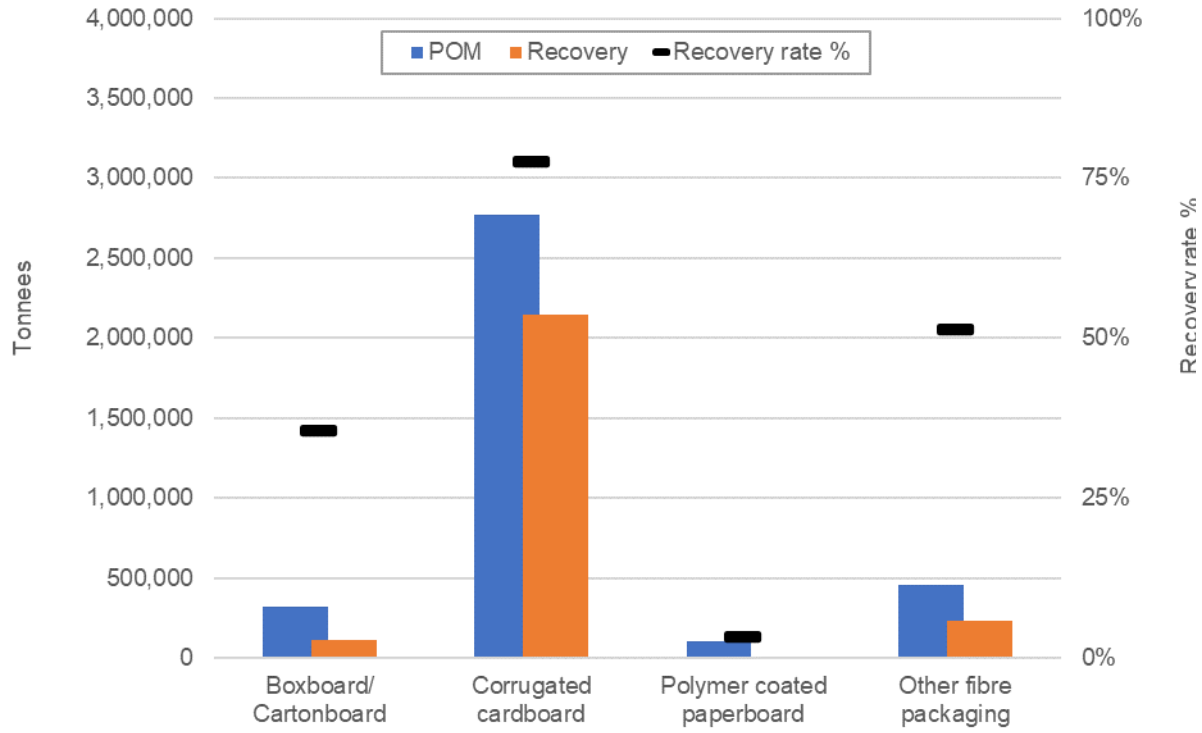

Figure 22 – Post-consumer paper & paperboard packaging recovery rates in 2021–22, by material type.

3.3 Recycling potential

Table 31 and **Figure 23** provide the recycling potential classifications of paper & paperboard packaging POM in 2021–22, and indicate that 93% of paper & paperboard packaging has a good recycling potential classification.

Table 31 – Paper & paperboard packaging POM in 2021–22, by recycling potential classification and material type.

Material type	Good recycling potential	Poor recycling potential	Not recyclable	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Boxboard/Cartonboard	312,000	8,000	0	0	320,000
Corrugated cardboard	2,772,000	0	0	0	2,772,000
HWS carrierboard	0	1,000	24,000	0	25,000
Kraft paper	235,000	55,000	0	0	290,000
Moulded fibreboard	63,000	0	2,000	0	65,000
PCPB – Aseptic	0	51,000	0	0	51,000
PCPB – Gable top	0	16,000	0	0	16,000
PCPB – Cold cup	0	0	8,000	0	8,000
PCPB – Hot cup	0	0	20,000	0	20,000
PCPB – Other	0	2,000	3,000	0	6,000
Polymer coated paper	0	1,000	0	0	1,000
Other fibre packaging	27,000	52,000	1,000	0	80,000
Total (tonnes)	**3,410,000**	**186,000**	**58,000**	**0**	**3,654,000**
Total (%)	**93.3%**	**5.1%**	**1.6%**	**0.0%**	**100.0%**

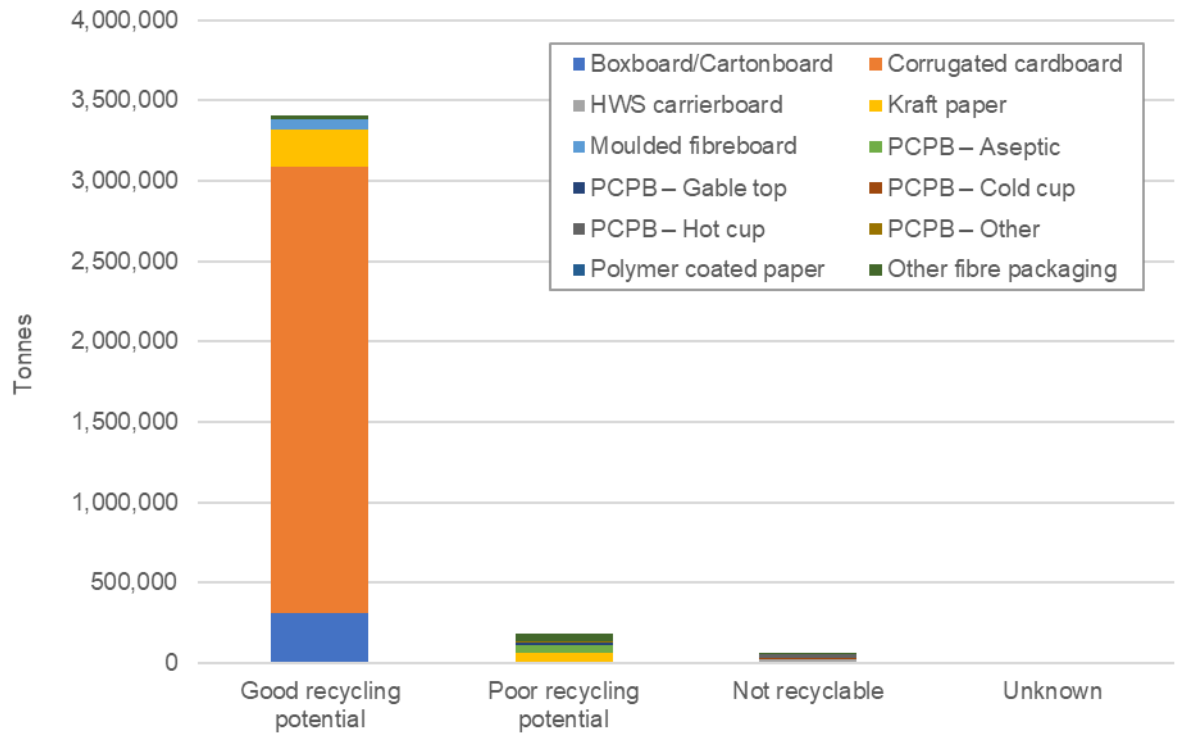

Figure 23 – Paper & paperboard packaging POM in 2021–22, by recycling potential classification and material type.

3.4 Projections to 2026–27

Projections for paper & paperboard packaging POM from 2022–23 to 2026–27 are provided in Table 32 and **Figure 24**. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 is projected data based on survey estimates of POM growth by material type.

The estimated five-year compound annual growth rate (CAGR) for paper & paperboard packaging POM from 2021–22 to 2026–27 is 4.0% per year.

Table 32 – Paper & paperboard packaging POM (mass and per capita bases) from 2019–20 to 2026–27, by material type.

Material type	2019–20		2020–21		2021–22		2022–23		2023–24		2024–25		2025–26		2026–27		5-yr CAGR[b]
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(%/yr)
Boxboard/Cartonboard	316,000	12.3	315,000	12.2	320,000	12.3	329,000	12.1	339,000	12.3	349,000	12.5	360,000	12.7	370,000	12.9	3.0%
Corrugated cardboard	2,513,000	98.0	2,539,000	98.8	2,772,000	106.6	2,858,000	105.3	2,947,000	106.9	3,038,000	108.6	3,133,000	110.4	3,230,000	112.3	3.1%
HWS[c] carrierboard	25,000	1.0	31,000	1.2	25,000	1.0	26,000	0.9	26,000	1.0	27,000	1.0	28,000	1.0	29,000	1.0	2.8%
Kraft paper	180,000	7.0	246,000	9.6	290,000	11.2	298,000	11.0	306,000	11.1	314,000	11.2	322,000	11.4	331,000	11.5	2.6%
Moulded fibreboard	56,000	2.2	63,000	2.4	65,000	2.5	67,000	2.5	69,000	2.5	72,000	2.6	74,000	2.6	76,000	2.7	3.3%
PCPB[d] – Aseptic	40,000	1.6	49,000	1.9	51,000	2.0	53,000	2.0	55,000	2.0	58,000	2.1	60,000	2.1	62,000	2.2	4.0%
PCPB – Gable top	12,000	0.5	15,000	0.6	16,000	0.6	17,000	0.6	17,000	0.6	18,000	0.6	19,000	0.7	20,000	0.7	4.0%
PCPB – Cold cup	13,000	0.5	8,000	0.3	8,000	0.3	8,000	0.3	8,000	0.3	8,000	0.3	8,000	0.3	8,000	0.3	0.3%
PCPB – Hot cup	23,000	0.9	18,000	0.7	20,000	0.7	20,000	0.7	21,000	0.8	22,000	0.8	23,000	0.8	24,000	0.8	4.0%
PCPB – Other	4,000	0.2	4,000	0.1	6,000	0.2	6,000	0.2	6,000	0.2	6,000	0.2	6,000	0.2	7,000	0.2	3.4%
Polymer coated paper	1,000	0.1	1,000	0.1	1,000	0.1	1,000	0.1	1,000	0.1	1,000	0.1	2,000	0.1	2,000	0.1	2.0%
Other fibre packaging[c]	95,000	3.7	99,000	3.9	80,000	3.1	83,000	3.0	85,000	3.1	88,000	3.1	91,000	3.2	94,000	3.3	3.2%
Total	**3,277,000**	**127.8**	**3,387,000**	**131.9**	**3,654,000**	**140.5**	**3,766,000**	**138.8**	**3,882,000**	**140.9**	**4,002,000**	**143.1**	**4,125,000**	**145.4**	**4,252,000**	**147.8**	**4.0%**

a) kg/p – kilograms per person.

b) CAGR – compound annual growth rate.

c) Examples of other fibre packaging POM include paper bags and food wraps.

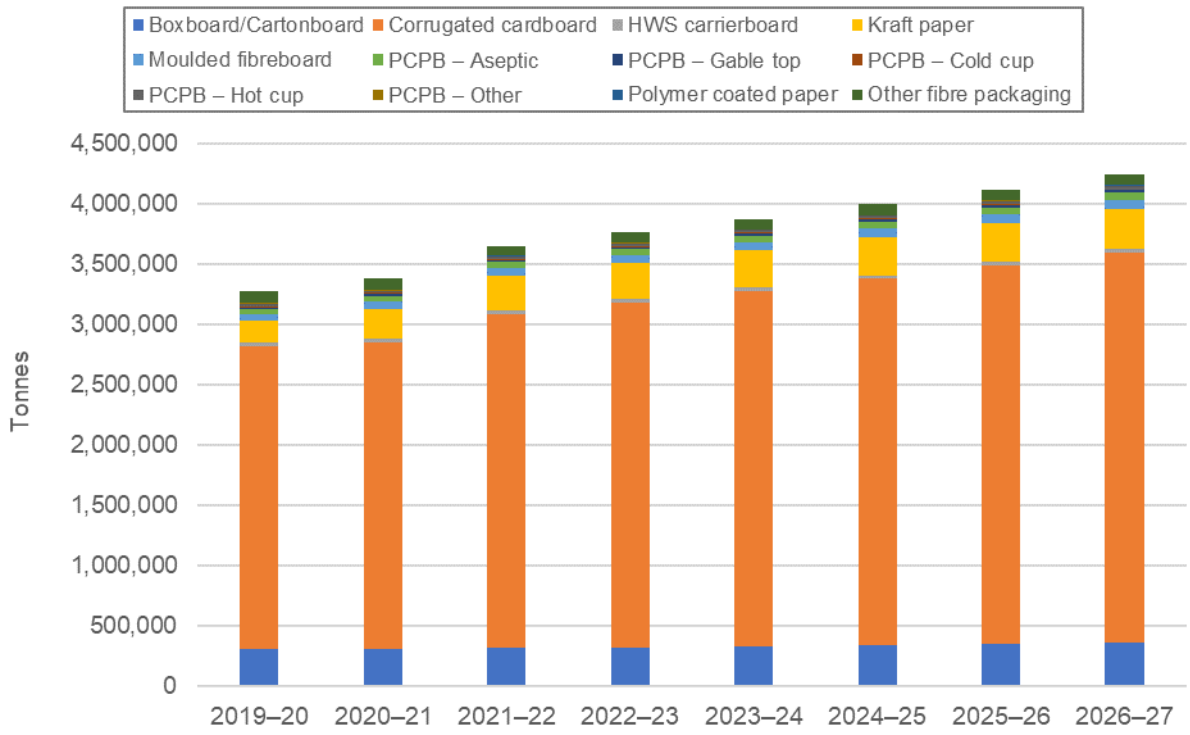

Figure 24 – Paper & paperboard packaging POM from 2019–20 to 2026–27, by material type.

Projections for paper & paperboard packaging reprocessing capacity from 2022–23 to 2026–27 are provided in Table 33 and **Figure 25**. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 onwards is projected based on reported planned new reprocessing capacity.

The estimated five-year CAGR for paper & paperboard reprocessing capacity from 2021–22 to 2026–27 is 3.6% per year.

Due to the level of detail provided in survey responses, the 'Other fibre packaging' material type in the table below effectively also includes any HWS carrierboard, kraft paper and moulded fibreboard related quantities.

Table 33 – Paper & paperboard packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

Material type	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26	2026–27	5 year CAGR[a]
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%/yr)
Boxboard/Cartonboard	41,000	35,000	35,000	38,000	41,000	43,000	46,000	49,000	6.7%
Corrugated cardboard	1,139,000	1,168,000	1,162,000	1,202,000	1,242,000	1,282,000	1,323,000	1,363,000	3.2%
HWS carrierboard	NR[b]	NR	No data	No data	No data	No data	No data	No data	N/A
Kraft paper	NR	NR	No data	No data	No data	No data	No data	No data	N/A
Moulded fibreboard	NR	NR	No data	No data	No data	No data	No data	No data	N/A
Polymer coated paperboard	<500	<500	<500	<500	<500	<500	<500	<500	0.0%
Polymer coated paper	0	0	0	0	0	0	0	0	N/A
Other fibre packaging	81,000	87,000	162,000	164,000	166,000	168,000	170,000	172,000	1.2%
Total	**1,261,000**	**1,291,000**	**1,359,000**	**1,405,000**	**1,451,000**	**1,497,000**	**1,542,000**	**1,588,000**	**3.6%**

a) CAGR – compound annual growth rate.
b) NR – not reported.

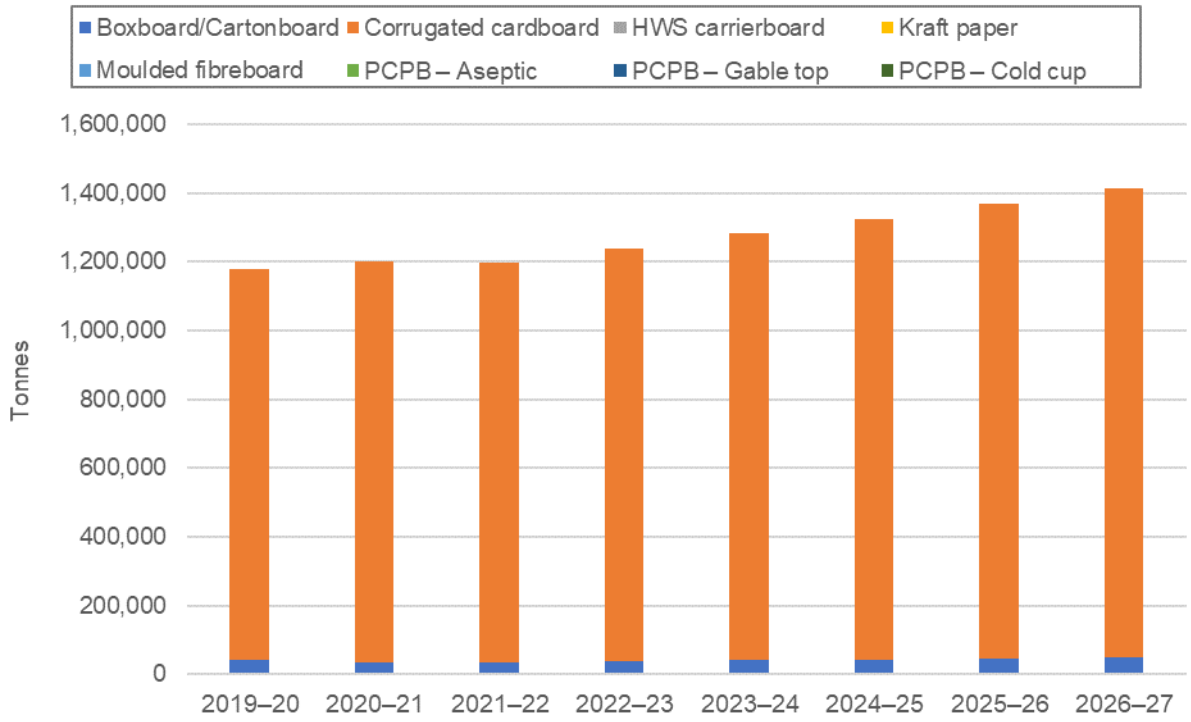

Figure 25 – Paper & paperboard packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

4 GLASS PACKAGING IN 2021–22

4.1 Placed on market

Trends

Glass packaging POM in Australia in 2021–22 is estimated at 1.14 million tonnes (±15%), which was 16.4% of all packaging POM. Five-year trends for glass packaging POM are provided in Table 34 and **Figure 26** (mass basis), and four-year trends are provided in Table 35 and Figure 27 (count basis). Note that 2017–18 count basis data is not available.

Between 2020–21 and 2021–22 there was a decrease in glass packaging POM of 140,000 tonnes (-11%).

Table 34 – Glass packaging POM (mass and per capita bases) from 2017–18 to 2021–22, by material type.

Material type	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Amber glass	438,000	17.5	381,000	15.0	334,000	13.0	233,000	9.1	181,000	7.0
Flint glass	471,000	18.9	643,000	25.4	606,000	23.6	605,000	23.6	494,000	19.0
Green glass[b]	364,000	14.6	258,000	10.2	216,000	8.4	445,000	17.3	468,000	18.0
Total	**1,273,000**	**51.0**	**1,283,000**	**50.6**	**1,156,000**	**45.1**	**1,283,000**	**50.0**	**1,143,000**	**44.0**

a) kg/p – kilograms per person.

b) Includes very small quantities of other glass colours (e.g. blue glass).

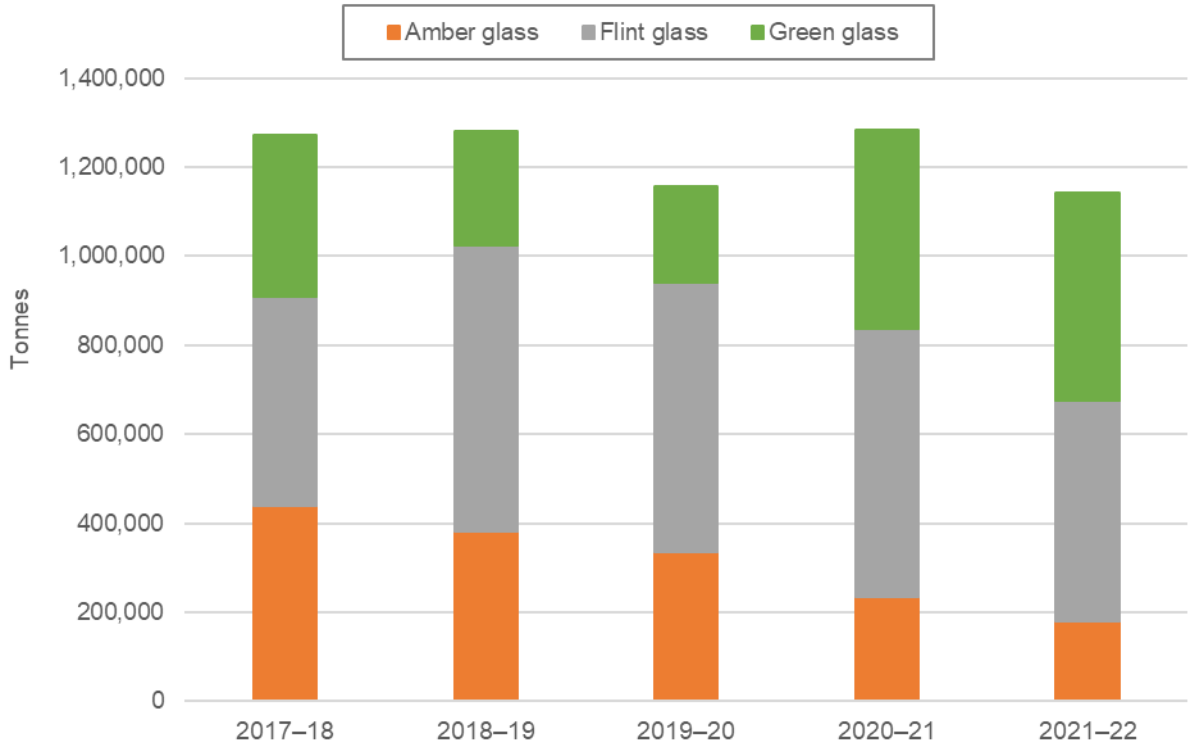

Figure 26 – Glass packaging POM (mass basis) from 2017–18 to 2021–22, by material type.

Table 35 – Glass packaging POM (count and per capita bases) from 2018–19 to 2021–22, by material type.

Material type	2018–19		2019–20		2020–21		2021–22	
	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)
Amber glass	1,800	72.2	1,600	62.5	1,100	43.5	900	33.4
Flint glass	2,500	97.4	2,300	90.7	2,300	90.5	1,900	72.9
Green glass	800	31.4	700	25.9	1,400	53.3	1,400	55.4
Total	**5,000**	**201.1**	**4,600**	**179.1**	**4,800**	**187.3**	**4,200**	**161.7**

a) Units/p – Units (count) per person.

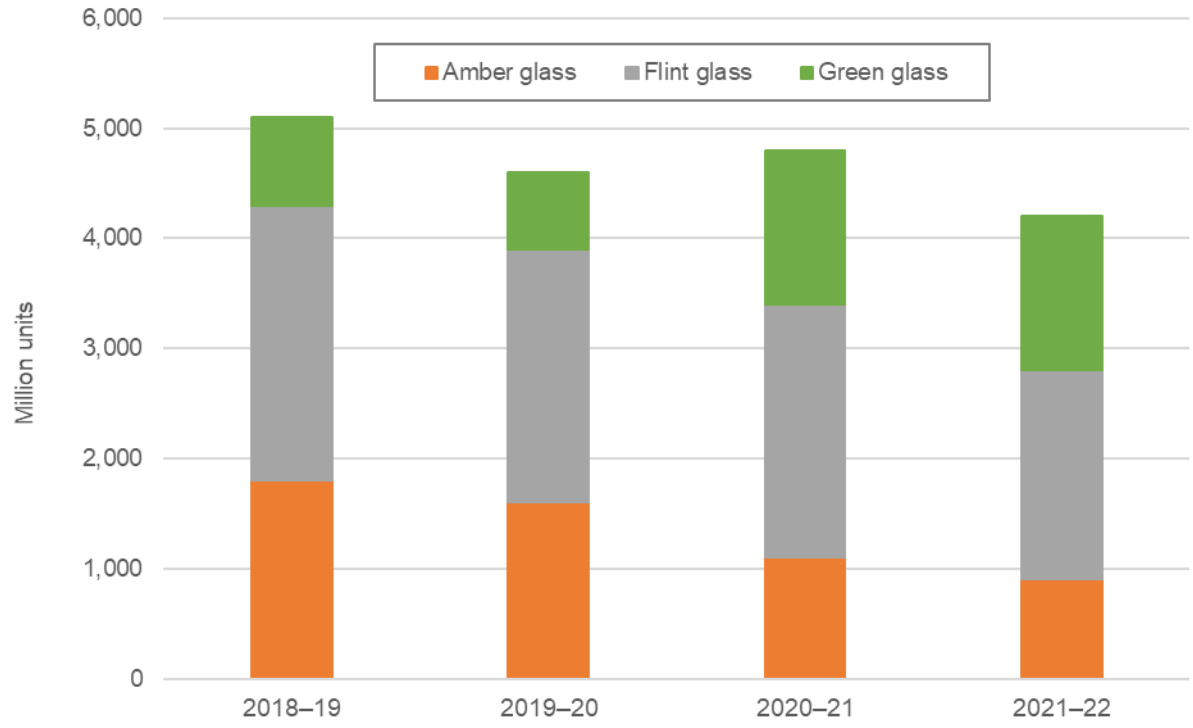

Figure 27 – Glass packaging POM (count basis) from 2018–19 to 2021–22, by material type.

Sector of use

Estimates for glass packaging POM by material type and sector of use are provided in Table 36 and Figure 28.

Glass packaging consumption is determined for three main colours, which are amber, flint (clear) and green glass. Flint glass makes up 43.2% of glass POM, followed by green glass (41.0%) and amber glass (15.8%). Almost all glass packaging was used in consumer applications.

Table 36 – Glass packaging POM in 2021–22, by material type and sector of use.

Material type	B2C – At home[a]	B2C – AfH[a]	B2B[a]	Other or unknown	Total	
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Amber glass	120,000	61,000	0	0	181,000	15.8%
Flint glass	376,000	116,000	1,000	0	494,000	43.2%
Green glass	313,000	156,000	0	0	468,000	41.0%
Total (tonnes)	**809,000**	**333,000**	**1,000**	**0**	**1,143,000**	**-**
Total (%)	**70.7%**	**29.1%**	**0.1%**	**0.0%**	**100.0%**	**100.0%**

a) Business-to-consumer (B2C) – At home | Business-to-consumer (B2C) – Away-from-home (AfH) | Business-to-business (B2B).

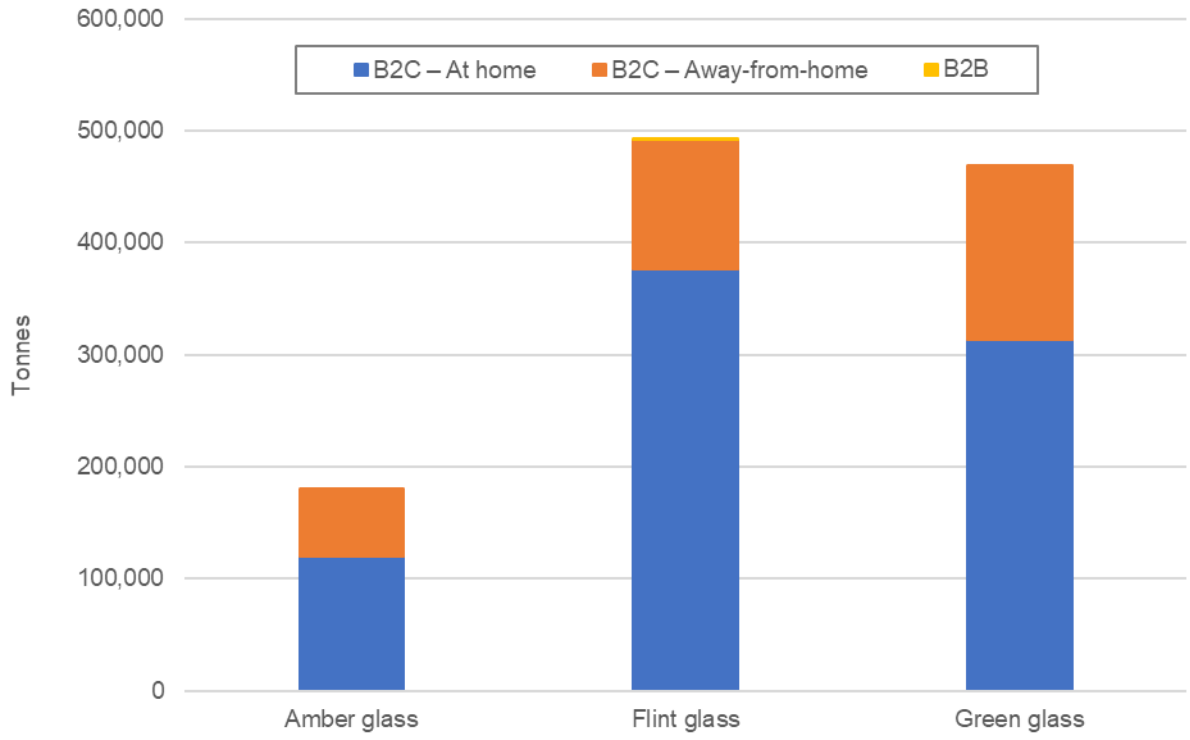

Figure 28 – Glass packaging POM in 2021–22, by material type and sector of use.

Component group

Table 37 and **Figure 29** provide glass packaging POM in 2021–22 by component group. All glass POM were bottles or jars.

Table 37 – Glass packaging POM in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Amber glass	0	0	181,000	0	0	0	0	0	0	0	0	0	0	0	0	181,000
Flint glass	0	0	494,000	0	0	0	0	0	0	0	0	0	0	0	0	494,000
Green glass	0	0	468,000	0	0	0	0	0	0	0	0	0	0	0	0	468,000
Total (tonnes)	**0**	**0**	**1,143,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,143,000**
Total (%)	**0.0%**	**0.0%**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

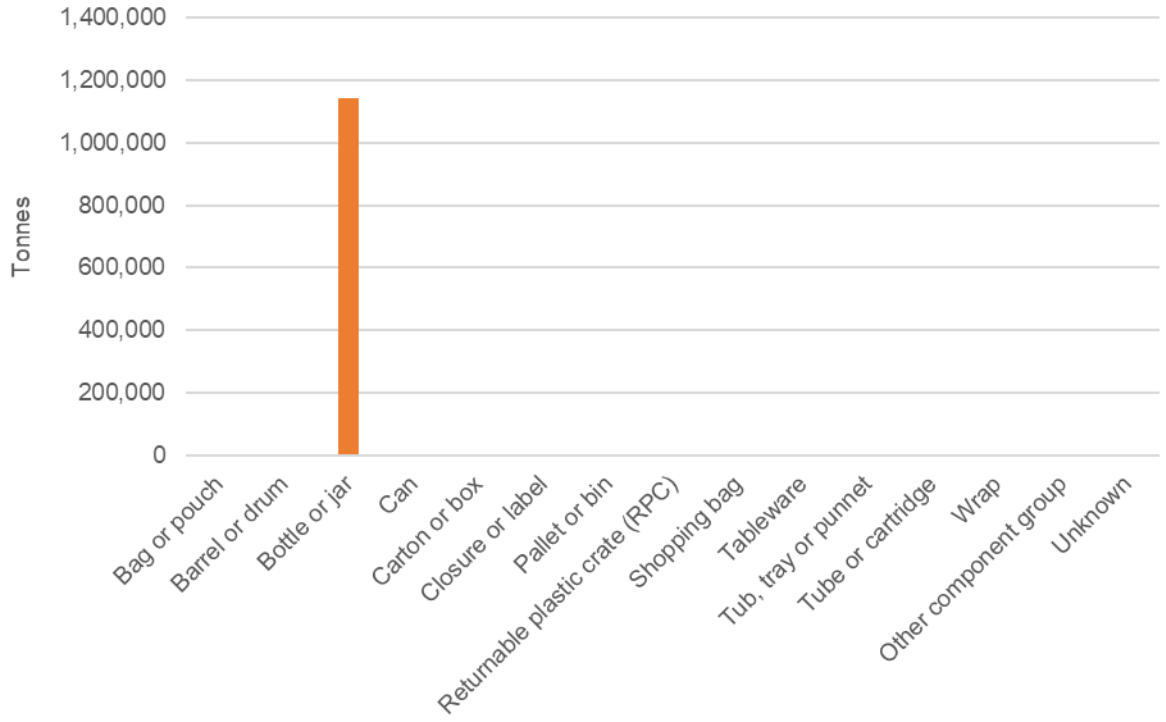

Figure 29 – Glass packaging POM in 2021–22, by material type and component group.

Packaging material source location

Glass packaging POM in 2021–22 by location of manufacturing and location or material source are provided in Table 38 and Figure 30. Packaging POM was mostly locally sourced and locally manufactured (78%), with most of the remainder imported empty packaging (13%).

Table 38 – Glass packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Material type	Locally manufactured packaging – locally sourced material	Locally manufactured packaging – overseas sourced material	Overseas manufactured packaging – filled packaging	Overseas manufactured packaging – empty packaging	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Amber glass	155,000	0	21,000	4,000	181,000
Flint glass	343,000	0	17,000	134,000	494,000
Green glass	393,000	0	65,000	10,000	468,000
Total (tonnes)	**892,000**	**1,000**	**102,000**	**148,000**	**1,143,000**
Total (%)	**78.0%**	**0.1%**	**8.9%**	**13.0%**	**100.0%**

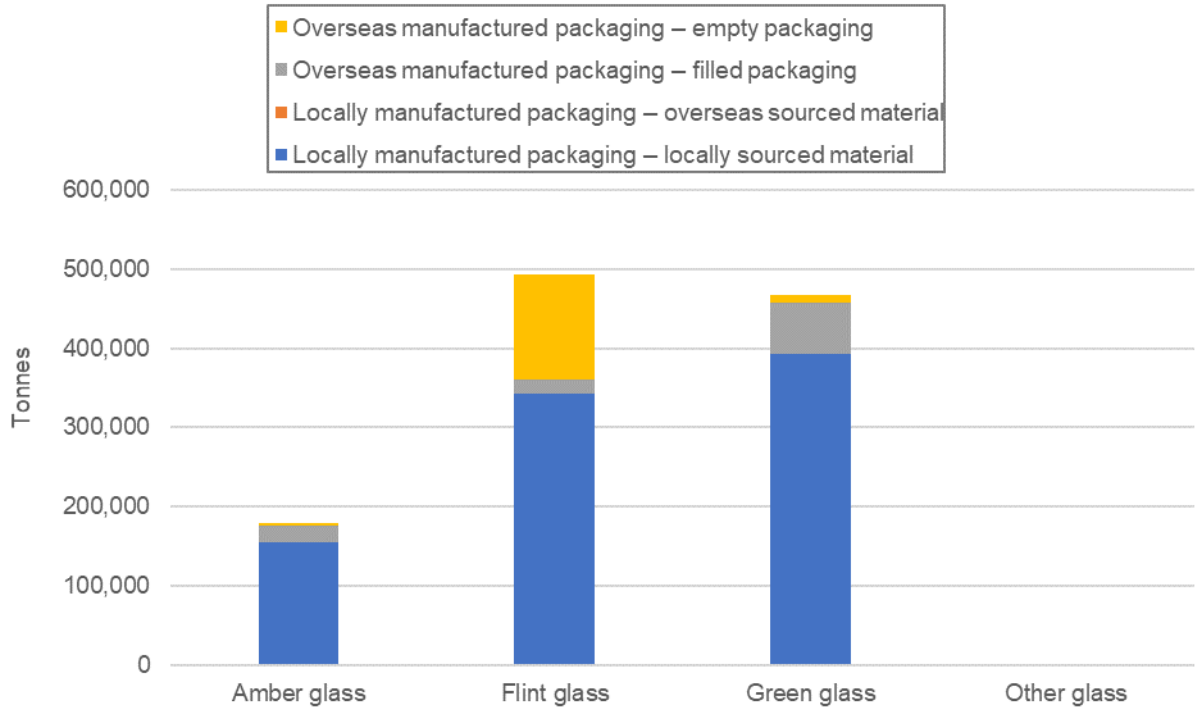

Figure 30 – Glass packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Recycled content

Estimates of the recycled content incorporated into glass packaging POM in 2021–22 and by material type are provided in Table 39 and Figure 31.

The PCR content of glass packaging was 0.47 million tonnes, or 41% of total glass packaging POM, an increase from 37% in the previous year. The pre-consumer recycled content was 76,000 tonnes (7%) and 0.60 million tonnes (52%) was sourced from virgin (primary) feedstocks.

Table 39 – Glass packaging POM in 2021–22, by material type and recycled content.

Material type	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Amber glass	83,000	46%	11,000	6%	87,000	48%	181,000
Flint glass	187,000	38%	38,000	8%	269,000	55%	494,000
Green glass	199,000	42%	28,000	6%	242,000	52%	468,000
Total	**469,000**	**41%**	**76,000**	**7%**	**599,000**	**52%**	**1,143,000**

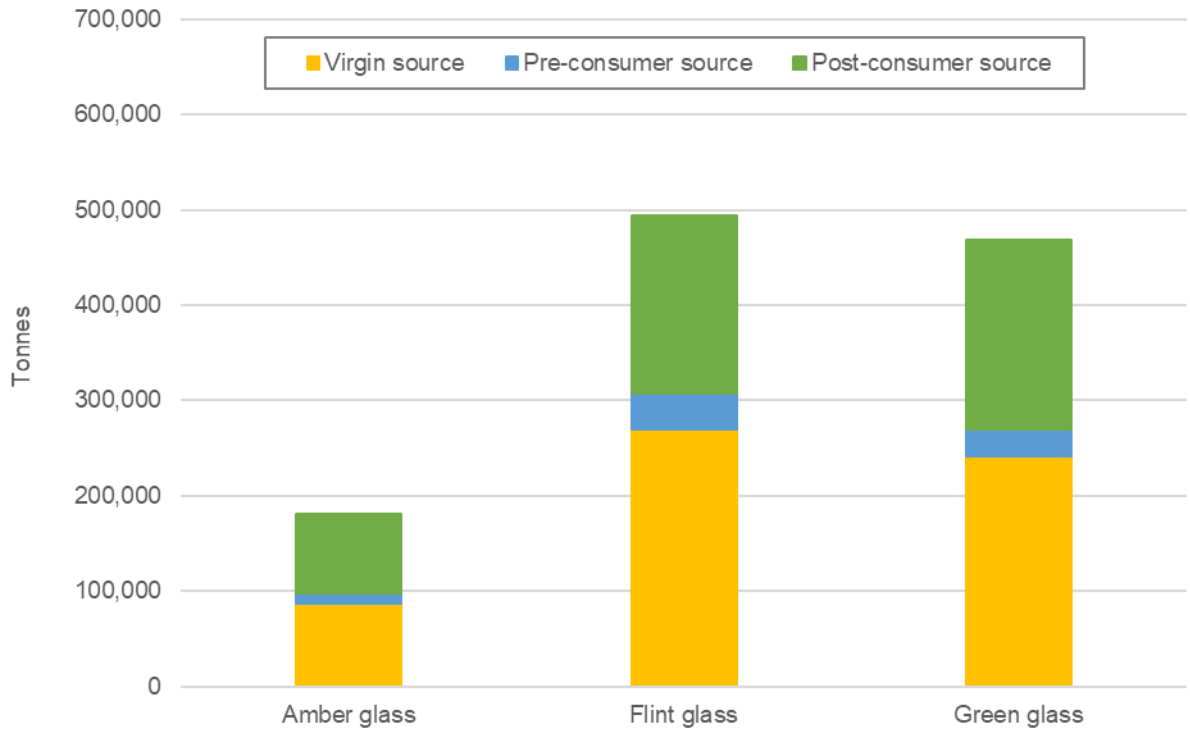

Figure 31 – Glass packaging POM in 2021–22, by material type and recycled content.

Packaging manufacturers were requested to provide percentage estimates of the *easily achievable post-consumer recycled content* (without major redesign or manufacturing equipment upgrades), and the *maximum achievable post-consumer recycled content* (with major redesign and/or equipment upgrades).

The potential PCR content percentage values for glass packaging POM, as reported by manufacturers, are provided in Table 40. It was reported that the potential maximum PCR content for glass packaging is 67%, compared to 41% currently.

Note that data is only reported where packaging manufacturers representing more than 20% of total packaging POM (by material type) responded to the related survey questions.

Table 40 – Potential glass packaging post-consumer recycled content, by material type and level of intervention.

Material type	Current	Easily achievable	Maximum achievable
	(%)	(%)	(%)
Amber glass	46%	68%	75%
Flint glass	38%	54%	54%
Green glass	42%	69%	75%
Total	**41%**	**63%**	**67%**

Food contact suitability

Estimates for the suitability for glass packaging POM for food contact applications are provided in Table 41, and indicate that 100% of glass packaging POM in 2021–22 was suitable for food contact applications.

Table 41 – Glass packaging POM suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Amber glass	181,000	100%	0	0%	0	0%	181,000
Flint glass	494,000	100%	0	0%	0	0%	494,000
Green glass	468,000	100%	0	0%	0	0%	468,000
Total	**1,143,000**	**100%**	**0**	**0%**	**0**	**0%**	**1,143,000**

4.2 Recovery

Trends

Post-consumer glass packaging recovery in Australia in 2021–22 is estimated at around 0.72 million tonnes (±12%), which was 18.4% of all post-consumer packaging recovery.

Five-year trends for glass packaging recovery are provided in Table 42 and Figure 32. Between 2020–21 and 2021–22 there was a decrease in glass recovery of 87,000 tonnes (12%).

Table 42 – Glass packaging recovery from 2017–18 to 2021–22, by material type.

Material type	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Amber glass	189,000	5.8	174,000	6.9	202,000	7.9	202,000	7.9	174,000	6.7
Flint glass	212,000	6.5	283,000	11.2	366,000	14.3	374,000	14.6	315,000	12.1
Green glass	180,000	5.5	117,000	4.6	131,000	5.1	228,000	8.9	230,000	8.8
Total	**582,000**	**23.3**	**574,000**	**22.6**	**699,000**	**27.3**	**805,000**	**31.3**	**718,000**	**27.6**

a) kg/p – kilograms per person.

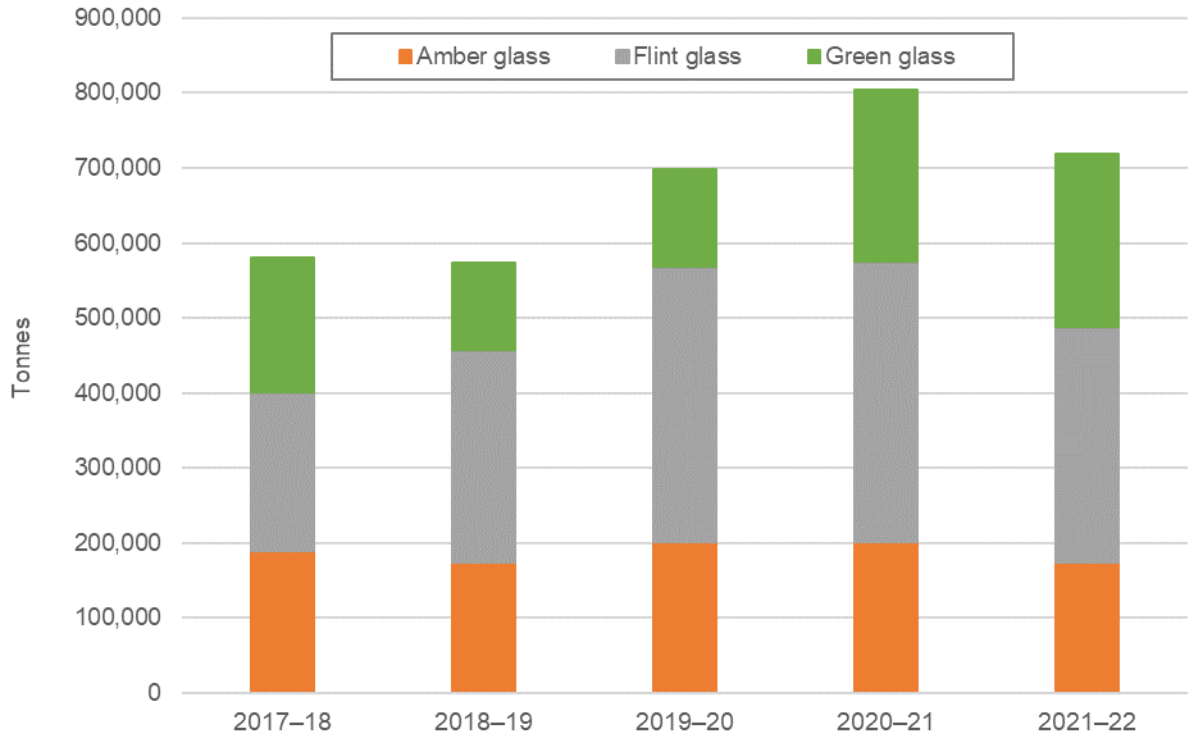

Figure 32 – Glass packaging recovery from 2017–18 to 2021–22, by material type.

Collection service

Estimates for glass packaging recovery, by material type and collection service, are provided in Table 43 and Figure 33.

An estimated 458,000 tonnes (64%) of glass packaging was recovered through MSW collections, with another 260,000 tonnes (36%) recovered through separate CDS collections. Less than 1% was reported as recovered through C&I related collections.

The kerbside collections (MSW) do include significant quantities of CDS eligible glass, which is subsequently redeemed through CDS systems directly by MRF operators. However, the collection system for this CDS glass is the kerbside recycling system.

Table 43 – Glass packaging recovery in 2021–22, by material type and collection service.

Material type	Collection service				Total	
	MSW[a]	C&I[a]	CDS[a]	Other		
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Amber glass	88,000	0	86,000	0	174,000	24.2%
Flint glass	208,000	0	107,000	0	315,000	43.8%
Green glass	162,000	0	68,000	0	230,000	32.0%
Total (tonnes)	**458,000**	**0**	**260,000**	**0**	**718,000**	**-**
Total (%)	**63.7%**	**0.0%**	**36.3%**	**0.0%**	**100.0%**	**100.0%**

a) Municipal solid waste (MSW), commercial and industrial (C&I) waste, and container deposit scheme (CDS) collection services.

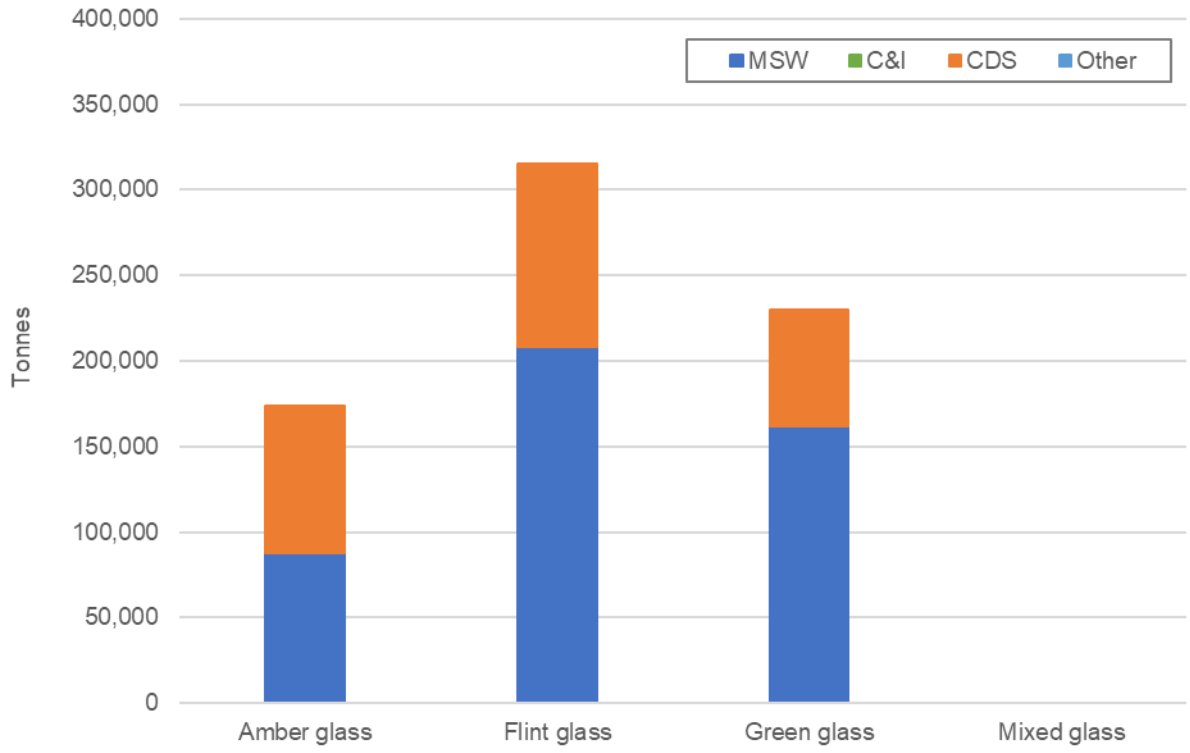

Figure 33 – Glass packaging recovery in 2021–22, by material type and collection service.

Component group

Table 44 and Figure 34 provide glass packaging recovery in 2021–22 by component group. All glass packaging recovery was bottles or jars.

Table 44 – Glass packaging recovery in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Amber glass	0	0	174,000	0	0	0	0	0	0	0	0	0	0	0	0	174,000
Flint glass	0	0	315,000	0	0	0	0	0	0	0	0	0	0	0	0	315,000
Green glass	0	0	230,000	0	0	0	0	0	0	0	0	0	0	0	0	230,000
Total (tonnes)	**0**	**0**	**718,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**718,000**
Total (%)	**0.0%**	**0.0%**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

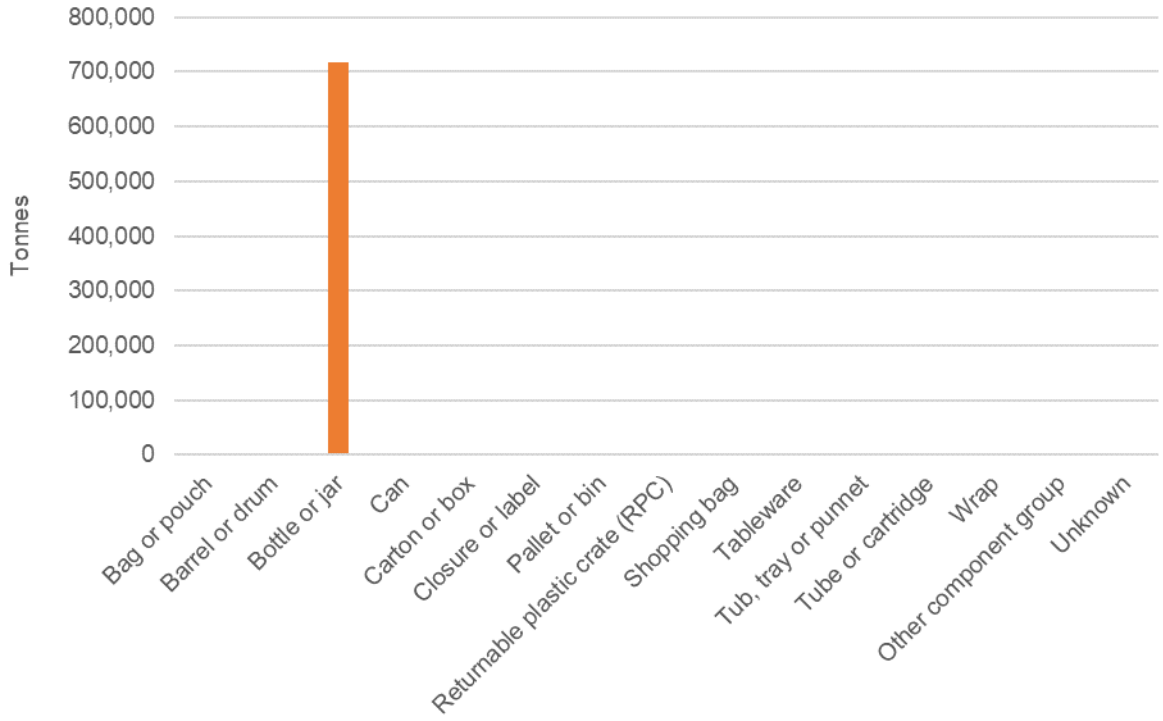

Figure 34 – Glass packaging recovery in 2021–22, by material type and component group.

Material use application

Glass packaging recovery in 2021–22 by material use application are provided in Table 45 and **Figure 35**.

Recovered glass packaging is mostly returned back into packaging applications. For non-packaging applications, large quantities of packaging glass are crushed and used in civil construction. The major application of this crushed glass is as a substitute for virgin sand or aggregate in road construction – typically blended with virgin sand and aggregate and then mixed with cement to manufacture road-base products. Crushed glass sand and aggregate are also regularly used in non-structural concrete mixes.

Table 45 – Glass packaging recovery in 2021–22, by material type and material use application.

Material type	Packaging applications	Non-packaging applications	Unknown applications	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Amber glass	123,000	51,000	0	174,000
Flint glass	191,000	124,000	0	315,000
Green glass	138,000	91,000	0	230,000
Total (tonnes)	**452,000**	**266,000**	**0**	**718,000**
Total (%)	**63.0%**	**37.0%**	**0.0%**	**100.0%**

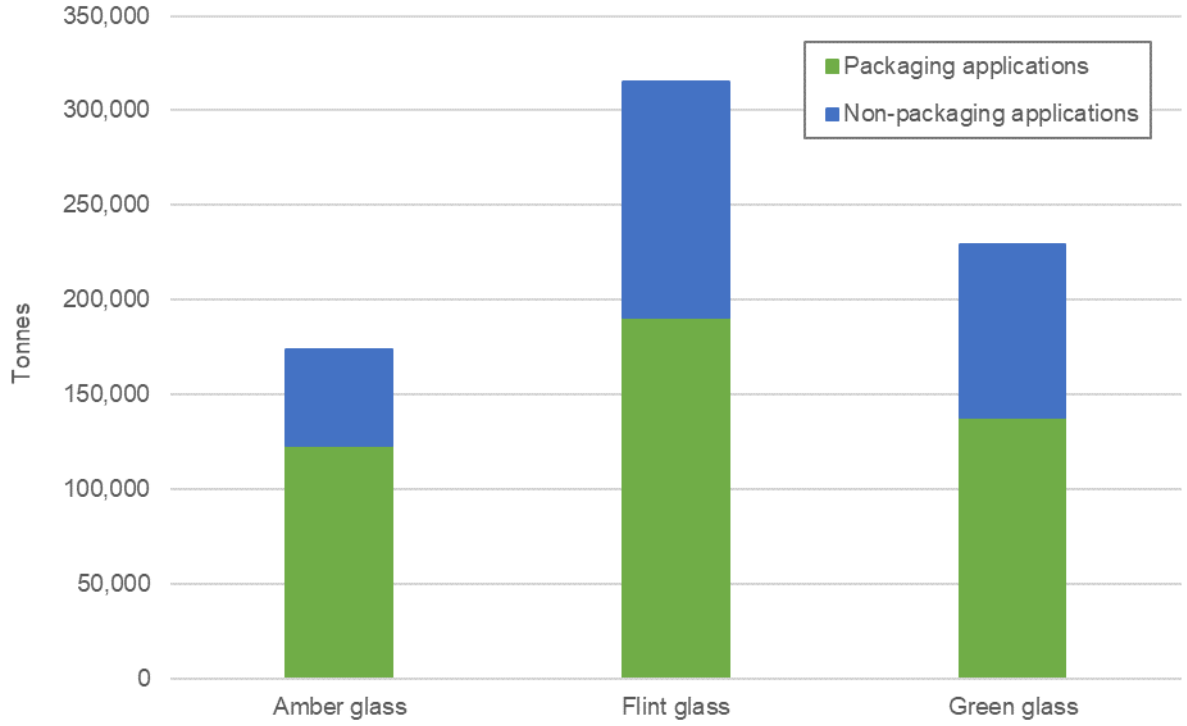

Figure 35 – Glass packaging recovery in 2021–22, by material type and material use application.

Material use destination

Glass packaging recovery in 2021–22 by material use destination are provided in Table 46 and Figure 36. Almost all recovered glass was sent to local applications.

Table 46 – Glass packaging recovery in 2021–22, by material type and destination of material.

Material type	Local	Overseas	Unknown destinations	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Amber glass	174,000	0	0	174,000
Flint glass	314,000	1,000	0	315,000
Green glass	229,000	1,000	0	230,000
Total (tonnes)	**717,000**	**1,000**	**0**	**718,000**
Total (%)	**99.8%**	**0.2%**	**0.0%**	**100.0%**

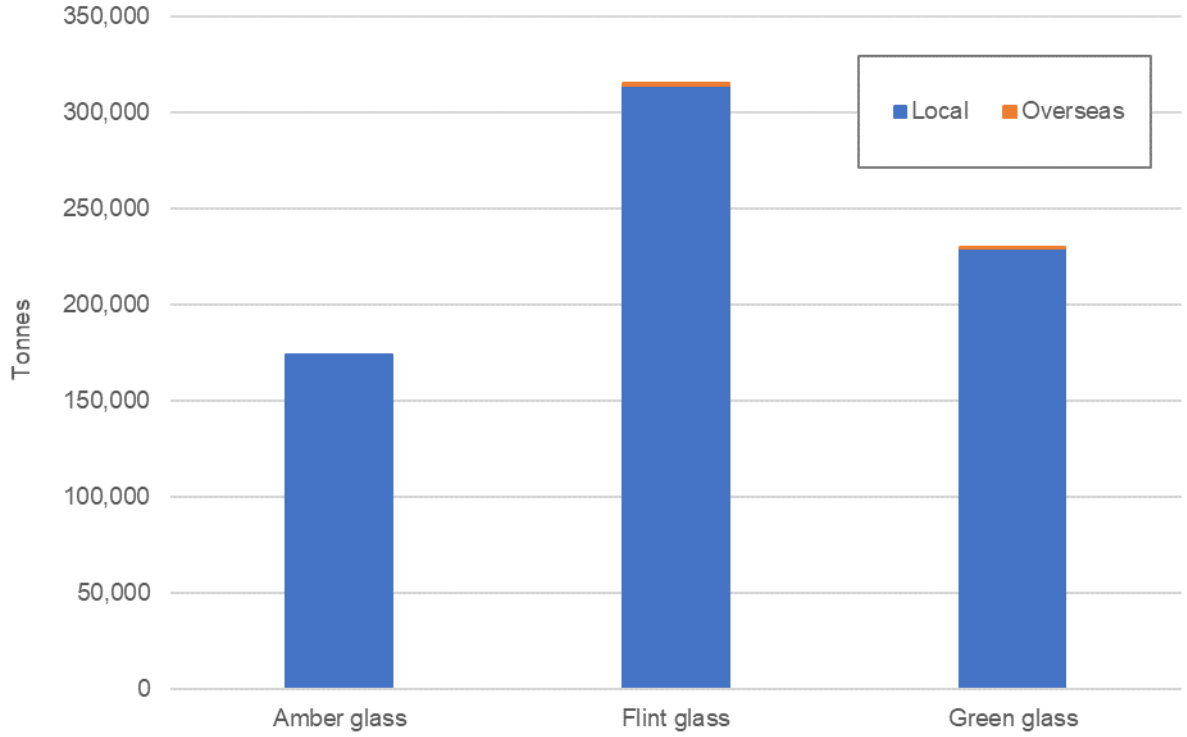

Figure 36 – Glass packaging recovery in 2021–22, by material type and destination of material.

Food contact suitability

Estimates for the suitability for glass packaging recovery for food contact applications are provided in Table 47, and indicates that 100% of recovered glass packaging was suitable for food contact packaging applications in 2021–22.

Table 47 – Glass packaging recovery suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Amber glass	135,000	77%	39,000	23%	0	0%	174,000
Flint glass	208,000	66%	107,000	34%	0	0%	315,000
Green glass	151,000	66%	78,000	34%	0	0%	230,000
Total	**494,000**	**69%**	**224,000**	**31%**	**0**	**0%**	**718,000**

Recovery rates

Estimates for post-consumer glass packaging recovery rates in 2021–22, by material type, are provided in Table 48 and **Figure 37**. The overall recovery rate for glass packaging is 63%, which is steady with the 2020–21 rate which was also 63%.

Recovery rates vary across the standard glass colours. Rates for amber and flint glass are higher, probably due to good coverage of amber glass (beer bottles) under CDS nationally, and flint glass being more sought after for recovery into new packaging. A large proportion of green glass is used in wine bottles, which are not covered under CDS nationally.

The very high (apparent) recovery rate for amber glass of 96% (compared with 87% in 2020–21) is probably in part due to the smaller quantities of this glass colour going onto market, and the increased data uncertainties associated with quantifying both POM and recovery at the colour level.

Table 48 – Post-consumer glass packaging recovery rates in 2021–22, by material type.

Material type	POM	Recovery	Recovery rate
	(tonnes)	(tonnes)	(%)
Amber glass	181,000	174,000	96%
Flint glass	494,000	315,000	64%
Green glass	468,000	230,000	49%
Total	**1,143,000**	**718,000**	**63%**

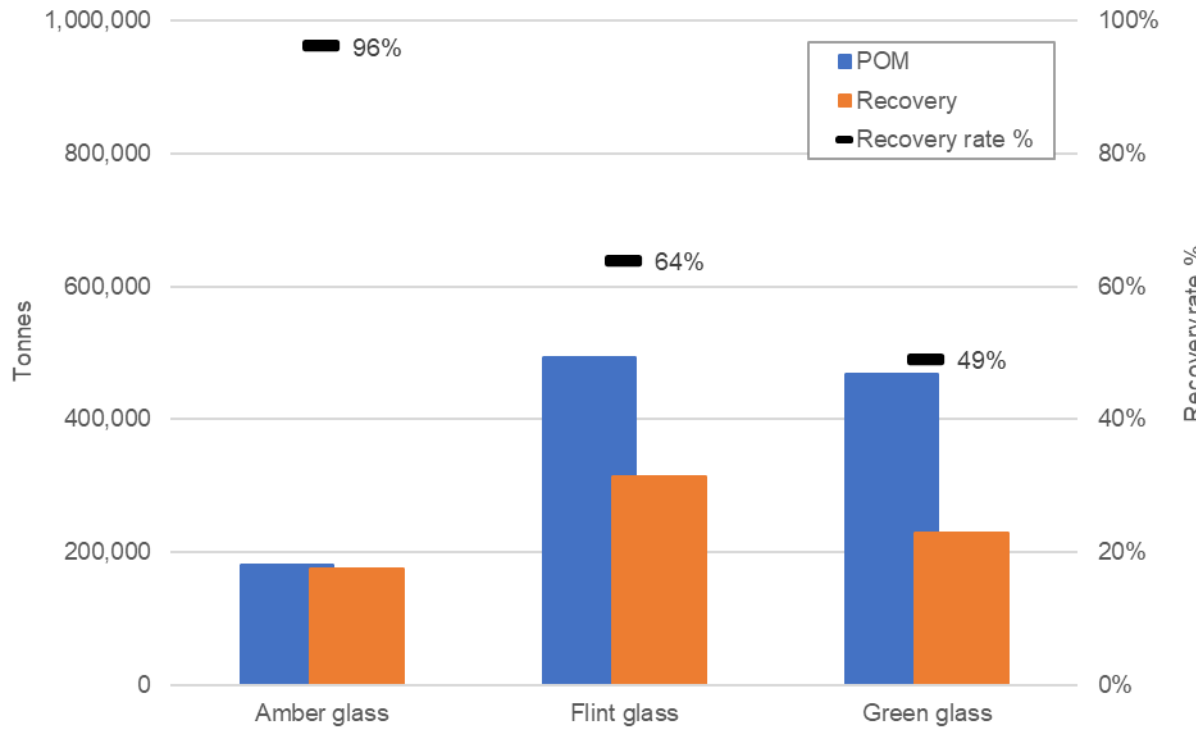

Figure 37 – Post-consumer glass packaging recovery rates in 2021–22, by material type.

4.3 Recycling potential

Table 49 and Figure 38 provide the recycling potential of glass packaging POM in 2021–22. Glass is a highly recyclable material with a 100% ‘good recycling potential’ classification.

Table 49 – Glass packaging POM in 2021–22, by recycling potential classification and material type.

Material type	Good recycling potential	Poor recycling potential	Not recyclable	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Amber glass	181,000	0	0	0	**181,000**
Flint glass	494,000	0	0	0	**494,000**
Green glass	468,000	0	0	0	**468,000**
Total (tonnes)	**1,143,000**	**0**	**0**	**0**	**1,143,000**
Total (%)	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

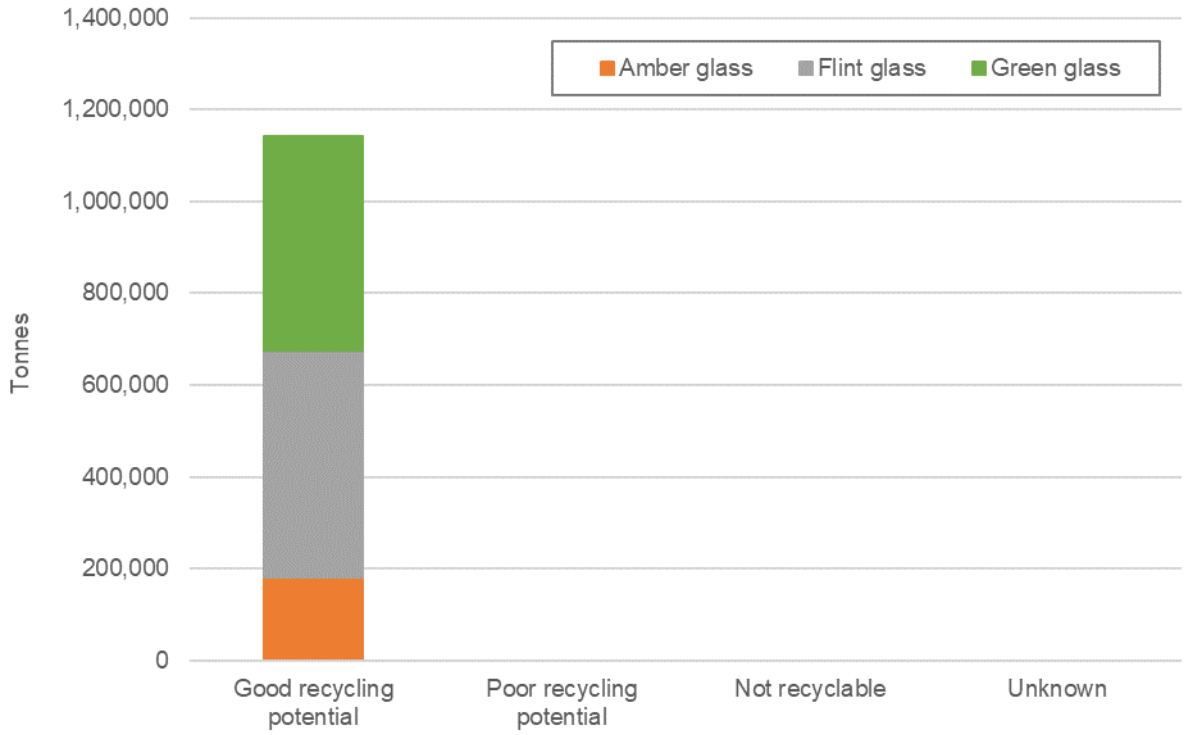

Figure 38 – Glass packaging POM in 2021–22, by recycling potential classification and material type.

4.4 Projections to 2026–27

Projections for glass packaging POM from 2022–23 to 2026–27 are provided in Table 50 and Figure 39. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 is projected data based on survey estimates of POM growth by material type.

The estimated five-year CAGR for glass packaging POM from 2021–22 to 2026–27 is 2.5% per year.

Table 50 – Glass packaging POM (mass and per capita bases) from 2019–20 to 2026–27, by material type.

Material type	2019–20		2020–21		2021–22		2022–23		2023–24		2024–25		2025–26		2026–27		5-yr CAGR[b]
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(%/yr)
Amber glass	334,000	13.0	233,000	9.1	181,000	7.0	185,000	6.8	190,000	6.9	195,000	7.0	199,000	7.0	204,000	7.1	2.5%
Flint glass	606,000	23.6	605,000	23.6	494,000	19.0	506,000	18.6	518,000	18.8	531,000	19.0	544,000	19.2	557,000	19.4	2.5%
Green glass	216,000	8.4	445,000	17.3	468,000	18.0	480,000	17.7	492,000	17.8	504,000	18.0	516,000	18.2	529,000	18.4	2.5%
Total	**1,156,000**	**45.1**	**1,283,000**	**50.0**	**1,143,000**	**44.0**	**1,171,000**	**43.1**	**1,200,000**	**43.5**	**1,229,000**	**44.0**	**1,260,000**	**44.4**	**1,291,000**	**44.9**	**2.5%**

a) kg/p – kilograms per person.
b) CAGR – compound annual growth rate.

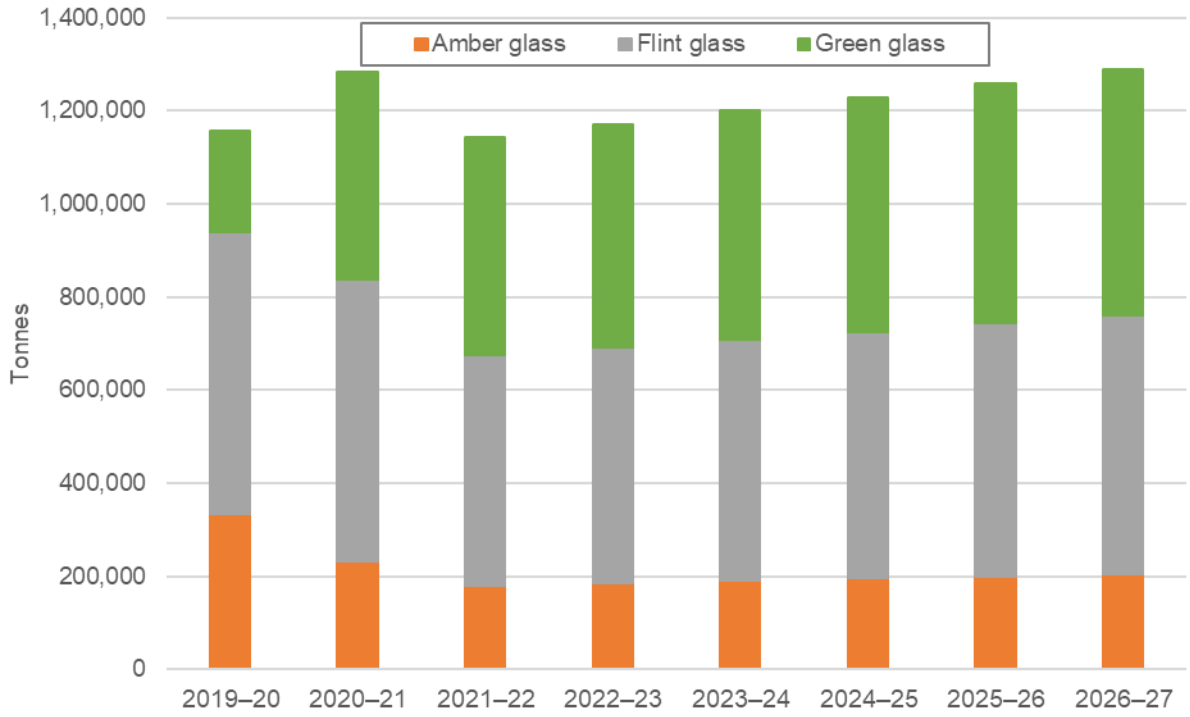

Figure 39 – Glass packaging POM from 2019–20 to 2026–27, by material type.

Projections for glass packaging reprocessing capacity from 2022–23 to 2026–27 are provided in Table 51 and Figure 40. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 onwards is projected based on reported planned new reprocessing capacity.

The estimated five-year CAGR for glass reprocessing capacity from 2021–22 to 2026–27 is 11.0%.

Table 51 – Glass packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

Material type	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26	2026–27	5 year CAGR[a]
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%/yr)
Amber glass	221,000	243,000	191,000	211,000	231,000	250,000	270,000	290,000	8.6%
Flint glass	402,000	466,000	355,000	407,000	459,000	511,000	563,000	615,000	11.6%
Green glass	143,000	284,000	259,000	297,000	335,000	374,000	412,000	450,000	11.7%
Total	**766,000**	**993,000**	**805,000**	**915,000**	**1,025,000**	**1,135,000**	**1,245,000**	**1,355,000**	**11.0%**

a) CAGR – compound annual growth rate.

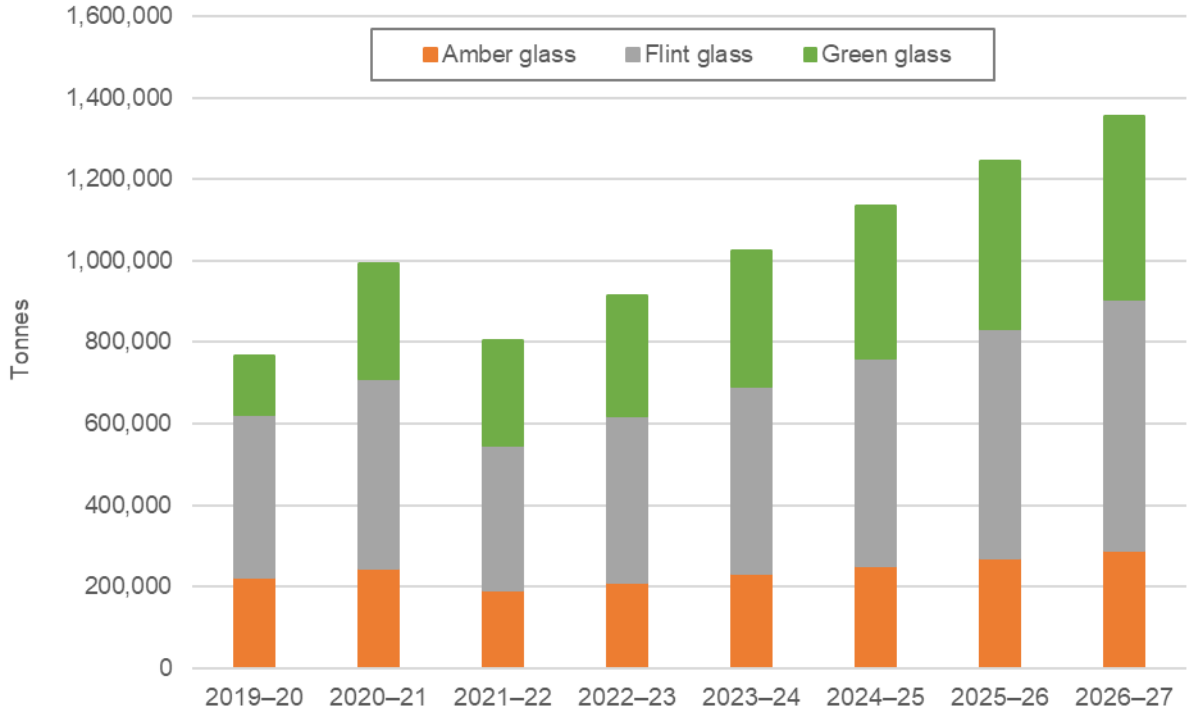

Figure 40 – Glass packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

5 PLASTIC PACKAGING IN 2021–22

5.1 Placed on market

Trends

Plastic packaging POM in Australia in 2021–22 is estimated at 1.28 million tonnes (±17%), which was 18.3% of all packaging POM. Five-year trends for plastic packaging POM are provided in Table 52 and **Figure 41** (mass basis), and four-year trends are provided in Table 53 and Figure 42 (count basis). Note that 2017–18 count basis data is not available.

Between 2020–21 and 2021–22 there was an increase in plastic packaging POM of 98,000 tonnes (+8%).

Table 52 – Plastic packaging POM (mass basis) from 2017–18 to 2021–22, by material type.

Material type[a]	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[b]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
PET (1)	132,000	5.3	154,000	6.1	163,000	6.4	149,000	5.8	179,000	6.9
HDPE (2)	351,000	14.1	316,000	12.5	275,000	10.7	287,000	11.2	332,000	12.8
PVC (3)	20,000	0.8	15,000	0.6	17,000	0.7	15,000	0.6	11,000	0.4
LDPE (4)	254,000	10.2	233,000	9.2	276,000	10.7	331,000	12.9	328,000	12.6
PP (5)	164,000	6.6	155,000	6.1	218,000	8.5	215,000	8.4	253,000	9.7
PS (6)	11,000	0.5	11,000	0.4	17,000	0.7	17,000	0.7	17,000	0.6
EPS (6)	22,000	0.9	16,000	0.6	23,000	0.9	29,000	1.1	30,000	1.1
Bioplastic (7)	1,000	0.0	6,000	0.3	9,000	0.3	4,000	0.1	2,000	0.1
Other (7)	111,000	4.4	16,000	0.6	20,000	0.8	21,000	0.8	17,000	0.7
Unidentified	NR[a]	NR	78,000	3.1	107,000	4.2	111,000	4.3	109,000	4.2
Total	**1,067,000**	**42.7**	**1,000,000**	**39.5**	**1,124,000**	**43.8**	**1,179,000**	**45.9**	**1,277,000**	**49.1**

a) PET (1) – Polyethylene terephthalate (PIC 1) | HDPE (2) – High-density polyethylene (PIC 2) | PVC (3) – Polyvinyl chloride (PIC 3) | LDPE (4) – Low-density polyethylene (PIC 4) | PP (5) – Polypropylene (PIC 5) | PS (6) – Polystyrene (PIC 6) | EPS (6) – Expanded polystyrene (PIC 6). PIC – Plastic identification code.

b) kg/p – kilograms per person.

c) NR – not reported.

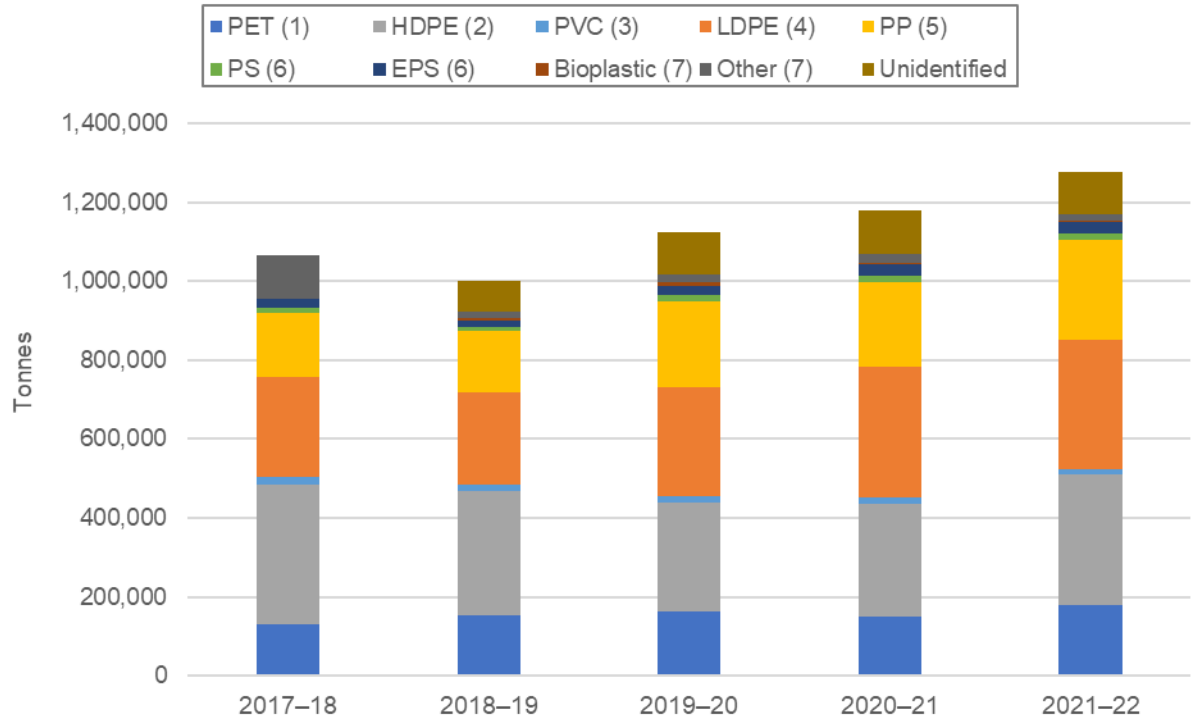

Figure 41 – Plastic packaging POM (mass basis) from 2017–18 to 2021–22, by material type.

Table 53 – Plastic packaging POM (count and per capita bases) from 2018–19 to 2021–22, by material type.

Material type	2018–19		2019–20		2020–21		2021–22	
	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)
PET (1)	10,000	383	10,000	385	7,000	253	9,000	329
HDPE (2)	16,000	628	16,000	636	20,000	789	27,000	1,024
PVC (3)	3,000	107	1,000	33	1,000	25	1,000	24
LDPE (4)	24,000	953	27,000	1,042	33,000	1,292	41,000	1,561
PP (5)	13,000	504	19,000	750	19,000	742	52,000	1,983
PS (6)	1,000	21	2,000	84	3,000	106	3,000	124
EPS (6)	0	0	1,000	56	1,000	32	0	13
Bioplastic (7)	1,000	47	0	0	0	0	0	14
Other (7)	0	0	3,000	124	4,000	138	0	1
Unidentified	0	0	0	0	2,000	87	2,000	75
Total	**67,000**	**2,643**	**80,000**	**3,109**	**89,000**	**3,463**	**134,000**	**5,148**

a) Units/p – Units (count) per person.

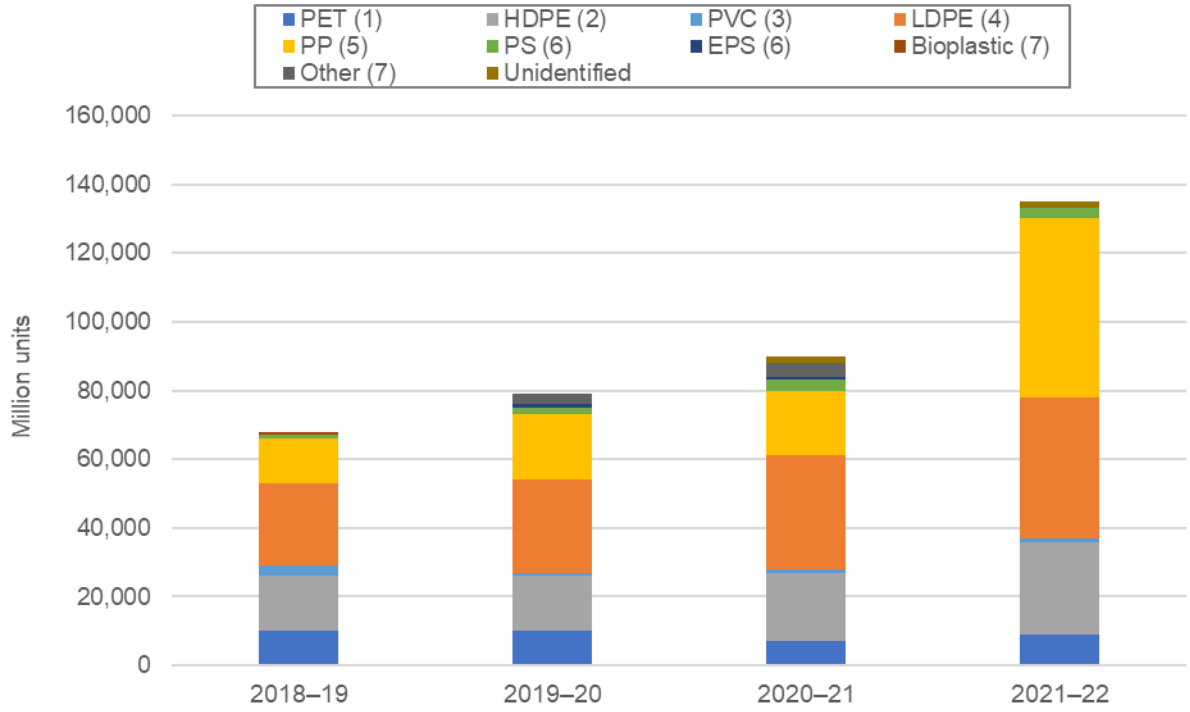

Figure 42 – Plastic packaging POM (count basis) from 2017–18 to 2021–22, by material type.

Sector of use

Estimates for plastic packaging POM by material type and sector of use are provided in Table 54 and Figure 43. Plastic packaging consumption is dominated by high-density polyethylene (HDPE) (26.0%), low-density polyethylene (LDPE) (25.7%), polypropylene (PP) (19.8%) and polyethylene terephthalate (PET) (14.0%).

Around 77% of plastic packaging was used in the B2C sector, with another 23% used in the B2B sector (mainly LDPE films and HPDE or PP in rigid packaging applications).

Table 54 – Plastic packaging POM in 2021–22, by material type and sector of use.

Material type	B2C – At home[a]	B2C – AfH[a]	B2B[a]	Other or unknown	Total	
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
PET (1)	150,000	20,000	9,000	0	179,000	14.0%
HDPE (2)	259,000	3,000	70,000	0	332,000	26.0%
PVC (3)	5,000	0	5,000	0	11,000	0.9%
LDPE (4)	206,000	2,000	120,000	0	328,000	25.7%
PP (5)	176,000	23,000	54,000	0	253,000	19.8%
PS (6)	7,000	10,000	0	0	17,000	1.3%
EPS (6)	14,000	4,000	12,000	0	30,000	2.3%
Bioplastic (7)	0	2,000	0	0	2,000	0.2%
Other (7)	6,000	2,000	10,000	0	17,000	1.3%
Unidentified	96,000	0	13,000	0	109,000	8.5%
Total (tonnes)	**918,000**	**65,000**	**294,000**	**0**	**1,277,000**	**-**
Total (%)	**71.9%**	**5.1%**	**23.0%**	**0.0%**	**100.0%**	**100.0%**

a) Business-to-consumer (B2C) – At home | Business-to-consumer (B2C) – Away-from-home (AfH) | Business-to-business (B2B).

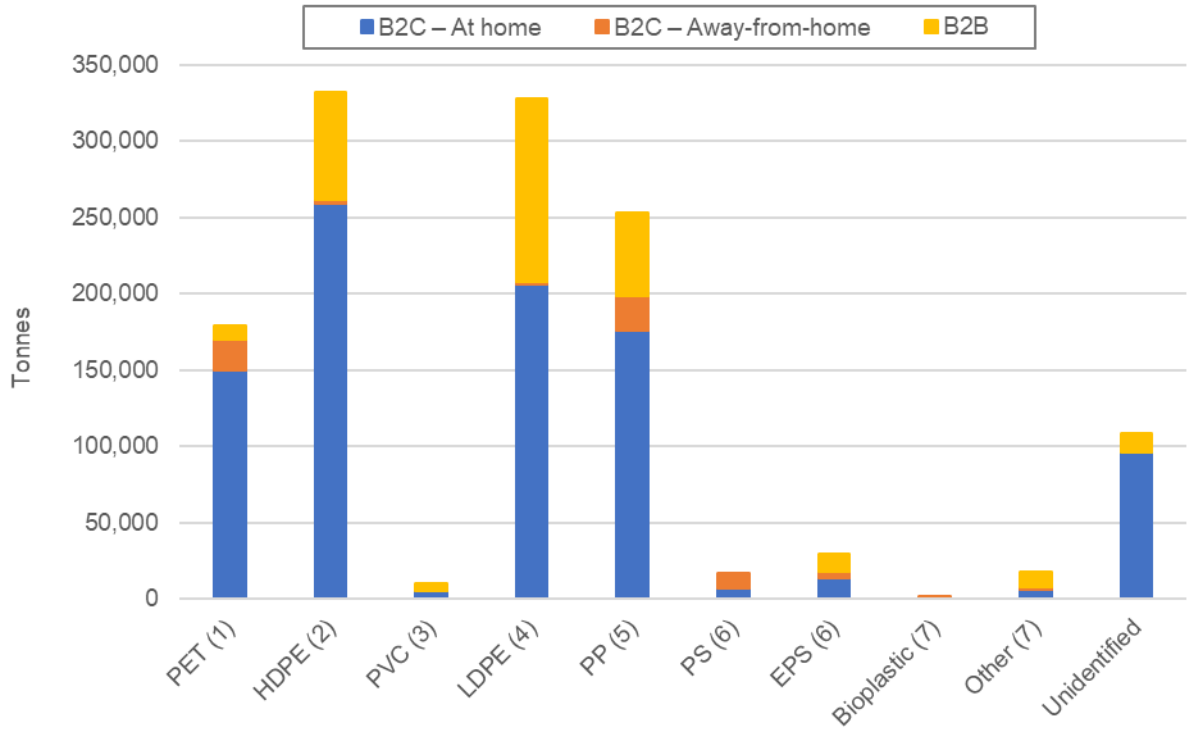

Figure 43 – Plastic packaging POM in 2021–22, by material type and sector of use.

Component group

Table 55 and Figure 44 provide plastic packaging POM in 2021–22 by component group. Plastic packaging is diverse and this is reflected in the spread across component groups. The major component groups are bottles or jars (26.9%), bags or pouches (23.9%), wraps (14.6%) and tubs, trays or punnets (10.3%).

Table 55 – Plastic packaging POM in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	1,000	0	89,000	0	0	1,000	0	0	0	4,000	42,000	0	2,000	0	5,000	145,000
PET (1) – Transparent	0	0	26,000	0	0	0	0	0	0	0	1,000	0	0	0	0	26,000
PET (1) – Opaque	0	0	1,000	0	0	0	0	0	0	2,000	0	0	5,000	0	0	8,000
HDPE (2) – Natural	9,000	4,000	153,000	0	0	11,000	1,000	0	0	0	0	0	2,000	0	22,000	203,000
HDPE (2) – Coloured	57,000	7,000	38,000	0	0	1,000	4,000	0	6,000	0	0	3,000	0	0	12,000	129,000
PVC (3)	1,000	0	1,000	0	0	1,000	0	0	0	0	1,000	0	6,000	0	1,000	11,000
LDPE (4)	179,000	0	6,000	0	0	3,000	0	0	15,000	0	0	0	114,000	1,000	11,000	328,000
PP (5) – Natural	4,000	1,000	0	0	2,000	15,000	0	0	0	2,000	37,000	0	47,000	2,000	8,000	118,000
PP (5) – Coloured	7,000	16,000	15,000	0	2,000	10,000	1,000	0	0	0	44,000	0	5,000	2,000	32,000	135,000
PS (6)	0	0	0	0	0	1,000	0	0	0	9,000	6,000	0	0	0	1,000	17,000
EPS (6)	0	0	0	0	13,000	0	0	0	0	0	1,000	0	0	16,000	0	30,000
Bioplastic (7)	0	0	0	0	0	0	0	0	0	2,000	0	0	0	0	0	2,000
Other	14,000	0	0	0	0	0	0	0	0	0	0	0	3,000	1,000	0	17,000
Identified	35,000	0	14,000	0	0	29,000	0	0	0	0	0	0	2,000	0	29,000	109,000
Total (tonnes)	**306,000**	**29,000**	**344,000**	**0**	**16,000**	**71,000**	**6,000**	**0**	**21,000**	**19,000**	**132,000**	**3,000**	**187,000**	**22,000**	**122,000**	**1,277,000**
Total (%)	**23.9%**	**2.3%**	**26.9%**	**0.0%**	**1.2%**	**5.6%**	**0.5%**	**0.0%**	**1.6%**	**1.5%**	**10.3%**	**0.3%**	**14.6%**	**1.7%**	**9.5%**	**100.0%**

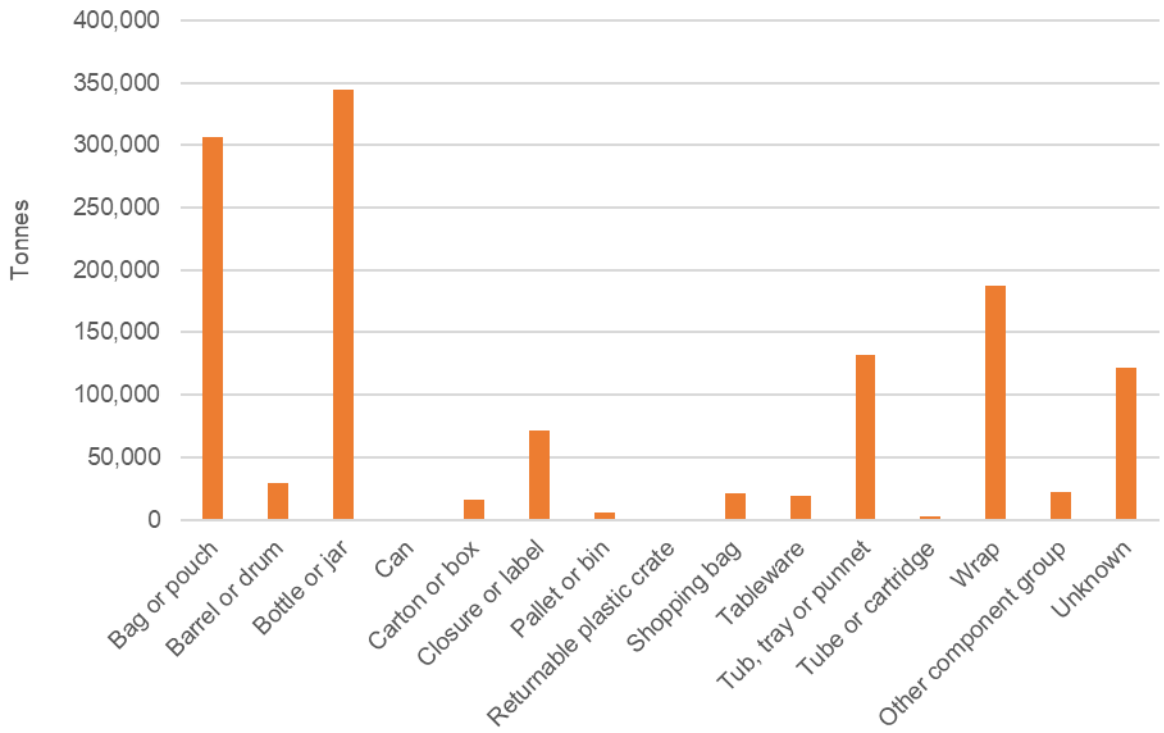

Figure 44 – Plastic packaging POM in 2021–22, by material type and component group.

Packaging material source location

Plastic packaging POM in 2021–22 by location of manufacturing and location or material source are provided in Table 56 and Figure 45. Of the 1.28 million tonnes of plastic packaging POM, about 40.8% was locally manufactured from overseas resins, 29.2% arrived as empty packaging from overseas, 21.8% was locally manufactured from local materials, and 8.2% was imported filled packaging.

Table 56 – Plastic packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Material type	Locally manufactured packaging – locally sourced material	Locally manufactured packaging – overseas sourced material	Overseas manufactured packaging – filled packaging	Overseas manufactured packaging – empty packaging	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	32,000	102,000	6,000	5,000	145,000
PET (1) – Transparent	7,000	11,000	8,000	0	26,000
PET (1) – Opaque	2,000	6,000	0	0	8,000
HDPE (2) – Natural	61,000	134,000	2,000	6,000	203,000
HDPE (2) – Coloured	17,000	23,000	3,000	86,000	129,000
PVC (3)	0	7,000	1,000	3,000	11,000
LDPE (4)	86,000	89,000	69,000	84,000	328,000
PP (5) – Natural	29,000	76,000	4,000	8,000	118,000
PP (5) – Coloured	42,000	40,000	5,000	48,000	135,000
PS (6)	0	6,000	0	11,000	17,000
EPS (6)	0	10,000	4,000	16,000	30,000
Bioplastic (7)	0	0	0	2,000	2,000
Other (7)	2,000	15,000	0	0	17,000
Unidentified	0	2,000	0	106,000	109,000
Total (tonnes)	**278,000**	**522,000**	**104,000**	**373,000**	**1,277,000**
Total (%)	**21.8%**	**40.8%**	**8.2%**	**29.2%**	**100.0%**

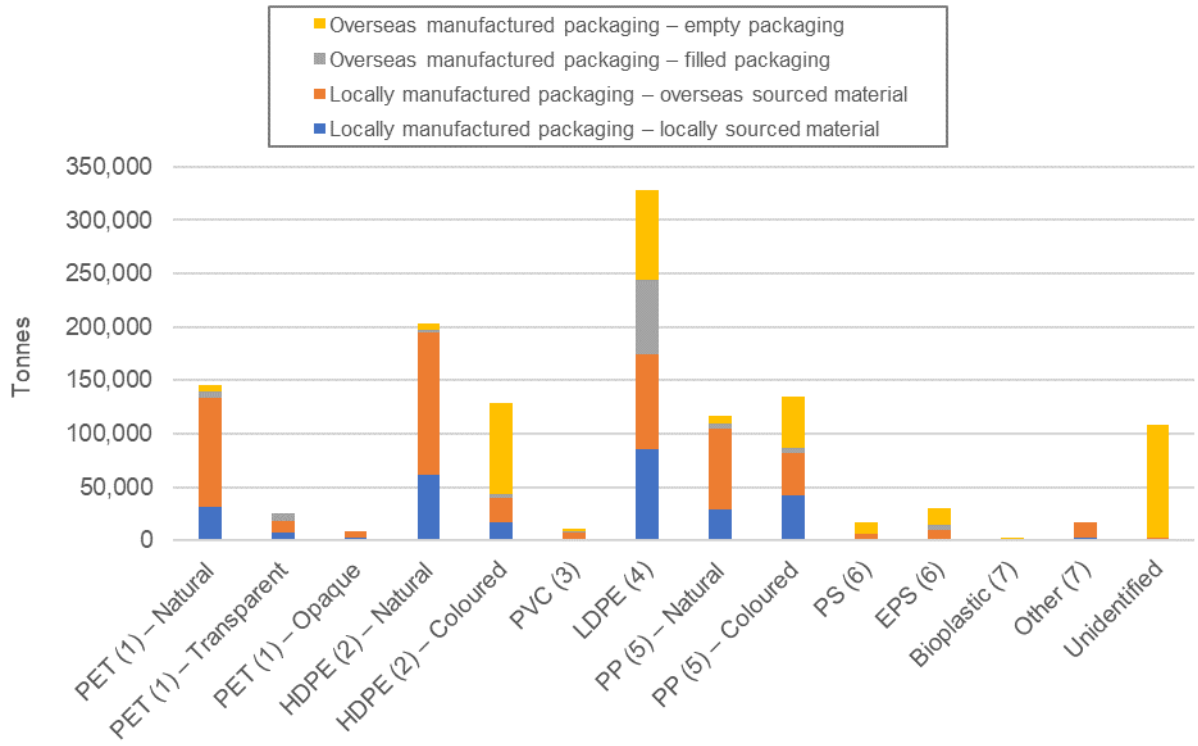

Figure 45 – Plastic packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Rigid/flexible plastic packaging

In this section of the report, estimates of plastic packaging POM by rigid/flexible classification are presented. Information on the rigidity of plastic packaging is useful as it is related to the recycling potential and value of the material. Estimates for packaging POM by plastic material type and rigid/flexible classification are provided in Table 57 and Figure 45.

The definitions of rigid and flexible plastic packaging adopted for this study are:

- Rigid plastic packaging is packaging such as bottles and tubs, which are (generally) moulded and hold their shape.
- Flexible (soft) plastic packaging is packaging that can be scrunched into a ball.

Of the 1.28 million tonnes of plastic packaging POM in 2021–22 an estimated 627,000 tonnes (49.1%) were identified as rigid plastic packaging, and 528,000 tonnes (41.4%) as flexible plastics. The format of the other 122,000 tonnes (9.5%) could not be identified in sufficient detail to classify this material as either rigid or flexible.

Most flexible packaging was made from LDPE (58%), followed by HDPE (15%) and PP (13%).

Most rigid packaging was made from HDPE (35%), followed by PET (26%) and PP (23%).

Table 57 – Plastic packaging POM in 2021–22, by material type and rigid/flexible classification.

Material type	Rigid	Flexible	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	136,000	3,000	5,000	145,000
PET (1) – Transparent	26,000	0	0	26,000
PET (1) – Opaque	3,000	6,000	0	8,000
HDPE (2) – Natural	168,000	13,000	22,000	203,000
HDPE (2) – Coloured	52,000	64,000	12,000	129,000
PVC (3)	3,000	8,000	1,000	11,000
LDPE (4)	9,000	307,000	11,000	328,000
PP (5) – Natural	56,000	54,000	8,000	118,000
PP (5) – Coloured	89,000	14,000	32,000	135,000
PS (6)	16,000	0	1,000	17,000
EPS (6)	30,000	0	0	30,000
Bioplastic (7)	2,000	0	0	2,000
Other (7)	1,000	17,000	0	17,000
Unidentified	37,000	42,000	29,000	109,000
Total (tonnes)	**627,000**	**528,000**	**122,000**	**1,277,000**
Total (%)	**49.1%**	**41.4%**	**9.5%**	**100.0%**

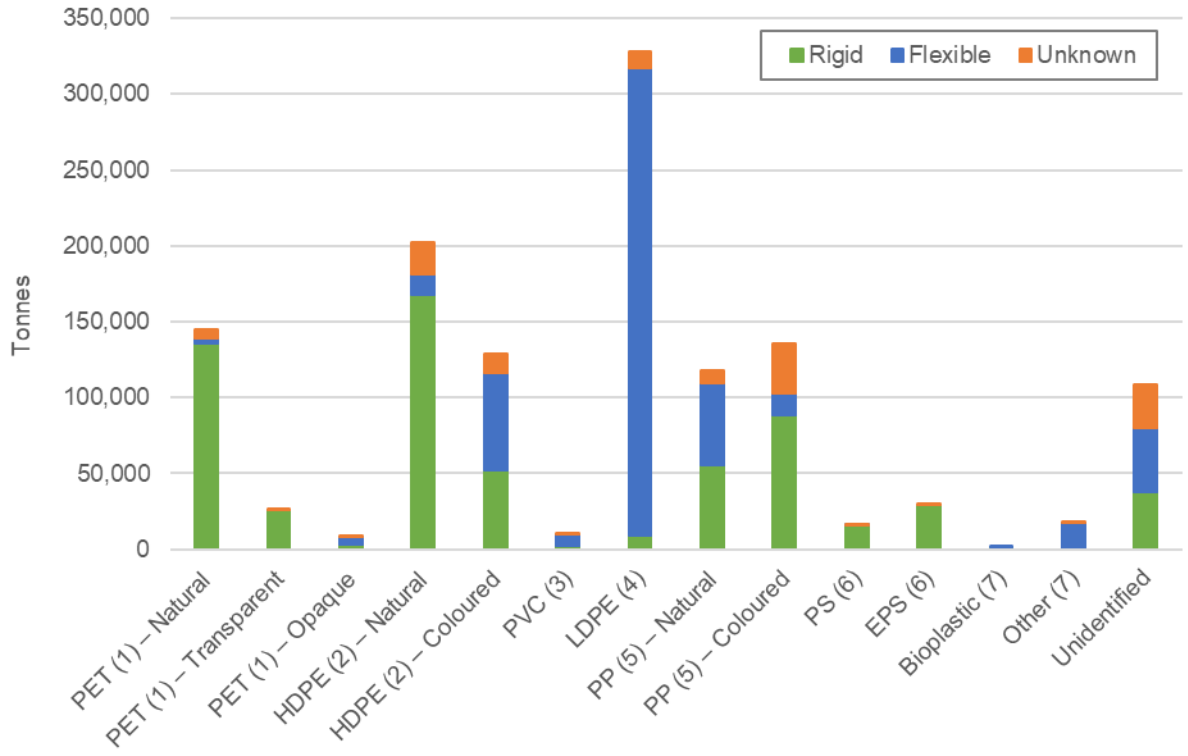

Figure 46 – Plastic packaging POM in 2021–22, by material type and rigid/flexible classification.

Recycled content

Estimates of the recycled content incorporated into plastic packaging POM in 2021–22 and by material type are provided in Table 58 and Figure 47.

The PCR content of plastic packaging was 74,000 tonnes, or 6% of total plastic packaging POM, an increase from 3% in the previous year. The pre-consumer recycled content was 23,000 tonnes (2%), and virgin (primary) resin feedstock dominated supply at 1.18 million tonnes or 92% of source material.

Table 58 – Plastic packaging POM in 2021–22, by material type and recycled content.

Material type	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
PET (1) – Natural	27,000	19%	8,000	5%	110,000	76%	145,000
PET (1) – Transparent	6,000	22%	1,000	5%	19,000	73%	26,000
PET (1) – Opaque	1,000	6%	2,000	20%	6,000	74%	8,000
HDPE (2) – Natural	15,000	7%	3,000	1%	185,000	91%	203,000
HDPE (2) – Coloured	5,000	4%	1,000	1%	123,000	96%	129,000
PVC (3)	0	0%	0	0%	11,000	100%	11,000
LDPE (4)	6,000	2%	5,000	1%	317,000	97%	328,000
PP (5) – Natural	0	0%	1,000	1%	116,000	99%	118,000
PP (5) – Coloured	15,000	11%	3,000	2%	118,000	87%	135,000
PS (6)	0	1%	0	0%	17,000	99%	17,000
EPS (6)	0	0%	0	0%	30,000	100%	30,000
Bioplastic (7)	0	0%	0	0%	2,000	100%	2,000
Other (7)	0	0%	0	0%	17,000	100%	17,000
Unidentified	0	0%	0	0%	109,000	100%	109,000
Total	**74,000**	**6%**	**23,000**	**2%**	**1,179,000**	**92%**	**1,277,000**

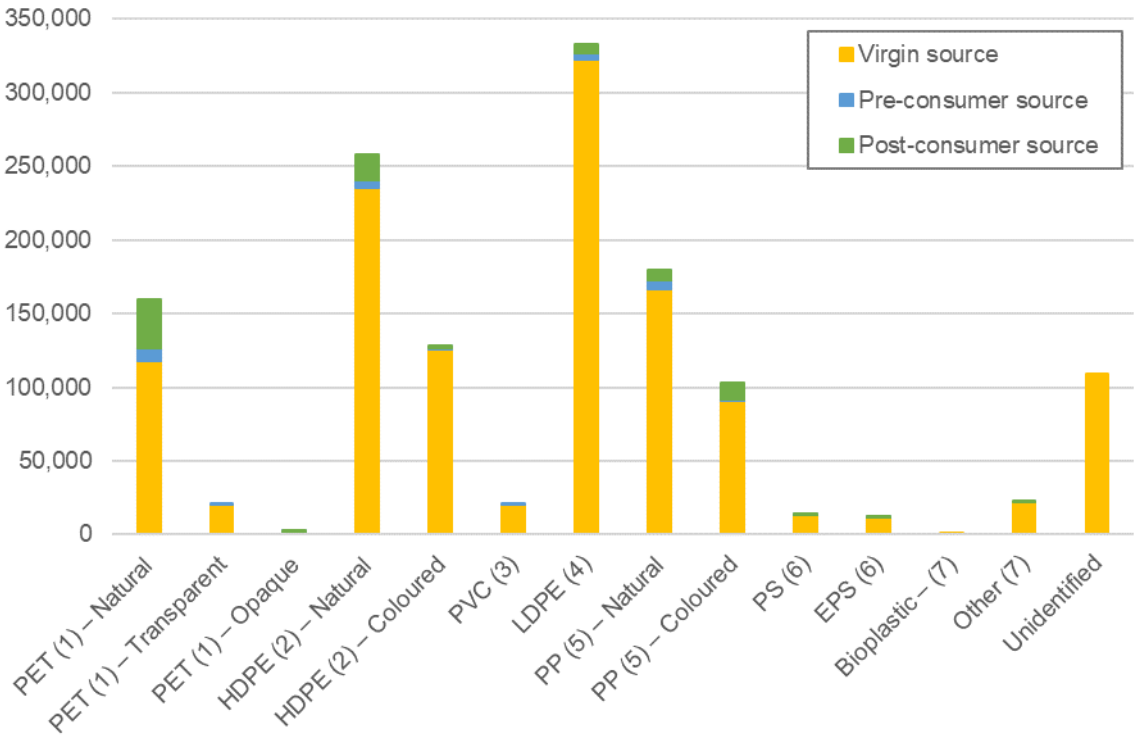

Figure 47 – Plastic packaging POM in 2021–22, by material type and recycled content.

Packaging manufacturers were requested to provide percentage estimates of the *easily achievable post-consumer recycled content* (without major redesign or manufacturing equipment upgrades), and the *maximum achievable post-consumer recycled content* (with major redesign and/or equipment upgrades).

The potential PCR content percentage values for plastic packaging POM, as reported by manufacturers, are provided in Table 59. It was reported that the potential maximum PCR content for plastic packaging is 41%, compared to 6% currently. This estimate is indicative only and is highly dependent on the plastic packaging component type and flexibility classification.

Note that data is only reported where packaging manufacturers representing more than 20% of total packaging POM (by material type) responded to the related survey questions. This is why the total easily achievable percentage value is higher than the maximum achievable percentage value, as more packaging manufacturers provided an 'easily achievable' estimate.

The estimates provided here relate to mechanically recycled plastics only. Chemically recycled plastics are assumed to be virgin equivalent and have not been included in the potential PCR content estimates.

Table 59 – Potential plastic packaging post-consumer recycled content, by material type and level of intervention.

Material type	Current	Easily achievable	Maximum achievable
	(%)	(%)	(%)
PET (1) – Natural	19%	Insufficient data	Insufficient data
PET (1) – Transparent	22%	Insufficient data	Insufficient data
PET (1) – Opaque	6%	50%	Insufficient data
HDPE (2) – Natural	7%	Insufficient data	Insufficient data
HDPE (2) – Coloured	4%	Insufficient data	Insufficient data
PVC (3)	0%	Insufficient data	Insufficient data
LDPE (4)	2%	31%	Insufficient data
PP (5) – Natural	0%	Insufficient data	Insufficient data
PP (5) – Coloured	11%	66%	75%
PS (6)	1%	Insufficient data	Insufficient data
EPS (6)	0%	Insufficient data	Insufficient data
Bioplastic (7)	0%	Insufficient data	Insufficient data
Other (7)	0%	Insufficient data	Insufficient data
Unidentified	0%	Insufficient data	Insufficient data
Total	**6%**	**43%**	**41%**

Food contact suitability

Estimates for the suitability for plastic packaging POM for food contact applications are provided in Table 60, and indicate that 89% of packaging POM in 2021–22 was suitable for food contact applications and 6% was not suitable. The suitability of the remainder was not known.

Table 60 – Plastic packaging POM suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
PET (1) – Natural	120,000	83%	1,000	1%	23,000	16%	145,000
PET (1) – Transparent	23,000	86%	0	0%	4,000	14%	26,000
PET (1) – Opaque	4,000	45%	4,000	49%	0	6%	8,000
HDPE (2) – Natural	182,000	90%	1,000	1%	20,000	10%	203,000
HDPE (2) – Coloured	113,000	88%	16,000	12%	0	0%	129,000
PVC (3)	10,000	88%	1,000	12%	0	0%	11,000
LDPE (4)	294,000	90%	28,000	9%	5,000	2%	328,000
PP (5) – Natural	110,000	93%	3,000	3%	4,000	4%	118,000
PP (5) – Coloured	108,000	80%	25,000	19%	2,000	2%	135,000
PS (6)	17,000	100%	0	0%	0	0%	17,000
EPS (6)	30,000	100%	0	0%	0	0%	30,000
Bioplastic (7)	2,000	100%	0	0%	0	0%	2,000
Other (7)	17,000	97%	0	0%	1,000	3%	17,000
Unidentified	107,000	98%	0	0%	2,000	2%	109,000
Total	**1,134,000**	**89%**	**81,000**	**6%**	**61,000**	**5%**	**1,277,000**

Problematic and unnecessary single-use plastics

APCO has identified a number of packaging materials or items as problematic and unnecessary single-use plastics (APCO, 2023b, p. 4). Table 61 compares the available POM data for six of these priority items.

The reported changes in PS, EPS, PVC and plastic tableware need to be treated with caution due to the low quantities and a large accuracy range, and high year-on-year reporting volatility.

Table 61 – Priority single-use plastics POM from 2016–17 to 2021–22, including the percentage change between 2020–21 and 2021–22.

Priority item	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	% change 2020–21 to 2021–22
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	
Single-use HDPE shopping bags[a]	30,700	-	7,000	200	100	100	23%
Rigid PS[b]	-	11,400	10,900	17,100	17,200	16,700	-3%
EPS[b,c]	-	22,000	16,400	22,700	29,000	29,800	3%
PVC[b,d]	-	20,400	15,300	16,900	14,800	10,800	-27%
Oxo-degradable plastics[b]	-	1,500	1,100	2,100	800	<10	-99%
Plastic tableware[d,e]	-	-	-	25,200	13,200	18,700	41%

a) Includes single-use HDPE bags (supermarket type) only. Single-use HDPE produce bags and single-use LDPE bags (boutique type) are not included. 2017–18 data not available for single-use HDPE shopping bags.

b) These estimates are subject to a large accuracy range and high year-on-year reporting volatility.

c) The most significant contributing packaging formats to EPS are void fill and crates for fresh produce (mostly into B2B applications).

d) The current priority is to phase out rigid PVC only, but this data cannot be reported for confidentiality reasons.

e) Includes certified compostable plastics.

5.2 Recovery

Trends

Post-consumer plastic packaging recovery in Australia in 2021–22 is estimated at 258,000 tonnes (±10%), which was 6.6% of all post-consumer packaging recovery.

Five-year trends for plastic packaging recovery are provided in Table 62 and Figure 48. Between 2020–21 and 2021–22 there was an increase in plastic packaging recovery of 51,000 tonnes (+25%).

Table 62 – Plastic packaging recovery from 2017–18 to 2021–22, by material type.

Material type[a]	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[b]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
PET (1)	57,000	2.3	55,000	2.2	55,000	2.2	58,000	2.2	90,000	3.5
HDPE (2)	66,000	2.7	73,000	2.9	60,000	2.3	66,000	2.6	71,000	2.7
PVC (3)	1,000	0.1	1,000	0.0	2,000	0.1	0	0.0	0	0.0
LDPE (4)	28,000	1.1	22,000	0.8	15,000	0.6	32,000	2.6	60,000	2.3
PP (5)	12,000	0.5	21,000	0.8	20,000	0.8	30,000	0.0	19,000	0.7
PS (6)	2,000	0.1	3,000	0.1	4,000	0.2	2,000	0.0	1,000	0.0
EPS (6)	4,000	0.2	4,000	0.2	4,000	0.2	9,000	1.2	5,000	0.2
Bioplastic (7)	0	0.0	0	0.0	0	0.0	0	1.2	0	0.0
Other (7)	1,000	0.1	0	0.0	1,000	0.0	0	0.0	4,000	0.2
Unidentified	NR[c]	NR[c]	3,000	0.1	17,000	0.7	10,000	0.1	7,000	0.3
Total	**173,000**	**6.9**	**182,000**	**7.2**	**179,000**	**7.0**	**207,000**	**8.0**	**258,000**	**9.9**

a) PET (1) – Polyethylene terephthalate (PIC 1) | HDPE (2) – High-density polyethylene (PIC 2) | PVC (3) – Polyvinyl chloride (PIC 3) | LDPE (4) – Low-density polyethylene (PIC 4) | PP (5) – Polypropylene (PIC 5) | PS (6) – Polystyrene (PIC 6) | EPS (6) – Expanded polystyrene (PIC 6). PIC – Plastic identification code.

b) kg/p – kilograms per person.

c) NR – not reported.

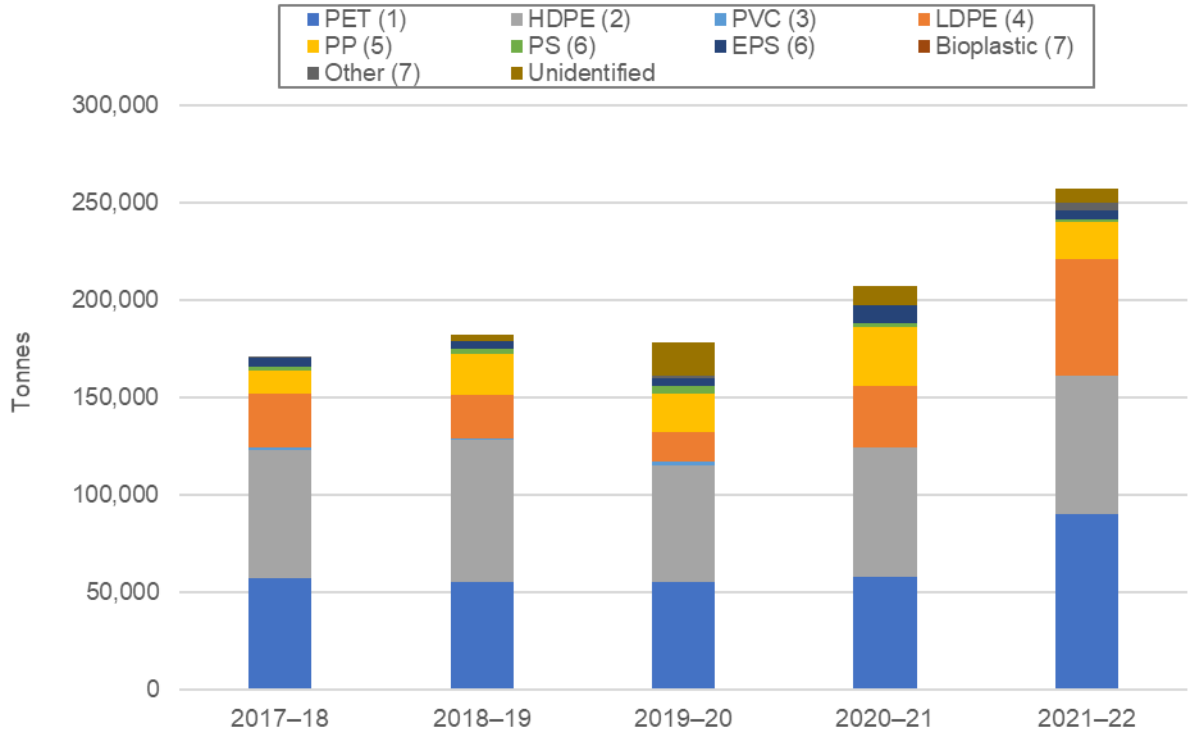

Figure 48 – Plastic packaging recovery from 2017–18 to 2021–22, by material type.

Collection service

Estimates for plastic packaging recovery, by material type and collection service, are provided in Table 63 and Figure 49. Around 146,000 tonnes (56.7%) of plastic packaging were recovered through MSW collections, with another 78,000 tonnes (30.0%) recovered through C&I collections and 32,000 tonnes (12.4%) recovered through separate CDS related collections.

Table 63 – Plastic packaging recovery in 2021–22, by material type and collection service.

Material type	Collection service				Total	
	MSW[a]	C&I[a]	CDS[a]	Other		
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
PET (1)	60,000	0	30,000	0	90,000	32.3%
HDPE (2)	60,000	9,000	2,000	0	71,000	2.2%
PVC (3)	<500	0	0	<500	0	0.3%
LDPE (4)	2,000	57,000	0	1,000	60,000	18.2%
PP (5)	13,000	6,000	0	0	19,000	9.4%
PS (6)	<500	1,000	0	0	1,000	0.0%
EPS (6)	<500	4,000	0	1,000	5,000	23.1%
Bioplastic (7)	<500	<500	0	0	0	3.1%
Other (7)	4,000	0	0	<500	4,000	4.3%
Unidentified	7,000	0	0	<500	7,000	0.4%
Total (tonnes)	**146,000**	**78,000**	**32,000**	**2,000**	**258,000**	-
Total (%)	**56.7%**	**30.0%**	**12.4%**	**0.9%**	**100.0%**	**100.0%**

a) Municipal solid waste (MSW), commercial and industrial (C&I) waste, and container deposit scheme (CDS) collection services.

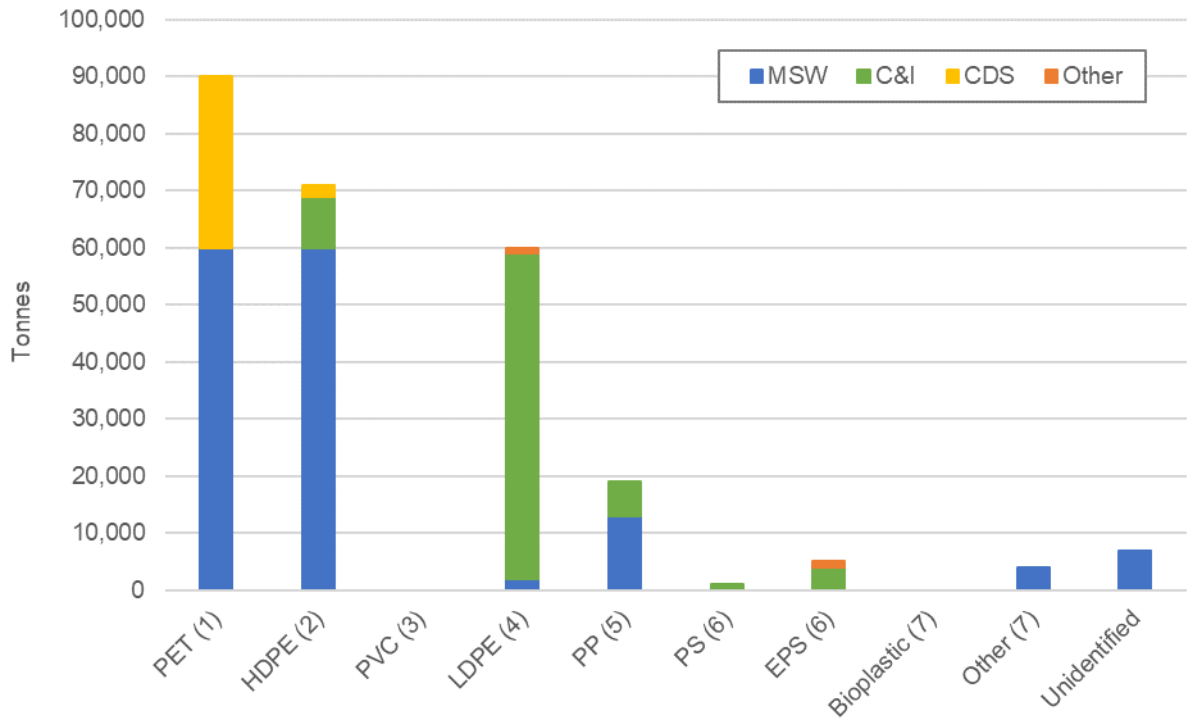

Figure 49 – Plastic packaging recovery in 2021–22, by material type and collection service.

Component group

Table 64 and Figure 50 provide plastic packaging recovery in 2021–22 by component group. The main recovered component groups were bottles or jars (59.2%) and wraps (22.1%).

Table 64 – Plastic packaging recovery in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	0	0	79,000	0	0	0	0	0	0	0	5,000	0	0	0	0	83,000
PET (1) – Transparent	0	0	6,000	0	0	0	0	0	0	0	0	0	0	0	0	6,000
PET (1) – Opaque	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000
HDPE (2) – Natural	0	2,000	39,000	0	0	1,000	0	0	0	0	4,000	0	0	0	0	47,000
HDPE (2) – Coloured	0	4,000	14,000	0	0	1,000	2,000	1,000	0	0	2,000	0	0	0	0	24,000
PVC (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LDPE (4)	3,000	0	1,000	0	0	0	0	0	0	0	0	0	55,000	0	0	60,000
PP (5) – Natural	0	0	3,000	0	0	0	0	0	0	0	4,000	0	0	0	0	8,000
PP (5) – Coloured	1,000	1,000	2,000	0	0	0	1,000	1,000	0	0	5,000	0	1,000	0	0	11,000
PS (6)	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	1,000
EPS (6)	0	0	0	0	2,000	0	0	0	0	0	0	0	0	3,000	0	5,000
Bioplastic (7)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	4,000	0	0	0	0	0	0	0	0	0	0	0	0	4,000
Identified	0	0	5,000	0	0	1,000	0	0	0	0	2,000	0	0	0	0	7,000
Total (tonnes)	**4,000**	**7,000**	**153,000**	**0**	**2,000**	**3,000**	**3,000**	**2,000**	**0**	**0**	**22,000**	**0**	**57,000**	**4,000**	**0**	**258,000**
Total (%)	**1.6%**	**2.6%**	**59.2%**	**0.0%**	**0.9%**	**1.3%**	**1.1%**	**0.9%**	**0.1%**	**0.0%**	**8.5%**	**0.0%**	**22.1%**	**1.6%**	**0.0%**	**100.0%**

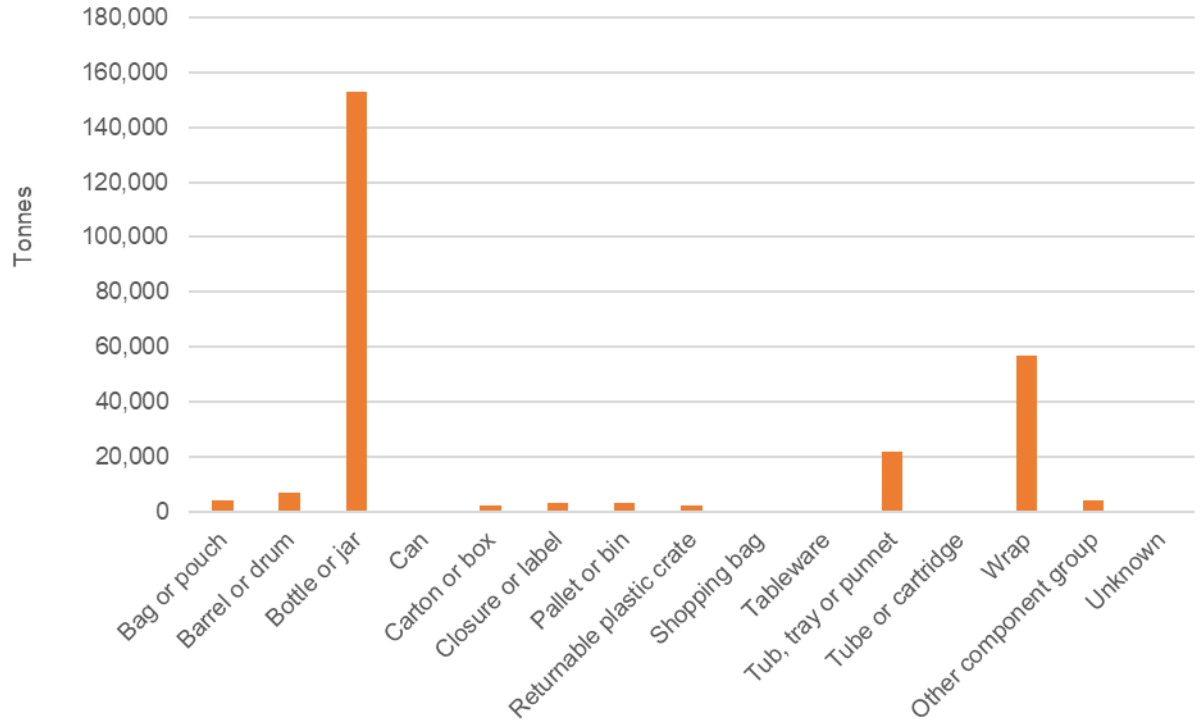

Figure 50 – Plastic packaging recovery in 2021–22, by material type and component group.

Material use application

Plastic packaging recovery in 2021–22 by material use application are provided in Table 65 and **Figure 51**. Around 20% went back into packaging and 17% into non-packaging applications. The end-use application of 63% of plastics packaging was unknown. It is likely that the majority of the plastic going into unknown applications was returned into non-packaging applications.

Table 65 – Plastic packaging recovery in 2021–22, by material type and material use application.

Material type	Packaging applications	Non-packaging applications	Unknown applications	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	30,000	0	53,000	83,000
PET (1) – Transparent	5,000	0	0	6,000
PET (1) – Opaque	1,000	0	0	1,000
HDPE (2) – Natural	7,000	7,000	33,000	47,000
HDPE (2) – Coloured	3,000	8,000	13,000	24,000
PVC (3)	0	0	0	0
LDPE (4)	1,000	15,000	43,000	60,000
PP (5) – Natural	0	3,000	5,000	8,000
PP (5) – Coloured	3,000	5,000	2,000	11,000
PS (6)	0	0	1,000	1,000
EPS (6)	0	5,000	1,000	5,000
Bioplastic (7)	0	0	0	0
Other (7)	0	0	4,000	4,000
Unidentified	0	0	7,000	7,000
Total (tonnes)	**51,000**	**44,000**	**162,000**	**258,000**
Total (%)	**19.9%**	**17.1%**	**62.9%**	**100.0%**

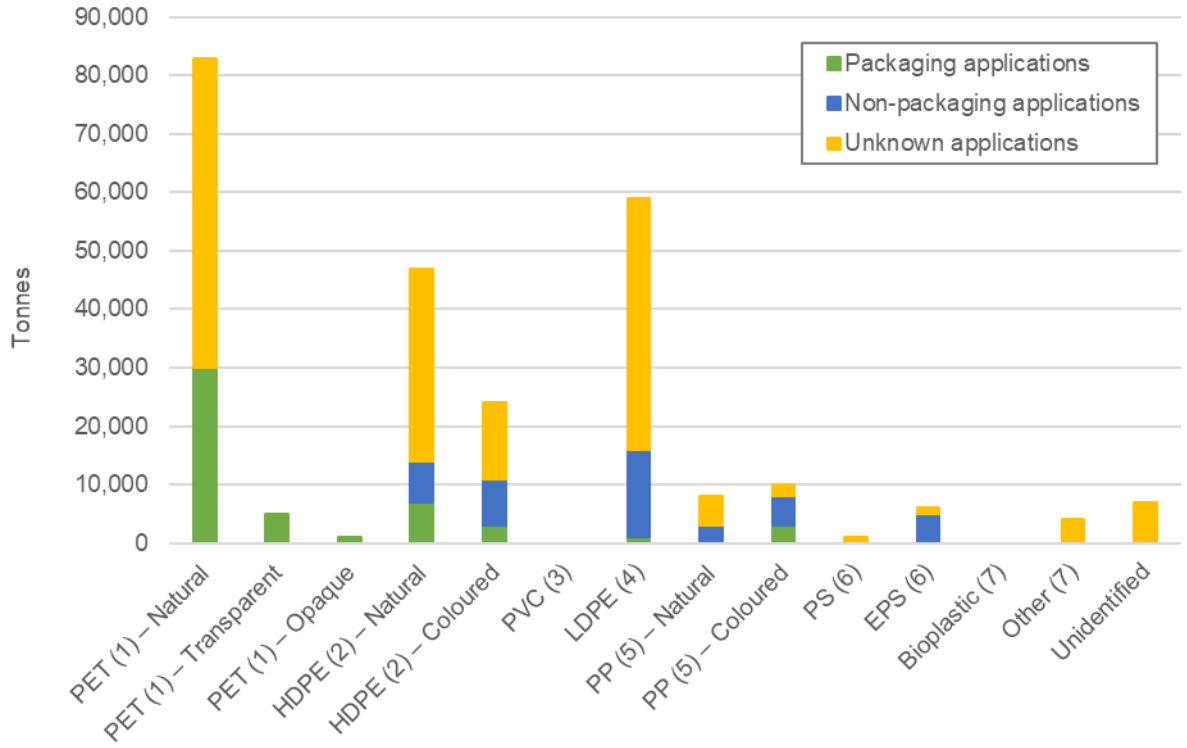

Figure 51 – Plastic packaging recovery in 2021–22, by material type and material use application.

The use of recovered plastic packaging is dependent in large part on the packaging source application and polymer type. Many of the typical applications are summarised in Table 66.

Table 66 – Typical uses of recycled plastics in Australia.

Polymer	Major uses of recycled polymer	Minor uses of recycled polymer
PET	Beverage bottles.	Timber substitutes, geo-textiles, other textiles, felted panels, pallets and fence posts.
HDPE	Milk bottles, films, pallets, wheelie bins, irrigation hose and pipes.	Cable covers, extruded sheet, moulded products, shopping and garbage bags, slip sheets, drip sheets for water, wood substitutes and mixed plastics products (e.g. fence posts, bollards, kerbing, marine structures and outdoor furniture), materials handling and roto-moulded water tanks.
PVC	Industrial and garden hose, profiles, pipes and conduit.	Gumboots, mats, resilient flooring, mudflaps and coving (decorative building mouldings).
LDPE / LLDPE	Film (including builders' and agricultural film, concrete lining, freight packaging, garbage bags, shopping bags), agricultural piping.	Binder additive to asphalt, trickle products, vineyard cover, pallets, shrink wrap, roto-moulding, slip sheets, irrigation tube, timber substitutes, cable covers, builders' film, garbage bags, carry bags, and other building industry applications.
PP	Crates, boxes and plant pots.	Electrical cable covers, building panels and concrete reinforcement stools (bar chairs and shims), furniture, irrigation fittings, agricultural and garden pipe, drainage products (such as drain gates) and tanks, builders' film, kerbing, bollards, concrete reinforcing and a wide variety of injection moulded products.
PS	Bar chairs and industrial spools.	Office accessories, coat hangers, glasses, building components, industrial packing trays, wire spools and a range of extrusion products.
EPS	Waffle pods for under slab construction of buildings.	Synthetic timber applications (including photo frames, decorative architraves, fence posts), XPS (extruded polystyrene) insulation sheeting, and lightweight concrete.

Packaging recovery through energy recovery

Packaging recovery includes quantities of post-consumer scrap plastic packaging sent to energy recovery in 2021–22. This is estimated to have been approximately 8,000 tonnes in 2021–22, compared with 9,000 tonnes in 2020–21, 17,000 tonnes in 2019–20, 16,000 tonnes in 2018–19, and 2,000–4,000 tonnes in 2017–18.

Packaging recovery through composting

It is estimated that around 100–200 tonnes of compostable plastic-based packaging were disposed into organics collections in 2021–22. This estimate is based on the composter survey and is indicative only.

Material use destination

Plastic packaging recovery in 2021–22 by material use destination are provided in Table 67 and Figure 52. The destination of recovered plastic packaging was split relatively evenly across local (46%) and overseas applications (54%).

Table 67 – Plastic packaging recovery in 2021–22, by material type and destination of material.

Material type	Local	Overseas	Unknown destinations	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	38,000	46,000	0	83,000
PET (1) – Transparent	5,000	0	0	6,000
PET (1) – Opaque	1,000	0	0	1,000
HDPE (2) – Natural	21,000	26,000	0	47,000
HDPE (2) – Coloured	18,000	7,000	0	24,000
PVC (3)	0	0	0	0
LDPE (4)	13,000	47,000	0	60,000
PP (5) – Natural	5,000	3,000	0	8,000
PP (5) – Coloured	10,000	1,000	0	11,000
PS (6)	0	1,000	0	1,000
EPS (6)	1,000	4,000	0	5,000
Bioplastic (7)	0	0	0	0
Other (7)	4,000	0	0	4,000
Unidentified	4,000	4,000	0	7,000
Total (tonnes)	**119,000**	**139,000**	**0**	**258,000**
Total (%)	**46.1%**	**53.9%**	**0.0%**	**100.0%**

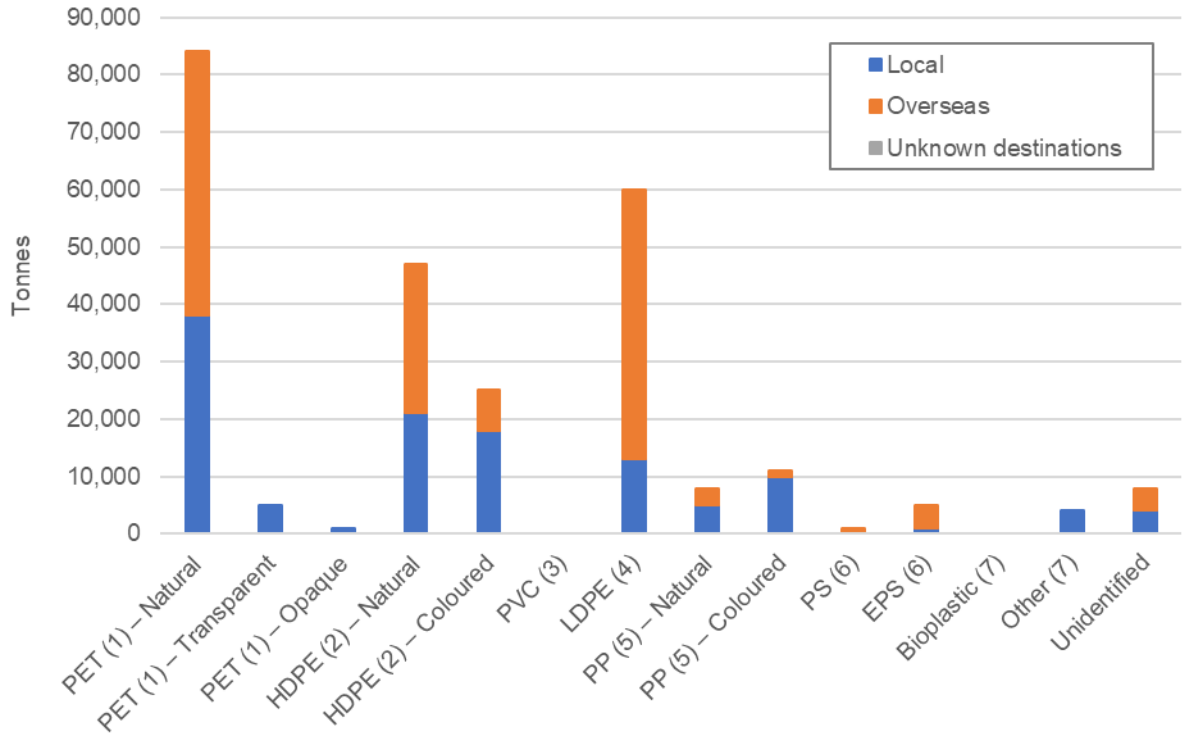

Figure 52 – Plastic packaging recovery in 2021–22, by material type and destination of material.

Rigid/flexible plastic packaging

Estimates of plastic packaging post-consumer recovery by rigid/flexible format are provided in Table 68 and Figure 53.

Of the 258,000 tonnes of plastic packaging recovered in 2021–22 around 196,000 tonnes (76%) was rigid, and 62,000 tonnes (24%) was flexible. Recovery of flexible plastic packaging is dominated by LDPE film recovery from B2B applications.

The estimate for 2021–22 flexible plastic packaging recovery is a significant increase on the 40,000 tonnes reported for 2020–21, but is still only a minor proportion of flexible plastic packaging POM.

Table 68 – Plastic packaging recovery in 2021–22, by material type and rigid/flexible classification.

Material type	Rigid	Flexible	Total
	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	83,000	0	83,000
PET (1) – Transparent	6,000	0	6,000
PET (1) – Opaque	0	0	1,000
HDPE (2) – Natural	47,000	0	47,000
HDPE (2) – Coloured	24,000	0	24,000
PVC (3)	0	0	0
LDPE (4)	1,000	59,000	60,000
PP (5) – Natural	8,000	0	8,000
PP (5) – Coloured	9,000	2,000	11,000
PS (6)	1,000	0	1,000
EPS (6)	5,000	0	5,000
Bioplastic (7)	0	0	0
Other (7)	4,000	0	4,000
Unidentified	7,000	0	7,000
Total (tonnes)	**196,000**	**62,000**	**258,000**
Total (%)	**75.9%**	**24.1%**	**100.0%**

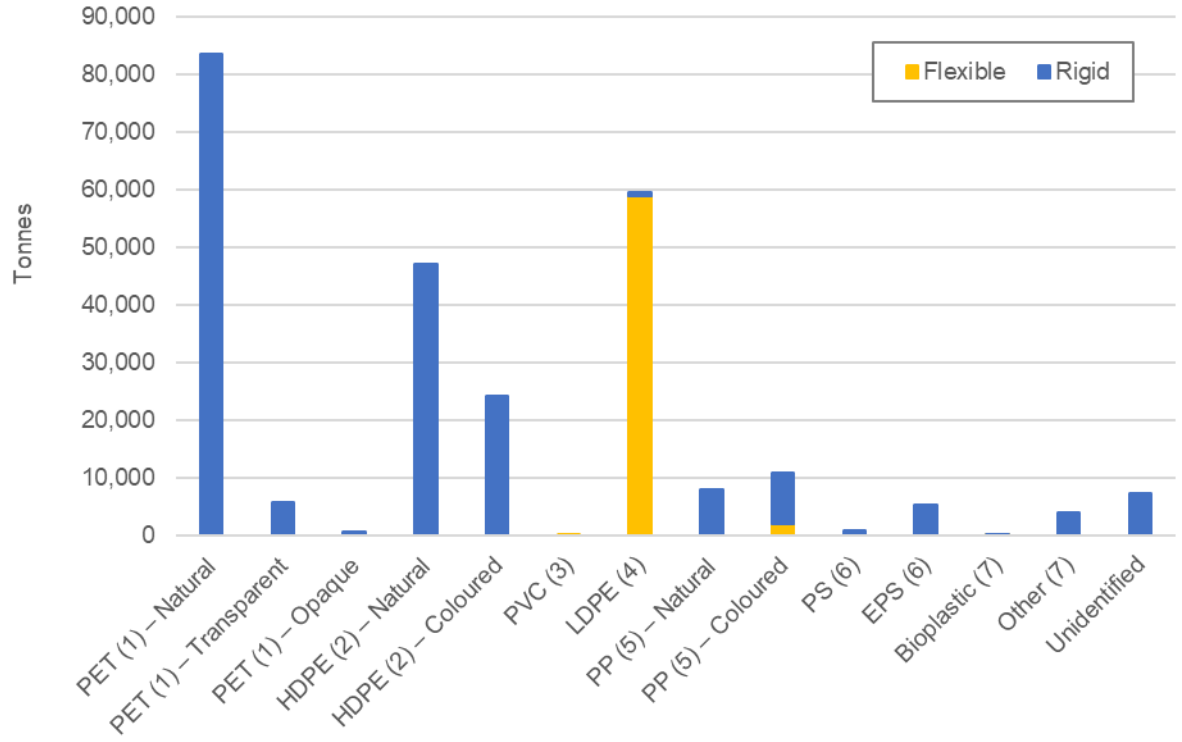

Figure 53 – Plastic packaging recovery in 2021–22, by material type and rigid/flexible classification.

Food contact suitability

Estimates for the suitability for plastic packaging recovery for food contact applications are provided in Table 69, and indicate that 16% of recovered plastic packaging was suitable for food contact packaging applications in 2021–22.

Table 69 – Plastic packaging recovery suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
PET (1) – Natural	30,000	36%	1,000	1%	52,000	63%	83,000
PET (1) – Transparent	5,000	92%	0	1%	0	7%	6,000
PET (1) – Opaque	0	46%	0	50%	0	4%	1,000
HDPE (2) – Natural	5,000	10%	10,000	20%	33,000	70%	47,000
HDPE (2) – Coloured	1,000	5%	14,000	58%	9,000	37%	24,000
PVC (3)	0	0%	0	100%	0	0%	0
LDPE (4)	0	0%	19,000	32%	41,000	68%	60,000
PP (5) – Natural	0	0%	3,000	40%	5,000	60%	8,000
PP (5) – Coloured	1,000	7%	9,000	81%	1,000	12%	11,000
PS (6)	0	0%	0	26%	1,000	74%	1,000
EPS (6)	0	0%	5,000	93%	0	7%	5,000
Bioplastic (7)	0	0%	0	100%	0	0%	0
Other (7)	0	0%	0	2%	4,000	98%	4,000
Unidentified	0	0%	0	0%	7,000	100%	7,000
Total	**43,000**	**16%**	**62,000**	**24%**	**154,000**	**60%**	**258,000**

Recovery rates

Estimates for post-consumer plastic packaging recovery rates in 2021–22, by material type, are provided in Table 70 and Figure 54**.** The overall recovery rate for plastic packaging is 20%, which is an increase on the 2020–21 rate of 18%.

The post-consumer PET packaging recovery rate is relatively high, reflecting the concentration of use in beverage packaging, with high levels of recovery through both kerbside and CDS collection systems. However, significant quantities of PET are also used in flexible packaging formats and non-beverage rigid packaging, both of which have significantly lower recovery rates than rigid PET beverage bottles.

The HDPE packaging recovery rate is underpinned by the kerbside collection of milk bottles. However, its diverse range of packaging formats, including flexible formats, results in a relatively low recovery rate.

Table 70 – Post-consumer plastic packaging recovery rates in 2021–22, by material type.

Material type	POM	Recovery	Recovery rate
	(tonnes)	(tonnes)	(%)
PET (1) – Natural	145,000	83,000	58%
PET (1) – Transparent	26,000	6,000	22%
PET (1) – Opaque	8,000	1,000	10%
HDPE (2) – Natural	203,000	47,000	23%
HDPE (2) – Coloured	129,000	24,000	19%
PVC (3)	11,000	0	1%
LDPE (4)	328,000	60,000	18%
PP (5) – Natural	118,000	8,000	7%
PP (5) – Coloured	135,000	11,000	8%
PS (6)	17,000	1,000	6%
EPS (6)	30,000	5,000	18%
Bioplastic (7)	2,000	0	6%
Other (7)	17,000	4,000	23%
Unidentified	109,000	7,000	7%
Total	**1,277,000**	**258,000**	**20%**

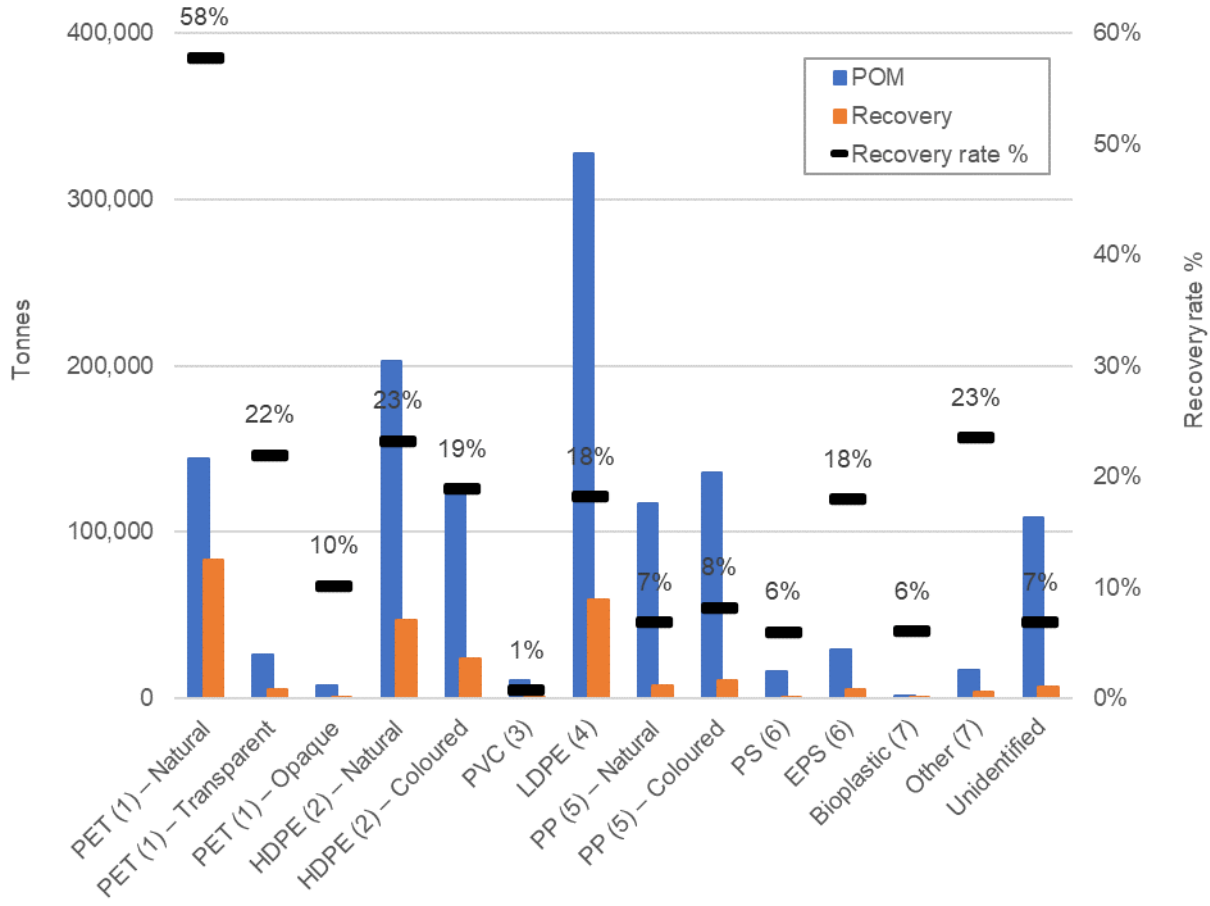

Figure 54 – Post-consumer plastic packaging recovery rates in 2021–22, by material type.

5.3 Recycling potential

Table 71 and **Figure 55** provide the recycling potential of plastic packaging POM in 2021–22. It is estimated that about 42% of plastic packaging had good recycling potential, 36% poor recycling potential and 12% was not recyclable. The recycling potential for about 11% of plastics packaging was unknown.

The good recycling potential classification percentage of 42% was a sharp decrease from 60% in 2020-21. This was caused by changes in the recycling potential classification scores for flexible B2C plastic packaging calculated as of 30 June 2022, which relate to the subsequent closure of the REDcycle program. As of 30 June 2022, while the REDcycle **collection** system was still in operation, both the reprocessing capacity and end-markets were considered poor, which changed the overall recycling potential score for flexible B2C plastic packaging from 'good' to 'poor'. This decision was made to reflect an extraordinary industry event where collection and reprocessing facilities became unavailable despite the technical recyclability of this material.

For reference, if the REDcycle related recycling potential score changes had not been applied to the 2021–22 data, then the plastic packaging good recycling potential classification percentage would have been 64%.

Table 71 – Plastic packaging POM in 2021–22, by recycling potential classification and material type.

Material type	Good recycling potential	Poor recycling potential	Not recyclable	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
PET (1) – Natural	89,000	42,000	8,000	5,000	145,000
PET (1) – Transparent	26,000	1,000	0	0	26,000
PET (1) – Opaque	1,000	0	8,000	0	8,000
HDPE (2) – Natural	170,000	11,000	0	22,000	203,000
HDPE (2) – Coloured	56,000	60,000	0	12,000	129,000
PVC (3)	0	0	11,000	0	11,000
LDPE (4)	65,000	251,000	0	11,000	328,000
PP (5) – Natural	40,000	67,000	2,000	8,000	118,000
PP (5) – Coloured	78,000	24,000	0	32,000	135,000
PS (6)	0	0	17,000	0	17,000
EPS (6)	5,000	0	25,000	0	30,000
Bioplastic (7)	2,000	0	0	0	2,000
Other (7)	0	0	17,000	1,000	17,000
Unidentified	0	0	65,000	43,000	109,000
Total (tonnes)	**533,000**	**457,000**	**152,000**	**136,000**	**1,277,000**
Total (%)	**41.7%**	**35.8%**	**11.9%**	**10.6%**	**100.0%**

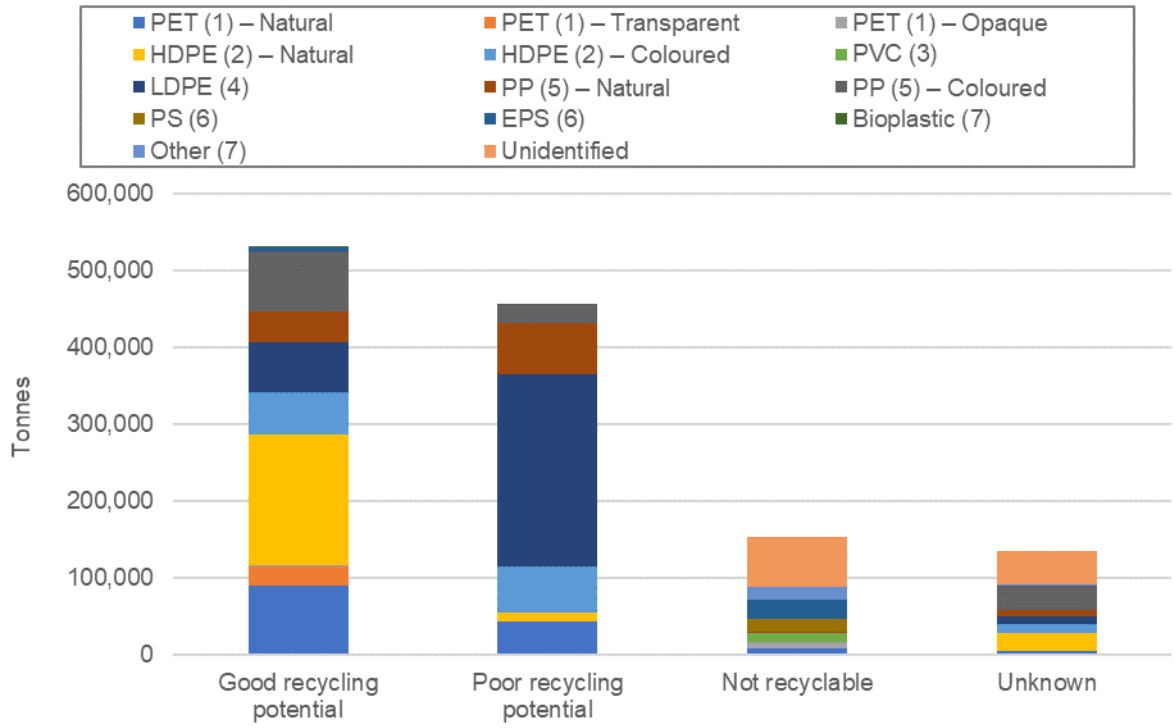

Figure 55 – Plastic packaging POM in 2021–22, by recycling potential classification and material type.

5.4 Projections to 2026–27

Projections for plastic packaging POM from 2022–23 to 2026–27 are provided in Table 72 and Figure 56. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 is projected data based on survey estimates of POM growth by material type.

The estimated five-year CAGR for plastic packaging POM from 2021–22 to 2026–27 is 2.5% per year.

Table 72 – Plastic packaging POM (mass and per capita bases) from 2019–20 to 2026–27, by material type.

Material type	2019–20		2020–21		2021–22		2022–23		2023–24		2024–25		2025–26		2026–27		5-yr CAGR
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(%/yr)
PET (1)	163,000	6.4	149,000	5.8	179,000	6.9	183,000	6.8	188,000	6.8	192,000	6.9	197,000	6.9	202,000	7.0	2.4%
HDPE (2)	275,000	10.7	287,000	11.2	332,000	12.8	338,000	12.5	345,000	12.5	351,000	12.6	358,000	12.6	365,000	12.7	1.9%
PVC (3)	17,000	0.7	15,000	0.6	11,000	0.4	9,000	0.3	8,000	0.3	7,000	0.2	6,000	0.2	5,000	0.2	-14.1%
LDPE (4)	276,000	10.7	331,000	12.9	328,000	12.6	341,000	12.5	354,000	12.8	368,000	13.2	383,000	13.5	398,000	13.8	3.9%
PP (5)	218,000	8.5	215,000	8.4	253,000	9.7	259,000	9.5	265,000	9.6	271,000	9.7	277,000	9.8	283,000	9.8	2.3%
PS (6)	17,000	0.7	17,000	0.7	17,000	0.6	16,000	0.6	16,000	0.6	15,000	0.5	15,000	0.5	14,000	0.5	-3.1%
EPS (6)	23,000	0.9	29,000	1.1	30,000	1.1	30,000	1.1	31,000	1.1	31,000	1.1	32,000	1.1	32,000	1.1	1.7%
Bioplastic (7)	9,000	0.3	4,000	0.1	2,000	0.1	2,000	0.1	3,000	0.1	3,000	0.1	3,000	0.1	4,000	0.1	14.5%
Other (7)	20,000	0.8	21,000	0.8	17,000	0.7	18,000	0.7	18,000	0.7	19,000	0.7	19,000	0.7	20,000	0.7	2.5%
Unidentified	107,000	4.2	111,000	4.3	109,000	4.2	111,000	4.1	114,000	4.1	117,000	4.2	120,000	4.2	123,000	4.3	2.5%
Total	**1,124,000**	**43.8**	**1,179,000**	**45.9**	**1,277,000**	**49.1**	**1,308,000**	**48.2**	**1,340,000**	**48.6**	**1,374,000**	**49.1**	**1,409,000**	**49.7**	**1,446,000**	**50.3**	**2.5%**

a) kg/p – kilograms per person.
b) CAGR – compound annual growth rate.

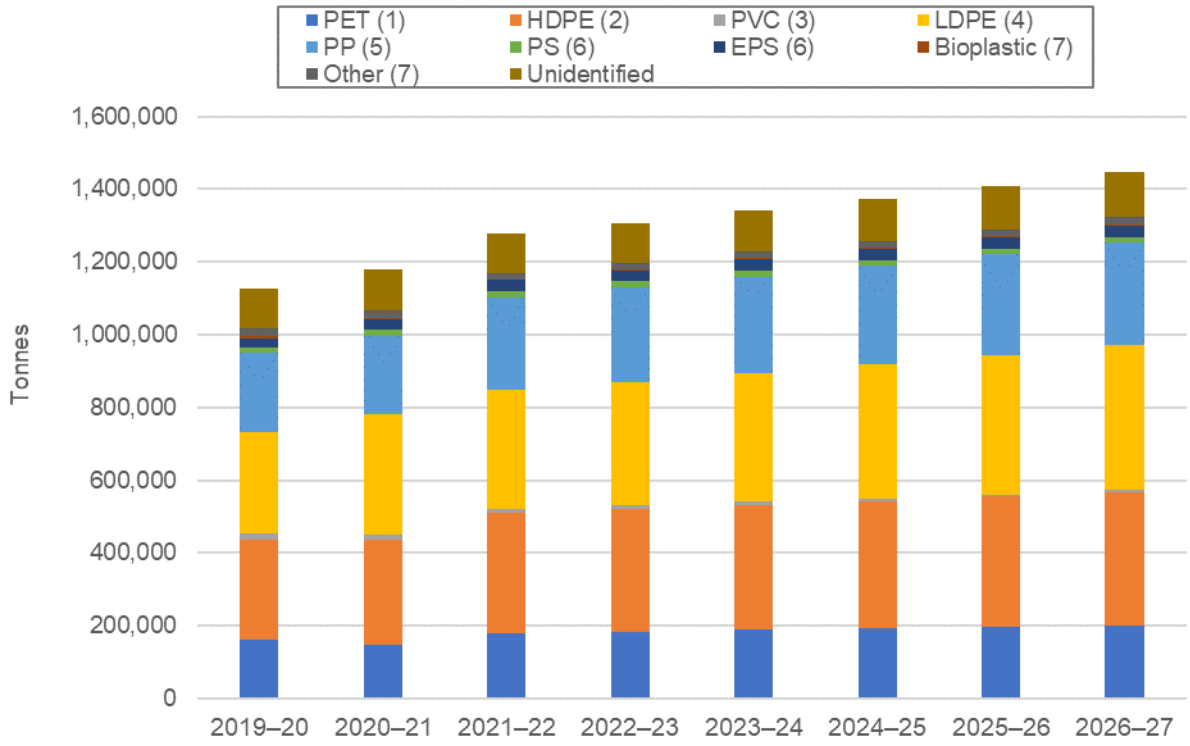

Figure 56 – Plastic packaging POM from 2019–20 to 2026–27, by material type.

Projections for plastic packaging reprocessing capacity from 2022–23 to 2026–27 are provided in Table 73 and Figure 57. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 onwards is projected based on reported planned new reprocessing capacity.

The estimated five year compound annual growth rate for plastic packaging reprocessing capacity from 2021–22 to 2026–27 is 16.9%.

Table 73 – Plastic packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

Material type	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26	2026–27	5 year CAGR[a]
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%/yr)
PET (1)	36,000	26,000	106,000	122,000	138,000	154,000	170,000	187,000	12.1%
HDPE (2)	58,000	57,000	123,000	151,000	178,000	206,000	233,000	261,000	16.1%
PVC (3)	0	0	0	0	0	1,000	1,000	1,000	17.9%
LDPE (4)	23,000	32,000	33,000	52,000	70,000	89,000	108,000	127,000	31.0%
PP (5)	18,000	45,000	36,000	51,000	66,000	80,000	95,000	110,000	24.8%
PS (6)	9,000	2,000	1,000	1,000	1,000	1,000	1,000	1,000	0.0%
EPS (6)	6,000	6,000	11,000	12,000	14,000	15,000	17,000	19,000	11.9%
Bioplastic (7)	0	0	0	0	0	0	0	0	0.0%
Other (7)	1,000	0	4,000	6,000	8,000	10,000	12,000	14,000	27.2%
Unidentified	16,000	20,000	26,000	26,000	26,000	26,000	26,000	26,000	0.0%
Total	**168,000**	**188,000**	**341,000**	**421,000**	**502,000**	**583,000**	**664,000**	**745,000**	**16.9%**

a) CAGR – compound annual growth rate.

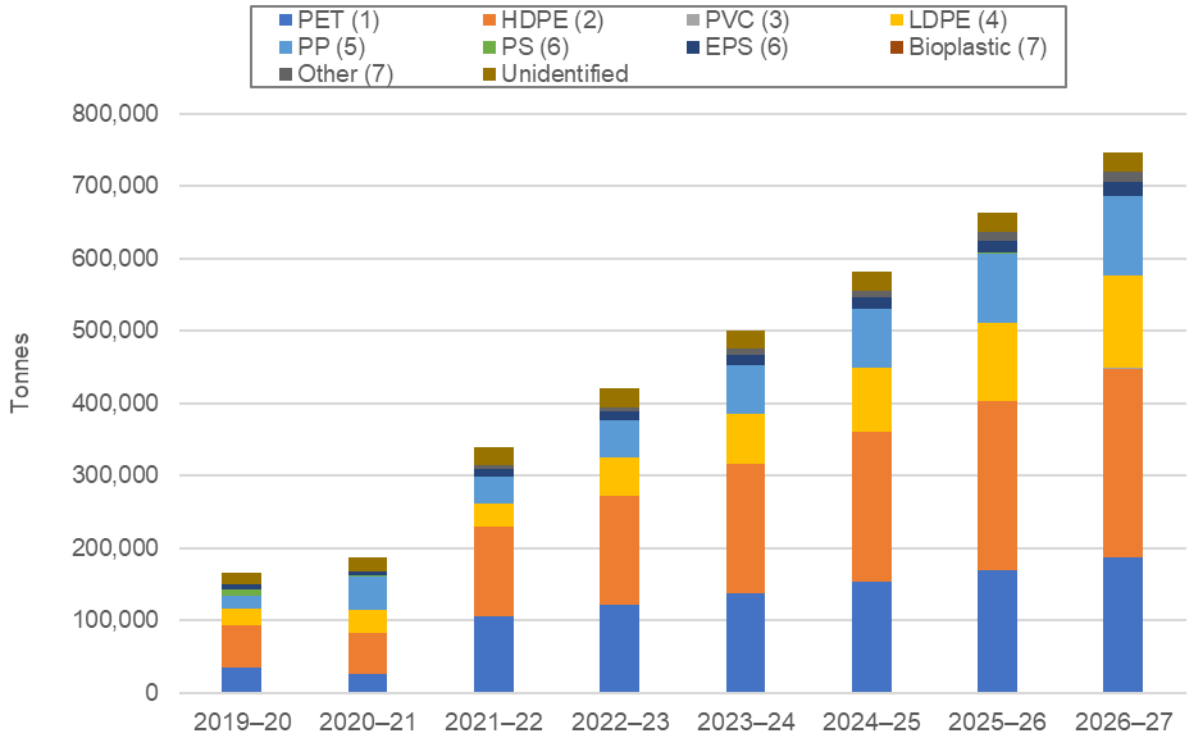

Figure 57 – Plastic packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

6 METAL PACKAGING IN 2021–22

6.1 Placed on market

Trends

Metal packaging POM in Australia in 2021–22 is estimated at 398,000 tonnes (±13%), which was 4.3% of all packaging POM. Five-year trends for metal packaging POM are provided in Table 74 and Figure 58 (mass basis), and four-year trends are provided in Table 75 and **Figure 59** (count basis). Note that 2017–18 count basis data is not available.

Between 2020–21 and 2021–22 there was an increase in metal packaging POM of 44,000 tonnes (+17%).

Table 74 – Metal packaging POM (mass and per capita bases) from 2017–18 to 2021–22, by material type.

Material type	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Beverage aluminium	79,000	3.2	86,000	3.4	82,000	3.2	95,000	3.7	100,000	3.9
Non-beverage aluminium	13,000	0.5	14,000	0.6	7,000	0.3	7,000	0.3	11,000	0.4
Tin-plate steel	121,000	4.8	127,000	5.0	139,000	5.4	125,000	4.9	161,000	6.2
Mild steel	NR[a]	NR	19,000	0.8	19,000	0.7	26,000	1.0	24,000	0.9
Stainless steel	NR	NR	0	0.0	1,000	0.0	0	0.0	1,000	0.1
Total	**213,000**	**8.5**	**246,000**	**9.7**	**248,000**	**9.7**	**254,000**	**9.9**	**298,000**	**11.5**

a) kg/p – kilograms per person.

b) NR – not reported.

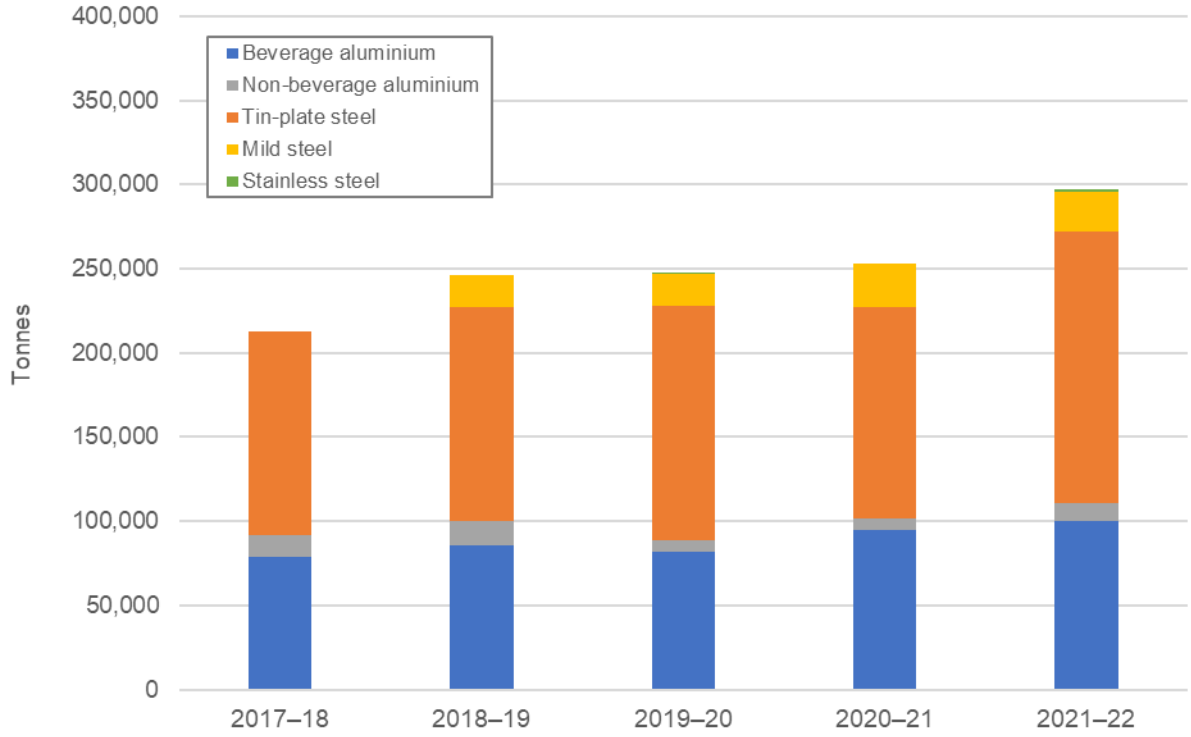

Figure 58 – Metal packaging POM (mass basis) from 2017–18 to 2021–22, by material type.

Table 75 – Metal packaging POM (count and per capita bases) from 2017–18 to 2021–22, by material type.

Material type	2018–19		2019–20		2020–21		2021–22	
	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)	(million units)	(units/p)
Beverage aluminium	6,000	225.7	5,000	212.7	6,000	246.2	7,000	257.2
Non-beverage aluminium	1,000	42.2	1,000	31.1	1,000	31.1	1,000	50.8
Tin-plate steel	2,000	77.5	3,000	97.6	2,000	80.0	3,000	110.4
Mild steel	0	0.1	0	0.1	0	0.1	0	0.1
Stainless steel	0	0.0	0	0.0	0	0.0	0	0.0
Total	**9,000**	**345.4**	**9,000**	**341.5**	**9,000**	**357.4**	**11,000**	**418.4**

a) kg/p – kilograms per person.
b) NR – not reported.

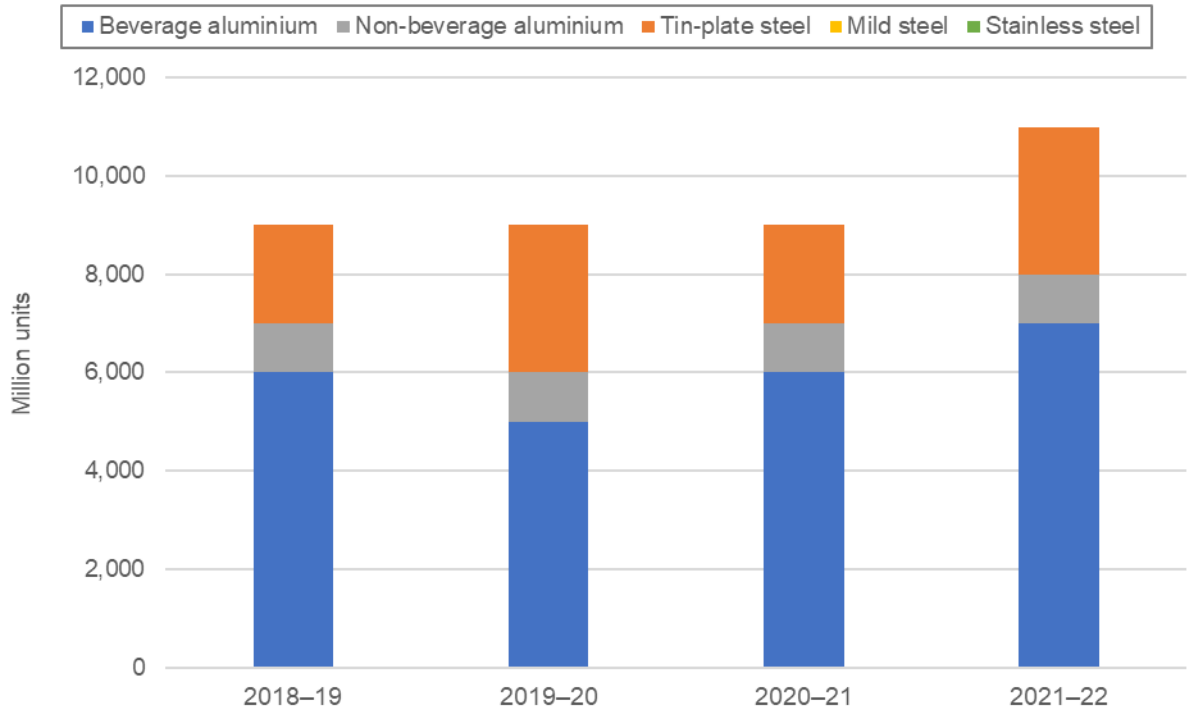

Figure 59 – Metal packaging POM (count basis) from 2017–18 to 2021–22, by material type.

Sector of use

Estimates for metal packaging POM by material type and sector of use are provided in Table 76 and **Figure 60**. Metal packaging consumption is dominated by tin-plate steel can (54.1%) and aluminium beverage can (33.7%) consumption.

Around 78% of metal packaging was used in the B2C sector, with the other 22% used in the B2B sector.

Table 76 – Metal packaging POM in 2021–22, by material type and sector of use.

Material type	B2C – At home[a]	B2C – AfH[a]	B2B[a]	Other or unknown	Total	
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Beverage aluminium	66,000	35,000	0	0	100,000	33.7%
Non-beverage aluminium	10,000	1,000	0	0	11,000	3.8%
Tin-plate steel	121,000	1,000	40,000	0	161,000	54.1%
Mild steel	0	0	24,000	0	24,000	8.0%
Stainless steel	0	0	1,000	0	1,000	0.5%
Total (tonnes)	**196,000**	**36,000**	**65,000**	**0**	**298,000**	**-**
Total (%)	**65.9%**	**12.2%**	**21.9%**	**0.0%**	**100.0%**	**100.0%**

a) Business-to-consumer (B2C) – At home | Business-to-consumer (B2C) – Away-from-home (AfH) | Business-to-business (B2B).

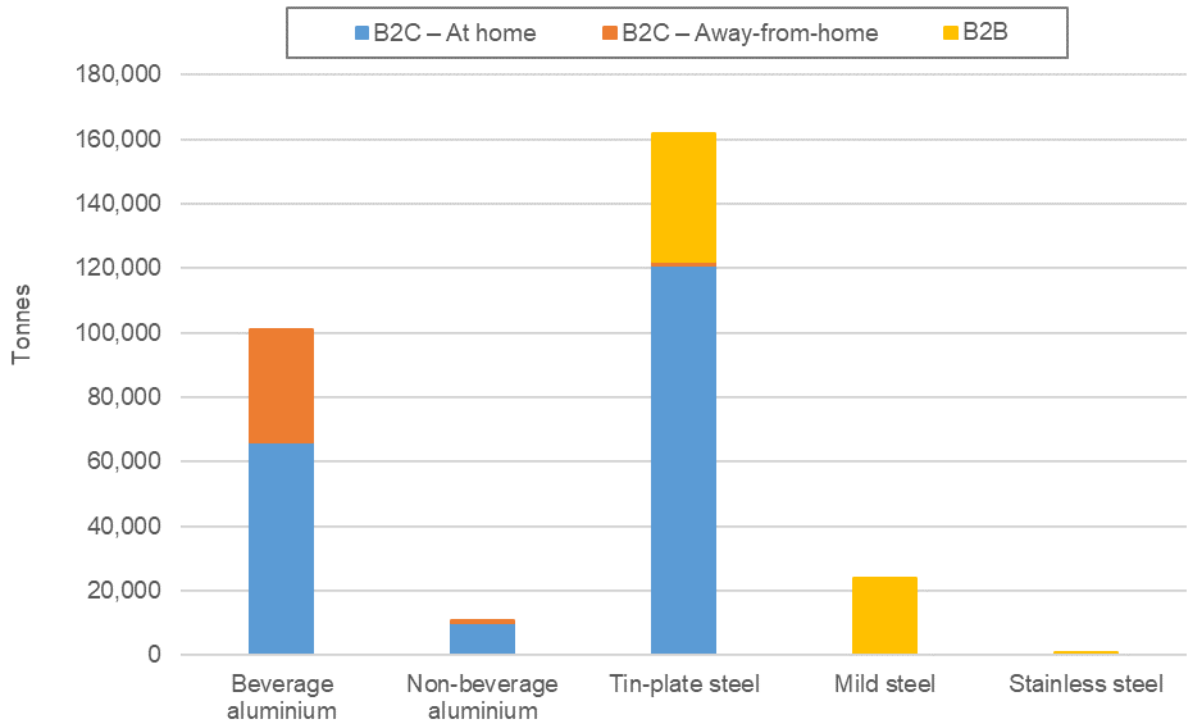

Figure 60 – Metal packaging POM in 2021–22, by material type and sector of use.

Component group

Table 77 and **Figure 61** provide metal packaging POM in 2021–22 by component group. Metal products POM are dominated by cans (86.9%), with the remainder mostly barrels or drums (9.5%).

Table 77 – Metal packaging POM in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	0	0	0	100,000	0	0	0	0	0	0	0	0	0	0	0	100,000
Non-beverage aluminium	0	0	0	7,000	0	1,000	0	0	0	0	4,000	0	0	0	0	11,000
Tin-plate steel	0	3,000	0	152,000	0	6,000	0	0	0	0	0	0	0	0	0	161,000
Mild steel	0	24,000	0	0	0	0	0	0	0	0	0	0	0	0	0	24,000
Stainless steel	0	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000
Total (tonnes)	**0**	**28,000**	**0**	**259,000**	**0**	**7,000**	**0**	**0**	**0**	**0**	**4,000**	**0**	**0**	**0**	**0**	**298,000**
Total (%)	**0.0%**	**9.5%**	**0.0%**	**86.9%**	**0.0%**	**2.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.2%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

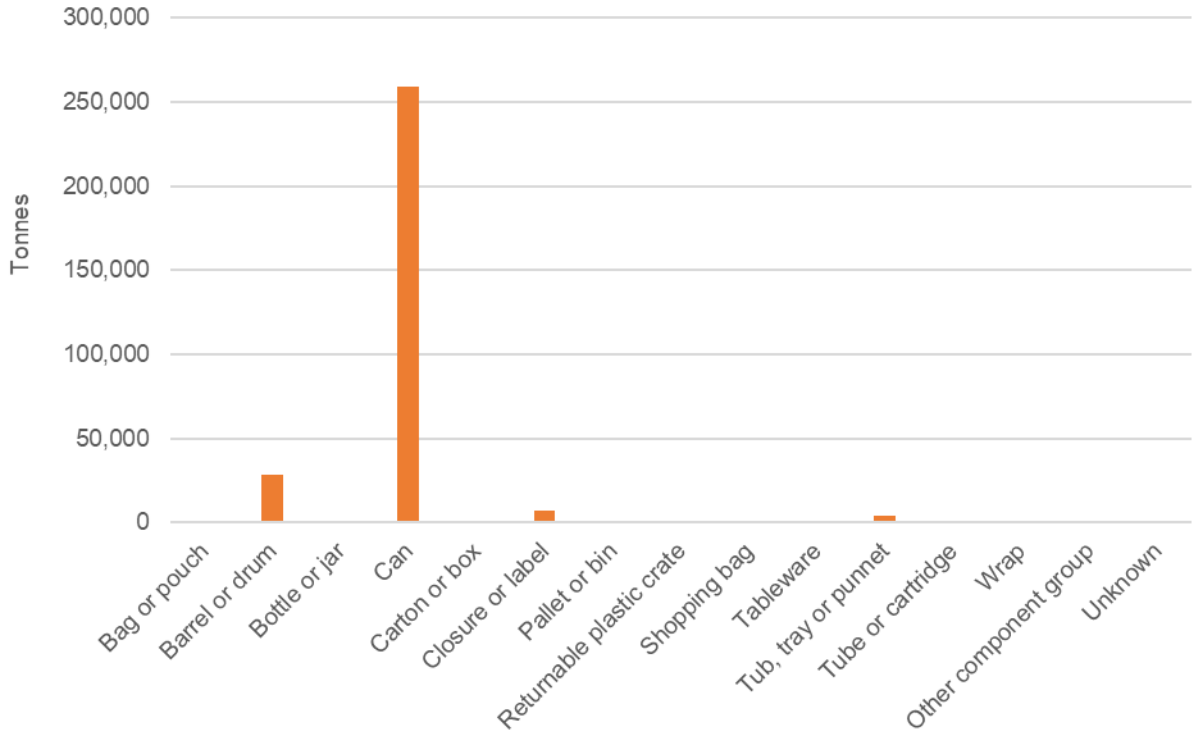

Figure 61 – Metal packaging POM in 2021–22, by material type and component group.

Packaging material source location

Metal packaging POM in 2021–22 by location of manufacturing and location or material source are provided in Table 78 and **Figure 62**. Of the 298,000 tonnes of metal packaging POM, about 74% was locally manufactured using materials from overseas, 7% was locally manufactured from local materials, 14% arrived as imported filled packaging and 5% was imported empty packaging.

Table 78 – Metal packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Material type	Locally manufactured packaging – locally sourced material	Locally manufactured packaging – overseas sourced material	Overseas manufactured packaging – filled packaging	Overseas manufactured packaging – empty packaging	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	0	94,000	5,000	1,000	100,000
Non-beverage aluminium	0	6,000	1,000	4,000	11,000
Tin-plate steel	0	120,000	35,000	6,000	161,000
Mild steel	19,000	0	1,000	3,000	24,000
Stainless steel	0	1,000	0	1,000	1,000
Total (tonnes)	**19,000**	**221,000**	**43,000**	**16,000**	**298,000**
Total (%)	**6.5%**	**74.0%**	**14.3%**	**5.2%**	**100.0%**

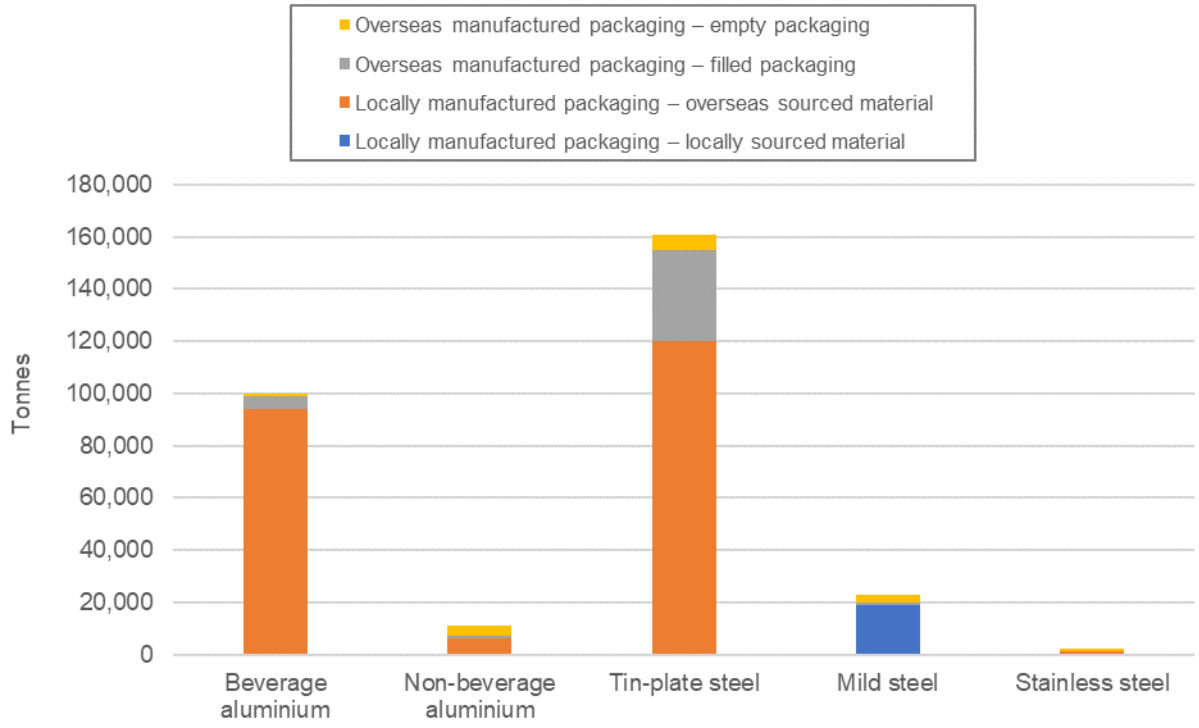

Figure 62 – Metal packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Recycled content

Estimates of the recycled content incorporated into metal packaging POM in 2021–22 and by material type are provided in Table 79 and Figure 79.

The PCR content of metal packaging was 40,000 tonnes, or 13% of total metal packaging POM, a small and probably insignificant decrease from 15% in the previous year.

The pre-consumer recycled content was 67,000 tonnes (22%), and 192,000 tonnes (64%) was sourced from virgin (primary) feedstocks.

The proportion of pre-consumer recycled content in aluminium based packaging is relatively high compared to other packaging material types due to the nature of aluminium goods manufacturing, which typically involves relatively large quantities of pre-consumer scrap generation.

Table 79 – Metal packaging POM in 2021–22, by material type and recycled content.

Material type	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Beverage aluminium	24,000	24%	36,000	36%	40,000	40%	100,000
Non-beverage aluminium	1,000	6%	3,000	30%	7,000	65%	11,000
Tin-plate steel	12,000	7%	26,000	16%	124,000	77%	161,000
Mild steel	3,000	13%	2,000	6%	19,000	80%	24,000
Stainless steel	0	7%	0	14%	1,000	79%	1,000
Total	**40,000**	**13%**	**67,000**	**22%**	**192,000**	**64%**	**298,000**

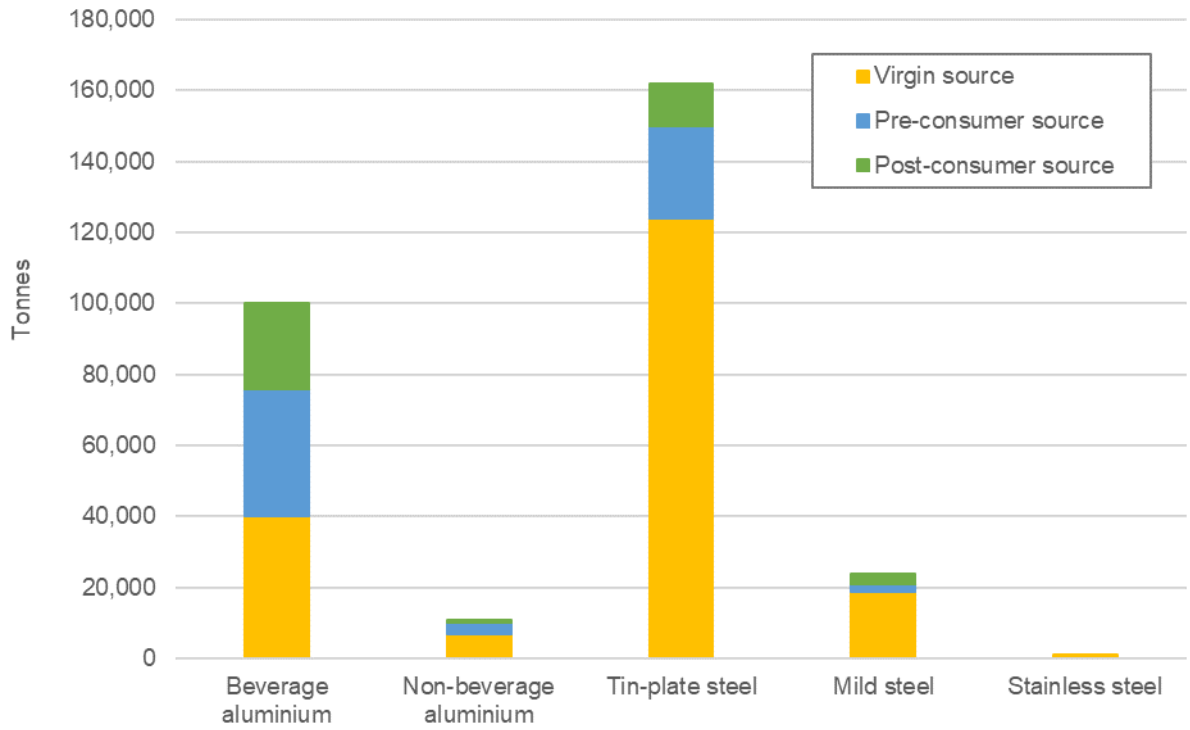

Figure 63 – Metal packaging POM in 2021–22, by material type and recycled content.

Packaging manufacturers were requested to provide percentage estimates of the *easily achievable post-consumer recycled content* (without major redesign or manufacturing equipment upgrades), and the *maximum achievable post-consumer recycled content* (with major redesign and/or equipment upgrades).

The potential PCR content percentage values for metal packaging POM, as reported by manufacturers, are provided in Table 80. It was reported that the potential maximum PCR content for metal packaging is 95%, compared to 13% currently.

Note that data is only reported where packaging manufacturers representing more than 20% of total packaging POM (by material type) responded to the related survey questions.

Table 80 – Potential metal packaging post-consumer recycled content, by material type and level of intervention.

Material type	Current	Easily achievable	Maximum achievable
	(%)	(%)	(%)
Beverage aluminium	24%	95%	95%
Non-beverage aluminium	6%	Insufficient data	Insufficient data
Tin-plate steel	7%	85%	Insufficient data
Mild steel	13%	Insufficient data	Insufficient data
Stainless steel	7%	Insufficient data	Insufficient data
Total	**13%**	**91%**	**95%**

Food contact suitability

Estimates for the suitability for metal packaging POM for food contact applications are provided in Table 81, and indicate that 88% of packaging POM in 2021–22 was suitable for food contact applications and 11% was not suitable. The suitability of the remainder was not known.

Table 81 – Metal packaging POM suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Beverage aluminium	100,000	100%	0	0%	0	0%	100,000
Non-beverage aluminium	11,000	98%	0	2%	0	0%	11,000
Tin-plate steel	142,000	88%	19,000	12%	0	0%	161,000
Mild steel	9,000	36%	13,000	55%	2,000	9%	24,000
Stainless steel	1,000	71%	0	29%	0	0%	1,000
Total	**263,000**	**88%**	**33,000**	**11%**	**2,000**	**1%**	**298,000**

6.2 Recovery

Trends

Post-consumer metal packaging recovery in Australia in 2021–22 is estimated at around 151,000 tonnes (±20%), which was 3.9% of all post-consumer packaging recovery.

Five-year trends for metal packaging recovery are provided in Table 82 and **Figure 64**. Between 2020–21 and 2021–22 there was an increase in metal packaging recovery of 4,000 tonnes (+3%).

Table 82 – Metal packaging recovery from 2017–18 to 2021–22, by material type.

Material type	2017–18		2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Beverage aluminium	53,000	2.1	65,000	2.6	66,000	2.6	73,000	2.8	62,000	2.4
Non-beverage aluminium	4,000	0.2	3,000	0.1	3,000	0.1	3,000	0.1	3,000	0.1
Tin-plate steel	45,000	1.8	52,000	2.1	53,000	2.1	53,000	2.1	68,000	2.6
Mild steel	NR[b]	NR	17,000	0.7	17,000	0.7	18,000	0.7	18,000	0.7
Stainless steel	NR	NR	0	0.0	1,000	0.0	0	0.0	0	0.0
Total	**102,000**	**4.1**	**137,000**	**5.4**	**139,000**	**5.4**	**147,000**	**5.7**	**151,000**	**5.8**

a) kg/p – kilograms per person.
b) NR – not reported.

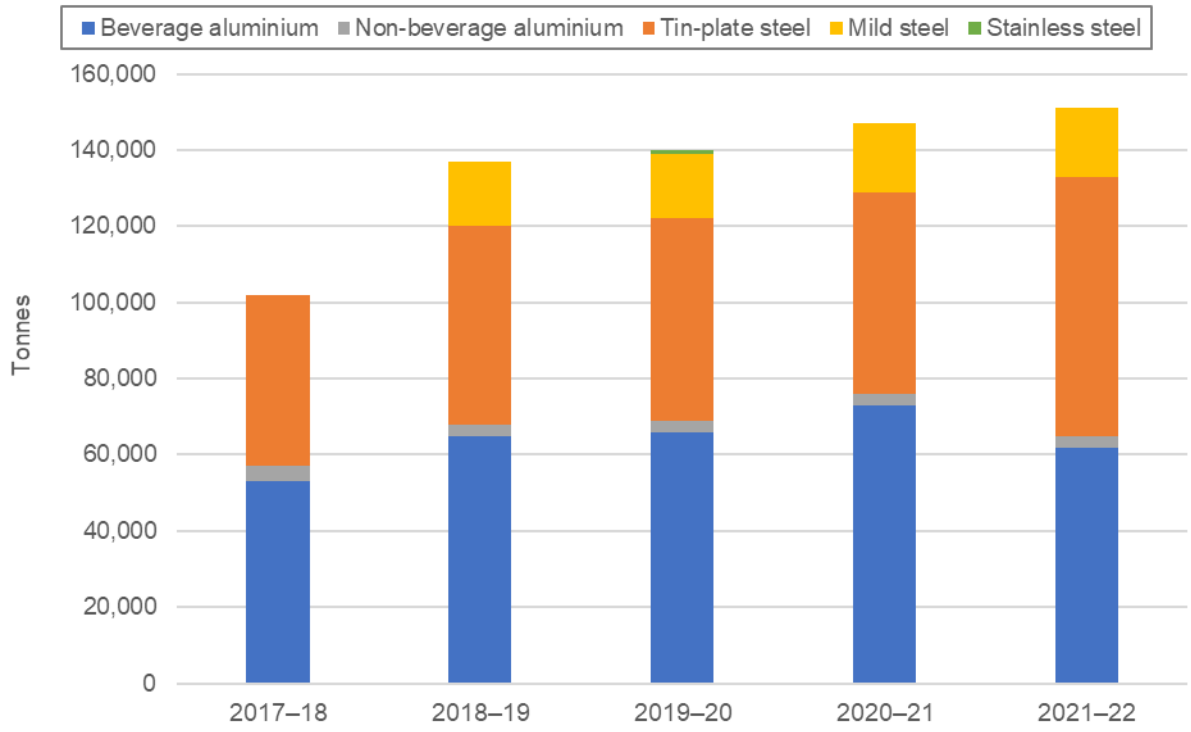

Figure 64 – Metal packaging recovery from 2017–18 to 2021–22, by material type.

Collection service

Estimates for metal packaging recovery, by material type and collection service, are provided in Table 83 and **Figure 65**. Around 97,000 tonnes (63.7%) of metal packaging were recovered through MSW collections, with another 36,000 tonnes (23.9%) recovered through separate CDS collections, and 18,000 tonnes (11.7%) through C&I collections. A small quantity of 1,000 tonnes (0.3%) was collected through C&D related collections.

Table 83 – Metal packaging recovery in 2021–22, by material type and collection service.

Material type	Collection service					Total	
	MSW[a]	C&I[a]	C&D	CDS[a]	Other		
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Beverage aluminium	26,000	0	0	36,000	0	62,000	41.1%
Non-beverage aluminium	3,000	0	0	0	0	3,000	2.0%
Tin-plate steel	68,000	0	0	0	0	68,000	45.0%
Mild steel	0	18,000	1,000	0	0	18,000	11.9%
Stainless steel	0	0		0	0	0	0.0%
Total (tonnes)	**97,000**	**18,000**	**1,000**	**36,000**	**0**	**151,000**	-
Total (%)	**63.7%**	**11.7%**	**0.3%**	**23.9%**	**0.0%**	**100.0%**	**100.0%**

a) Municipal solid waste (MSW), commercial and industrial (C&I) waste, and container deposit scheme (CDS) collection services.

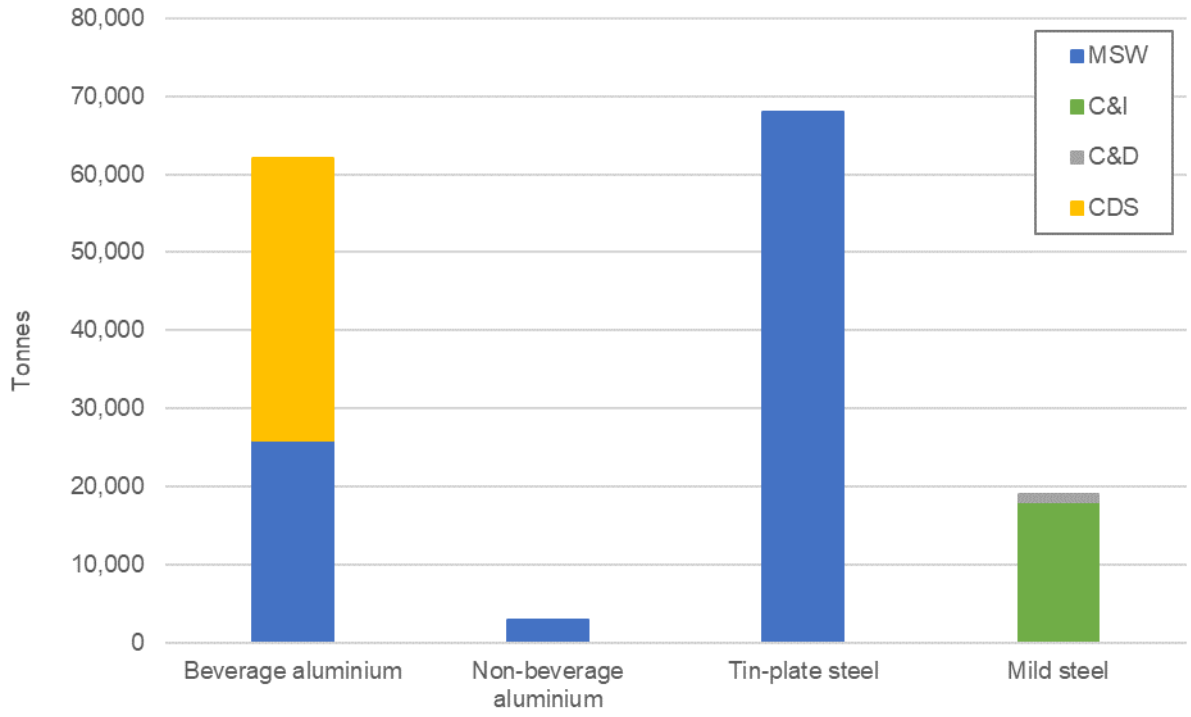

Figure 65 – Metal packaging recovery in 2021–22, by material type and collection service.

Component group

Table 84 and **Figure 66** provide metal packaging recovery in 2021–22 by component group. All metal packaging recovery was either cans (87.8%), and barrels or drums (12.2%).

Table 84 – Metal packaging recovery in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	0	0	0	62,000	0	0	0	0	0	0	0	0	0	0	0	62,000
Non-beverage aluminium	0	0	0	3,000	0	0	0	0	0	0	0	0	0	0	0	3,000
Tin-plate steel	0	0	0	68,000	0	0	0	0	0	0	0	0	0	0	0	68,000
Mild steel	0	18,000	0	0	0	0	0	0	0	0	0	0	0	0	0	18,000
Stainless steel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (tonnes)	**0**	**19,000**	**0**	**133,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**151,000**
Total (%)	**0.0%**	**12.2%**	**0.0%**	**87.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

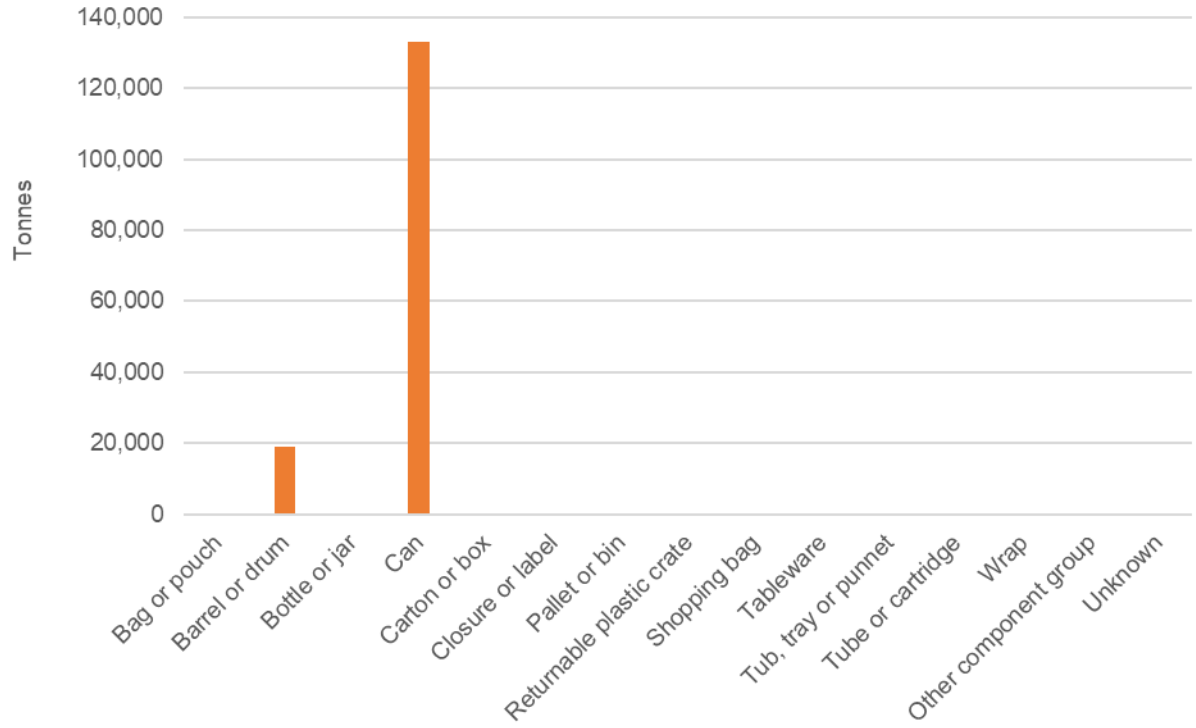

Figure 66 – Metal packaging recovery in 2021–22, by material type and component group.

Material use application

Metal packaging recovery in 2021–22 by material use application are provided in Table 85 and **Figure 67**. Most recovered metal went into unknown applications, as a consequence of the large international markets for aluminium and steel scrap, and the relatively small contribution of scrap metal packaging to these markets.

Table 85 – Metal packaging recovery in 2021–22, by material type and material use application.

Material type	Packaging applications	Non-packaging applications	Unknown applications	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	0	0	62,000	62,000
Non-beverage aluminium	0	0	3,000	3,000
Tin-plate steel	0	0	68,000	68,000
Mild steel	0	18,000	0	18,000
Stainless steel	0	0	0	0
Total (tonnes)	**0**	**19,000**	**133,000**	**151,000**
Total (%)	**0.0%**	**12.5%**	**87.5%**	**100.0%**

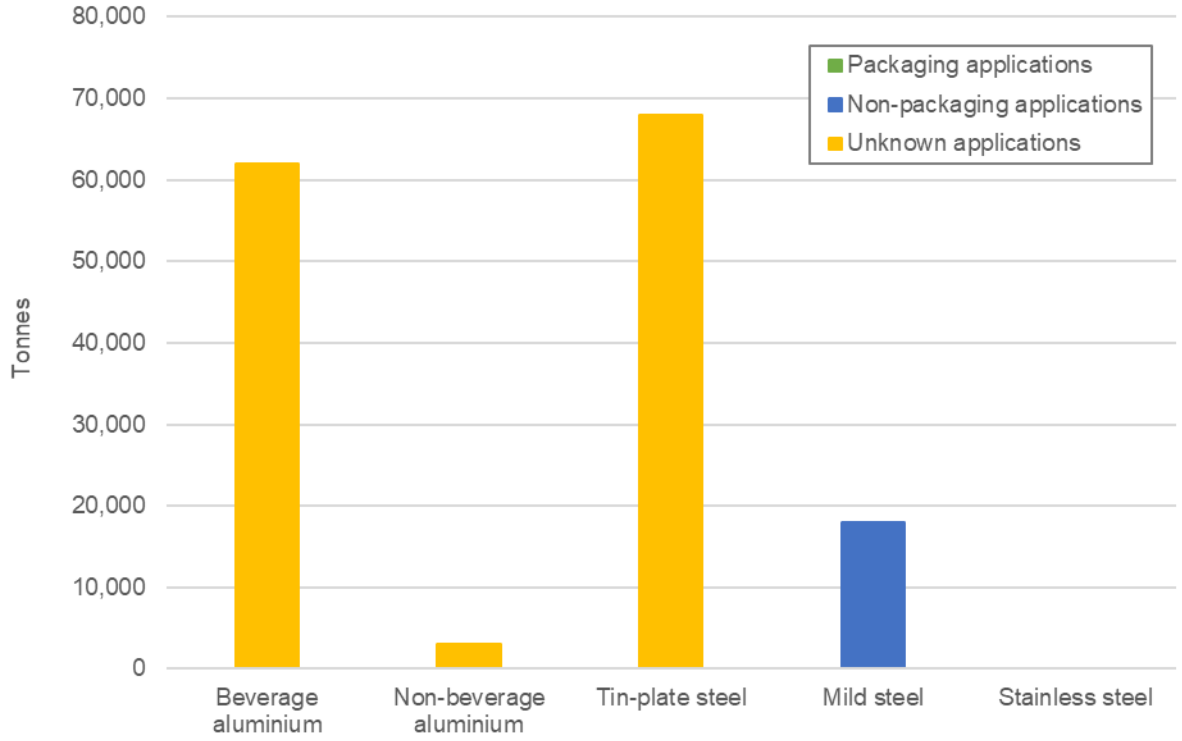

Figure 67 – Metal packaging recovery in 2021–22, by material type and material use application.

Material use destination

Metal packaging recovery in 2021–22 by material use destination are provided in Table 86 and Figure 68. Almost all recovered metal went overseas (99.3%), highlighting the strength of this material's export markets.

Table 86 – Metal packaging recovery in 2021–22, by material type and destination of material.

Material type	Local	Overseas	Unknown destinations	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	0	62,000	0	62,000
Non-beverage aluminium	0	3,000	0	3,000
Tin-plate steel	0	68,000	0	68,000
Mild steel	1,000	18,000	0	18,000
Stainless steel	0	0	0	0
Total (tonnes)	**1,000**	**150,000**	**0**	**151,000**
Total (%)	**0.7%**	**99.3%**	**0.0%**	**100.0%**

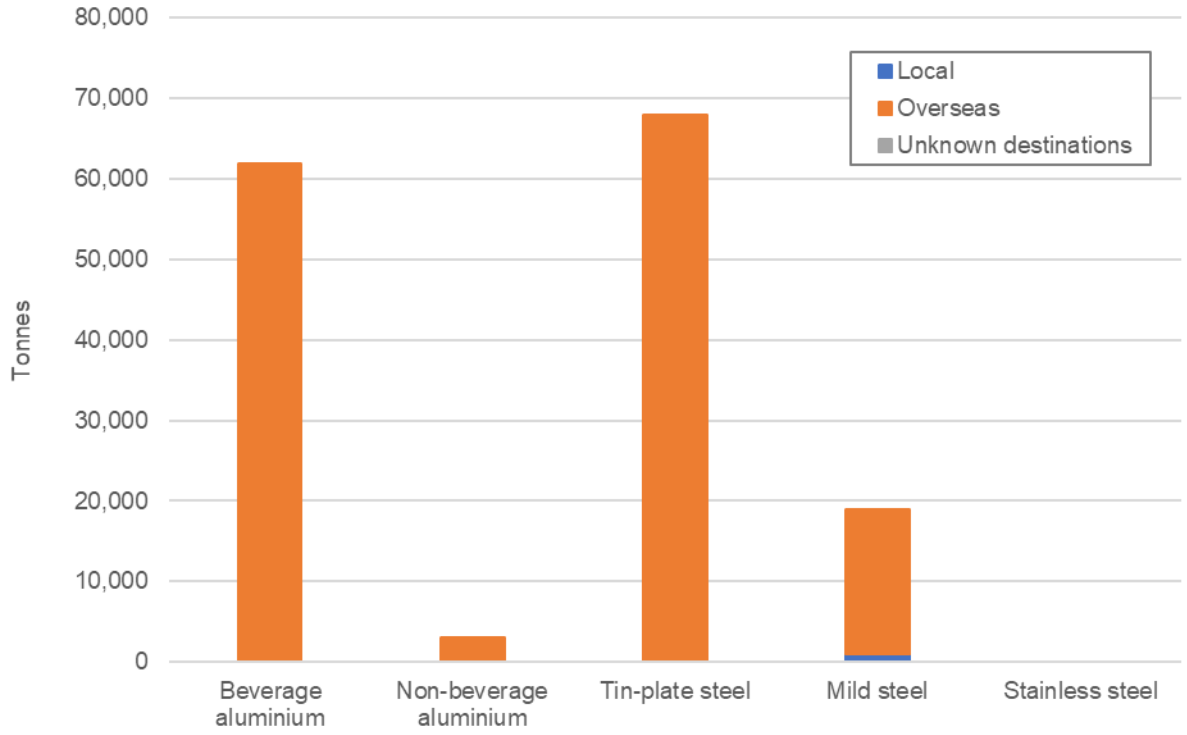

Figure 68 – Metal packaging recovery in 2021–22, by material type and destination of material.

Food contact suitability

Estimates for the suitability for metal packaging recovery for food contact applications are provided in Table 87, and indicate that 54% of recovered metal packaging was suitable for food contact packaging applications in 2021–22.

Table 87 – Metal packaging recovery suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Beverage aluminium	62,000	100%	0	0%	0	0%	62,000
Non-beverage aluminium	3,000	97%	0	3%	0	0%	3,000
Tin-plate steel	0	0%	0	0%	68,000	100%	68,000
Mild steel	17,000	95%	1,000	5%	0	0%	18,000
Stainless steel	0	0%	0	0%	0	0%	0
Total	**82,000**	**54%**	**1,000**	**1%**	**68,000**	**45%**	**151,000**

Recovery rates

Estimates for post-consumer metal packaging recovery rates in 2021–22, by material type, are provided in Table 88 and **Figure 69**. The overall recovery rate for metal packaging is 51%, which is a decrease on the 2020–21 rate of 58%.

Larger (mild) steel drums have the highest reported recovery rate, reflecting the concentrated generation of this form of packaging at manufacturing and other commercial and industrial facilities nationally, along with well-developed B2B collection systems for steel, and the relatively high value of each drum.

Aluminium beverage cans have the next highest recovery rate reflecting its high material value, and the concentration of use in beverage packaging that has high levels of recovery both through kerbside and CDS collection systems.

The tin-plate steel can recovery rate is relatively low at 42%, even though this material is highly recyclable and easily separated from kerbside commingled recyclables.

Table 88 – Post-consumer metal packaging recovery rates in 2021–22, by material type.

Material type	POM	Recovery	Recovery rate[a]
	(tonnes)	(tonnes)	(%)
Beverage aluminium	100,000	62,000	62%
Non-beverage aluminium	11,000	3,000	24%
Tin-plate steel	161,000	68,000	42%
Mild steel	24,000	18,000	77%
Stainless steel	1,000	0	0%
Total	**298,000**	**151,000**	**51%**

a) Percentage values are calculated prior to rounding contributing values.

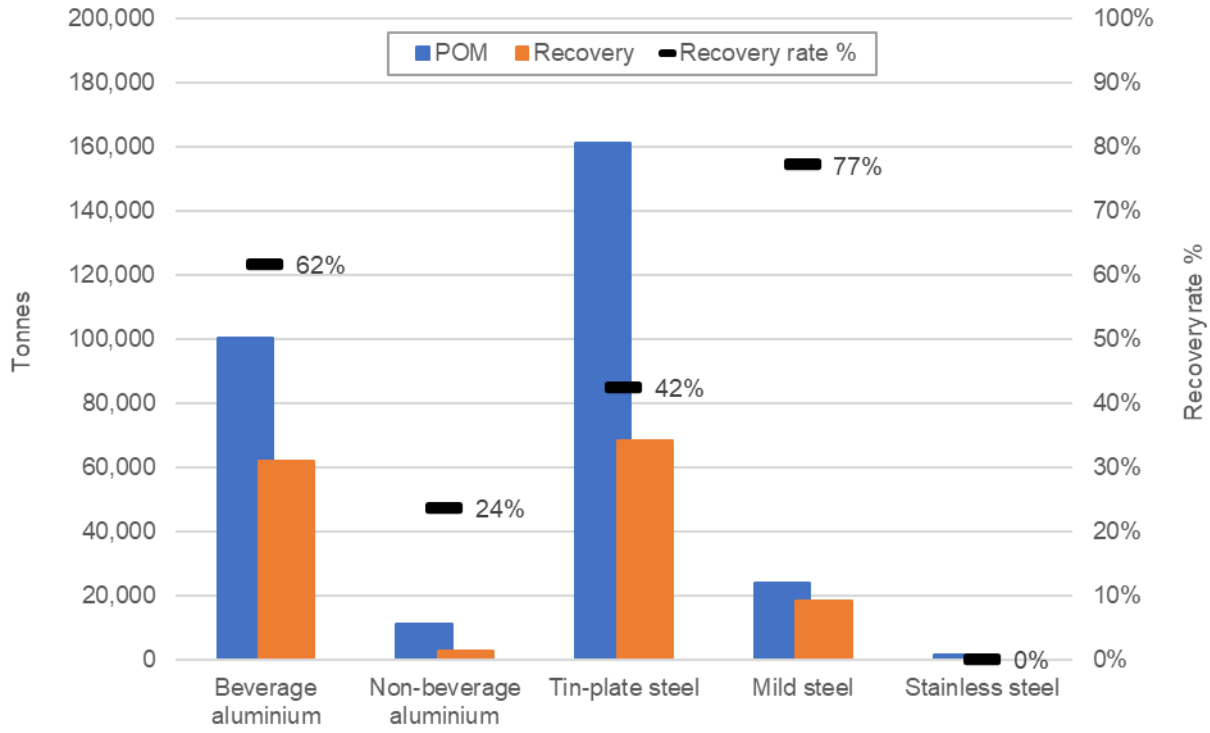

Figure 69 – Post-consumer metal packaging recovery rates in 2021–22, by material type.

6.3 Recycling potential

Table 89 and Figure 70 provide the recycling potential of metal packaging POM in 2021–22. Metal is a highly recyclable material with almost a 100% 'good recycling potential' classification.

Table 89 – Metal packaging POM in 2021–22, by recycling potential classification and material type.

Material type	Good recycling potential	Poor recycling potential	Not recyclable	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	100,000	0	0	0	**100,000**
Non-beverage aluminium	10,000	0	1,000	0	**11,000**
Tin-plate steel	161,000	0	0	0	**161,000**
Mild steel	24,000	0	0	0	**24,000**
Stainless steel	1,000	0	0	0	**1,000**
Total (tonnes)	**297,000**	**0**	**1,000**	**0**	**298,000**
Total (%)	**99.7%**	**0.1%**	**0.2%**	**0.0%**	**100.0%**

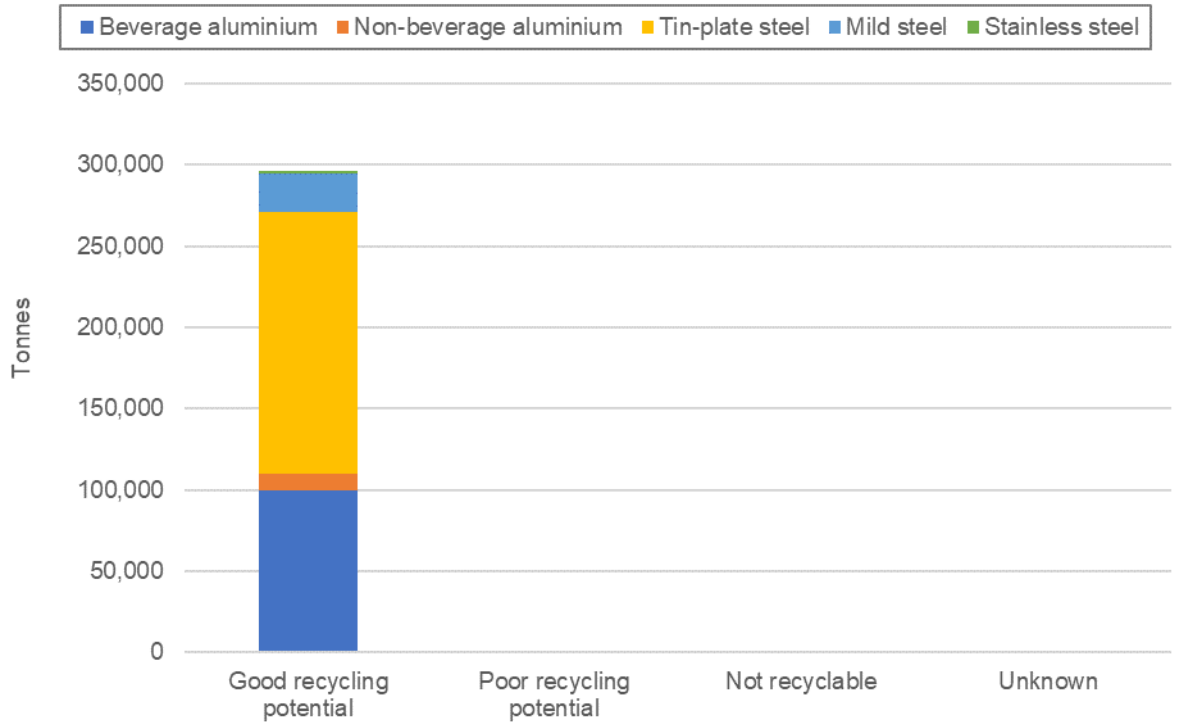

Figure 70 – Metal packaging POM in 2021–22, by recycling potential classification and material type.

6.4 Projections to 2026–27

Projections for metal packaging POM from 2022–23 to 2026–27 are provided in Table 90 and Figure 71. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 is projected data based on survey estimates of POM growth by material type.

The estimated five-year CAGR for metal packaging POM from 2021–22 to 2026–27 is 1.9% per year.

Table 90 – Metal packaging POM (mass and per capita bases) from 2019–20 to 2026–27, by material type.

Material type	2019–20		2020–21		2021–22		2022–23		2023–24		2024–25		2025–26		2026–27		5-yr CAGR[b]
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(%/yr)
Beverage aluminium	82,000	3.2	95,000	3.7	100,000	3.9	101,000	3.7	102,000	3.7	103,000	3.7	104,000	3.7	105,000	3.7	1.0%
Non-beverage aluminium	7,000	0.3	7,000	0.3	11,000	0.4	11,000	0.4	12,000	0.4	12,000	0.4	12,000	0.4	13,000	0.4	2.5%
Tin-plate steel	139,000	5.4	125,000	4.9	161,000	6.2	165,000	6.1	169,000	6.1	173,000	6.2	177,000	6.2	181,000	6.3	2.4%
Mild steel	19,000	0.7	26,000	1.0	24,000	0.9	25,000	0.9	25,000	0.9	26,000	0.9	26,000	0.9	27,000	0.9	2.5%
Stainless steel	1,000	0.0	0	0.0	1,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2,000	0.1	2.5%
Total	**248,000**	**9.7**	**254,000**	**9.9**	**298,000**	**11.5**	**304,000**	**11.2**	**310,000**	**11.2**	**316,000**	**11.3**	**322,000**	**11.3**	**328,000**	**11.4**	**1.9%**

a) kg/p – kilograms per person.

b) CAGR – compound annual growth rate.

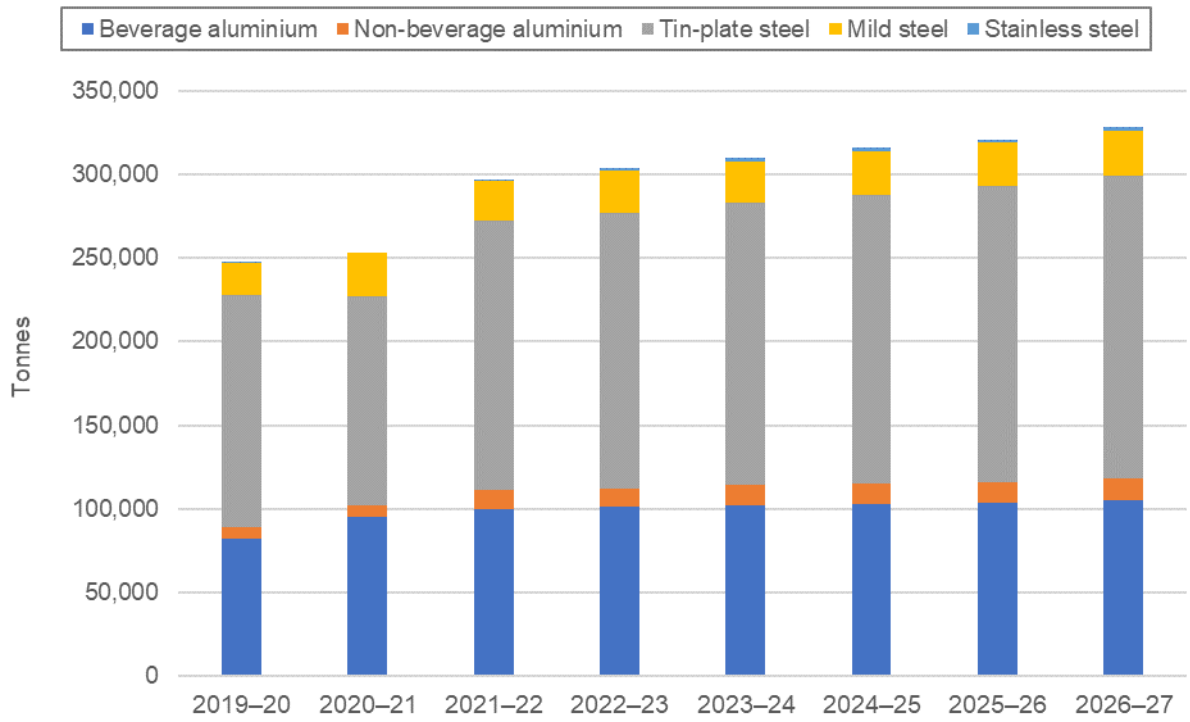

Figure 71 – Metal packaging POM from 2019–20 to 2026–27, by material type.

Projections for metal packaging reprocessing capacity from 2022–23 to 2026–27 are not provided in this report as they cannot be determined, due to almost all metal packaging being exported, and there being no reported significant local (Australian) initiatives to increase the local reprocessing of either aluminium or tin-plate steel packaging.

The local reprocessing capacity for mild steel packaging (e.g. 205 L drums) is unconstrained relative to the quantities of end-of-life drums requiring reprocessing.

7 WOOD PACKAGING IN 2021–22

7.1 Placed on market

Trends

Wood packaging POM in Australia in 2021–22 is estimated at 612,000 tonnes (±12%), which was 8.8% of all packaging POM. Four-year trends for wood packaging POM are provided in Table 91 and Figure 72 (mass basis), and four-year trends are provided in Table 92 (count basis). Note that 2017–18 data is not available.

Between 2020–21 and 2021–22 there was a decrease in wood packaging POM of 26,000 tonnes (-4%).

Table 91 – Wood packaging POM (mass and per capita bases) from 2018–19 to 2021–22, by material type.

Material type	2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Fibreboard – Low-density	0	0.0	50,000	2.0	94,000	3.7	42,000	1.6
Fibreboard – OSB[b]	0	0.0	50,000	2.0	37,000	1.5	25,000	1.0
Hardwood	6,000	0.3	81,000	3.1	60,000	2.3	63,000	2.4
Softwood	118,000	4.6	281,000	10.9	446,000	17.3	482,000	18.5
Total	**124,000**	**4.9**	**462,000**	**18.0**	**638,000**	**24.8**	**612,000**	**23.5**

a) kg/p – kilograms per person.
b) OSB – Oriented strand board.

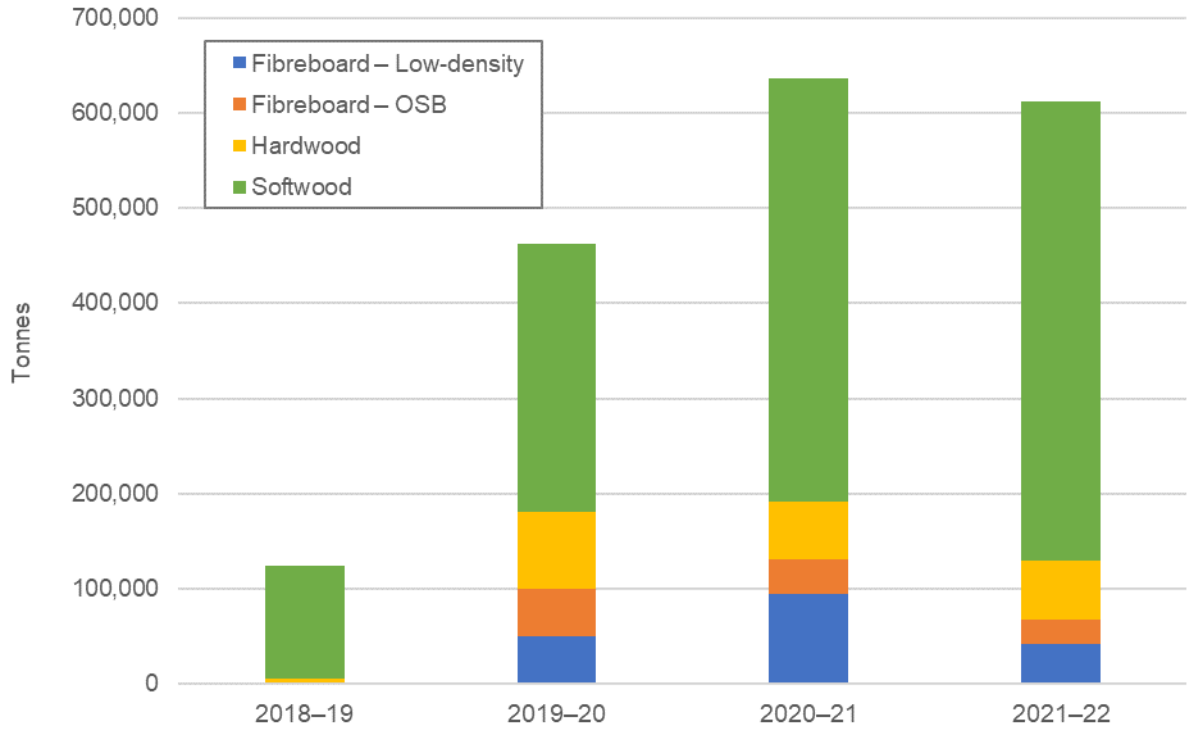

Figure 72 – Wood packaging POM (mass basis) from 2017–18 to 2021–22, by material type.

Table 92 – Wood packaging POM (count basis) from 2018–19 to 2021–22, by material type.

Material type	2018–19	2019–20	2020–21	2021–22
	(units)	(units)	(units)	(units)
Fibreboard – Low-density	NR[b]	2,504,000	4,697,000	2,105,000
Fibreboard – OSB[a]	NR	1,473,000	1,087,000	735,000
Hardwood	130,000	1,929,000	2,604,000	1,660,000
Softwood	5,110,000	11,132,000	18,329,000	19,851,000
Total	**5,239,000**	**17,038,000**	**26,717,000**	**24,351,000**

a) OSB – Oriented strand board.

b) NR – not reported.

Sector of use

Estimates for wood packaging POM by material type and sector of use are provided in Table 93. Wood packaging consumption was dominated by softwood use (78.8%), with almost all wood packaging used in the B2B sector, except for around 1,000 tonnes (0.1%) that was used in the B2C (AfH) section (single-use tableware).

The B2B packaging components include pallets, skids, crates, and cable reels. Note that all estimates have large accuracy ranges due to the uncertainties associated with estimating imported single-use wood pallets and skids carrying goods.

Table 93 – Wood packaging POM in 2021–22, by material type and sector of use.

Material type	B2C – At home[a]	B2C – AfH[a]	B2B[a]	Other or unknown	Total	
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Fibreboard – Low-density	0	0	42,000	0	42,000	6.9%
Fibreboard – OSB	0	0	25,000	0	25,000	4.1%
Hardwood	0	0	63,000	0	63,000	10.2%
Softwood	0	1,000	481,000	0	482,000	78.8%
Total (tonnes)	**0**	**1,000**	**611,000**	**0**	**612,000**	**-**
Total (%)	**0.0%**	**0.1%**	**99.9%**	**0.0%**	**100.0%**	**100.0%**

a) Business-to-consumer (B2C) – At home | Business-to-consumer (B2C) – Away-from-home (AfH) | Business-to-business (B2B).

Component group

Table 94 and **Figure 73** provide wood packaging POM in 2021–22 by component group. Wood products POM are dominated by pallets or bins (84.5%), with the rest mostly cartons or boxes (13.9%).

Table 94 – Wood packaging POM in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fibreboard – Low-density	0	0	0	0	0	0	42,000	0	0	0	0	0	0	0	0	42,000
Fibreboard – OSB	0	0	0	0	0	0	25,000	0	0	0	0	0	0	0	0	25,000
Hardwood	0	9,000	0	0	0	0	54,000	0	0	0	0	0	0	0	0	63,000
Softwood	0	0	0	0	85,000	0	396,000	0	0	1,000	0	0	0	0	0	482,000
Total (tonnes)	**0**	**9,000**	**0**	**0**	**85,000**	**0**	**517,000**	**0**	**0**	**1,000**	**0**	**0**	**0**	**0**	**0**	**612,000**
Total (%)	**0.0%**	**1.4%**	**0.0%**	**0.0%**	**13.9%**	**0.0%**	**84.5%**	**0.0%**	**0.0%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

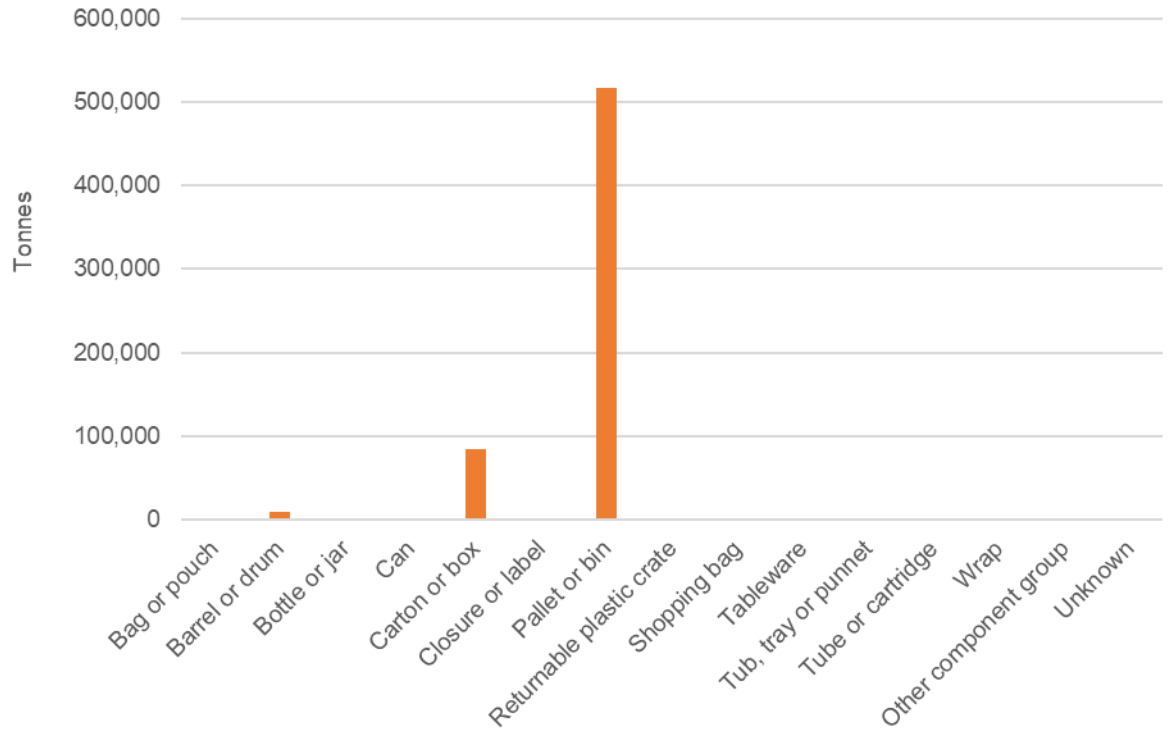

Figure 73 – Wood packaging POM in 2021–22, by material type and component group.

Packaging material source location

Wood packaging POM in 2021–22 by location of manufacturing and location or material source are provided in Table 95 and **Figure 74**. Of the 612,000 tonnes of wood packaging POM, about 63% was locally manufactured from local materials, 33% was imported filled packaging and 4% was imported empty packaging.

Table 95 – Wood packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Material type	Locally manufactured packaging – locally sourced material	Locally manufactured packaging – overseas sourced material	Overseas manufactured packaging – filled packaging	Overseas manufactured packaging – empty packaging	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fibreboard – Low-density	17,000	0	25,000	0	42,000
Fibreboard – OSB	0	0	25,000	0	25,000
Hardwood	28,000	0	25,000	10,000	63,000
Softwood	341,000	0	125,000	16,000	482,000
Total (tonnes)	**386,000**	**0**	**200,000**	**26,000**	**612,000**
Total (%)	**63.1%**	**0.0%**	**32.7%**	**4.2%**	**100.0%**

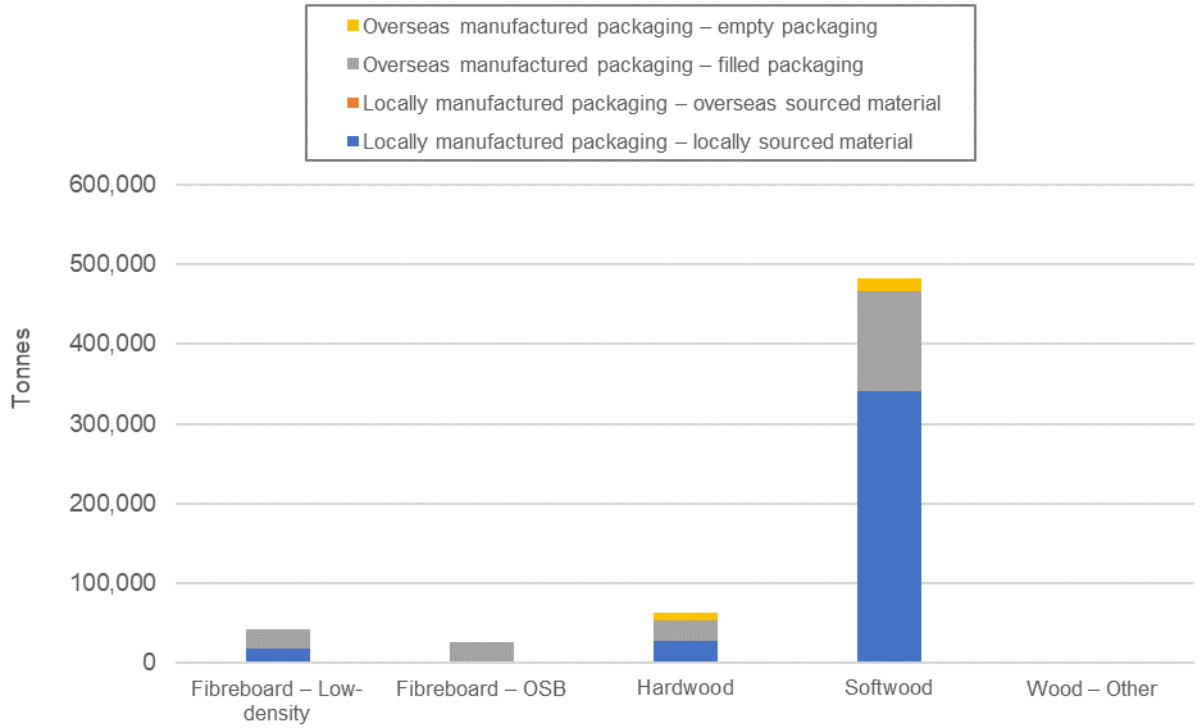

Figure 74 – Wood packaging POM in 2021–22, by material type, location of manufacturing, and location of packaging material source.

Recycled content

Estimates of the recycled content incorporated into metal packaging POM in 2021–22 and by material type are provided in Table 96**.**

There was no post-consumer or pre-consumer recycled content identified as present in wood packaging, which was made from 100% virgin (primary) feedstocks.

Table 96 – Wood packaging POM in 2021–22, by material type and recycled content.

Material type	Post-consumer source		Pre-consumer source		Virgin source		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Fibreboard – Low-density	0	0%	0	0%	42,000	100%	42,000
Fibreboard – OSB	0	0%	0	0%	25,000	100%	25,000
Hardwood	0	0%	0	0%	63,000	100%	63,000
Softwood	0	0%	0	0%	482,000	100%	482,000
Total	**0**	**0%**	**0**	**0%**	**612,000**	**100%**	**612,000**

Packaging manufacturers were requested to provide percentage estimates of the *easily achievable post-consumer recycled content* (without major redesign or manufacturing equipment upgrades), and the *maximum achievable post-consumer recycled content* (with major redesign and/or equipment upgrades).

The potential PCR content percentage values for wood packaging POM, as reported by manufacturers, are provided in Table 97. It was reported that the potential maximum PCR content for wood packaging is 90%, compared to 0% currently.

Table 97 – Potential wood packaging post-consumer recycled content, by material type and level of intervention.

Material type	Current	Easily achievable	Maximum achievable
	(%)	(%)	(%)
Fibreboard – Low-density	0%	85%	90%
Fibreboard – OSB	0%	0%	0%
Hardwood	0%	85%	90%
Softwood	0%	85%	90%
Total	**0%**	**85%**	**90%**

Food contact suitability

Estimates for the suitability for wood packaging POM for food contact applications are provided in Table 98, and indicate that 0.1% of packaging POM in 2021–22 was suitable for food contact applications and 99.9% was not suitable.

Table 98 – Wood packaging POM suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Fibreboard – Low-density	0	0.0%	42,000	100.0%	0	0.0%	42,000
Fibreboard – OSB	0	0.0%	25,000	100.0%	0	0.0%	25,000
Hardwood	0	0.0%	63,000	100.0%	0	0.0%	63,000
Softwood	1,000	0.2%	481,000	99.8%	0	0.0%	482,000
Total	**1,000**	**0.1%**	**611,000**	**99.9%**	**0**	**0.0%**	**612,000**

7.2 Recovery

Trends

Post-consumer wood packaging recovery in Australia in 2021–22 is estimated at around 277,000 tonnes (±20%), which accounted for 7.1% of all post-consumer packaging recovery.

Four-year trends for wood packaging recovery are provided in Table 98 and Figure 75. Between 2020–21 and 2021–22 there was an increase in wood packaging recovery of 17,000 tonnes (+7%).

Table 99 – Wood packaging recovery from 2017–18 to 2021–22, by material type.

Material type	2018–19		2019–20		2020–21		2021–22	
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)
Fibreboard	0	0.0	9,000	0.4	5,000	0.2	2,000	0.1
Hardwood	2,000	0.1	36,000	1.4	36,000	1.4	35,000	1.3
Softwood	42,000	1.7	125,000	4.9	219,000	8.5	240,000	9.2
Total	**44,000**	**1.8**	**171,000**	**6.6**	**260,000**	**10.1**	**277,000**	**10.7**

a) kg/p – kilograms per person.

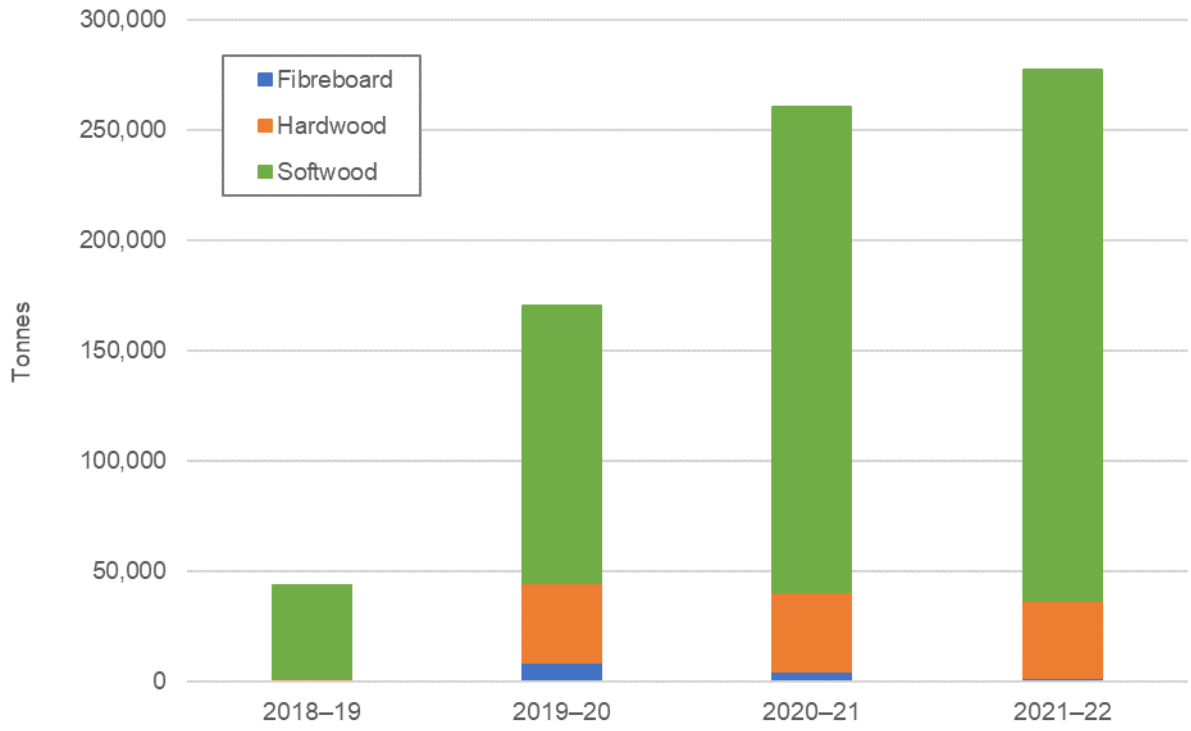

Figure 75 – Wood packaging recovery from 2017–18 to 2021–22, by material type.

Collection service

Estimates for wood packaging recovery, by material type and collection service, are provided in Table 100. All identified recovery of wood packaging was through C&I collections.

Table 100 – Wood packaging recovery in 2021–22, by material type and collection service.

Material type	Collection service				Total	
	MSW[a]	C&I[a]	C&D[a]	Other		
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%)
Fibreboard	0	2,000	0	0	2,000	0.7%
Hardwood	0	35,000	0	0	35,000	12.6%
Softwood	0	240,000	0	0	240,000	86.6%
Total (tonnes)	**0**	**277,000**	**0**	**0**	**277,000**	-
Total (%)	**0.0%**	**100.0%**	**0.0%**	**0.0%**	**100.0%**	**100.0%**

a) Municipal solid waste (MSW), commercial and industrial (C&I) waste, and construction % demolition (C&D) collection services.

Component group

Table 101 and **Figure 66** provide wood packaging recovery in 2021–22 by component group. Most wood packaging recovery was pallets or bins (88.0%), and cartons or boxes (10.9%).

Table 101 – Wood packaging recovery in 2021–22, by material type and component group.

Material type	Bag or pouch	Barrel or drum	Bottle or jar	Can	Carton or box	Closure or label	Pallet or bin	Returnable plastic crate	Shopping bag	Tableware	Tub, tray or punnet	Tube or cartridge	Wrap	Other component group	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fibreboard	0	0	0	0	0	0	2,000	0	0	0	0	0	0	0	0	2,000
Hardwood	0	3,000	0	0	0	0	31,000	0	0	0	0	0	0	0	0	35,000
Softwood	0	0	0	0	30,000	0	210,000	0	0	0	0	0	0	0	0	240,000
Total (tonnes)	**0**	**3,000**	**0**	**0**	**30,000**	**0**	**244,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**277,000**
Total (%)	**0.0%**	**1.1%**	**0.0%**	**0.0%**	**10.9%**	**0.0%**	**88.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**

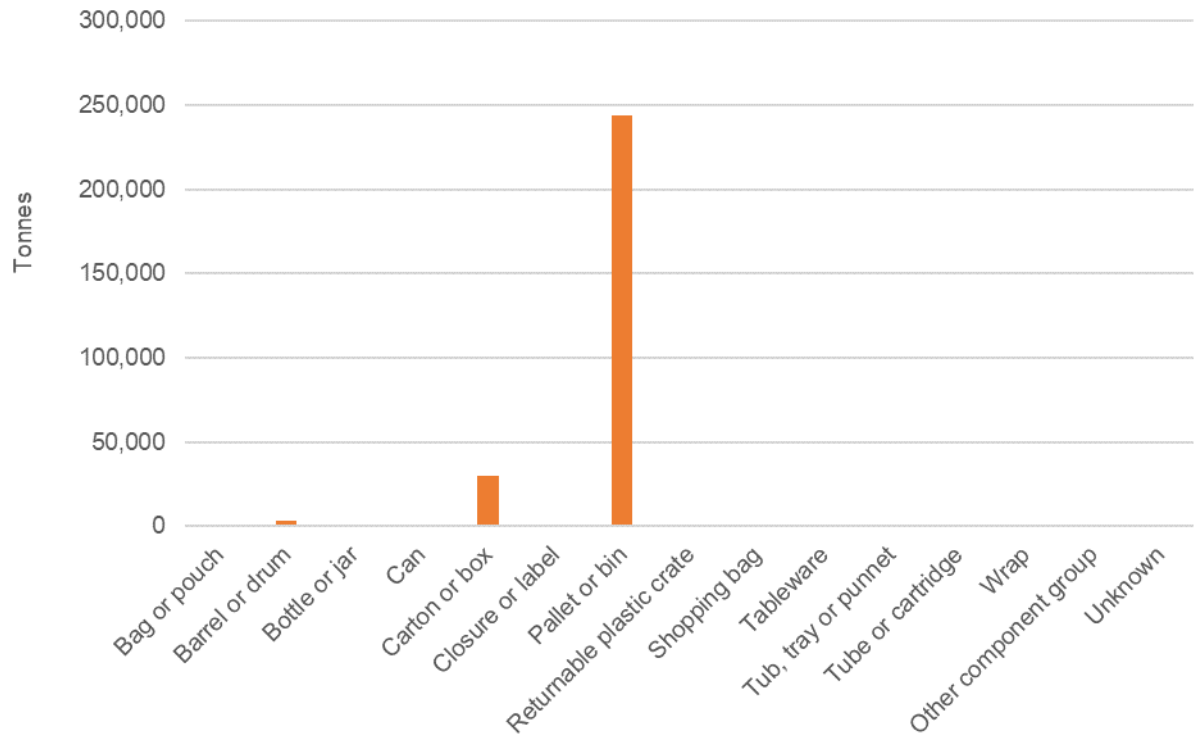

Figure 76 – Wood packaging recovery in 2021–22, by material type and component group.

Material use application

Wood packaging recovery in 2021–22 by material use application are provided in Table 102. 100% of recovered wood packaging went into non-packaging applications.

The major identified applications for recovered end-of-life wood packaging were wood chip products, mulches and soil conditioners. It is also understood that some recovered wood packaging was used in the manufacture of particle board products and animal bedding products.

In addition, it was estimated that around 30,000 tonnes of wood packaging were sent to Australian energy recovery facilities in 2020–21. However, no updated estimate is available for 2021–22.

Table 102 – Wood packaging recovery in 2021–22, by material type and material use application.

Material type	Packaging applications	Non-packaging applications	Unknown applications	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fibreboard	0	2,000	0	2,000
Hardwood	0	35,000	0	35,000
Softwood	0	240,000	0	240,000
Total (tonnes)	**0**	**277,000**	**0**	**277,000**
Total (%)	**0.0%**	**100.0%**	**0.0%**	**100.0%**

Material use destination

Wood packaging recovery in 2021–22 by material use destination are provided in Table 103. All recovered wood packaging went to local markets.

Table 103 – Wood packaging recovery in 2021–22, by material type and destination of material.

Material type	Local	Overseas	Unknown destinations	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fibreboard	2,000	0	0	2,000
Hardwood	35,000	0	0	35,000
Softwood	240,000	0	0	240,000
Total (tonnes)	**277,000**	**0**	**0**	**277,000**
Total (%)	**100.0%**	**0.0%**	**0.0%**	**100.0%**

Food contact suitability

Estimates for the suitability for wood packaging recovery for food contact applications are provided in Table 104, and indicates that 0% of recovered wood packaging was suitable for food contact packaging applications in 2021–22.

Table 104 – Wood packaging recovery suitable for food contact applications, by material type.

Material type	Into food contact applications or suitable for food contact applications		Not suitable for food contact applications		Unknown suitability for food contact applications		Total
	(tonnes)	(%)	(tonnes)	(%)	(tonnes)	(%)	(tonnes)
Fibreboard	0	0%	2,000	100%	0	0%	2,000
Hardwood	0	0%	35,000	100%	0	0%	35,000
Softwood	0	0%	240,000	100%	0	0%	240,000
Total	**0**	**0%**	**277,000**	**100%**	**0**	**0%**	**277,000**

Recovery rates

Estimates for wood packaging recovery rates in 2021–22, by material type, are provided in Table 105 and Figure 79. The estimated overall recovery rate for wood packaging is 45%, which is an increase on the 2020–21 rate which was 41%. However, due to the underlying data uncertainties, this apparent increase should be viewed with caution.

The major identified end-markets for end-of-life hardwood and softwood packaging were wood chip products, mulches, and soil conditioners. It is also understood that some recovered wood packaging was used in the manufacture of particle board and animal bedding products. The only identified end-market destination for fibreboard packaging is energy recovery.

Table 105 – Post-consumer wood packaging recovery rates in 2021–22, by material type.

Material type	POM	Recovery	Recovery rate
	(tonnes)	(tonnes)	(%)
Fibreboard	67,000	2,000	4%
Hardwood	63,000	35,000	55%
Softwood	482,000	240,000	50%
Total	**612,000**	**277,000**	**45%**

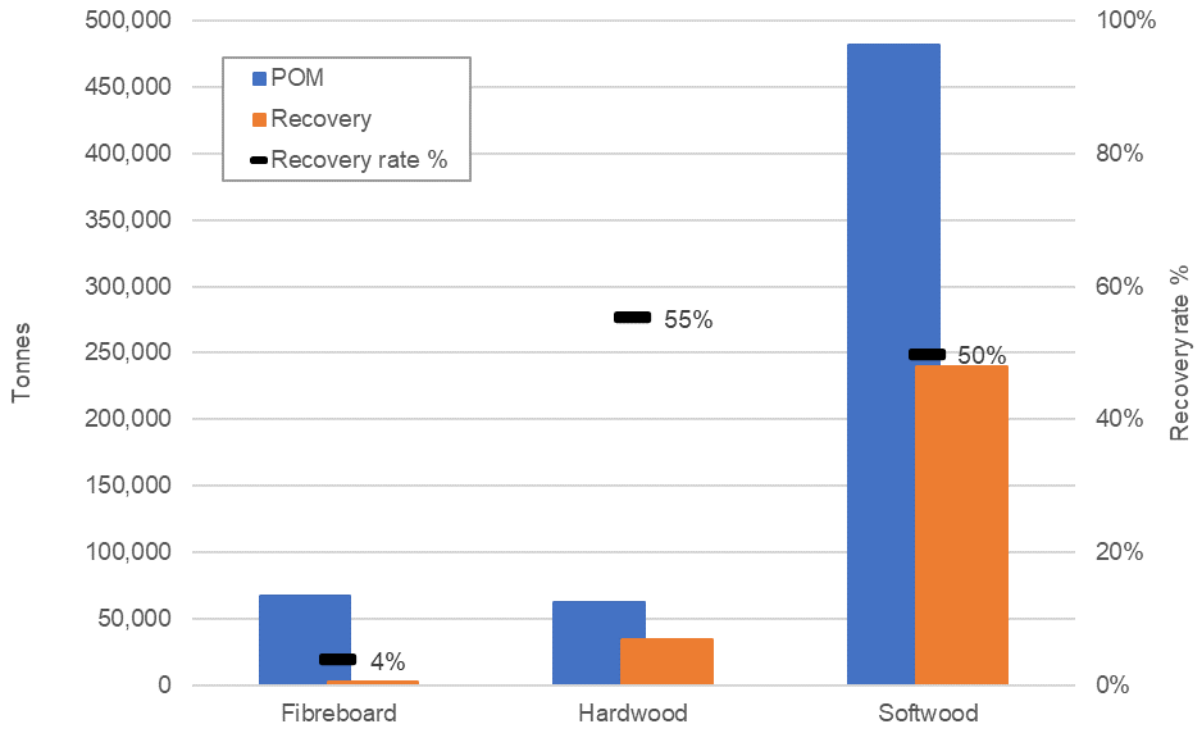

Figure 77 – Post-consumer wood packaging recovery rates in 2021–22, by material type.

7.3 Recycling potential

Table 106 and Figure 78 provide the recycling potential of wood packaging POM in 2021–22. It is estimated that about 75% of wood packaging had good recycling potential, 14% poor recycling potential and 11% was not recyclable.

Table 106 – Wood packaging POM in 2021–22, by recycling potential classification and material type.

Material type	Good recycling potential	Poor recycling potential	Not recyclable	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fibreboard – Low-density	0	0	42,000	0	**42,000**
Fibreboard – OSB[a]	0	0	25,000	0	**25,000**
Hardwood	63,000	0	0	0	**63,000**
Softwood	396,000	85,000	1,000	0	**482,000**
Total (tonnes)	**459,000**	**85,000**	**68,000**	**0**	**612,000**
Total (%)	**75.0%**	**13.9%**	**11.1%**	**0.0%**	**100.0%**

a) OSB – Oriented strand board.

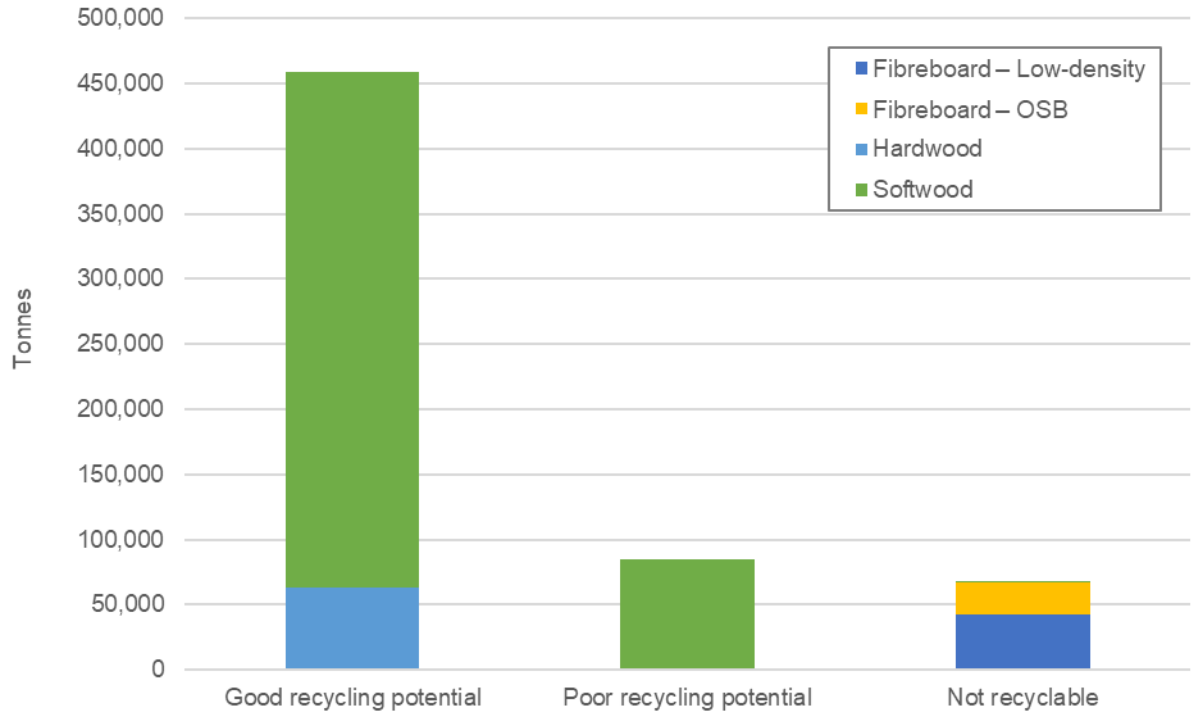

Figure 78 – Wood packaging POM in 2021–22, by recycling potential classification and material type.

7.4 Projections to 2026–27

Projections for wood packaging POM from 2022–23 to 2026–27 are provided in Table 107 and Figure 79. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 is projected data based on survey estimates of POM growth by material type.

The estimated five-year CAGR for wood packaging POM from 2021–22 to 2026–27 is 3.0% per year.

Table 107 – Wood packaging POM (mass and per capita bases) from 2019–20 to 2026–27, by material type.

Material type	2019–20		2020–21		2021–22		2022–23		2023–24		2024–25		2025–26		2026–27		5-yr CAGR[b]
	(tonnes)	(kg/p)[a]	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(tonnes)	(kg/p)	(%/yr)
Fibreboard – Low-density	50,000	2	94,000	4	170,000	7	175,000	6	179,000	7	184,000	7	189,000	7	194,000	7	2.7%
Fibreboard – OSB[c]	50,000	2	37,000	1	83,000	3	87,000	3	90,000	3	94,000	3	97,000	3	101,000	4	4.0%
Hardwood	81,000	3	60,000	2	108,000	4	105,000	4	101,000	4	98,000	4	95,000	3	92,000	3	-3.3%
Softwood	281,000	11	446,000	17	1,203,000	46	1,245,000	46	1,288,000	47	1,333,000	48	1,380,000	49	1,428,000	50	3.5%
Total	**462,000**	**18**	**638,000**	**25**	**1,565,000**	**60**	**1,611,000**	**59**	**1,659,000**	**60**	**1,709,000**	**61**	**1,761,000**	**62**	**1,815,000**	**63**	**3.0%**

a) kg/p – kilograms per person.
b) CAGR – compound annual growth rate.
c) OSB – Oriented strand board.

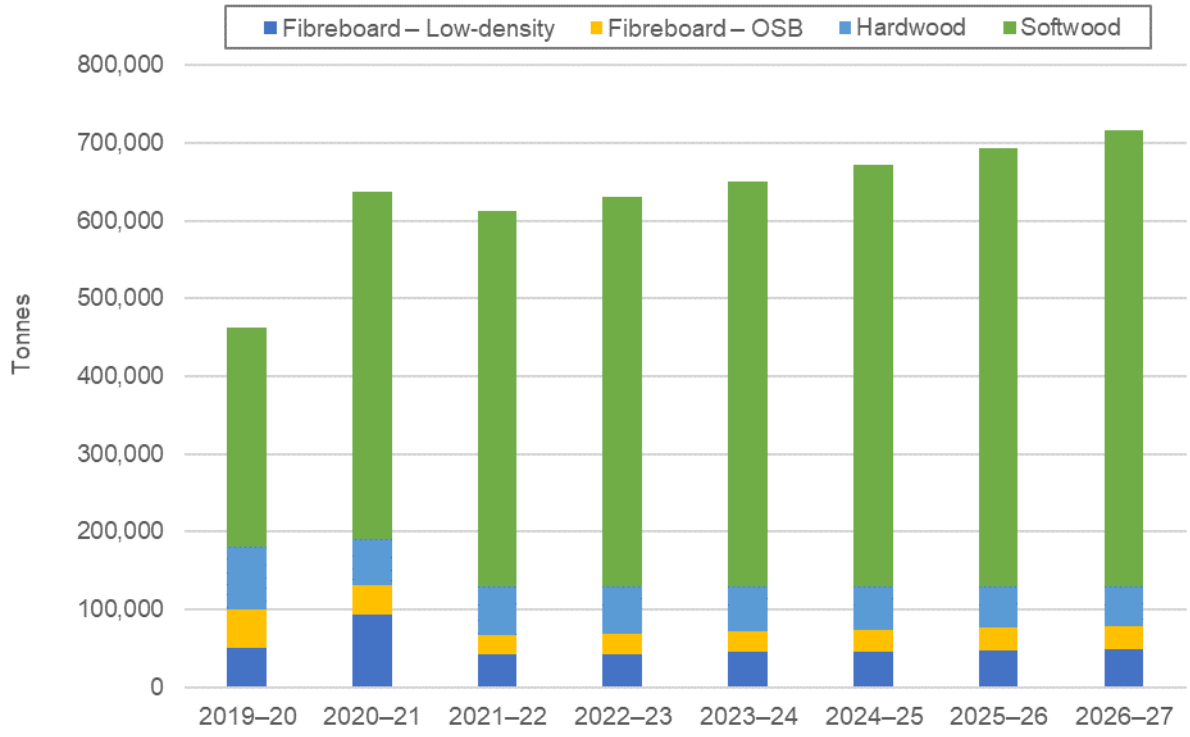

Figure 79 – Wood packaging POM from 2019–20 to 2026–27, by material type.

Projections for wood packaging reprocessing capacity from 2022–23 to 2026–27 are provided in Table 108. Data from 2019–20 to 2021–22 is survey data, and data from 2022–23 onwards is projected based on reported planned new reprocessing capacity.

The estimated five-year CAGR for wood packaging reprocessing capacity from 2021–22 to 2026–27 is 0%. That is, there was no new reprocessing capacity identified that is specifically targeting wood packaging.

Table 108 – Wood packaging reprocessing capacity projections from 2019–20 to 2026–27, by material type.

Material type	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25	2025–26	2026–27	5 year CAGR[a]
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(%/yr)
Fibreboard	9,000	5,000	2,000	2,000	2,000	2,000	2,000	2,000	0.0%
Hardwood	36,000	36,000	35,000	35,000	35,000	35,000	35,000	35,000	0.0%
Softwood	125,000	219,000	240,000	240,000	240,000	240,000	240,000	240,000	0.0%
Total	**171,000**	**260,000**	**277,000**	**277,000**	**277,000**	**277,000**	**277,000**	**277,000**	**0.0%**

a) CAGR – compound annual growth rate.

8 PACKAGING LOSSES AND IMPACTS IN 2021–22

8.1 Packaging losses to landfill

Estimates of post-consumer packaging to landfill by material group are provided in Table 109 and **Figure 80**. In total there were 3.08 million tonnes of post-consumer packaging disposed to landfill, which was 44% of packaging POM. This compares to 2.95 million tonnes in 2020–21 (also 44% of packaging POM).

This packaging to landfill consisted of 1.15 million tonnes of paper & paperboard packaging (37%), 1.02 million tonnes of plastic packaging (33%), 0.43 million tonnes of glass packaging (14%), 0.34 million tonnes wood-based packaging (11%), and 0.15 million tonnes of metal-based packaging (5%).

Table 109 – Post-consumer packaging to landfill in 2021–22, by material group.

Material group	POM	Landfill		Landfill rate
	(tonnes)	(tonnes)	(%)	(%)
Paper & paperboard	3,654,000	1,152,000	37%	32%
Glass	1,143,000	425,000	14%	37%
Plastic	1,277,000	1,019,000	33%	80%
Metal	298,000	147,000	5%	49%
Wood	612,000	335,000	11%	55%
Total	**6,984,000**	**3,077,000**	**100.0%**	**44%**

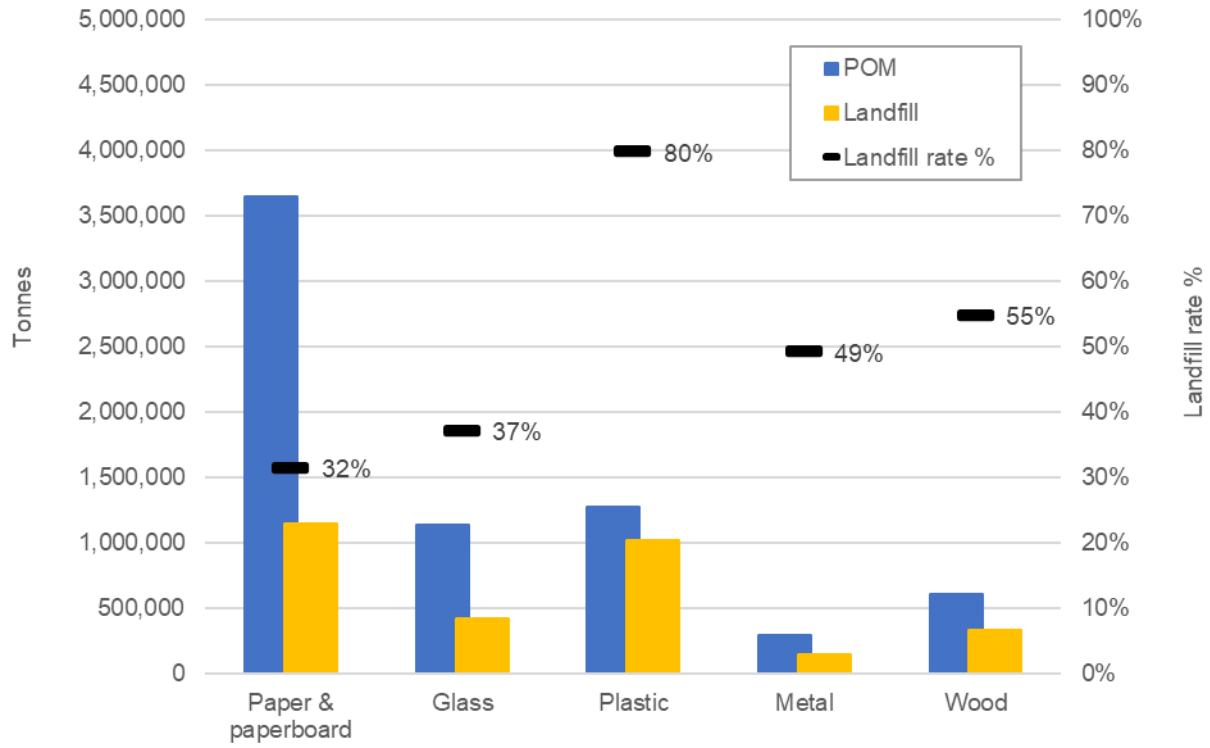

Figure 80 – Post-consumer packaging to landfill in 2021–22, by material group.

8.2 Lost value of landfilled packaging

This section provides indicative estimates of the value (in Australian Dollars – AUD) of packaging material sent to landfill in 2021–22. These are theoretical estimates based on the following conditions and assumptions:

- Commodity values have been estimated at 30 June 2022.
- Value was based on packaging being sorted into the most common saleable commodity grade for the packaging material type but was otherwise unprocessed.
- Packaging materials that are not currently sorted into discrete commodity grades have still been allocated an existing commodity price that is considered the best proxy price for the theoretical sorted value. This was usually a low price. As packaging design, sorting/processing technologies and end-markets improve, the quantities of unsortable (whether that be for technical or economic reasons) and/or unsaleable sorted packaging should decrease, and the average value of used packaging should also increase. For this reason, allocating all packaging a value, even if low, better reflects the theoretical value of used packaging diverted from landfill at some future time.
- Packaging commodity values are typically estimated at a municipal or C&I MRF out-going gate value.
- Transport costs are excluded. Note that transport costs are typically somewhat higher for packaging materials that are sent to recovery, relative to packaging to landfill.
- MRF processing costs, additional post-MRF sorting processing, or the costs associated with operating source separation-based systems (e.g. dedicated CDS collections) are excluded.
- Avoided landfill gate fees are excluded. It is worth noting that landfill gate fees and MRF processing costs (see point above) can vary widely but are of a similar magnitude.
- It is an implicit assumption with the use of fixed commodity prices by material type that end-market demand for the sorted packaging is not restricted.

Table 110 presents the indicative estimates of the lost value (AUD) of packaging landfilled in 2021–22. The national sorted value is estimated at $900 million, at a weighted average value of $292 per tonne.

Table 110 – Quantity and lost value of landfilled packaging in 2021–22, by material group.

Material group	Landfill	Value of landfilled packaging	
	(tonnes)	(AUD/tonne)	(AUD million)
Paper & paperboard	1,152,000	$222	$260
Glass	425,000	$124	$50
Plastic	1,019,000	$452	$340
Metal	147,000	$1,071	$160
Wood	335,000	$266	$90
Total	**3,077,000**	**$292**	**$900**

8.3 Climate change impact of packaging to landfill

This section estimates the climate change impact (in terms of tonnes $CO_{2\text{-}e}$ emissions) of packaging disposal to landfill. This is the net reduction in greenhouse gas emissions that could be achieved nationally if all packaging that is currently landfilled was recycled.

An extensive body of life cycle assessment (LCA) literature going back to the 1970s has established that reusing packaging or recycling single-use packaging almost invariably reduces emissions when compared to landfilling single-use packaging. This is due to the following:

- Reusable packaging typically requires far lower manufacturing related energy inputs per cycle, compared with single-use packaging that is either recycled or disposed to landfill.
- Recycled single-use packaging typically requires less manufacturing energy inputs, compared with single-use packaging that is disposed to landfill.
- Methane emissions from landfills from the decomposition of biodegradable packaging materials, especially paper & paperboard.

Reviews of more recent LCA studies and other literature sources were undertaken to identify the required emission factors. The sources drawn on for the emission factors used in this report were:

- South Australia's Circular Economy Resource Recovery Report 2021-22 (Blue Environment, 2023b, p. 70).
- Carbon emissions assessment of Australian plastics consumption – Project report (Blue Environment, 2023c, p. 59).
- LCA of Kerbside Recycling in Victoria (RMIT, 2015, p. 7).

Table 111 presents the indicative estimates of the reduction in emissions if all landfilled packaging had been recycled in 2021–22. The national reduction that could have been achieved is estimated at 3.45 million tonnes of CO_2 emissions, at a weighted average of 1.12 tonnes CO_2 per tonne diverted to recycling. This compares with the 2020–21 estimate of 2.17 million tonnes of CO_2 of emissions.

Assuming the average car emits 3.57 tonnes CO_2/year[1], these 2021–22 emissions, if avoided, would be equivalent to removing 968,000 cars from the road for a year.

Table 111 – Estimated reduction in greenhouse gas emissions through diverting recyclable landfilled packaging to recycling in 2021–22, by material group.

Material group	Landfill	Emission factor	Avoided emissions
	(tonnes)	(t CO2-e /t)	(t CO2-e)
Paper & paperboard	1,152,000	0.169	194,650
Glass	425,000	0.528	224,320
Plastic	1,019,000	1.888	1,923,430
Metal	147,000	6.609	968,910
Wood	335,000	0.427	143,120
Total	**3,077,000**	**1.123**	**3,454,430**

[1] Average passenger vehicle emissions based on a travel distance in 2019–20 of 11,100 km (latest available data published by ABS), with an average fuel consumption of 11.1 L/100 km (ABS, 2020). Assumed petrol vehicle. Petrol emission factor of 2.90 kg $CO_{2\text{-}e}$/L adopted (DCCEEW, 2023, p. 20). This gives fuel consumption of 1,232 L/vehicle.yr, and emissions of 3,573 kg $CO_{2\text{-}e}$/vehicle.yr.

9 PACKAGING REUSE IN 2021–22

9.1 Introduction

This year flows of eight reusable packaging systems have been quantified, which are the same as those quantified in 2020–21. This is a continuation of the 2018–19 pilot exercise, working towards fully incorporating reusable packaging flows into the core consumption and recovery dataset, along with the appropriate metrics to measure comparative flows of reusable and single-use packaging systems. This is a complex measurement that requires more research on the most appropriate methodology, which is discussed further below.

This quantification has been framed by the following ISO standard:

- ISO 18603:2013 Packaging and the environment – Reuse (ISO, 2013).

In ISO (2013, p. 1) reusable packaging is defined as:

> *Packaging or packaging component which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations in a system for reuse.*

ISO (2013, p. 3) requires that the following conditions are met in order for a claim of 'reusable' to be appropriate:

a) *that the design of the packaging enables the principal components to accomplish a number of trips or rotations in normally predictable conditions of use;*

b) *that the packaging is capable of being successfully reconditioned in accordance with the requirements of Annex B (including removal/replacement of damaged components, appropriate cleaning or washing, inspection and inspection of fitness-for-purpose, and re-entry into the reuse system) and,*

c) *that a system, necessary to support reuse, is available in markets in which the packaging is placed, as appropriate.*

The established Australian reusable packaging systems that fit the criteria above (with some minor exceptions) and have been quantified this year are:

- **Kegs** – Beer kegs only.
- **Drums (200–205 litre)** – All reusable steel and plastic drums in the 200–205 litre volumetric capacity range (44 gallon UK or 55 gallon US).
- **Intermediate bulk containers (IBCs)** – All rigid IBCs are assumed to be reusable (rather than single-use) packaging.
- **Milk crates** – Non-collapsible plastic crates. Limited to dairy applications only.
- **Pallets** – Reusable timber and plastic pallets only, including display pallets. Single-use pallets are excluded.
- **Returnable plastic crates (RPCs)** – Collapsible plastic crates. Limited to major supermarket systems only (e.g. ALDI, Coles and Woolworths).
- **Reusable shopping bags** – Reusable non-woven PP bags, and reusable HDPE and LDPE bags (supermarket type).
- **Reusable coffee cups** – Reusable coffee cups used in an AfH setting where they could be reasonably expected to have avoided the use of a single-use coffee cup.

Due to circular flows and often long lifespans, quantification of reusable packaging systems requires metrics that measure mass flows, the same as single-use packaging flow quantifications, but extended to measure the service delivered by reusable packaging per cycle.

Strictly speaking single-use packaging systems should also require this determination of the service delivered per (single-use) cycle, to enable the monitoring of changes in packaging system product to packaging ratio efficiencies (e.g. quantify the impact of single-use packaging light-weighting). It has not been considered necessary to track this metric in the past.

However, this changes once it is of interest to quantify and track single-use and reusable packaging system flows in an integrated manner. The common denominator becomes the service provided by packaging systems, which then supports the following mass-based comparisons:

- Service performance between single-use and reusable packaging systems based on mass flows of packaging standardised to product flows.
- Single-use and reusable packaging system inputs and outputs standardised to product flows.
- Service performance efficiency changes for packaging systems, standardised to product flows, between different time periods.

A purpose of this quantification of eight reusable packaging systems is to advance the consideration of this system performance measure.

The data collection plan adopted for the reusable packaging quantifications is outlined in the following table.

Table 112 – Data plan for packaging reuse quantification (2021–22 target year).

Data requirement	Data purposes	Data sources
General reusable packaging system description.	General overview of the system.	Surveys of major pool operators and/or users, including: Major breweries (2). Major supermarkets (3). Major dairy-processing related organisations (2). Major pool operators (5). Major reusable plastic bag suppliers (2). Reusable packaging manufacturers (4).
Quantity of new reusable packaging POM in 2021–22.	Reusable packaging pool inputs in 2021–22.	
Quantity of reusable packaging leaving the reusable packaging pool (stocks) to end-of-life (EoL) fate in 2021–22.	Reusable packaging pool outputs in 2021–22 and fate.	
Average lifespan of reusable packaging.	Support estimation of pool size and service delivered by packaging.	
Average number of reuse cycles prior to reaching EoL or otherwise leaving the pool.	Support estimation of pool size and service delivered by packaging.	
Reusable packaging cycle time.	Support estimation of pool size and service delivered by packaging.	
Total pool size in 2021–22.	Support estimation of pool size.	
Other details.	Reusable packaging materials, packaging weights, and product weights. Competing single-use packaging types. System reconditioning descriptions including: removal/replacement of damaged components, appropriate cleaning or washing, inspection of fitness-for-purpose, and re-entry into the reuse system.	

The metrics that have been quantified in this section of the report are:

- Pool (stocks) size in 2021–22 (tonnes and number).
- New reusable packaging entering service (inputs) in 2021–22 (tonnes and number).

- Old reusable packaging exiting service (outputs) in 2021–22 (tonnes and number) and fate.
- Reusable packaging cycle time, cycle number and average service life.
- Indicative estimates of avoided single-use packaging consumption through use of the assessed reusable packaging systems.

9.2 Reusable packaging system flows

Estimates of reusable packaging system flows in 2021–22 are provided in Table 113 and **Figure 81**. Reusable timber pallets dominated the material flows for the quantified systems, across inputs (new pallets into use), pool size and outputs (end-of-life pallets leaving the pool).

After timber pallets, plastic pallets and drums had the largest pool sizes, followed by IBCs, RPCs and beer kegs.

Table 113 – Reusable packaging system flows in 2021–22.

Packaging system	Input flow		Pool size[a]		Output flow	
	(tonnes)	('000 units)	(tonnes)	('000 units)	(tonnes)	('000 units)
Beer kegs	1,000	80	11,900	1,000	300	30
Drums (200–205 L)	15,600	930	46,500	2,320	15,600	930
Rigid IBCs	13,400	530	33,600	820	13,400	530
Reusable plastic pallets	3,700	160	97,400	2,530	3,700	160
Reusable timber pallets	104,600	2,950	1,136,500	29,520	104,600	2,950
Dairy crates	1,000	980	10,300	9,810	1,000	980
RPCs	1,300	840	21,000	14,000	600	420
Reusable HDPE bags	7,500	527,680	400	30,440	7,500	527,680
Reusable LDPE bags	17,500	599,320	2,100	149,830	17,500	599,320
Reusable PP bags	5,500	58,420	1,700	116,840	5,500	58,420
Cups/mugs	400	2,640	1,000	11,250	400	2,640
Total	**171,500**	**1,194,530**	**1,362,400**	**368,360**	**170,100**	**1,194,060**

a) Estimated pool size at 30 June 2022.

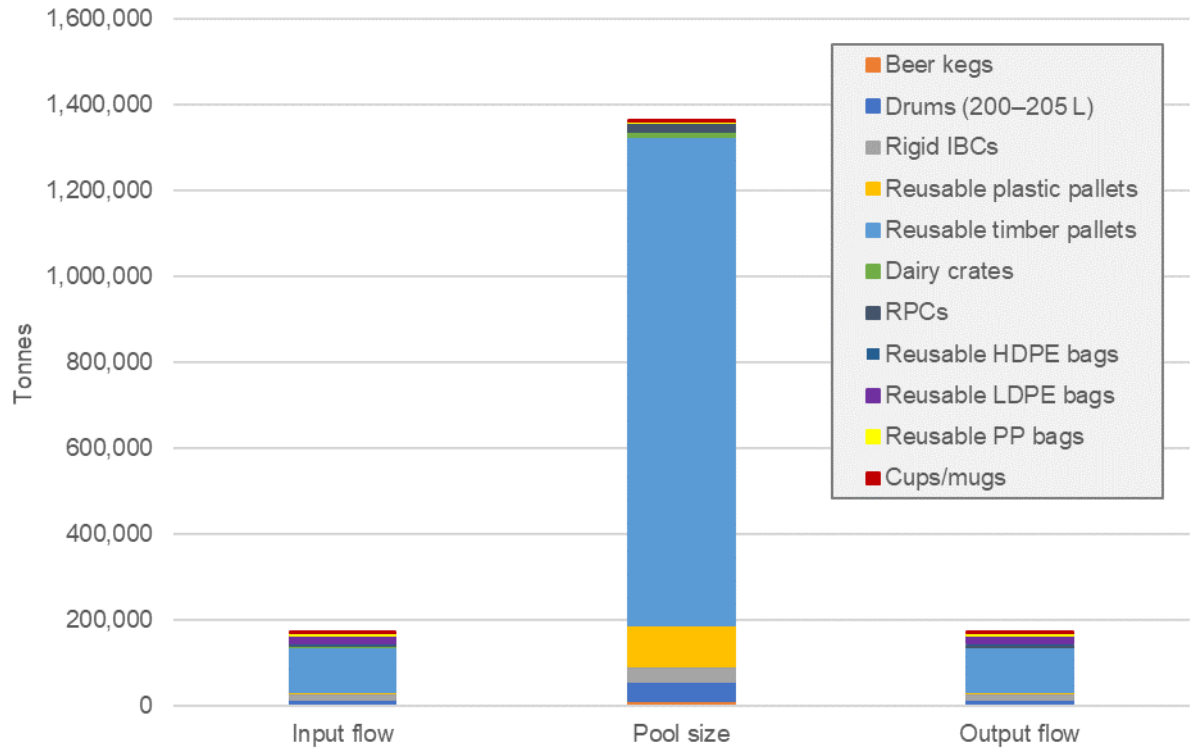

Figure 81 – Reusable packaging system flows in 2021–22.

Reusable packaging system inputs in 2021–22, by material group, are provided in Table 114 and **Figure 82**. Wood was the most significant material input into the quantified systems, making up 60% of total inputs. Plastic made up 25% and metal contributed 15%.

Table 114 – Reusable packaging input flows in 2021–22, by packaging system and material group.

Packaging system	Paper & paperboard	Glass	Plastic	Metal	Wood	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beer kegs	0	0	0	1,000	0	**1,000**
Drums (200–205 L)	0	0	2,200	13,400	0	**15,600**
Rigid IBCs	0	0	4,600	8,800	0	**13,400**
Reusable plastic pallets	0	0	3,700	0	0	**3,700**
Reusable timber pallets	0	0	0	2,600	102,000	**104,600**
Dairy crates	0	0	1,000	0	0	**1,000**
RPCs	0	0	1,300	0	0	**1,300**
Reusable HDPE bags	0	0	7,500	0	0	**7,500**
Reusable LDPE bags	0	0	17,500	0	0	**17,500**
Reusable PP bags	0	0	5,500	0	0	**5,500**
Cups/mugs	0	200	200	0	0	**400**
Total (tonnes)	**0**	**200**	**43,400**	**25,800**	**102,000**	**171,400**
Total (%)	**0.0%**	**0.1%**	**25.3%**	**15.1%**	**59.5%**	**100.0%**

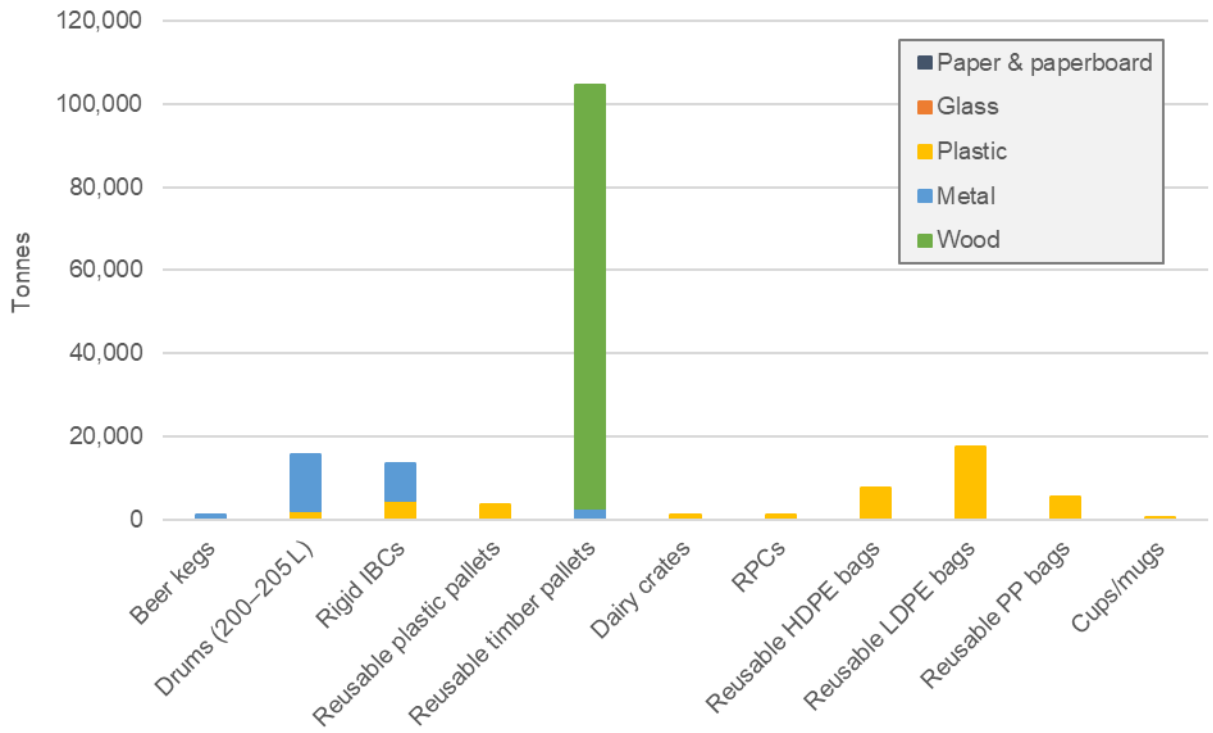

Figure 82 – Reusable packaging input flows in 2021–22, by packaging system and material group.

Reusable packaging system outputs in 2021–22, by end-of-life destination, are provided in Table 115 and **Figure 83**. The most significant destination was 78,000 tonnes of timber pallets to mulching or composting, which was 46% of total output flows. Overall diversion of outputs to recovery fates was 64%, reflecting the high rates of recovery that are achievable with (mostly) closed system reusable packaging flows.

Table 115 – Reusable packaging system end-of-life destinations in 2021–22.

Packaging system	Recycling	Composting	Landfill	System leakage	Other	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beer kegs	100	0	0	140	0	**280**
Drums (200–205 L)	11,700	0	0	780	3,100	**15,610**
Rigid IBCs	13,100	0	300	0	0	**13,410**
Reusable plastic pallets	3,600	0	0	50	0	**3,700**
Reusable timber pallets	0	78,460	20,900	2,620	2,600	**104,610**
Dairy crates	900	0	0	100	0	**1,030**
RPCs	300	0	0	220	100	**630**
Reusable HDPE bags	300	0	7,200	0	0	**7,490**
Reusable LDPE bags	600	0	16,900	0	0	**17,500**
Reusable PP bags	200	0	5,300	0	0	**5,470**
Cups/mugs	0	0	400	0	0	**380**
Total (tonnes)	**30,800**	**78,460**	**51,000**	**3,910**	**5,800**	**170,100**
Total (%)	**18%**	**46%**	**30%**	**2.3%**	**3%**	**100%**

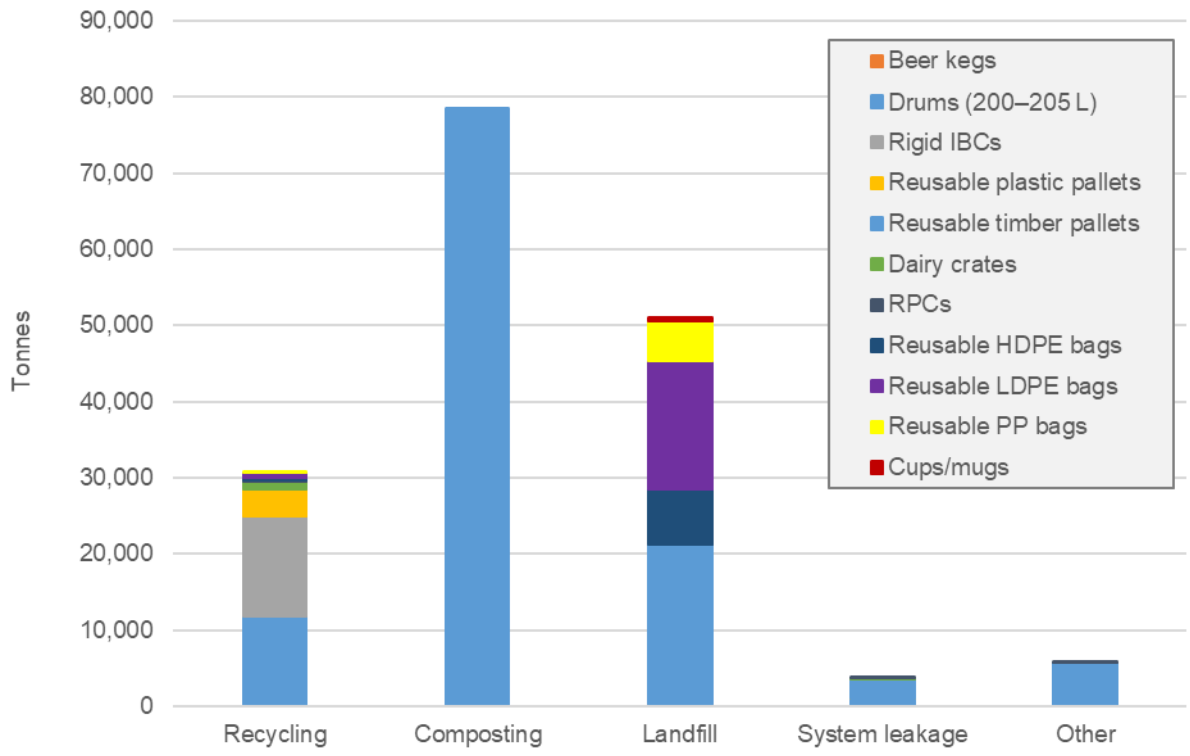

Figure 83 – Reusable packaging system end-of-life destinations in 2021–22.

9.3 Reusable packaging system use phase parameters

Provided in Table 116 is a summary of significant use phase parameters for the quantified reusable packaging systems. Beer kegs, dairy crates, and RPCs in particular, have long lifespans coupled with relatively high rotations (use cycles) per year.

Table 116 – Reusable packaging system use phase parameters.

Packaging system	Average weight	Average lifespan	Rotations	Rotation time	Average deliverable volume
	(kg/unit)	(yr)	(rotations /life cycle)	(rotations/yr)	(litres/rotation)
Beer kegs	11.633	28	85	3.0	50
Drums (200–205 L)	16.167	3	3	1.0	200
Rigid IBCs	27.750	2	3	2.0	1,000
Reusable plastic pallets	23.500	10	50	5.0	1,000
Reusable timber pallets	36.250	10	37	3.7	1,000
Dairy crates	1.050	10	120	12.0	18
RPCs	1.500	10	140	14.0	10
Reusable HDPE bags	0.014	0	3	52.0	14
Reusable LDPE bags	0.029	0	3	12.0	14
Reusable PP bags	0.094	2	104	52.0	17
Cups/mugs	0.191	4	1,000	250.0	0
Simple average (unweighted)	**15.591**	**7**	**141**	**37.0**	**302**

9.4 Avoided single-use packaging

This section provides indicative estimates of the quantities of single-use packaging that are avoided by using the quantified reusable packaging systems.

The reusable packaging systems have differing levels of competition with the alternative single-use packaging systems. However, this substitutability aspect has been ignored for the purposes of this exercise, which was to determine the theoretical performance of reusable packaging systems relative to single-use packaging systems, in terms of the comparative material flows.

Provided in Table 117 and **Figure 84** are estimates of the single-use packaging avoided by each reusable packaging rotation, by material group. IBCs avoided the most single-use packaging (the competing product was a single-use IBC), reflecting the importance of reusing IBCs wherever possible.

Table 117 – Single-use packaging avoided per reusable packaging rotation, by material group and packaging system.

Packaging system	Paper & paperboard	Glass	Plastic	Metal	Wood	Total
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)
Beer kegs	3.2	14.3	0.0	1.6	0.0	19.2
Drums (200–205 L)	0.0	0.0	2.4	5.8	0.0	8.1
Rigid IBCs	0.0	0.0	0.0	41.0	0.0	41.0
Reusable plastic pallets	0.0	0.0	0.0	0.0	20.0	20.0
Reusable timber pallets	0.0	0.0	0.0	0.0	20.0	20.0
Dairy crates	0.5	0.0	0.0	0.0	0.0	0.5
RPCs	0.4	0.0	0.0	0.0	0.0	0.4
Reusable HDPE bags	0.000	0.000	0.007	0.000	0.000	0.007
Reusable LDPE bags	0.000	0.000	0.007	0.000	0.000	0.007
Reusable PP bags	0.000	0.000	0.009	0.000	0.000	0.009
Cups/mugs	0.010	0.000	0.003	0.000	0.000	0.013

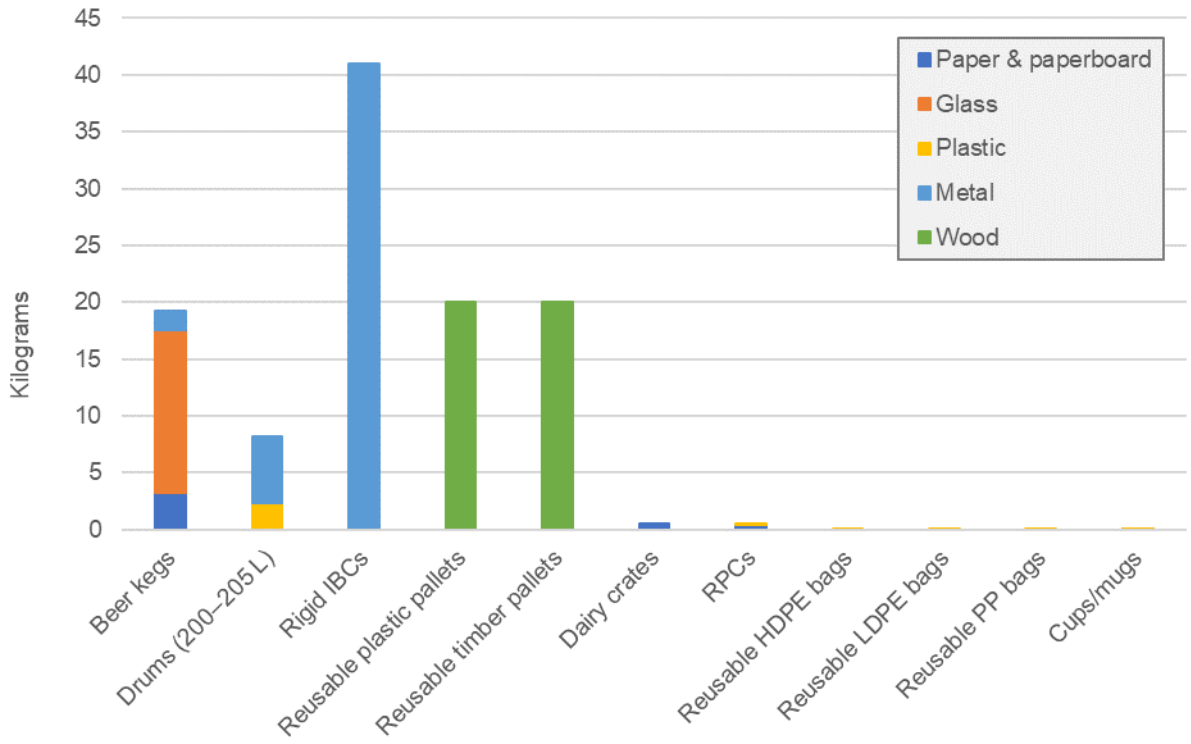

Figure 84 – Single-use packaging avoided per reusable packaging rotation, by material group and packaging system.

Provided in Table 118 and **Figure 85** are estimates of the total quantities of single-use packaging avoided in 2021–22, through the use of the eight quantified reusable packaging systems.

The quantified reusable packaging systems avoided the use of an estimated 2.81 million tonnes of single-use packaging. Approximately 91% of the avoided single-use packaging consumption benefit is provided by reusable pallets and plastic crates. The net theoretical reduction in packaging use was 2.64 million tonnes, as there were 171,000 tonnes of reusable packaging inputs in 2020–21 (Table 113).

Table 118 – Total single-use packaging avoided in 2020–21 through use of the quantified reusable packaging systems.

Packaging system	Paper & paperboard	Glass	Plastic	Metal	Wood	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beer kegs	9,700	42,900	0	4,900	0	57,500
Drums (200–205 L)	0	0	5,500	13,400	0	18,900
Rigid IBCs	0	0	0	67,200	0	67,200
Reusable plastic pallets	0	0	0	0	253,000	253,000
Reusable timber pallets	0	0	0	0	2,154,800	2,154,800
Dairy crates	58,800	0	0	0	0	58,800
RPCs	85,200	0	1,700	0	0	86,900
Reusable HDPE bags	0	0	11,500	0	0	11,500
Reusable LDPE bags	0	0	13,100	0	0	13,100
Reusable PP bags	0	0	53,700	0	0	53,700
Cups/mugs	27,600	0	8,200	0	0	35,700
Total (tonnes)	**181,300.0**	**42,900.0**	**93,700.0**	**85,500.0**	**2,407,900.0**	**2,811,300.0**
Total (%)	**6.4%**	**1.5%**	**3.3%**	**3.0%**	**85.7%**	**100.0%**

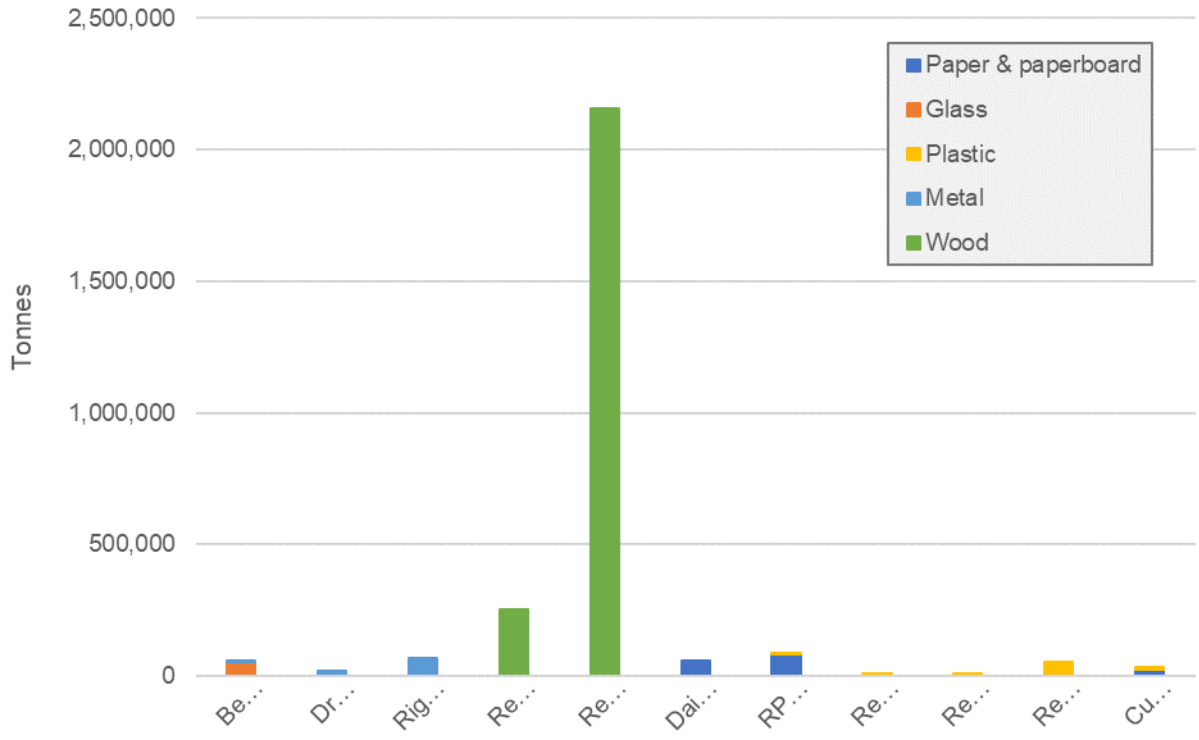

Figure 85 – Total single-use packaging avoided in 2021–22 through use of the quantified reusable packaging systems.

10 REFERENCES

ABS & IndustryEdge, 2023a. *Packaging related imports in 2021–22 by the Combined Australian Customs Tariff Nomenclature and Statistical Classification (the Customs Tariff) code – Customised report,* Canberra: Australian Bureau of Statistics (derived) and IndustryEdge.

ABS & IndustryEdge, 2023b. *Packaging related exports in 2021–22 by the Australian Harmonized Export Commodity Classification (AHECC) code – Customised report,* Canberra: Australian Bureau of Statistics (derived) and IndustryEdge.

ABS & Industry Edge, 2023c. *Scrap related exports in 2021–22 by the Australian Harmonized Export Commodity Classification (AHECC) code – Customised report (state/territory level data) – Scrap fibre, glass, plastics and metals.,* Canberra: Australian Bureau of Statistics (derived) and IndustryEdge.

ABS, 2018. *3222.0 Projected population (data cube), components of change and summary statistics – Australia, state/territory, greater capital city/balance of state, 2017 (base) to 2066 (released 22 November 2018).* [Online] Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3222.02017%20(base)%20-%202066?OpenDocument [Accessed 31 July 2019].

ABS, 2020. *Survey of Motor Vehicle Use, Australia.* [Online] Available at: https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release#data-download [Accessed 9 July 2021].

ABS, 2023. *3101.0 Australian Demographic Statistics, Dec 2022, Table 4. Estimated Resident Population, States and Territories (Number) (released 15 June 2023). This quarterly release contains the most recent estimates of the resident populations (ERP) of Australia a.* [Online] Available at: https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/dec-2022/310104.xlsx [Accessed 11 August 2023].

Antrekowitsch, J. et al., 2014. Chapter 9 - Zinc and Residue Recycling. In: M. A. R. Ernst Worrell, ed. *Handbook of Recycling.* Online: Elsevier, pp. 113-124.

APCO, 2019. *Australian packaging consumption & resource recovery data 2017–18,* Sydney: Report prepared by Envisage Works, IndustryEdge, Randell Environmental Consulting and Sustainable Resource Use on behalf of the Australian Packaging Covenant Organisation.

APCO, 2020. *Australian Packaging Consumption and Recycling Data 2018–19,* Sydney: Report prepared by Envisage Works, IndustryEdge, Randell Environmental Consulting and Sustainable Resource Use on behalf of the Australian Packaging Covenant Organisation.

APCO, 2021. *Australian packaging consumption and recycling data 2019–20,* Sydney: Report prepared by Blue Environment and IndustryEdge on behalf of the Australian Packaging Covenant Organisation.

APCO, 2023a. *Australian packaging consumption and recycling data 2020–21,* Sydney: Report prepared by Blue Environment and IndustryEdge on behalf of the Australian Packaging Covenant Organisation.

APCO, 2023b. *Action Plan for Problematic and/or Unnecessary Single-Use Plastic Packaging,* Sydney: Australian Packaging Covenant Organisation.

Blue Environment, 2023a. *Australian Plastics Flows and Fates Study 2021–22 – National report,* Melbourne: Report prepared by Blue Environment on behalf of the Department of Climate Change, Energy, the Environment and Water.

Blue Environment, 2023b. *Circular Economy Resource Recovery Report 2021-22,* Melbourne: Report prepared by Blue Environment on behalf of Green Industries SA.

Blue Environment, 2023c. *Carbon emissions assessment of Australian plastics consumption – Project report,* Melbourne: Report prepared by Blue Environment on behalf of the Australian Marine Conservation Society and World Wide Fund for Nature Australia.

DCCEEW, 2023. *Australian National Greenhouse Accounts Factors 2022 – For individuals and organisations estimating greenhouse gas emissions,* Canberra: Department of Climate Change, Energy, the Environment and Water.

ISO, 2013. *ISO 18603:2013 Packaging and the environment – Reuse,* Geneva: The International Organization for Standardization.

RMIT, 2015. *LCA of Kerbside Recycling in Victoria,* Melbourne: Report prepared by RMIT University on behalf of Sustainability Victoria.

APPENDIX A – GLOSSARY OF TERMS AND ABBREVIATIONS

Table A-1 – Glossary of terms and abbreviations.

Term	Definition
Beneficiation (of glass)	Processing of used glass packaging. The beneficiation process includes sorting (including colour sorting), cleaning, crushing and sizing. Beneficiated glass is considered “furnace-ready” for sale to glass product manufacturers.
Biodegradable	A generic term that indicates a polymer is biologically available for microbial decomposition, with no detail on breakdown products, time or extent of degradation or end environments.
Bioplastics	Plastics that are biobased, biodegradable or both. Bioplastics fall into three broad groupings, which are: biobased (but not biodegradable); biodegradable (but not biobased); or biobased and biodegradable. Conventional polymers (e.g. PET and HDPE) can also be fully or partially ‘biobased’.
Business-to-business (B2B) packaging	Packaging used for the containment, protection, or handling of product where the end-customer, prior to the packaging reaching end-of-life, is a business or institution. Typically includes the secondary and tertiary packaging that is used to move products between businesses prior to sale to end-consumers but can also include primary packaging if the business is the end-user. Same meaning as 'Commercial packaging'. Also see 'Packaging' and 'Business-to-consumer (B2C) packaging'.
Business-to-consumer (B2C) packaging	Packaging used for the containment, protection, marketing, or handling of product where the end-customer, prior to the packaging reaching end-of-life, is a consumer (i.e., a person). Includes the primary packaging that is sold to end-consumer, and possibly some secondary packaging, but excludes any B2B packaging that is part of the packaging system. Same meaning as 'Consumer packaging'. Also see 'Packaging' and 'Business-to-business (B2B) packaging'. B2C packaging can be split into two categories related to the location of used packaging generation, which are 'At home' and 'Away-from-home (AfH)'. At home packaging includes any packaging that is likely or known to be generated as used packaging at homes, and so will enter residential waste management systems. AfH packaging includes any packaging that is likely or known to be generated as used packaging in non-residential settings, and so will enter commercial waste management systems.
CAGR	See the ‘Compound annual growth rate’ entry.
Certified compostable	Means that claims of compliance with Australian Standard 4736-2006, compostable and biodegradable plastics – “Biodegradable plastics suitable for composting and other microbial treatment” and Australian Standard AS 5810-2010 Home Composting – “Biodegradable plastics suitable for home composting” have been verified.
Circular economy	The circular economy concept is a systems approach to material/energy flows that extends significantly on the ‘waste hierarchy’, with the objective being to decouple economic growth/development from the use of non-renewable resources (including energy). It is a concept that extends to cover the entire life cycle of products and services, including design. It assumes that the current approach of incremental and fractured improvements in materials and energy efficiency are not sufficient to achieve the potential (much larger) economic and environmental gains that are available.
Closed-loop recycling	Material from a product system is recycled in the same product system and is of the same quality and functionality as the original material. In terms of end-of-life fates, closed-loop recycling will typically provide greatest environmental benefits, with the key attribute being the displacement (competition with) virgin resource extraction. Also see 'Open-loop recycling' and 'Downcycling'.

Term	Definition
Collection	Packaging materials collected for recycling.
Collection efficiency	Materials collected for recycling divided by total packaging waste entering the collection system.
Commercial and industrial (C&I) waste	Solid inert waste generated from trade, commercial and industrial activities including the government sector. It includes waste from offices, manufacturing, factories, schools, universities, state and government operations and small to medium enterprises e.g. food waste.
Commercial packaging	The same meaning as 'Business-to-business' (B2B) packaging.
Commingled recyclables	Materials combined generally for the purposes of collection, mainly through municipal collection services. Includes plastic bottles, other plastics, paper, glass and metal containers. Commingled recyclable materials require sorting after collection before they can be reprocessed. Can also be called commingled materials.
Compostable packaging	A packaging or packaging component (1) is compostable if it is certified to AS4736 or a similar standard for commercial composting, and if its successful post-consumer (2) collection, (sorting), and composting is proven to work in practice and at scale (3). Also see the related 'Recyclable packaging' and 'Reusable packaging' definitions. Supporting notes: 1. ISO 18601:2013: A packaging component is a part of packaging that can be separated by hand or by using simple physical means (e.g. a cap, a lid and (non in-mould) labels). 2. ISO 14021 clarifies post-consumer material as material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. 3. 'At scale' implies that there are significant and relevant geographical areas, as measured by population size, where the packaging is actually composted in practice.
Composted (packaging)	Packaging that underwent degradation by biological processes during composting to yield CO_2, water, inorganic compounds and biomass at a rate consistent with other known compostable materials and leaves no visible, distinguishable or toxic residue, in accordance with accepted industry standards (1). Supporting notes: 1. Accepted industry standards include standards referred in the above definitions 'Compostable packaging – industrial' and 'Compostable packaging – home'. Reference to accepted industry standards is to ensure packaging can fully degrade within specified periods of time in the conditions of standard composting system and does not alter the quality of compost.
Compound annual growth rate (CAGR)	The CAGR is a term for the ratio that provides a constant rate of growth, each year, over a defined time period of two or more years. CAGR is equivalent to the more generic exponential growth rate when the exponential growth interval is one year. The CAGR is useful as it provides a smoothed rate of growth over a number of years, reducing the impact of year-on-year growth data volatility.
Construction and demolition (C&D) waste	Solid inert waste generated from residential and commercial construction and demolition activities e.g. bricks and concrete.

Term	Definition
Consumer packaging	Packaging used for the containment, protection, marketing, or handling of product where the end-customer, prior to the packaging reaching end-of-life, is a consumer (i.e., a person). Includes the primary packaging that is sold to end-consumer, and possibly some secondary packaging, but excludes any B2B packaging that is part of the packaging system. Same meaning as 'Business-to-consumer (B2C) packaging'. Also see 'Packaging' and 'Business-to-business (B2B) packaging'. It is worth noting that the *National Environment Protection (Used Packaging Materials) Measure 2011* (the NEPM) defines *consumer packaging* to mean all packaging products made of any material, or combination of materials, for the containment, protection, marketing, or handling of consumer products. This includes: • Primary packaging – materials directly containing the product. • Secondary packaging – materials used to contain single or multiple primary packed products. • Tertiary packaging – materials used to distribute packaged and unpackaged products. This NEPM definition for consumer packaging is different from that adopted for consumer packaging (and B2C packaging) in this study in that the adopted definition excludes all tertiary packaging, even if it is part of the (upstream) consumer packaging system.
Consumption	Total use of product by Australian industry and consumers. Includes locally made and used product, imported product and locally utilised recyclate. Does not include locally made product that is exported.
Consumption of packaging	Packaging put onto the market in Australia from local and imported sources. Because most packaging is single-use, it is assumed that packaging consumed equates to packaging waste generated. Does not include locally made product that is exported for sale.
Container deposit scheme (CDS) collection	Separate collection system for container deposit eligible glass, metal, paper and plastic containers.
Contaminants – Out throws	A sorted scrap (bale) related term. Recyclable materials that are unsuitable for inclusion in the sorted grade (product) in which they are present, but can be sorted, separated and/or removed easily during the recycling process. Out throws generally have significantly higher allowable thresholds, compared to prohibited materials, in bale specifications for sorted recycled material commodities. Also see 'Contaminants – Prohibited materials' entry.
Contaminants – Prohibited materials	A sorted scrap (bale) related term. Unrecyclable materials that are unsuitable for inclusion in the sorted grade (product) in which they are present, and cannot be sorted, separated and/or removed during the recycling process. Prohibited materials cause adverse impacts on end-products and may damage the recycling facilities. Prohibited materials generally have significantly lower allowable thresholds, compared to out throws, in bale specifications for sorted recycled material commodities. Also see 'Contaminants – Out throws' entry.
Converter	Company which converts material inputs into a finished packaging product (whether filled or unfilled).
Cullet	Sorted glass feedstock resulting from the beneficiation process of mixed container glass. Generally consists of sorted streams of amber, flint and green glass of particle size greater that 5–10 mm depending on the capacity of the beneficiation plant.
Delamination	The process of splitting a composite material into its component parts e.g. laminated glass.
Disposal	Discarding solid waste to landfill or incineration (without energy recovery).
Diversion rate	Recovery (at a defined point) as a percentage of end-of-life disposal. Also see 'Recovery rate' and 'Recycling rate'.

Term	Definition
Domestic	Material from domestic (household) sources.
Downcycling	Recycled material is of lower quality and functionality than the original material(s). Materials are recycled into different applications with less stringent performance specifications, and where the recycled materials are typically substituting for (competing with) materials other than the original high quality virgin materials. Examples of this include the recycling of mixed polymer rigid plastics, e.g. a mixture of HDPE, low-density polyethylene (LDPE) and polypropylene (PP) into timber substitute products (e.g. outdoor furniture, pallets and fencing), where the recovered plastics are competing primarily with timber as the alternative material. Down-cycled materials are potentially more difficult to recycle at end-of-life (although they often have long functional lifespans), and are more likely to be disposed to landfill at end-of-life. Also see 'Closed-loop recycling' and 'Open-loop recycling'.
Drop off centre/site	A facility where households can drop off selected materials and household items for recycling and reuse. Also called drop off facilities.
End user (of recycled content raw materials)	A user of raw materials that have a recycled content. Examples of end users include plastic product manufacturers that use recycled polymer in their products, or agricultural producers that purchased composted organics as a soil conditioner/fertiliser.
Energy from waste (EfW)	The terms ‘energy recovery from waste’, ‘waste to energy’ or ‘energy from waste’ can be used interchangeably to describe a number of treatment processes and technologies used to generate a usable form of energy from waste materials. Examples of usable forms of energy include electricity, heat and transport fuels.
Energy recovery	A waste fate in which a substantial portion of energy value in a waste is recovered.
Energy recovery facility	A facility that captures, on average, more than 20% of the embodied energy in the waste it receives for beneficial use.
Export for reprocessing	Material sent for reprocessing overseas.
Feedstock	Raw material used to manufacture products. Material varies depending on what is being produced.
Feedstock (chemical) recycling	The use of chemical processes such as pyrolysis to convert scrap plastics into a hydrocarbon gas or liquid (often a polymer to monomer conversion) that is usable as a fuel or as an input for manufacturing plastics resins.
Fines (glass)	Unsorted sub-5–10 mm glass material left over from the glass beneficiation process. It can contain contamination including plastics and small pieces of metals. These fines can be further processed to produce a glass sand product which has a number of uses.
Flexible packaging	Soft (flexible) plastics are generally defined as plastics that can be scrunched into a ball, unlike ‘rigid’ plastics such as bottles and tubs, which are moulded and hold their shape. Also refer to the 'Rigid packaging' entry.
Foam packaging	Foam plastic packaging is in a lightweight cellular form resulting from introduction of gas bubbles during manufacture. Foam packaging is typically used to reduce shock and vibration or abrasion. The most common example used in packaging is expanded polystyrene (EPS).
Food organics	Food waste from households or industry, including food processing waste, out- of-date or off-specification food, meat, fruit and vegetable scraps. Excludes liquid wastes.
Garden organics	Organics derived from garden sources e.g. grass clippings, tree prunings. Also known as green organics.
Generated material/waste	Materials or waste originating from a point source or source of origin.
Green organics	See garden organics.

Term	Definition
Greenhouse gases	Gases, including carbon dioxide and methane, that trap heat in the earth's atmosphere, affecting weather and climate patterns.
Hard waste	The term applied to household garbage that is not usually accepted in kerbside garbage bins by local councils e.g. old fridges and mattresses.
Hazardous waste	Waste with potentially adverse impacts on human health and the environment.
Household	Material from domestic (household) sources.
In the gate	Material entering a facility for reprocessing. This may include material that is unusable due to contamination. In the gate material that is subsequently sent to landfill is generally either a combination of gross contamination (i.e. materials that should not have been presented and are not recyclable at the receiving facility) and/or designated scrap plastics that were not recovered into product due to cross contamination with unrecyclable materials or losses due to other types of production inefficiencies (e.g. losses to trade waste). Also see 'Out the gate'.
Incinerator	A site and/or process that facilitates disposal of waste streams through burning, without producing another useful end product or capturing value from the waste material.
Internal use	Recyclate processed and used within the one company.
In-vessel composting	Composting technology involving the use of a fully enclosed chamber or vessel in which the composting process is controlled by regulating the rate of mechanical aeration. Aeration assists in heat removal, temperature control and oxygenation of the mass. Aeration is provided to the chamber by a blower fan which can work in a positive (blowing) and/or negative (sucking) mode. Rate of aeration can be controlled with temperature, oxygen or carbon dioxide feedback signals.
Kerbside waste/ collection	Waste collected by local councils from residential properties, including garbage, commingled recyclables and garden organics, but excluding hard waste.
Kraft paper	Kraft paper is paper, or paperboard (cardboard) produced from chemical pulp produced in the kraft process. It is commonly used in paper sacks, food and other paper-based wraps (including burger wraps and similar). Kraft pulp is normally darker than other wood pulps, but it can be bleached to make white papers.
Landfill	Discharge or deposit of solid wastes onto land that cannot be practically removed from the waste stream.
Liquid paperboard (LPB)	Liquid paperboard (LPB) is a fibre-based packaging board that is designed to hold a liquid. It commonly comes in two main types, which are gable-topped LPB (plastic polymer layer / paperboard layer / plastic polymer layer), and aseptic LPB (plastic polymer layer / paperboard layer / aluminium foil layer / plastic polymer layer). Also see Polymer-coated paperboard (PCPB).
Local material utilisation	Materials recovered and reprocessed (recyclate) for use within Australia for the manufacture of new products.
Local material utilisation rate	Materials recovered for local manufacturing of new product divided by total packaging waste entering the system.
Local use	Recyclate used within Australia by an Australian company in the manufacture of a new product.
Local/Locally	In Australia.
Material flow analysis (MFA)	Material flow analysis (MFA) is a mass balanced based analytical method to quantify flows and stocks of materials or substances for a well-defined system and time period. MFA is also referred to as substance flow analysis (SFA).
Material recycling	Reprocessing, by means of a manufacturing process, of a used packaging material into a product, a component incorporated into a product, or a secondary (recycled) raw material

Term	Definition
Materials recovered	Materials diverted from landfill for use or reprocessing irrespective of where the recovery or reprocessing takes place.
Materials recovery facility (MRF)	A centre for the receipt, sorting and transfer of materials recovered from the waste stream prior to transport to another facility for recovery and management. At a MRF materials may undergo mechanical treatment for sorting by characteristics such as density, size, magnetism and optical characteristics, and may include cleaning and compression. Materials may be received as mixed streams such as commingled recyclables from households and businesses or single streams such as metals.
Mechanical recycling	The use of physical processes such as sorting, chipping, grinding, washing and extruding to convert scrap plastics to a usable input for the manufacture of new products.
Mild steel	Mild steel is defined as having no more than 2% carbon and no other functional alloying elements. Mild steel is also referred to as ‘carbon steel’.
Mixed paper	Post-consumer kerbside mix of fibre based packaging and non-packaging papers. Includes materials such as magazine, newspaper, marketing, some old corrugated cardboard (OCC) and others fibre-based formats. Typically has high levels of contamination, of which broken glass is a particular issue.
Mixed plastics	Post-consumer kerbside mix of plastics based packaging and non-packaging plastic items. Includes materials such as bottles, containers and other packaging formats consisting of all the major polymer groups. Often undergoes a polymer sort at MRFs or post-MRFs to positively recover a limited range of polymer types, typically PET and HDPE. Often has moderate to high levels of contamination.
Municipal solid waste (MSW)	Solid waste generated from municipal and residential activities, and including waste collected by, or on behalf of, a municipal council. Excludes dedicated container deposit scheme (CDS) collections or drop-off by consumers or businesses.
Non-packaging / durable	Long-term use item; not designed to be single use or disposable within a 12-month period.
OCC	Old, corrugated cardboard (unbleached kraft).
ONP	Old newsprint.
Open-loop recycling	Material from a product system is recycled into a different product system and may be of lower quality and functionality than the original material. Importantly, the recycled materials substitute for, and avoid the use of virgin materials in the new applications. Examples of this in Australia include the recycling of PET bottles into fibre for use in clothing and other textiles, and high-density polyethylene (HDPE) milk bottles into mobile garbage bins and milk crates. Open-loop recycling can be as environmental beneficial as closed-loop recycling. Also see 'Closed-loop recycling' and 'Downcycling'.
Optical sorting	Technologies used to sort glass by colour type, and plastics by polymer type.
Organic material	Plant or animal matter, e.g. grass clippings, tree prunings and food waste, originating from domestic or industrial sources.
Organics recycling	The treatment of separately collected organics waste by anaerobic digestion, composting or vermiculture.
Out the gate	Material leaving a facility following reprocessing and excluding most contamination. Also see ‘In the gate’.
Oxo-degradable or photo-degradable	Conventional fossil-based polymers (usually polyethylene or polypropylene) that have additives incorporated into the polymer at low rates (2-3%) to provide highly accelerated fragmentation of the plastic in sunlight or in the presence of oxygen or in an anaerobic environment.

Term	Definition
Packaging	Material used for the containment, protection, marketing or handling of product. Includes primary, secondary and tertiary/freight packaging in both consumer and industrial packaging applications.
Packaging assembly	A collection of packaging components that are intended to function as a single packaging unit. For example, a single-use glass soft-drink bottle is typically a packaging assembly consisting of; a glass bottle, a metal or plastic closure and a paper or plastic label. Also see 'Packaging component'.
Packaging component	A part of a packaging assembly that can be separated by hand or by using simple physical means. Also see 'Packaging assembly'.
Packaging constituent	A part from which a packaging assembly or its components are made and which cannot be separated by hand or by using simple physical means.
Packaging level	Identifies the hierarchical level of the packaging assembly, i.e. primary, secondary or tertiary. **Primary packaging**, also known as consumer or retail packaging, refers to the layer/s that contain and protect individual product units up to the point of sale (e.g. bag, bottle, jar, box etc.) and that are removed for use. Primary packaging also includes any packaging given to consumers at the point of retail sales (e.g. retail bag, tissue paper etc.) as well as packaging delivered to consumers with online sales (e.g. bag, cushioning, box etc.). **Secondary packaging** is additional to the primary packaging and is used to protect and collate individual product units during storage, transport and distribution. This may include shelf-ready packaging (SRP), also known as retail-ready packaging (RRP) or counter- top display units (CDUs), containing multiple product units and used for retail display. **Tertiary packaging** is used in the protection and shipping of a product. This type of packaging is also known as distribution packaging, transport packaging and business-to-business (B2B packaging). It consists of packaging and components such as cardboard cartons, pallets, slip sheets, stretch wrap, strapping and any labels.
Packaging system	Complete set of packaging for a packaged good, encompassing one or more of the following that are applicable (depending on the packaged goods): Primary packaging, Secondary packaging, Tertiary (distribution or transport) packaging.
Paper & paperboard	Paperboard is a group term related to papers (including multi-ply papers) that have been manufactured specifically for packaging purposes. Paper is both an input into paperboard manufacturing and can be a packaging product in its own right.
PE-HD or HDPE	High-density polyethylene (PIC 2). Typically referred to as HDPE.
PE-LD or LDPE	Low-density polyethylene (PIC 4). Typically referred to as LDPE.
PE-LLD or LLDPE	Linear low-density polyethylene (PIC 4). Typically referred to as LLDPE.
PET	Polyethylene terephthalate (PIC 1).
PIC	Plastic identification code. Also referred to as the resin identification code (RIC) in some other countries.
Placed on market (POM)	Packaging is defined as being 'placed on market' (POM) when it is first made available to the end-consumer, and disposal is following the intended full use of the packaging and can be considered 'post-consumer'. Packaging losses prior to the point of POM are considered pre-consumer losses.
Polymer coated paperboard (PCPB)	Paper-based packaging with a polymer coating for water resistance and structural integrity, generally, polyethylene (PE) or polylactic acid (PLA). Aseptic PCPB containers also contain a foil/metallised film layer.
Post-consumer domestic	Used material from household sources. Mostly packaging material from kerbside recycling collections.
Post-consumer industrial	Used material from non-household sources.

Term	Definition
Post-consumer recycled content (PCR)	The post-consumer recycled content of packaging placed on market is sourced from end-of-life materials generated by households or by commercial, industrial and institutional facilities.
Post-consumer used packaging	ISO 14021 defines post-consumer material as material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. It excludes pre-consumer material (e.g. production scrap).
PP	Polypropylene (PIC 5).
Pre-consumer recycled content	The pre-consumer recycled content of packaging placed on market is sourced from scrap materials generated during manufacturing (excluding rework). The compositional profile of the pre-consumer recycled content of the material is typically the same as that of the packaging material POM, and reflects the composition of the incoming material into the packaging manufacturing. That is, it can have a proportion of virgin, pre-consumer and post-consumer content. If manufacturing processes, including scrap reprocessing processes, are considered a single black box, then the sources of pre-consumer materials upstream from manufacturing processes are either virgin or post-consumer sourced materials only.
Pre-consumer scrap packaging	Scrap off-cuts and off-specification materials in the manufacturing industry which are collected for reprocessing at a different facility. Does not include material that is recycled directly back into manufacturing processes at the same facility. Does not include material that has reached the end-consumer, whether domestic, commercial or industrial.
PREP	Packaging Recycling potential Evaluation Portal (PREP) is an online platform used to verify if packaging is or is not recyclable in Australian and New Zealand kerbside collections.
Primary material	See ‘Virgin material’.
Problematic	Can be considered a ‘contaminant’ in the recycling facility because it is either 1) not one of the requested materials 2) causes problems e.g. getting entangled in machinery 3) reduces the quality of the recyclate or some other reason.
Process derived fuels	Also called process engineered fuel (PEF) or refuse derived fuel (RDF), is a fuel produced after basic processing in a MRF or MBT to increase the calorific value and remove recyclable materials and contaminants of municipal solid waste, commercial and industrial waste and construction and demolition waste.
Processing facilities	Facilities which either receive materials directly from collection systems or from recovery facilities for further sorting and/or processing to provide material for use in the generation of new products.
Product stewardship	A concept of shared responsibility by all sectors involved in the manufacture, distribution, use and disposal of products, which seeks to ensure value is recovered from products at the end of life.
PS-E or EPS	Expanded polystyrene (PIC 6). Typically referred to as EPS.
Public place recycling	Recycling facilities found in public areas, such as parks, reserves, transport hubs, shopping centres and sport and entertainment venues, that allow the community to recycle when away from home.
Putrescible waste	Waste that readily decomposes, including food waste and organic waste from gardens.
PVC	Polyvinyl chloride (PIC 3).
Pyrolysis	Thermal breakdown of waste in the absence of air, to produce char, pyrolysis oil and syngas e.g. the conversion of wood into charcoal.

Term	Definition
Recover / recovery / resource recovery	The process of recovering resources from waste for reuse or reprocessing. This includes collection, sorting and aggregation of materials. To convert waste into a reusable material.
Recovery rate	Recovery (at a defined point) as a percentage of end-of-life disposal. Similar meaning to 'Recycling rate' but can include material into composting and energy recovery. Excludes reused products. Also see 'Diversion rate' and 'Recycling rate'.
Recyclable packaging	A packaging (1) or packaging component (2,3) is recyclable if its successful post-consumer (4) collection, sorting, and recycling is proven to work in practice and at scale. Also see the related ‘Compostable packaging’ and ‘Reusable packaging’ definitions. Supporting notes: 1. A package can be considered recyclable if its main packaging components, are recyclable according to the above definition, and if the remaining minor components are compatible with the recycling process and do not hinder the recycling potential of the main components. The PREP design tool provides information on recycling potential of packaging through kerbside collection services. 2. A packaging component is a part of packaging that can be separated by hand or by using simple physical means (ISO 18601), e.g. a cap, a lid and (non in-mould) labels. 3. A packaging component can only be considered recyclable if that entire component, excluding minor incidental constituents (5), is recyclable according to the definition above. If just one material of a multi-material component is recyclable, one can only claim recycling potential of that material, not of the component as a whole (in line with ISO 14021). 4. ISO 14021 defines post-consumer material as material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. It excludes pre-consumer material (e.g. production scrap). 5. ISO 18601:2013: A packaging constituent is a part from which packaging or its components are made and which cannot be separated by hand or by using simple physical means (e.g. a layer of a multi-layered pack or an in-mould label).
Recycling potential	See the 'Recyclable packaging' entry.
Recyclate	Scrap material either before or after reprocessing.
Recycle/Recyclables/Recycling	In common practice the term is used to cover a wide range of activities, including collection, sorting, reprocessing and reuse.
Recycled (packaging)	Packaging is recycled if at least 70% of its weight is recycled into a product, a component incorporated into a product, or a secondary (recycled) raw material.
Recycled content	Is the proportion, by mass, of pre-consumer and post-consumer recycled (PCR) material in packaging (AS/ISO 14021). ‘Pre-consumer’ material is material diverted from the waste stream during manufacturing (excluding rework). ‘Post-consumer’ material is material waste generated by households or by commercial, industrial and institutional facilities. The amount of renewable or recycled material is expressed as a percentage of the quantity of packaging material put onto the market.
Recycling	Activities in which solid wastes are collected, sorted, processed (including through composting), and converted into raw materials to be used in the production of new products (the amount of solid waste recycled is net of any residuals disposed). Excludes energy recovery and stockpiles.

Term	Definition
Recycling rate	Recovery (at a defined point) as a percentage of end-of-life disposal. Similar meaning to 'Recovery rate' but excludes material into energy recovery and reused products. Also see 'Diversion rate' and 'Reprocessing rate'.
Refuse derived fuels	Refer to ‘Process derived fuels’.
Reprocess / reprocessing	To put a material that has been used through an industrial process to change it so that it can be used again.
Reprocessor / reprocessing facility / reprocessing infrastructure	Facility that uses an industrial process to change the physical structure and properties of a waste material so it can be used again. This can include facilities that dismantle products, such as tyres, e-waste and mattresses, and energy from waste facilities that use materials to generate energy.
Resale centre / shop	A centre/shop that enables the sale and subsequent reuse of good quality, saleable products and materials that were disposed of by their previous owner.
Residual waste	Residual material that remains after any source separation or reprocessing activities of recyclable materials or garden organics. Waste that is left over after suitable materials have been recovered for reuse and recycling. This generally means the environmental or economic costs of further separating and cleaning the waste are greater than any potential benefit of doing so.
Resin	Raw plastic polymer material.
Resource recovery	Total materials recovered including materials sent to recycling and energy recovery, including export and stockpiling, net of contaminants and residual wastes sent to disposal.
Resource recovery infrastructure	Facility that receives and manages materials to enable them to be reused or reprocessed. This includes drop off points, resale centres, resource recovery centres, transfer stations and materials recovery facilities.
Resource recovery rate	The proportion calculated by dividing resource recovery by waste generation (also referred to as the ‘recovery rate’).
Reusable packaging	Packaging or packaging component which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations in a system for reuse. Also see the related ‘Compostable packaging’ and ‘Recyclable packaging’ definitions. Supporting notes: 1. A trip is defined as transfer of packaging, from filling/loading to emptying/unloading. A rotation is defined as a cycle undergone by reusable packaging from filling/loading to filling/loading (ISO 18603). 2. The minimum number of trips or rotations refers to the fact that the ‘system for reuse’ in place should be proven to work in practice, i.e. that a significant share of the package is actually reused (measured e.g. by an average reuse rate or an average number of use-cycles per package). 3. A system for reuse is defined as established arrangements (organisational, technical or financial) which ensure the possibility of reuse, in closed-loop, open-loop or in a hybrid system (ISO 18603). 4. Reuse is an operation by which packaging is refilled or used for the same purpose for which it was conceived, enabling the packaging to be refilled (ISO 18603). Also refer to the 'Single-use packaging' entry.
Reuse	Recovering value from a discarded resource without processing or remanufacture e.g. garments sold though opportunity shops.
Rigid packaging	Rigid plastic packaging such as bottles and tubs, which are (generally) moulded and hold their shape. Also refer to the 'Flexible packaging' entry.

Term	Definition
Scrap packaging	Used packaging that has been recovered for reprocessing but has not yet been reprocessed.
Secondary processing	A process undertaken after sorting in which a recovered material is put through an industrial process to change it so that it can be used as an input for the manufacture of new products. Also see ‘Reprocessor’.
Sectors / industry sectors	Groupings of industries used to generalise patterns in waste generation and disposal e.g. construction and demolition, food services including food retail and food manufacturing, small to medium enterprises.
Single-use packaging	Single-use packaging is defined as a packaging system or packaging component which has been principally designed to accomplish a single trip, even if some form of reuse is possible. Single-use packaging does not meet the definitional requirements of ISO 18603:2013 (Packaging and the environment – Reuse) as reusable packaging. Also refer to the 'Reusable packaging' entry.
Soft plastics packaging	Soft (flexible) plastics are generally defined as plastics that can be scrunched into a ball, unlike ‘rigid’ plastics such as bottles and tubs, which are moulded and hold their shape.
Solid industrial waste (SIW)	Solid waste generated from commercial, industrial or trade activities, including waste from factories, offices, schools, universities, state and federal government operations and commercial construction and demolition work. Excludes MSW and hazardous wastes.
Solid inert waste	Solid inert waste is hard waste that has a negligible activity or effect on the environment. The waste may be either a municipal or industrial waste.
Solid waste	Non-hazardous, non-prescribed, solid waste materials, ranging from municipal garbage to industrial waste.
Sorting / primary sorting	A process typically between collection (recovery) and reprocessing in which collected end-of-life materials are sorted (or disassembled) into more usable and economically valuable material fractions. Material recovery facilities (MRFs) are sorting facilities.
Sorting efficiency	Material processed at MRF or CDS divided by total packaging waste entering the system.
Source separation	The practice of segregating materials into discrete material streams prior to collection by, or delivery to, processing facilities.
Source stream	Either MSW, C&I, C&D or CDS.
Stockpile	Unprocessed or processed material where 500 tonnes or more of the same material has been held for more than six months.
Stockpiling	Storage of materials in line with the 'stockpile' definition.
Transfer coefficient	A derived factor that defines the partitioning of an input entering a process into a transformed material stream (e.g. the separation of PET from kerbside recycling materials at MRF).
Transfer station	Facility which receives materials from the waste stream for possible segregation, consolidation, or compaction for bulk transport for resource recovery, treatment or disposal facilities.
Unprocessed material	Material that is unrefined and has not been through any process of recycling.
Virgin material	Material that has been sourced through primary resource extraction. Virgin materials are often referred to as primary materials. Virgin materials are not sourced from recycled materials (sometimes called secondary materials). For example, ‘virgin’ steel is manufactured from iron ore, and ‘virgin’ paper is manufactured from plantation sourced wood fibre.

Term	Definition
Waste	Any discarded, rejected, unwanted, surplus, or abandoned matter, including where intended for recycling, reprocessing, recovery, purification or sale. Anything that is no longer valued by its owner for use or sale, and which is, or will be, discarded. In this document, the term 'solid waste' refers to non-hazardous, solid waste materials ranging from municipal garbage to industrial waste.
Waste packaging export	Export of (typically baled) scrap packaging materials sent offshore for reprocessing.
Waste to energy	Refer to ‘Energy from waste’.

APPENDIX B – PACKAGING MATERIAL AND COMPONENT LISTS

The lists of packaging material type labels applied during data collection, analysis and reporting are provided in **Table B-1**.

Two separate lists are provided for the consumption and recovery/disposal lifecycle stages. These are as consistent as possible, while reflecting the difficulties of disaggregating data collection, particularly at the recovery/disposal stage.

Table B-1 – Packaging material type and group lists.

Material types – Consumption related	Material type list – Collection or sorting output related	Material group
Boxboard/Cartonboard	Boxboard/Cartonboard	Paper & paperboard
Corrugated cardboard	Corrugated cardboard	Paper & paperboard
High wet strength carrier board	High wet strength carrier board	Paper & paperboard
Kraft paper	Kraft paper	Paper & paperboard
Moulded fibreboard	Moulded fibreboard	Paper & paperboard
Polymer coated paperboard – Aseptic	Polymer coated paperboard – Aseptic	Paper & paperboard
Polymer coated paperboard – Gable top	Polymer coated paperboard – Gable top	Paper & paperboard
Polymer coated paperboard – Cold cup	Polymer coated paperboard – Cold cup	Paper & paperboard
Polymer coated paperboard – Hot cup	Polymer coated paperboard – Hot cup	Paper & paperboard
Polymer coated paperboard – Other	Polymer coated paperboard – Other	Paper & paperboard
Polymer coated paper	Polymer coated paper	Paper & paperboard
Other fibre packaging	Other fibre packaging	Paper & paperboard
Not applicable	Paper & paperboard – Mixed	Paper & paperboard
Newsprint & magazine	Newsprint & magazine	Paper & paperboard
Other fibre non-packaging	Other fibre non-packaging	Paper & paperboard
Glass – Amber	Glass – Amber	Glass
Glass – Flint	Glass – Flint	Glass
Glass – Green	Glass – Green	Glass
Not applicable	Glass – Mixed	Glass
Glass – Other	Glass – Other	Glass
Plastic – PET (1) – Natural	Plastic – PET (1) – Natural	Plastic
Plastic – PET (1) – Coloured – Transparent	Plastic – PET (1) – Coloured – Transparent	Plastic
Plastic – PET (1) – Coloured – Opaque	Plastic – PET (1) – Coloured – Opaque	Plastic
Plastic – HDPE (2) – Natural	Plastic – HDPE (2) – Natural	Plastic
Plastic – HDPE (2) – Coloured	Plastic – HDPE (2) – Coloured	Plastic
Plastic – PVC (3)	Plastic – PVC (3)	Plastic
Plastic – LDPE (4)	Plastic – LDPE (4)	Plastic

Material types – Consumption related	Material type list – Collection or sorting output related	Material group
Plastic – PP (5) – Natural	Plastic – PP (5) – Natural	Plastic
Plastic – PP (5) – Coloured	Plastic – PP (5) – Coloured	Plastic
Plastic – PS (6)	Plastic – PS (6)	Plastic
Plastic – EPS (6)	Plastic – EPS (6)	Plastic
Plastic – Bioplastic – Compostable (7)	Plastic – Bioplastic – Compostable (7)	Plastic
Plastic – Other (7)	Plastic – Other (7)	Plastic
Not applicable	Plastic – Mixed (1–7)	Plastic
Not applicable	Plastic – Mixed (3–7)	Plastic
Not applicable	Plastic – Mixed	Plastic
Plastic – Unidentified	Plastic – Unidentified	Plastic
Plastic – Non-packaging	Plastic – Non-packaging	Plastic
Aluminium – Beverage	Aluminium – Beverage	Metal
Aluminium – Non-beverage	Aluminium – Non-beverage	Metal
Aluminium – Other	Aluminium – Other	Metal
Steel – Tin-plate steel	Steel – Tin-plate steel	Metal
Steel – Mild steel	Steel – Mild steel	Metal
Steel – Stainless steel	Steel – Stainless steel	Metal
Steel – Other	Steel – Other	Metal
Metal – Other	Metal – Other	Metal
Fibreboard – Low-density	Fibreboard	Wood
Fibreboard – Medium-density	Fibreboard	Wood
Fibreboard – High-density	Fibreboard	Wood
Fibreboard – Oriented strand board	Fibreboard	Wood
Wood – Hard	Wood – Hard	Wood
Wood – Soft	Wood – Soft	Wood
Wood – Plywood	Wood – Plywood	Wood
Wood – Other	Wood – Other	Wood
Ceramic	Ceramic	Other
Cloth or fabric	Cloth or fabric	Other
Composite	Composite	Other
Other material into packaging	Other material into packaging	Other
Other material into non-packaging	Other material into non-packaging	Other
Not applicable	Commingled recyclables	Commingled recyclables
Not applicable	Food organics and/or garden organics	Organics
Contamination	Contamination	Other
Waste to landfill	Waste to landfill	Mixed wastes
Unknown	Unknown	Unknown

Table B-2 – Packaging component groups.

Packaging component groups	In scope?	Comments
Bag or pouch	Yes	Includes bags, bladders, envelopes, liners, nets, pouches (including peel pouches) and sachets
Barrel or drum	Yes	Barrels includes barrels, casks and kegs. Drums are plastic and steel containers of >20 L. Note that barrels, casks and kegs are not classified as drums. This group includes rigid intermediate bulk container (RIBC) and flexible intermediate bulk containers (FIBC).
Bottle or jar	Yes	See Table B-3 entries for more details.
Can	Yes	A metallic and generally cylindrical container of unspecified size. Includes aerosol containers.
Carton or box	Yes	See Table B-3 entries for more details.
Closure or label	Yes	See Table B-3 entries for more details.
Pallet or bin	Yes	Group for larger format packaging types not covered elsewhere.
Returnable plastic crate (RPC)	Yes	Returnable plastic crate (RPC).
Shopping bag	Yes	See Table B-3 entries for more details.
Tableware	Yes	Includes plates, bowls, straws, stirrers, cups, cup lids and cutlery, all intended for single-use.
Tub, tray or punnet	Yes	See Table B-3 entries for more details.
Tube or cartridge	Yes	See Table B-3 entries for more details.
Wrap	Yes	See Table B-3 entries for more details. Note that 'Film seals' have been moved to the 'Closure or label' group.
Other packaging component	No	See Table B-3 entries for more details.

Provided in **Table B-2** is the list of packaging components, and the related groups (as summarised in **Table B-2**) adopted this year. Note that project reporting is generally not at the component level, but rather at the component group level summarised in **Table B-2**, except as identified elsewhere in this report.

Table B-3 – Packaging components.

Component	Component group	In scope?	Comments
Bag	Bag or pouch	Yes	A preformed, flexible container, generally enclosed on all but one side, which forms an opening that may or may not be sealed after filling.
Liner	Bag or pouch	Yes	A liner is any layer of material that is not acting as a bag or wrapper, but is being used to protect or separate contents from outer packaging. Can be found as inner linings of liquid or pressurised containers (B2C), or as lining cartons in B2B use. Note, bags or wrappers may also be used, where liners are present.
Net	Bag or pouch	Yes	A container of meshwork material made from threads or strips twisted or woven to form a regular pattern with spaces between the threads that is used for holding, carrying, trapping, or confining something.
Pouch	Bag or pouch	Yes	A preformed, flexible container, typically enclosed with a gusset seal at the bottom of the pack can be shaped/arranged to allow the pack to stand on shelf. Pouches are currently used in a wide range of packaging. Specifically, pouches can be for single-serve food item and as such may have integrated mouthpiece, which is not detachable. 'Pouch' also includes 'Envelopes', which are a predominantly flat container of flexible material having only two faces, and joined at three edges to form an enclosure. The non-

Component	Component group	In scope?	Comments
			joined edge provides a filling opening, which may later be closed by a gummed or adhesive flap, heat seal, tie string, metal clasp, or other methods. Also includes packages used for sterile products which may be torn open without touching the product inside (peel pouches).
Sachet	Bag or pouch	Yes	A small, sealed bag or packet containing a small quantity of a product, usually food related.
Barrel, cask or keg	Barrel or drum	Yes	This packaging component includes barrels, casks and kegs. Packaging of circular cross-section, with greater length than breadth, with convex sides and two ends of equal diameter. A barrel is normally made of wooden staves bound together with hoops. Note that barrels, casks and kegs are not classified as drums.
Drum	Barrel or drum	Yes	Plastic and steel containers of ≥20 L. Cylindrical packaging whose bottom end is permanently fixed to the body and top end (head) is either removable or non-removable. Note that barrels, casks and kegs are not classified as drums.
IBC – flexible	Barrel or drum	Yes	A non-rigid container used for transport and storage of fluids and other bulk materials. The construction of the IBC container and the materials used are chosen depending on the application, but is typically woven polypropylene fabric reinforced with nylon or polyester strapping.
IBC – rigid	Barrel or drum	Yes	A rigid intermediate bulk container (RIBC) that is attached to a pallet or has the pallet integrated into the RIBC. The container is used for the transport and storage of fluids and other bulk materials. The construction of the IBC container and the materials used are chosen depending on the application. There are various types available in the marketplace: Foldable (collapsible) IBC Container, Plastic composite IBC Container, Wire Cage IBC Container, Steel IBC Container, and Stainless steel IBC Container.
Pail	Barrel or drum	Yes	Plastic or tin-plate steel containers of ≤20 L. Cylindrical packaging whose bottom end is permanently fixed to the body and top end (lid), if present, is removable.
Bottle	Bottle or jar	Yes	A container having a round neck of relatively smaller diameter than the body and an opening capable of holding a closure for retention of the contents. Specifically, a narrow-necked container as compared with a jug, jar or wide-mouth container. The cross section of the bottle may be round, oval, square, oblong, or a combination of these. The bottle may also have an integrated handle. Bottles generally are made of glass or plastics, but can also be earthenware or metal. Bottle may be disposable, recyclable, returnable, or reusable.
Jar	Bottle or jar	Yes	A rigid container made of glass, stone, earthenware, plastic or other appropriate material with a large opening, which is used to store products, (e.g. jams, cosmetics). Usually with a secure closure
Jug	Bottle or jar	Yes	A rigid container with a handle, and large opening or spout for holding and pouring liquids, generally with no secure closure. They can be cylindrical, round, oval, square, oblong, or a combination of these.
Aerosol	Can	Yes	A gas-tight, pressure-resistant container with a valve and propellant. When the valve is opened, propellant forces the product from the container in a fine or coarse spray pattern or stream. (e.g. a spray can dispensing paint, furniture polish, etc, under pressure). It does not include atomizers, because atomizers do not rely on a pressurised container to propel product from the container.
Can	Can	Yes	A metallic and generally cylindrical container of unspecified size. Generally unpressurised.
Box	Carton or box	Yes	A non-specific term used to refer to a rigid, three-dimensional container with closed faces that completely enclose its contents and may be made out of any material.
Carton	Carton or box	Yes	A non-specific term for an open or re-closable container used mostly for perishable foods (e.g. eggs, or fruit). Includes aseptic PCPB packs or 'bricks', which are defined as rectangular-shaped, stackable packages designed primarily for liquids such as juice or milk. Includes gable top PCPB cartons, which are rectangular-shaped, non-stackable packages designed primarily for liquids

Component	Component group	In scope?	Comments
			such as juice or milk.
Crate (single-use)	Carton or box	Yes	A non-specific term usually referring to a rigid three-dimensional container with semi-closed faces that enclose its contents for shipment or storage. Crates could have an open or closed top and may have internal dividers.
Wrap or basket	Carton or box	Yes	Cardboard (typically) wraps and baskets for beer, soft drink, ready to drink pre-mix beverages, and multi-packs of single-serve food containers or tins. Note that non-beverage 'wrappers' are defined as a separate packaging component, and in a different component group.
Closure	Closure or label	Yes	Lids, caps, stoppers and all other closures.
Hook, kimble, affixing item	Closure or label	Yes	Includes: hooks for hanging clothing or displays; plastic kimbles that attach tags, accessories, and similar to clothing; string or other methods of attaching tags and accessories to clothing; and any other item that is used to link, attach or fix something temporarily to a product prior to sale.
Label	Closure or label	Yes	Separately affixed labels, that is, labels that are a separate component and are not printed directly onto packaging components with other major functions. Can include stickers,
Seal	Closure or label	Yes	Containment, freshness or safety seals on rigid containers. Usually plastic, polymer coated paper/paperboard, or aluminium foil.
Bin	Pallet or bin	Yes	A three-dimensional container which either has a pallet platform permanently attached at its base or alternatively requires a platform for its handling and storage as due to its constitution it cannot be handled without it. Also referred to as a 'pallet box'.
Cage	Pallet or bin	Yes	Includes containers enclosed on at least one side by a grating of wires or bars that lets in air and light.
Pallet	Pallet or bin	Yes	A platform used to hold or transport unit loads.
Skid	Pallet or bin	Yes	A group of parallel runners (usually made from timber) attached to a single top-desk or the undersides of boxes, crates, and machines to allow entry of platform trucks or fork lift tines. Unlike a pallet, a skid has no bottom deck.
Stillage	Pallet or bin	Yes	Includes containers enclosed on at least one side by a grating of wires or bars that lets in air and light.
Milk crate	Returnable plastic crate (RPC)	Yes	Non-collapsible RPCs typically used as B2B shelf ready packaging for transporting milk bottles from dairy-processing companies to supermarkets.
RPC	Returnable plastic crate (RPC)	Yes	Collapsible RPCs typically used as B2B shelf ready packaging for transporting fruit and vegetables from farms to supermarkets. Also known as 'Reusable plastic crates'.
Produce bag	Shopping bag	Yes	A bag intended for single-use, without handles, for holding fresh produce.
Reusable bag	Shopping bag	Yes	A bag with handles, intended for carrying shopping, multiple uses are possible.
Single-use bag	Shopping bag	Yes	A bag with handles, intended for carrying shopping and for single-use.
Other shopping bag	Shopping bag	Yes	Any other shopping bag, not already described in other categories.
Bowl	Tableware	Yes	Any size bowl, intended for single-use for takeaway food.
Cup	Tableware	Yes	Any size cup, intended for single-use for takeaway drinks. Can be made from polymer-coated paperboard (PCPB), polystyrene (PS) or expanded polystyrene (EPS).
Cup lid	Tableware	Yes	A closure for single-use cup, commonly made from polystyrene. Can also be from polypropylene (PP) or bioplastic (PLA).
Cutlery	Tableware	Yes	Any type of utensil, usually fork, knife, or spoon, or combination of two, intended for single-use. Can be part of a shelf product, or accompany take-away food. Usually made from plastic or wood(other stuff…?).
Plate	Tableware	Yes	Any size plate, intended for single-use for takeaway food.
Stirrer	Tableware	Yes	Intended for single-use, to stir drinks. Usually made of plastic.
Straw	Tableware	Yes	Any size straw, intended for single-use. Usually plastic or waxed

Component	Component group	In scope?	Comments
			paper.
Blister pack	Tub, tray or punnet	Yes	A type of packaging in which the item is secured between a thermoformed dome or "bubble" (usually transparent plastic) and a paperboard surface or "carrier." This packaging component relates to the plastic bubble component only, not any non-plastic carrier. Attachment to the carrier may be by stapling, heat- sealing, gluing, or other means. In other instances, the blister folds over the product in clam-shell fashion to form an enclosing container. Blisters are often thermoformed from polyvinyl chloride. However, almost any thermoplastic can be thermoformed into a blister. Where a blister pack is made from a plastic polymer the packaging is usually thermoformed (sheet plastic is heated to soften and then placed into a mould).
Carrier	Tub, tray or punnet	Yes	The base of a blister pack. The base is what the preformed shape attaches to, by stapling, heat- sealing, gluing, or other means. The carrier is usually made of boxboard/cartonboard and often has labelling printed on it.
Pot	Tub, tray or punnet	Yes	A flat-bottomed container that has a base of any shape and which may or not be closed with a lid. Pots are usually made of cardboard, plastic, ceramic, metal or other materials and may be used for a wide array of products such as cosmetics, food/liquids, dairy products, plants.
Punnet or clamshell	Tub, tray or punnet	Yes	A punnet is a small box or square basket for the transport and sale of fruit and vegetables, typically for small fruits such as berries. Punnets can consist of a base only, a separable base and lid, or be a one-piece container consisting of a base and lid joined by a hinge area which allows the pack to come together to close. A clamshell is typically a one-piece container consisting of a base and lid joined by a hinge area which allows the pack to come together to close. The clamshell format is often also used in takeaway food packaging. NOTE: Punnets have base and closure of same material, so they are considered to be same component and weighed together. This is consistent with how the clamshell format is weighed. Where a punnet or clamshell is made from a plastic polymer the packaging is usually thermoformed (sheet plastic is heated to soften and then placed into a mould).
Tray	Tub, tray or punnet	Yes	A shallow container, usually rectangular, which may or may not have a cover, and is used for displaying or carrying items. The base is bigger than the height. It may have moulded pockets or forms for holding contents. Where a tray is made from a plastic polymer the packaging is usually thermoformed (sheet plastic is heated to soften and then placed into a mould).
Tub	Tub, tray or punnet	Yes	A flat-bottomed container that has a base of any shape and which may or not be closed with a lid. The height is usually greater than the base. Usually made of paper, plastic or other materials, these containers are typically used to contain mostly (but not exclusively) foods such as ice cream, margarine, yoghurt, sour cream, confections, etc. Includes 'cups', usually for smaller volume product.
Cartridge	Tube or cartridge	Yes	A rigid cylindrical container holding an item or substance, typically designed for insertion into a delivery mechanism.
Tube – flexible	Tube or cartridge	Yes	A flexible cylindrical container sealed on one end that could be closed with a cap or dispenser on the other end.
Tube – rigid	Tube or cartridge	Yes	A rigid cylindrical component for holding product around the outside, typically designed for holding and dispensing yarn, string or flexible films. Includes consumer packaging 'Reels' and 'Rolls'.
Fodder film or net wrap	Wrap	Yes	A plastic film or netting around a round or rectangular bale of agricultural fodder (e.g. hay) to protect the fodder from weather, maintain the bale integrity, and/or generally protect the fodder. Often referred to as silage wrap.
Pallet wrap	Wrap	Yes	A high-tensile plastic film, stretched and wrapped repeatedly around a pallet item or group of items to secure and maintain unit integrity. The use of stretch film to tightly wrap the pallet load is to bind, protect and immobilise it for further handling or shipping. This is specifically B2B use.
Shrink wrap	Wrap	Yes	A plastic film around an item or group of items which is heated causing the film to shrink, securing the film. The use of shrunken

Component	Component group	In scope?	Comments
			film to tightly wrap a package or a unit load in order to bind, protect and immobilise it for further handling or shipping.
Sleeve	Wrap	Yes	A non-rigid container usually made of paper, cardboard or plastic, that is open-ended and is slid over the contents for protection or presentation.
Strapping or banding	Wrap	Yes	Something used to bind, tie, or encircle the item or its packaging to secure and maintain unit integrity. Includes packaging tape. Includes baling twine, and other forms of packaging twines.
Stretch wrap	Wrap	Yes	A high-tensile plastic film, stretched and wrapped around an item or group of items to secure and maintain unit integrity. The use of stretch film to tightly wrap a package or a unit load in order to bind, protect and immobilise it for further storage, handling or shipping. This mainly includes B2C use.
Wrapper	Wrap	Yes	The process of enclosing all or part of an item with layers of flexible wrapping material (e.g. chocolate blocks). Does not include items which are shrink-wrapped or vacuum-packed. Note that cardboard beverage 'wraps' are defined as a separate packaging component, and in a different component group.
Absorbent	Other component group	Yes	Pouches, sachets or similar filled with an absorbent material or chemical for absorbing liquids or gases. Often used to extend the shelf-life of fresh foods but also used with clothing, electronic items, papergoods and other products.
Applicator	Other component group	Yes	Includes balls for roll-on deodorants, pump dispensers from sprays and atomizers, and the tubing and springs that accompany such, and any other fitting that is used to apply a product. Also includes plastic components used to present goods at point of sale, such as plastic components used to present and hold disposable razors and razor blades.
Basket	Other component group	No	A semi rigid container usually open at the top traditionally used for gathering, shipping and marketing agricultural products.
Coat hanger	Other component group	Yes	Coat hangers for clothes.
Dunnage	Other component group	No	Loose wood, matting, or similar material used to keep a cargo in position during sea, road or air transport.
Rack	Other component group	No	A nonspecific term identifying a framework or stand for carrying, holding, or storing items. Commonly on wheels and primarily used in the logistical functions to deliver items such as hanging garments, or items on shelves such as dairy products and bakery items and flowers.
Reel	Other component group	Yes	A B2B spool on which thread, wire, film, etc, is wound. Any device on which a material may be wound. Usually has flanged ends and is used for shipping or processing purposes.
Slip sheet	Other component group	Yes	A strong sheet of plastic, cardboard or other material which may be grabbed, hooked or attached to a forklift or other transportation equipment. The slip sheet is used to pull the products stacked on top of it, i.e. to remove all products from a pallet in one action.
Void fill	Other component group	Yes	Materials use to prevent goods from moving around and being damaged within secondary freight packaging (typically corrugated cardboard boxes). Types of void fill include bubble wrap, creased kraft paper and EPS foam.
Other component	Other component group	Yes	Packaging components not currently specified on the list.

Table B-4 provides a reference list of identified reusable packaging systems known to be operating in Australia during 2021–22.

Table B-4 – Reusable packaging systems.

Reusable packaging system	Packaging level	Sector of use	Profiled in 2021–22 (Section 9)	Comments
Kegs – Beer & cider	Primary	B2B	Yes	-
Plastic crates – Collapsible – RPCs	Secondary	B2B	Yes	-
Plastic crates – Non-collapsible – Dairy	Secondary	B2B	Yes	-
Reusable pallets – Plastic	Tertiary	B2B	Yes	Includes display pallets.
Reusable pallets – Timber	Tertiary	B2B	Yes	Includes display pallets.
Reusable shopping bags – LDPE bags (supermarket type)	Secondary	B2C	Yes	-
Reusable shopping bags – Non-woven PP bags	Secondary	B2C	Yes	-
Barrels and drums	Primary	B2B	Yes	Excludes beer kegs (and kegs for other beverages) and IBCs.
Beverage bottles	Primary	B2C	No	-
Coat hangers	Primary	B2C	No	-
Cups/mugs	Primary	B2C	Yes	-
Gas cylinders – BBQ gas bottles	Primary	B2C	No	-
Gas cylinders – Compressed CO2 cylinders for home beverage carbonation	Primary	B2C	No	For example Sodastream.
Intermediate bulk containers	Tertiary	B2B	Yes	-
Kegs – Other beverages	Primary	B2B	No	-
Metal stillages	Tertiary	B2B	No	-
Pallet slip sheets, wrapping and strapping	Tertiary	B2B	No	-
Plastic crates – Non-collapsible – Non-dairy	Secondary	B2B	No	For example the AusPost fluted polypropylene crate system.
Plastic crates – Trays	Secondary	B2B	No	For example bread trays.
Produce bins	Tertiary	B2B	No	-
Reusable consumer packaging	Primary	B2C	No	For example the Zero Co refillable cleaning and personal care products packaging system.
Tableware	Primary	B2C	No	-
Toner cartridges	Primary	B2C + B2B	No	-

APPENDIX C – JURISDICTIONAL DATA

This section provides consumption (POM) and recovery data for Australia (**Table C-1**) and for each of the states and territories (**Tables C-2 to C-9**).

The state/territory level data reported here was primarily captured through the two main surveys, on packaging manufacturers (POM data), and packaging reprocessing facility operators (recovery data). As part of both surveys, respondents were surveyed on the destination (for POM) and source (for recovery), by jurisdiction. Refer to Section 1.2 (Table 1 and Table 2) for more detail on the surveys and the survey coverage respectively.

Many of the packaging manufacturers, particularly the larger manufacturers, could not provide accurate data on the destination jurisdictions for their packaging. For these respondents, packaging POM was allocated to states/territories on a per capita basis.

Imports of packaging POM (both empty and filled) were allocated to states/territories on a per capita basis.

Australian Customs data on scrap packaging exports was also obtained and analysed at the state/territory source level to provide information on the source jurisdiction for exported scrap packaging.

Table C-1 – Australian packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	3,654,000	2,502,000	68%
Glass	1,143,000	718,000	63%
Plastic	1,277,000	258,000	20%
Metal	298,000	151,000	51%
Wood	612,000	277,000	45%
Total	**6,984,000**	**3,907,000**	**56%**

Table C-2 – ACT packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	35,000	NR	NR
Glass	20,000	8,000	40%
Plastic	22,000	4,000	19%
Metal	4,000	2,000	49%
Wood	7,000	2,000	25%
Paper & paperboard	**88,000**	**68,000**	**77%**

Table C-3 – NSW packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	1,031,000	908,000	88%
Glass	359,000	214,000	59%
Plastic	400,000	63,000	16%
Metal	108,000	42,000	39%
Wood	173,000	96,000	56%
Total	**2,072,000**	**1,323,000**	**64%**

Table C-4 – NT packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	30,000	5,000	16%
Glass	11,000	4,000	41%
Plastic	12,000	1,000	5%
Metal	2,000	2,000	62%
Wood	5,000	0	0%
Total	**60,000**	**11,000**	**19%**

Table C-5 – QLD packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	849,000	491,000	58%
Glass	234,000	138,000	59%
Plastic	256,000	18,000	7%
Metal	53,000	37,000	70%
Wood	139,000	62,000	45%
Total	**1,531,000**	**747,000**	**49%**

Table C-6 – SA packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	327,000	154,000	47%
Glass	80,000	51,000	64%
Plastic	89,000	35,000	40%
Metal	18,000	11,000	60%
Wood	54,000	NR	NR
Total	**568,000**	**310,000**	**55%**

Table C-7 – TAS packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	33,000	NR	NR
Glass	25,000	3,000	13%
Plastic	28,000	3,000	10%
Metal	6,000	3,000	59%
Wood	7,000	3,000	38%
Total	**100,000**	**49,000**	**50%**

Table C-8 – VIC packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	921,000	718,000	78%
Glass	291,000	222,000	76%
Plastic	335,000	118,000	35%
Metal	77,000	39,000	51%
Wood	155,000	47,000	30%
Total	**1,780,000**	**1,145,000**	**64%**

Table C-9 – WA packaging consumption and recovery data in 2021–22, by material group.

Material group	POM (tonnes)	Recovery (tonnes)	Recovery rate (%)
Paper & paperboard	427,000	138,000	32%
Glass	123,000	77,000	63%
Plastic	135,000	15,000	11%
Metal	28,000	15,000	53%
Wood	73,000	8,000	11%
Total	**786,000**	**254,000**	**32%**

APPENDIX D – EMPLOYMENT AND CAPACITY DATA

This year the project included a quantification of 2021–22 packaging industry employment and facility capacity (existing and planned). This included:

- Packaging related employment by companies undertaking packaging manufacturing or reprocessing. A national survey of MRF operators was not undertaken for the project, so the employment data does not include MRF related employment.
- Packaging related facility capacity (existing and planned). Planned capacity increases are those that relate to increased use of post-consumer packaging in manufacturing or post-consumer packaging reprocessing, and where capital works are approved and funded.

D.1 Packaging industry employment

Estimates of 2021–22 packaging related employment in terms of equivalent full-time employees (EFTE) are provided in **Table D-1** and **Table D-2**, by organisation type, for packaging manufacturers and reprocessors respectively. Employment is also normalised to 10,000 tonnes (or 10 kilotonnes, or 10 kt) of throughput to provide a standard basis for comparisons.

Table D-1 – Number of employees involved in packaging manufacturing related activities.

Organisation type	Employment	Normalised employment
	(EFTE)	(EFTE/10 kt)
Manufacturer – fibre	2,620	12.9
Manufacturer – glass	1,960	22.0
Manufacturer – metals	1,060	44.2
Manufacturer – plastics	7,390	92.5
Manufacturer – wood	380	9.9
Total	**13,410**	**30.9**

Table D-2 – Number of employees involved in packaging reprocessing related activities.

Organisation type	Employment	Normalised employment
	(EFTE)	(EFTE/10 kt)
Reprocessor – fibre	1,220	9.2
Reprocessor – glass	600	8.4
Reprocessor – metals	0	0.0
Reprocessor – plastics	490	41.4
Reprocessor – wood	150	0.0
Total	**2,460**	**10.1**

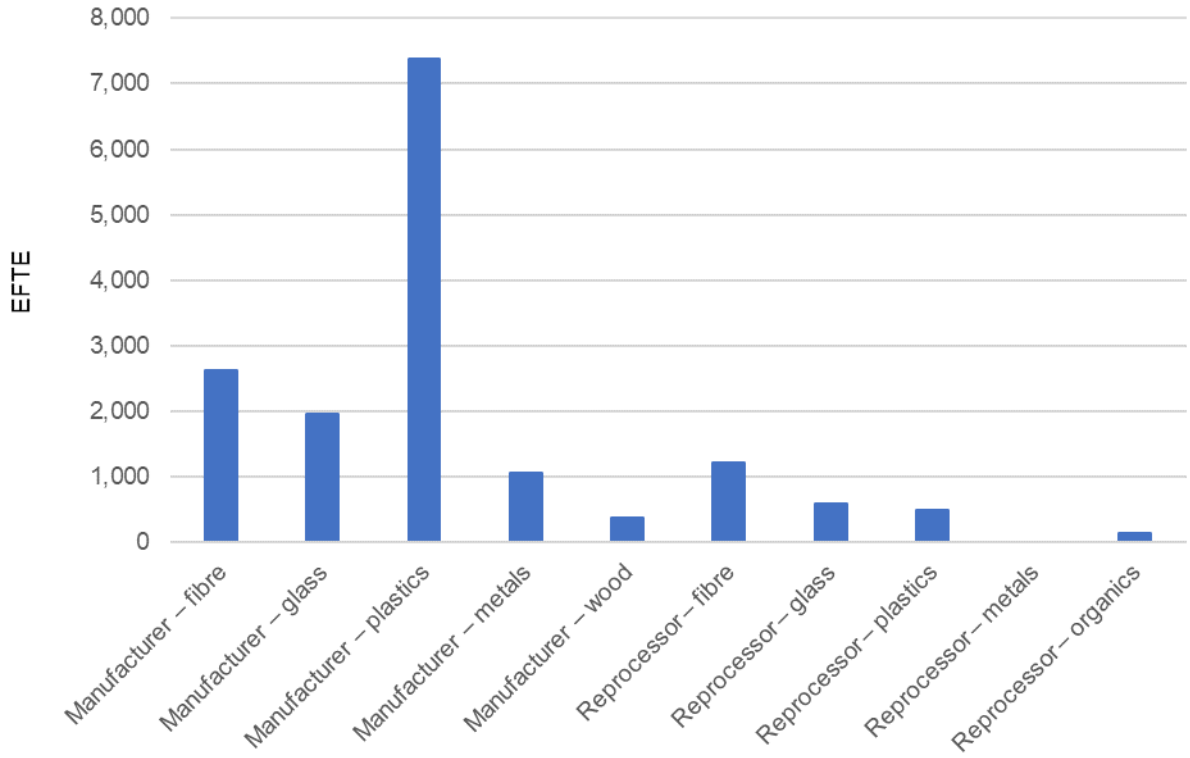

Figure D-1 – Number of employees involved in packaging related activities.

D.2 Facility capacities

D.2.1 Packaging manufacturers

Packaging manufacturers were surveyed to collect data on facilities (by count and quantity) with funded and approved plans to increase the use of post-consumer recycled content in packaging over the next few years. The summary results by facility count are provided in **Table D-3**, and by quantity of increased use of post-consumer packaging (tonnes) in **Table D-4**.

There are two major shifts between the 2020–21 and 2021–22 surveys:

- Glass packaging – In the 2021–22 survey glass packaging manufacturers reported plans to increase PCR content by 138,000 tonnes over the next few years.
- Plastic packaging – In the 2021-22 survey plastic packaging manufacturers reported plans to increase PCR content by 47,000 tonnes over the next few years.

Table D-3 – Number of manufacturing facilities with funded and approved plans to increase use of PCR content in packaging over the next few years, by material group.

Material group	Yes	No	Maybe	No response	Total
	(count)	(count)	(count)	(count)	(count)
Paper & paperboard	1	12	0	31	**44**
Glass	5	0	0	1	**6**
Plastic	24	51	9	45	**129**
Metal	1	7	1	8	**17**
Wood	0	0	0	2	**2**
Total	**31**	**70**	**10**	**87**	**198**

Table D-4 – Total tonnes of PCR content expected based on manufacturing facilities with funded and approved plans to increase use of PCR content in packaging over the next few years, by material group.

Material group	Yes	No	Maybe	No response	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Paper & paperboard	1,000	N/A	0	N/A	**1,000**
Glass	138,000	N/A	0	N/A	**138,000**
Plastic	47,000	N/A	0	N/A	**47,000**
Metal	5,000	N/A	0	N/A	**5,000**
Wood	0	N/A	0	N/A	**0**
Total	**191,000**	**N/A**	**0**	**N/A**	**191,000**

D.2.2 Packaging reprocessors – Existing capacity

Packaging reprocessors were surveyed to collect data on their average reprocessing capacity utilisation in 2021–22, by material type and capacity utilisation category. The summary results by utilisation category are provided in **Table D-5** and **Figure D-2**. The tonnages reported are the reprocessing throughput for the facilities that reported under each capacity utilisation category. These quantities are then converted to estimated 'spare' capacities in **Table D-5** and **Figure D-5**.

Table D-5 – Average reprocessing capacity utilisation in 2021–22, by material group and capacity utilisation category.

Material group	At <25% capacity	At <50% capacity	At 50% capacity	At 75% capacity	At 90% capacity	At capacity	No response	Not applicable[a]	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Paper & paperboard	0	0	0	0	320,100	1,315,800	0	900	865,400
Glass	1,800	0	0	217,300	0	417,700	0	79,900	1,500
Plastic	3,800	57,400	9,900	13,400	7,500	30,900	0	33,000	102,100
Metal	0	200	0	0	1,100	0	0	17,600	132,500
Wood	0	0	0	0	0	0	0	0	277,000
Total	**5,600**	**57,600**	**9,900**	**230,700**	**328,700**	**1,764,400**	**0**	**131,500**	**1,378,500**

a) The 'Not applicable' quantity is mostly exported material. For wood packaging it refers to mulching and composting facilities.

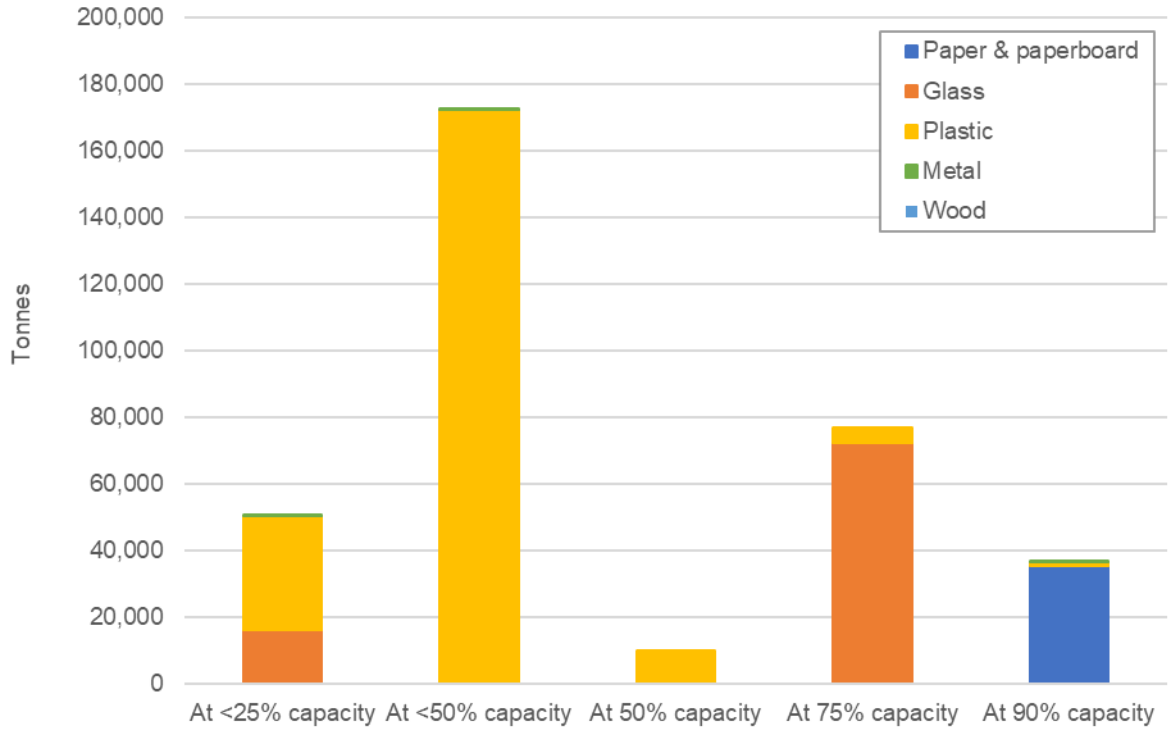

Figure D-2 – Average reprocessing capacity utilisation in 2021–22, by material group and capacity utilisation category (tonnes).

Table D-6 and **Figure D-3** present the estimated quantities of spare reprocessing capacity nationally in 2021–22. Total reported spare capacity was 345 kt, which is around 9% of local reprocessing. There would also have been some additional spare capacity at those reprocessors that did not report their capacity utilisation. These reprocessors made up 3% of local reprocessing.

Table D-6 – Spare reprocessing capacity utilisation in 2021–22, by material group and capacity utilisation category.

Material group	At <25% capacity[a]	At <50% capacity[a]	At 50% capacity	At 75% capacity	At 90% capacity	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Paper & paperboard	0	0	0	0	35,600	**35,600**
Glass	16,200	0	0	72,400	0	**88,600**
Plastic	34,300	172,300	9,900	4,500	800	**221,900**
Metal	100	500	0	0	100	**700**
Wood	0	0	0	0	0	**0**
Total	**50,600**	**172,800**	**9,900**	**76,900**	**36,500**	**346,800**

a) Reprocessors that reported being at less than 25% capacity were assumed to be at 10% capacity utilisation, and at less than 50% capacity were assumed to be at 25% capacity utilisation, in calculating spare capacity.

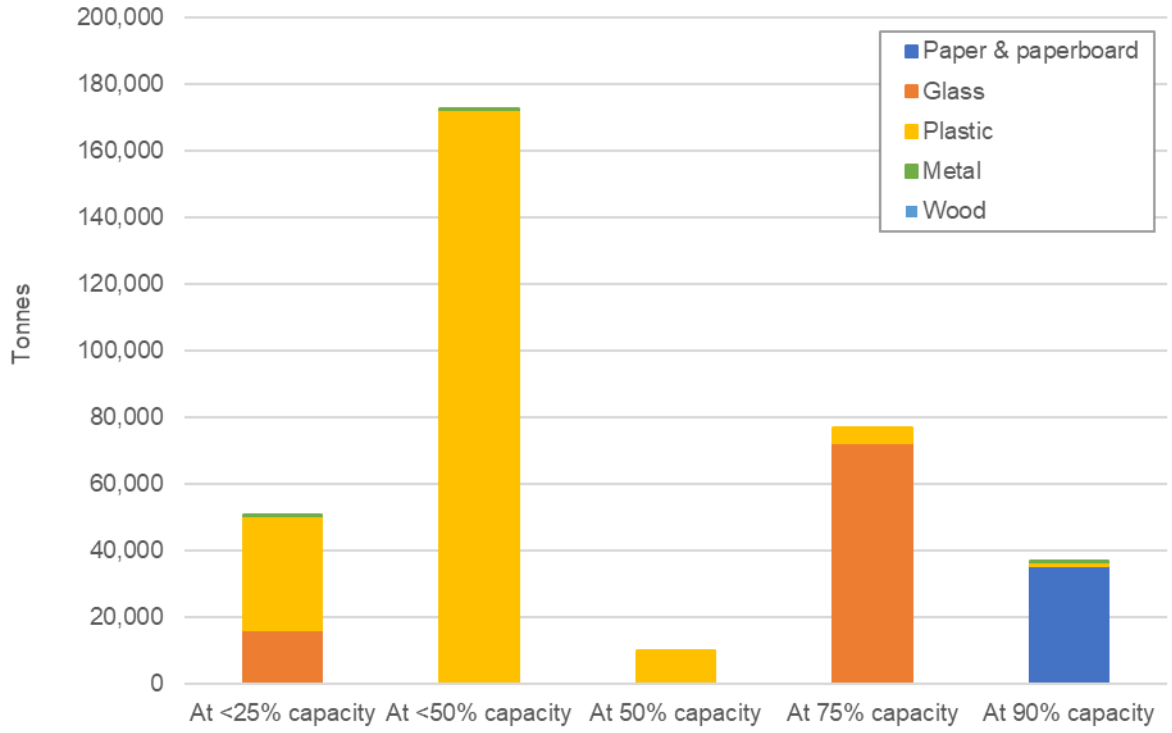

Figure D-3 – Spare reprocessing capacity utilisation in 2021–22, by material group and capacity utilisation category (tonnes).

D.2.3 Packaging reprocessors – Planned new capacity

Packaging reprocessors were surveyed to collect data on their funded and approved plans to increase reprocessing capacity over the next few years, by material type. The summary results by material group are provided in **Table D-7** and **Figure D-4**.

There was 1,205 kt of new reprocessing capacity reported to be in the pipeline, 46% of which was related to glass packaging and 33% to plastic packaging reprocessing. This is a 16% increase on the planned new capacity (1,042 kt) reported for the 2020–21 packaging quantification study.

The expected reprocessing capacity for plastics (+401,000 tonnes) is a 31% increase on the projected increase in the 2020–21 survey (306,000 tonnes).

Table D-7 – Expected increase in reprocessing capacity over the next few years, by material group.

Material group	Quantity (tonnes)
Paper & paperboard	**254,000**
Glass	**550,000**
Plastic	**401,000**
Metal	**1,000**
Wood	**0**
Total	**1,205,000**

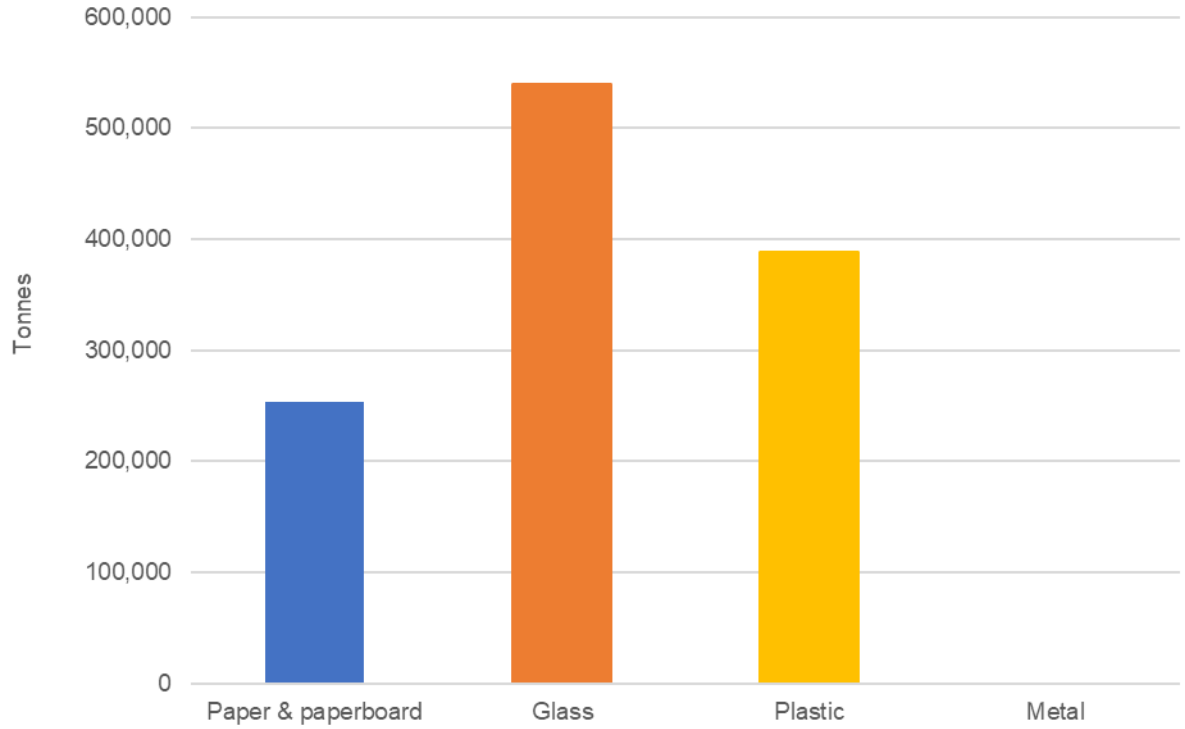

Figure D-4 – Expected increase in reprocessing capacity over the next few years, by material group (tonnes).

APPENDIX E – CONTAINER DEPOSIT ELIGIBLE PACKAGING DATA

This year the project has included the quantification of 2021–22 flows of container deposit (CD) eligible packaging, both POM and recovered by collection pathway.

The CD scheme operational dates covered by the data in this appendix are:

- ACT is full year 2021–22 (launched 30 June 2018).
- NSW is full year 2021–22 (launched 1 December 2017).
- NT is full year 2021–22 (launched 3 January 2012).
- QLD is full year 2021–22 (launched 1 November 2018).
- SA is full year 2021–22 (launched in 1977).
- TAS scheme to commence in 2024 or later (no data in this appendix).
- VIC scheme commenced November 2023 (no data in this appendix).
- WA is full year 2021–22 (launched 1 October 2020).

The data provided in this section includes (in terms of both tonnes and package counts):

- CD eligible packaging POM by jurisdiction (Section E.1).
- CD eligible packaging redeemed via depots and reverse vending machines (Section E.2.1).
- CD eligible packaging redeemed via MRFs (Section E.2.2).
- CD eligible packaging unredeemed packaging recovered via MRFs and other pathways (Section E.2.3).
- Total recovery of CD eligible packaging via all collection routes (Section E.2.4).
- Reprocessing destinations for CD eligible packaging (Section E.2.5).
- CD eligible packaging to landfill (Section E.3).

E.1 CD eligible packaging POM

Table E-1 – CD eligible packaging POM in 2021–22 by material type and jurisdiction (tonnes).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	820	19,470	870	27,760	5,320	8,320	62,560
Tin-plate steel	10	260	10	120	0	110	510
Amber glass	2,360	57,610	1,670	60,280	12,110	23,640	157,670
Flint glass	2,930	71,570	2,070	74,900	14,700	29,370	195,550
Green glass	1,860	45,390	1,310	47,500	9,470	18,630	124,150
PET (1) – Natural	690	17,760	670	24,620	4,260	8,430	56,430
PET (1) – Coloured	160	4,170	160	2,140	1,000	480	8,110
HDPE (2) – Natural	80	1,520	70	2,500	360	670	5,190
HDPE (2) – Coloured	20	330	20	550	80	150	1,140
Other plastic (7)	0	10	0	0	0	0	10
PCPB – Aseptic	110	2,060	60	2,310	970	1,130	6,640
PCPB – Gable top	30	520	20	580	130	280	1,550
Other material	10	30	0	0	0	10	40
Total	**9,060**	**220,680**	**6,920**	**243,250**	**48,410**	**91,220**	**619,540**

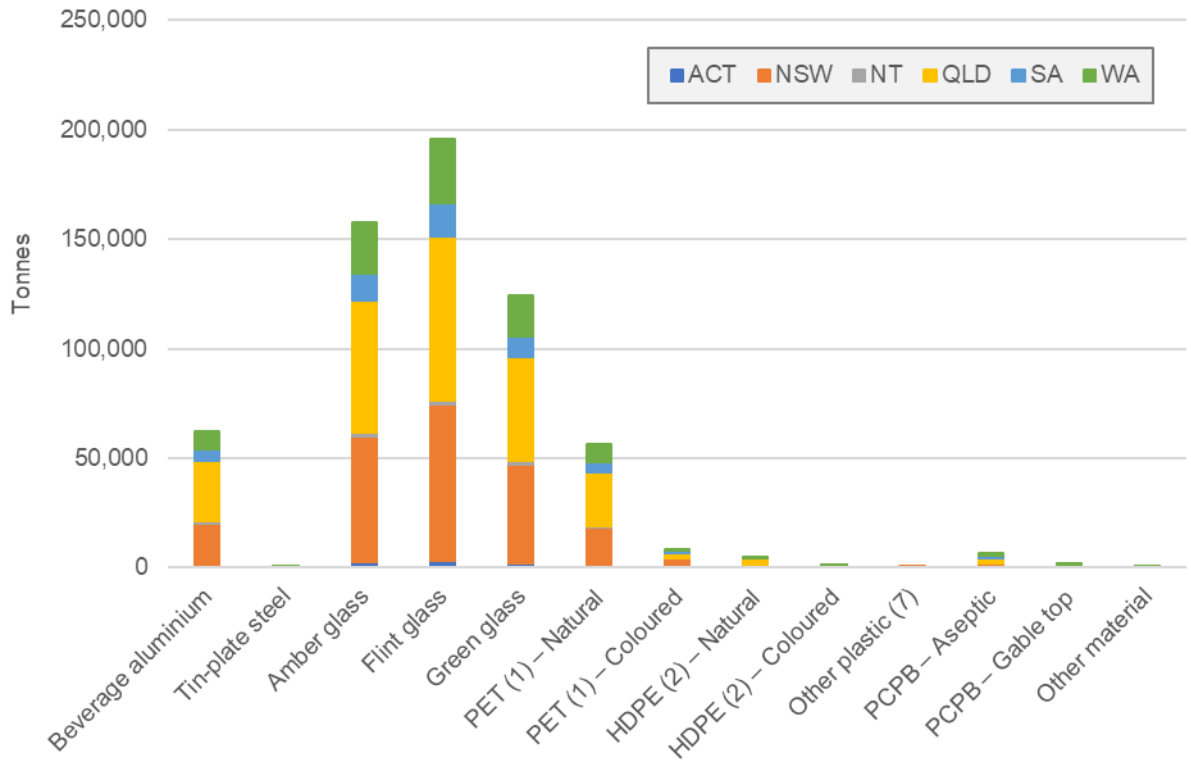

Figure E-1 – CD eligible packaging POM in 2021–22 by material type and jurisdiction (tonnes).

Table E-2 – CD eligible packaging POM in 2021–22 by material type and jurisdiction (million packs).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)
Beverage aluminium	60.666	1,441.900	64.351	1,347.707	389.831	589.464	3,893.920
Tin-plate steel	0.229	5.683	0.157	2.801	0.000	1.696	10.567
Amber glass	11.495	280.598	8.114	211.078	60.156	120.454	691.895
Flint glass	14.282	348.621	10.081	262.249	74.739	149.655	859.627
Green glass	9.057	221.077	6.393	166.304	47.395	94.903	545.129
PET (1) – Natural	32.264	829.960	31.092	707.487	161.182	389.020	2,151.005
PET (1) – Coloured	7.568	194.682	7.293	61.521	37.808	22.162	331.034
HDPE (2) – Natural	2.585	52.064	2.570	70.786	18.585	20.785	167.376
HDPE (2) – Coloured	0.567	11.429	0.564	15.538	4.080	4.563	36.741
Other plastic (7)	0.042	0.771	0.000	0.000	0.000	0.000	0.812
PCPB – Aseptic	7.409	145.084	4.424	110.491	40.459	64.386	372.253
PCPB – Gable top	1.852	36.271	1.106	27.623	10.753	16.096	93.701
Other material	0.306	1.223	0.000	0.000	0.000	0.271	1.799
Total	**148.322**	**3,569.364**	**136.145**	**2,983.585**	**844.989**	**1,473.456**	**9,155.860**

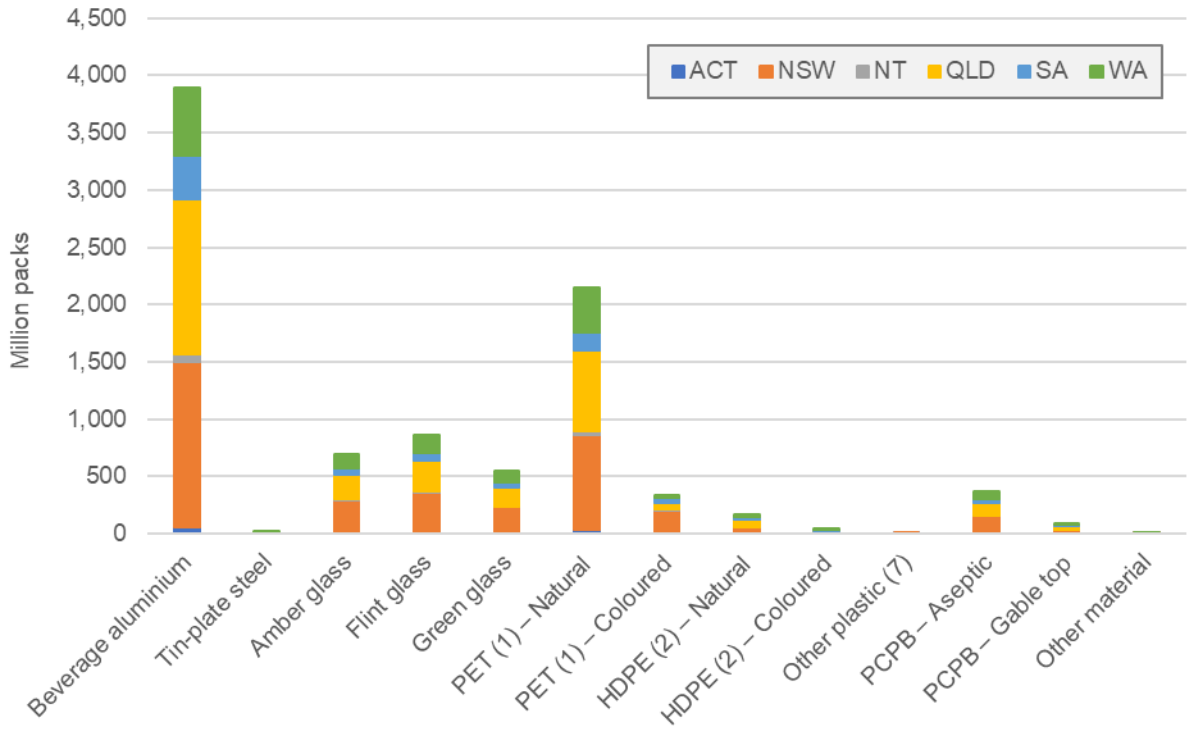

Figure E-2 – CD eligible packaging POM in 2021–22 by material type and jurisdiction (million packs).

E.2 CD eligible packaging recovery

E.2.1 Redeemed recovery via depots and reverse vending machines

Table E-3 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via depots and reverse vending machines (tonnes).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	390	11,130	710	16,350	4,300	4,410	37,290
Tin-plate steel	0	80	0	30	0	30	150
Amber glass	910	31,950	1,640	34,420	9,950	13,740	92,630
Flint glass	1,140	39,700	2,040	42,770	12,090	17,070	114,800
Green glass	720	25,170	1,290	27,120	7,790	10,830	72,920
PET (1) – Natural	210	8,610	370	11,600	2,790	3,720	27,300
PET (1) – Coloured	50	2,020	90	1,010	660	210	4,030
HDPE (2) – Natural	20	460	20	860	220	180	1,760
HDPE (2) – Coloured	0	100	0	190	50	40	390
Other plastic (7)	0	0	0	0	0	0	0
PCPB – Aseptic	20	350	30	530	520	250	1,690
PCPB – Gable top	0	90	10	130	70	60	360
Other material	0	0	0	0	0	0	10
Total	**3,470**	**119,660**	**6,210**	**135,010**	**38,430**	**50,560**	**353,330**
Redemption (%)[1]	**38.3%**	**54.2%**	**89.7%**	**55.5%**	**79.4%**	**55.4%**	**57.0%**

1. Redemption % is relative to CD eligible packaging POM.

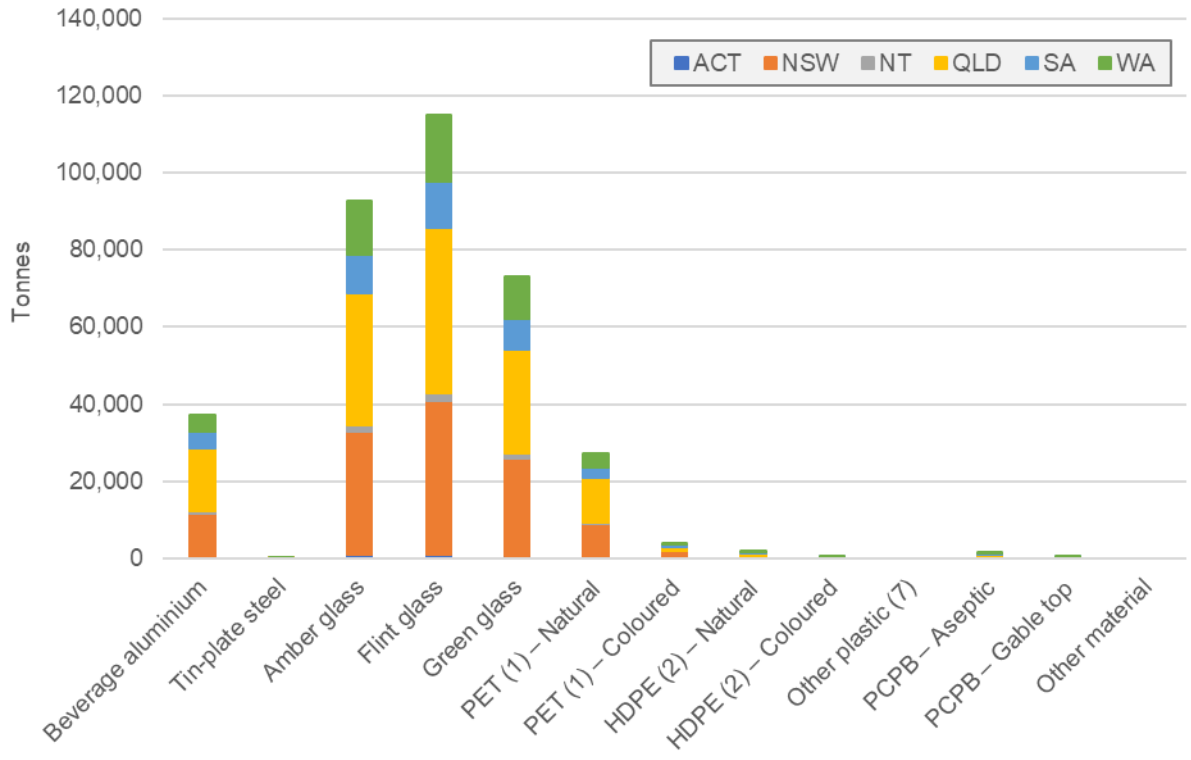

Figure E-3 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via depots and reverse vending machines (tonnes).

Table E-4 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via depots and reverse vending machines (million packs).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)
Beverage aluminium	29.113	824.133	52.393	793.799	315.102	312.409	2,326.950
Tin-plate steel	0.008	1.788	0.086	0.748	0.000	0.517	3.147
Amber glass	4.452	155.638	7.992	120.526	49.448	70.023	408.080
Flint glass	5.531	193.369	9.930	149.744	61.435	86.999	507.008
Green glass	3.508	122.624	6.297	94.960	38.959	55.170	321.517
PET (1) – Natural	9.940	402.179	17.249	333.226	105.638	171.707	1,039.940
PET (1) – Coloured	2.332	94.338	4.046	28.976	24.779	9.782	164.254
HDPE (2) – Natural	0.684	15.743	0.761	24.492	11.260	5.579	58.518
HDPE (2) – Coloured	0.150	3.456	0.167	5.376	2.472	1.225	12.845
Other plastic (7)	0.000	0.020	0.000	0.000	0.000	0.000	0.020
PCPB – Aseptic	1.257	24.535	2.219	25.302	21.507	14.170	88.991
PCPB – Gable top	0.314	6.134	0.555	6.326	5.717	3.542	22.588
Other material	0.000	0.119	0.000	0.000	0.000	0.107	0.226
Total	**57.290**	**1,844.076**	**101.696**	**1,583.475**	**636.316**	**731.230**	**4,954.084**
Redemption (%)[1]	**38.6%**	**51.7%**	**74.7%**	**53.1%**	**75.3%**	**49.6%**	**54.1%**

1. Redemption % is relative to CD eligible packaging POM.

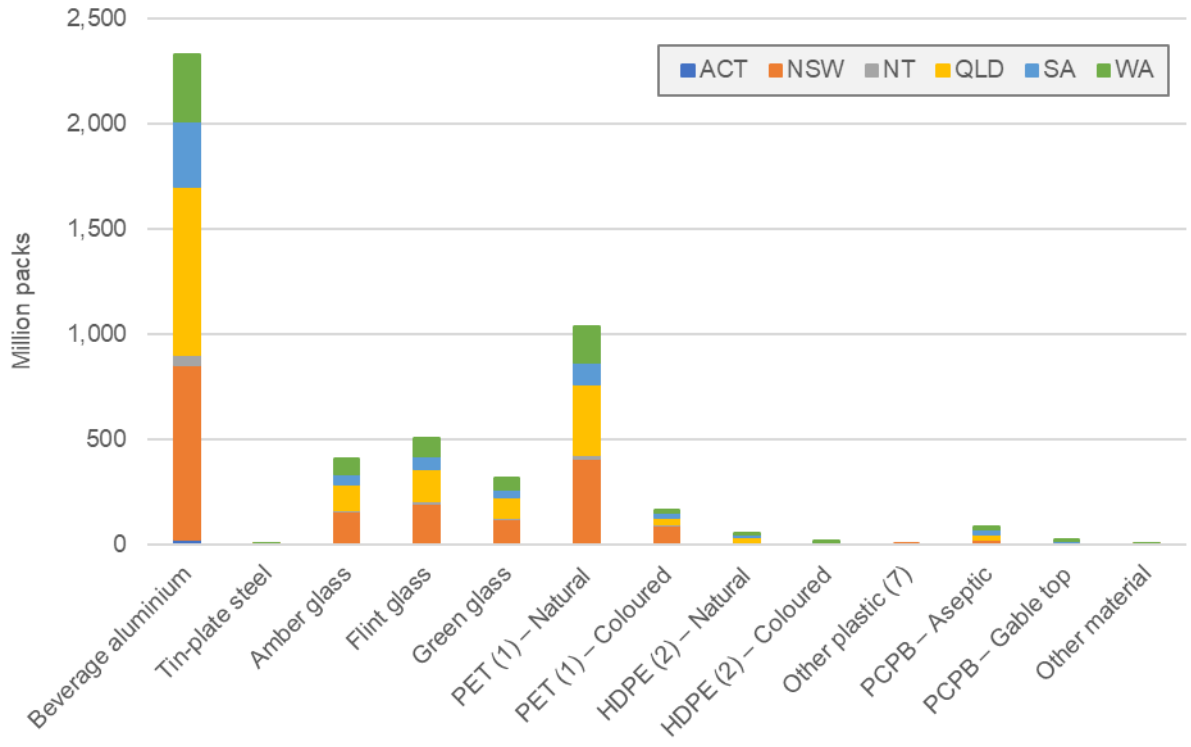

Figure E-4 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via depots and reverse vending machines (million packs).

E.2.2 Redeemed recovery via MRFs

Table E-5 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via MRFs (tonnes).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	290	2,200	0	1,920	120	770	5,300
Tin-plate steel	0	0	0	0	0	0	0
Amber glass	1,280	11,240	0	13,200	0	3,980	29,710
Flint glass	1,590	13,960	0	16,400	0	4,950	36,910
Green glass	1,010	8,860	0	10,400	0	3,140	23,400
PET (1) – Natural	210	2,440	0	1,600	160	980	5,400
PET (1) – Coloured	50	570	0	140	40	60	860
HDPE (2) – Natural	30	230	0	280	0	120	660
HDPE (2) – Coloured	10	50	0	60	0	30	140
Other plastic (7)	0	0	0	0	0	0	0
PCPB – Aseptic	0	0	0	0	0	0	0
PCPB – Gable top	0	0	0	0	0	0	0
Other material	0	0	0	0	0	0	0
Total	**4,470**	**39,560**	**0**	**44,010**	**320**	**14,020**	**102,370**
Redemption (%)[1]	**49.3%**	**17.9%**	**0.0%**	**18.1%**	**0.7%**	**15.4%**	**16.5%**

1. Redemption % is relative to CD eligible packaging POM.

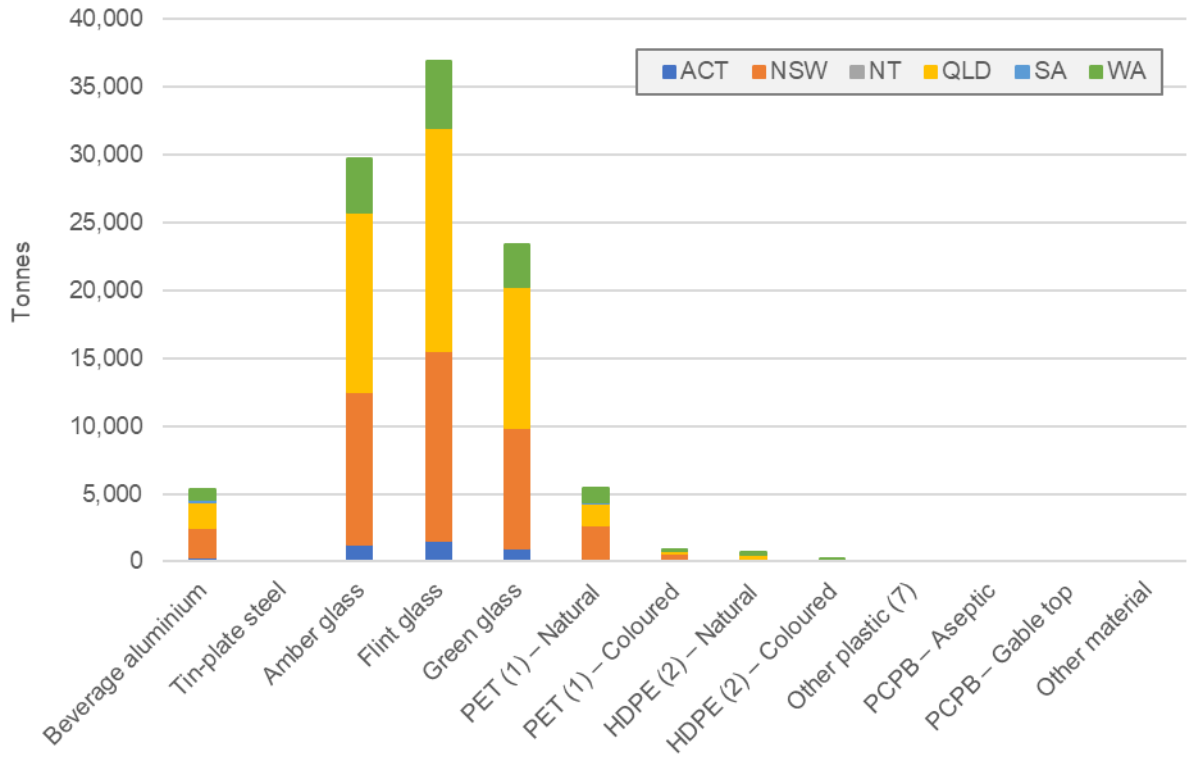

Figure E-5 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via MRFs (tonnes).

Table E-6 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via MRFs (million packs).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)
Beverage aluminium	21.294	163.075	0.000	92.992	8.715	54.851	340.927
Tin-plate steel	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Amber glass	6.248	54.745	0.000	46.226	0.000	20.289	127.509
Flint glass	7.763	68.017	0.000	57.432	0.000	25.208	158.420
Green glass	4.923	43.133	0.000	36.421	0.000	15.985	100.461
PET (1) – Natural	9.814	114.199	0.000	45.987	6.103	45.221	221.324
PET (1) – Coloured	2.302	26.787	0.000	3.999	1.432	2.576	37.096
HDPE (2) – Natural	0.949	7.919	0.000	7.999	0.000	3.677	20.544
HDPE (2) – Coloured	0.208	1.738	0.000	1.756	0.000	0.807	4.510
Other plastic (7)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PCPB – Aseptic	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PCPB – Gable top	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other material	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**53.501**	**479.614**	**0.000**	**292.811**	**16.249**	**168.614**	**1,010.790**
Redemption (%)[1]	**36.1%**	**13.4%**	**0.0%**	**9.8%**	**1.9%**	**11.4%**	**11.0%**

1. Redemption % is relative to CD eligible packaging POM.

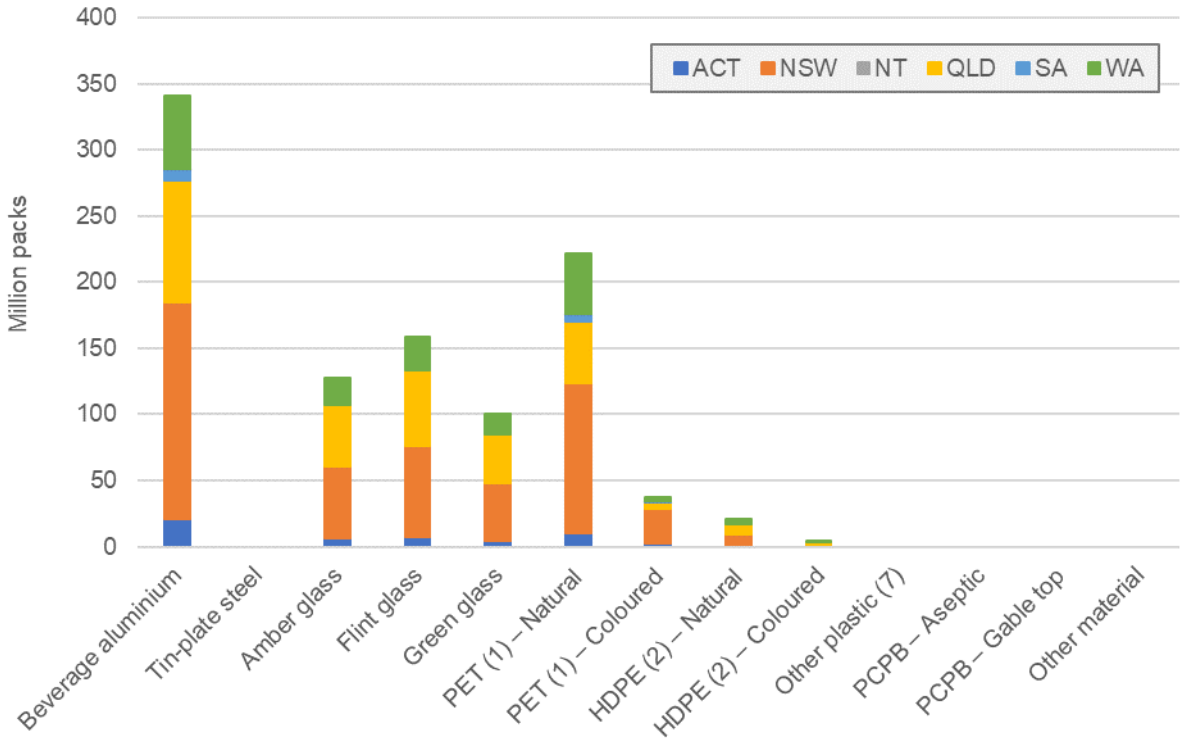

Figure E-6 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Redeemed recovery via MRFs (million packs).

E.2.3 Unredeemed recovery via MRFs and other pathways

While most CD eligible packaging recovery in 2021–22 was via pathways that triggered the payment of a redeemed deposit, this was not always the case. There are a number of unredeemed recovery pathways that exist, with differing levels of applicability to different jurisdictions. These unredeemed recovery pathways included:

- MRF recovery where the MRF operators may not have claimed the deposits for internal operational or administrative reasons.
- MRF recovery where the published methods for claiming deposits in mixed CD eligible / CD ineligible streams did not cover all material types (e.g., LPB packaging), or otherwise had particular exceptions.
- MRF recovery of CD eligible packaging recovered from some C&I sources.
- CD eligible packaging recovered through away-from-home recycling bins or events related recycling, in some circumstances.
- Alternative Waste Treatment (AWT) or Mechanical Biological Treatment (MBT) facility recovery of CD eligible packaging.

Provided here are estimates of the recovery of unredeemed but CD eligible packaging during 2021–22. It is important to note that the earlier estimates of CD eligible packaging POM and redeemed CD eligible packaging are highly accurate as they are based on detailed regulated monthly or quarterly reporting. However, the recovery estimates of unredeemed CD eligible packaging are estimates derived from industry surveys and are less precise.

Table E-7 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Unredeemed recovery via MRFs and other pathways (tonnes).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	0	1,170	0	1,670	320	500	3,650
Tin-plate steel	0	0	0	10	0	0	20
Amber glass	0	3,460	0	3,620	730	1,420	9,220
Flint glass	0	4,290	0	4,490	880	1,760	11,430
Green glass	0	2,720	0	2,850	570	1,120	7,260
PET (1) – Natural	40	1,070	40	1,480	260	510	3,390
PET (1) – Coloured	10	250	10	130	60	30	490
HDPE (2) – Natural	0	90	0	150	20	40	310
HDPE (2) – Coloured	0	20	0	30	0	10	70
Other plastic (7)	0	0	0	0	0	0	0
PCPB – Aseptic	0	0	0	0	0	0	0
PCPB – Gable top	0	0	0	0	0	0	0
Other material	0	0	0	0	0	0	0
Total	**60**	**13,070**	**50**	**14,420**	**2,840**	**5,380**	**35,830**
Recovery (%)[1]	**0.7%**	**5.9%**	**0.8%**	**5.9%**	**5.9%**	**5.9%**	**5.8%**

1. Recovery % is relative to CD eligible packaging POM.

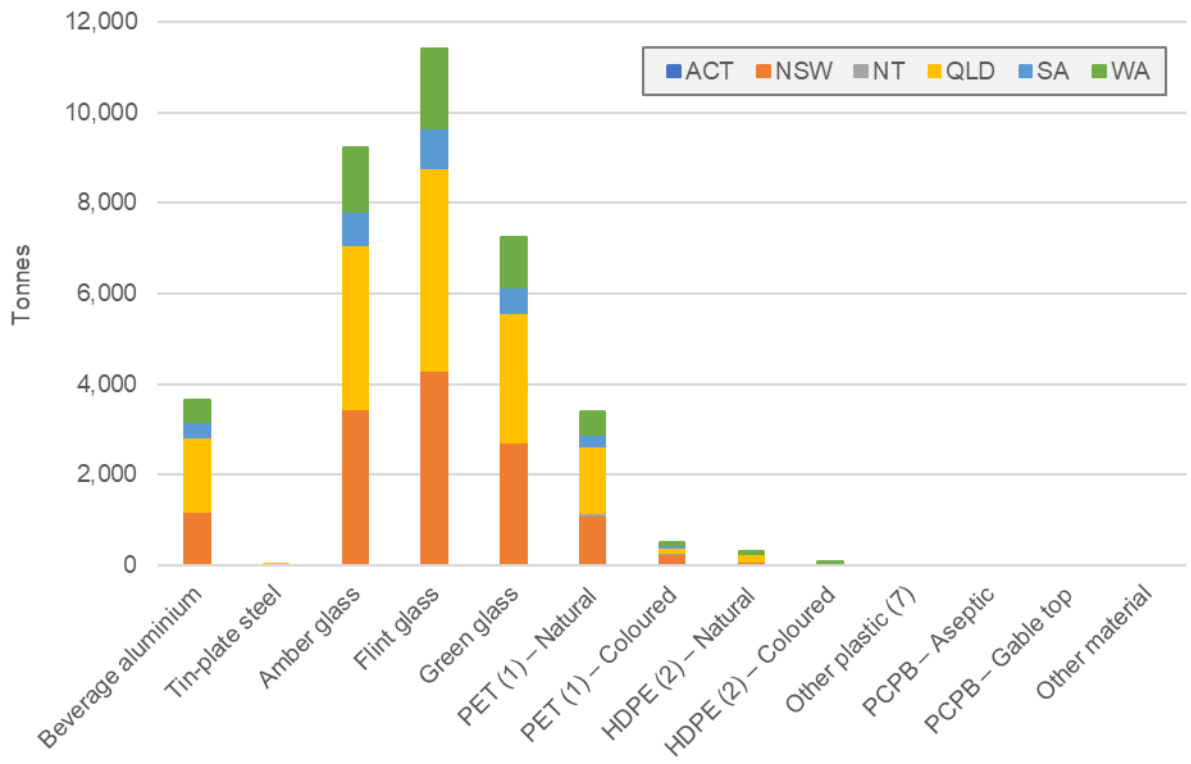

Figure E-7 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Unredeemed recovery via MRFs and other pathways (tonnes).

Table E-8 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Unredeemed recovery via MRFs and other pathways (million packs).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)
Beverage aluminium	0.000	86.514	0.000	80.862	23.390	35.368	226.134
Tin-plate steel	0.067	0.088	0.000	0.176	0.000	0.042	0.374
Amber glass	0.000	16.836	0.000	12.665	3.609	7.227	40.337
Flint glass	0.000	20.917	0.000	15.735	4.484	8.979	50.116
Green glass	0.000	13.265	0.000	9.978	2.844	5.694	31.781
PET (1) – Natural	1.936	49.798	1.866	42.449	9.671	23.341	129.060
PET (1) – Coloured	0.454	11.681	0.438	3.691	2.268	1.330	19.862
HDPE (2) – Natural	0.155	3.124	0.154	4.247	1.115	1.247	10.043
HDPE (2) – Coloured	0.034	0.686	0.034	0.932	0.245	0.274	2.204
Other plastic (7)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PCPB – Aseptic	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PCPB – Gable top	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other material	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**2.646**	**202.908**	**2.491**	**170.737**	**47.627**	**83.503**	**509.911**
Recovery (%)[1]	**1.8%**	**5.7%**	**1.8%**	**5.7%**	**5.6%**	**5.7%**	**5.6%**

1. Recovery % is relative to CD eligible packaging POM.

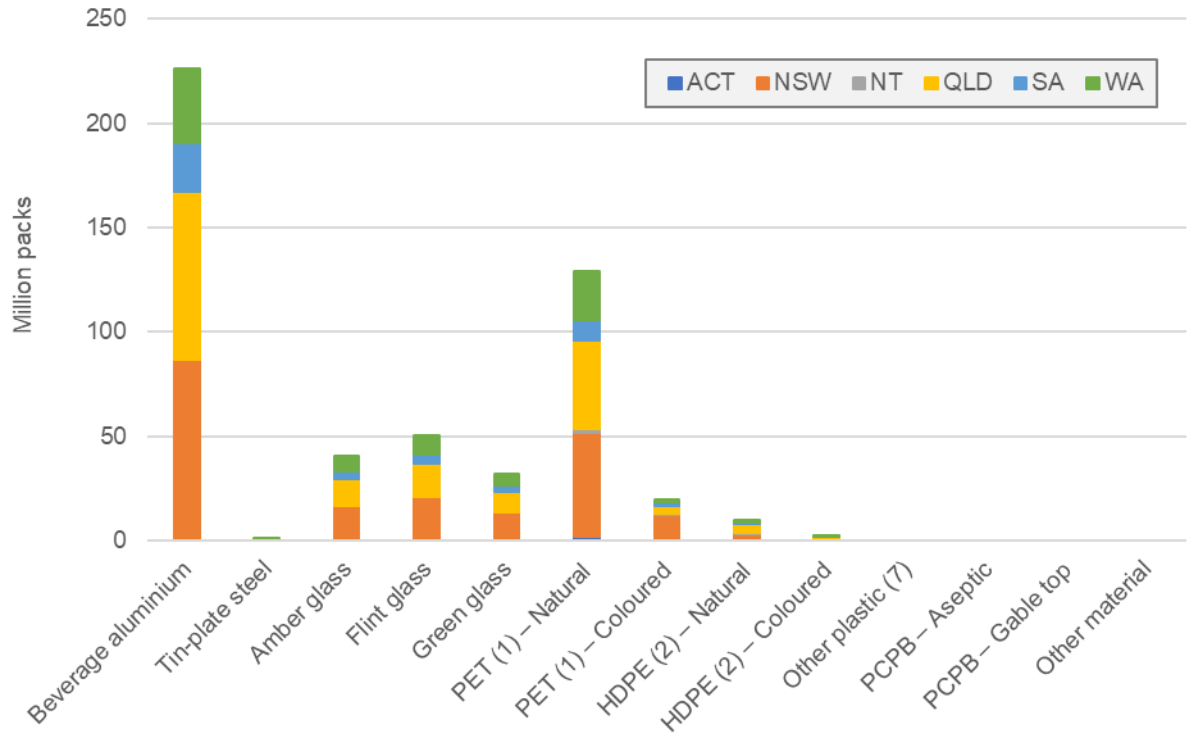

Figure E-8 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Unredeemed recovery via MRFs and other pathways (million packs).

E.2.4 Total recovery via all collection routes

Table E-9 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Total recovery via all collection routes (tonnes).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	680	14,500	710	19,930	4,740	5,680	46,240
Tin-plate steel	0	90	0	40	0	40	170
Amber glass	2,200	46,650	1,640	51,240	10,680	19,140	131,550
Flint glass	2,730	57,960	2,040	63,660	12,970	23,780	163,140
Green glass	1,730	36,750	1,290	40,370	8,360	15,080	103,590
PET (1) – Natural	460	12,120	410	14,670	3,210	5,210	36,080
PET (1) – Coloured	110	2,840	100	1,280	750	300	5,370
HDPE (2) – Natural	50	780	30	1,300	240	340	2,730
HDPE (2) – Coloured	10	170	10	280	50	70	600
Other plastic (7)	0	0	0	0	0	0	0
PCPB – Aseptic	20	350	30	530	520	250	1,690
PCPB – Gable top	0	90	10	130	70	60	360
Other material	0	0	0	0	0	0	10
Total	**8,000**	**172,290**	**6,260**	**193,440**	**41,580**	**69,960**	**491,530**
Recovery (%)[1]	**88.3%**	**78.1%**	**90.5%**	**79.5%**	**85.9%**	**76.7%**	**79.3%**

1. Recovery % is relative to CD eligible packaging POM.

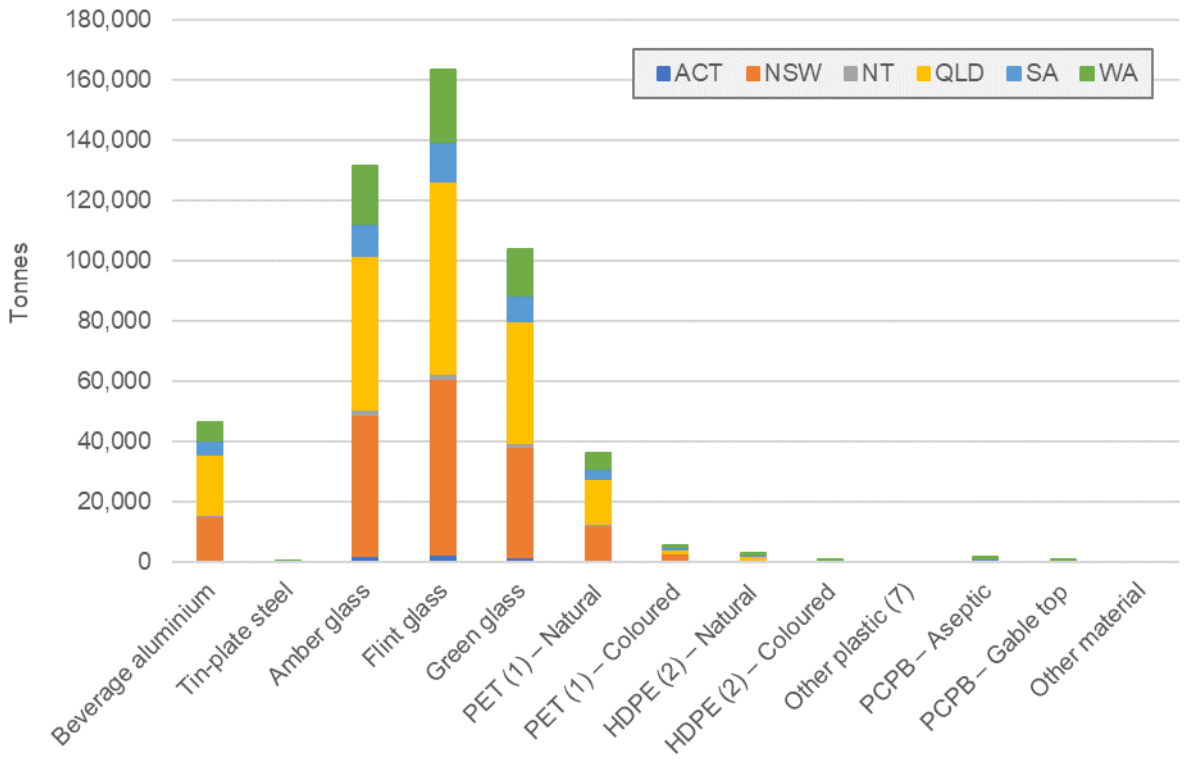

Figure E-9 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Total recovery via all collection routes (tonnes).

Table E-10 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Total recovery via all collection routes (million packs).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)
Beverage aluminium	50.407	1,073.723	52.393	967.654	347.207	402.628	2,894.011
Tin-plate steel	0.076	1.876	0.086	0.924	0.000	0.560	3.521
Amber glass	10.700	227.219	7.992	179.416	53.057	97.540	575.926
Flint glass	13.294	282.303	9.930	222.911	65.920	121.186	715.544
Green glass	8.430	179.021	6.297	141.358	41.803	76.850	453.760
PET (1) – Natural	21.690	566.176	19.115	421.662	121.412	240.269	1,390.324
PET (1) – Coloured	5.088	132.807	4.484	36.666	28.479	13.688	221.212
HDPE (2) – Natural	1.788	26.786	0.915	36.738	12.375	10.503	89.104
HDPE (2) – Coloured	0.392	5.880	0.201	8.064	2.716	2.306	19.559
Other plastic (7)	0.000	0.020	0.000	0.000	0.000	0.000	0.020
PCPB – Aseptic	1.257	24.535	2.219	25.302	21.507	14.170	88.991
PCPB – Gable top	0.314	6.134	0.555	6.326	5.717	3.542	22.588
Other material	0.000	0.119	0.000	0.000	0.000	0.107	0.226
Total	**113.438**	**2,526.598**	**104.187**	**2,047.023**	**700.192**	**983.347**	**6,474.786**
Recovery (%)[1]	**76.5%**	**70.8%**	**76.5%**	**68.6%**	**82.9%**	**66.7%**	**70.7%**

1. Recovery % is relative to CD eligible packaging POM.

Note: These recovery rates may differ from published figures available elsewhere as they included estimates for non-redeemed CD eligible packaging that is collected through MRFs.

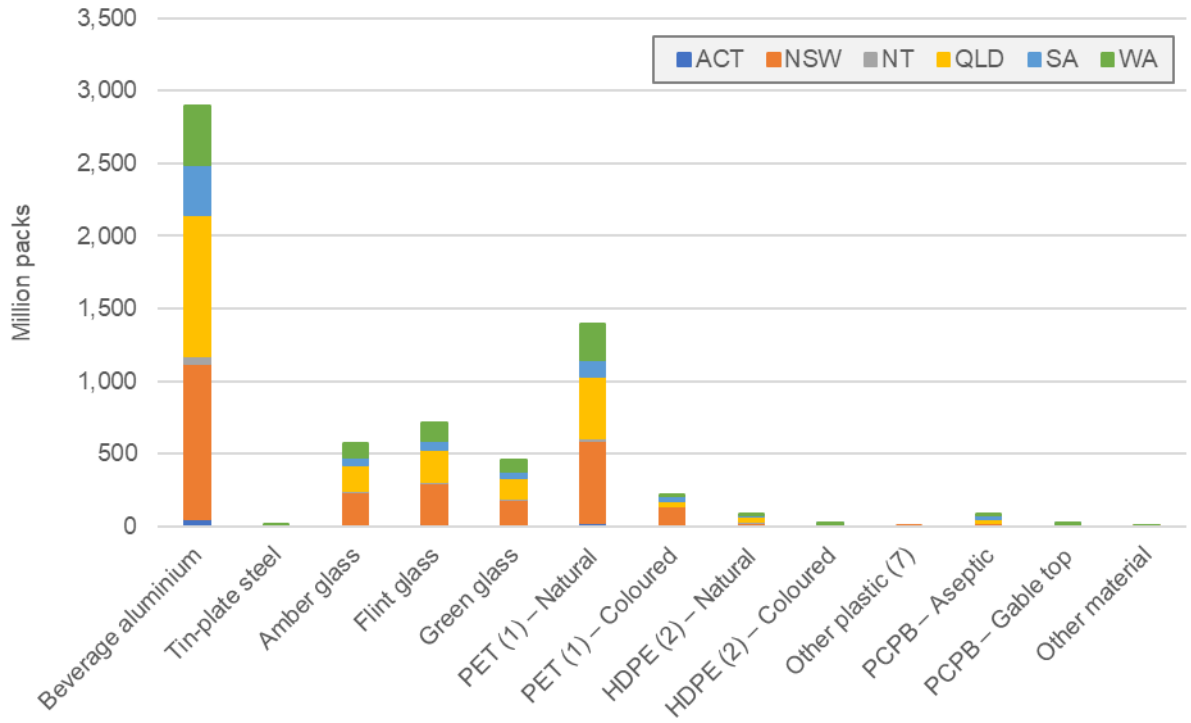

Figure E-10 – CD eligible packaging recovery in 2021–22 by material type and jurisdiction – Total recovery via all collection routes (million packs).

E.2.5 Reprocessing destination

Table E-11 – CD eligible packaging reprocessing destination in 2021–22 by material type (tonnes).

Material type	Local	Overseas	Unknown	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	5,920	40,200	120	46,240
Tin-plate steel	50	130	0	170
Amber glass	131,550	0	0	131,550
Flint glass	163,140	0	0	163,140
Green glass	103,590	0	0	103,590
PET (1) – Natural	28,130	7,950	0	36,080
PET (1) – Coloured	4,850	520	0	5,370
HDPE (2) – Natural	2,490	200	40	2,730
HDPE (2) – Coloured	550	40	10	600
Other plastic (7)	0	0	0	0
PCPB – Aseptic	1,190	480	20	1,690
PCPB – Gable top	250	100	0	360
Other material	10	0	0	10
Total	**441,710**	**49,630**	**190**	**491,530**

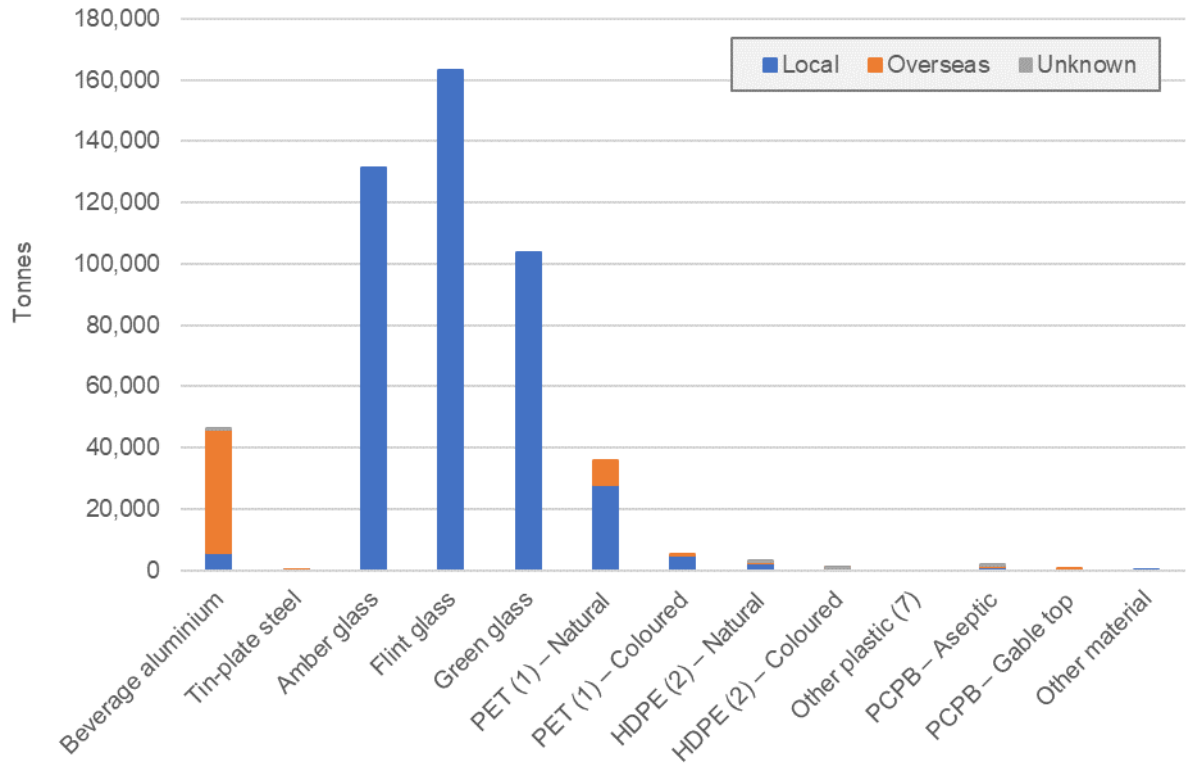

Figure E-11 – CD eligible packaging reprocessing destination in 2021–22 by material type (tonnes).

E.3 CD eligible packaging to landfill

The following tables provide estimates of CD eligible packaging disposed to landfill. These quantities are almost entirely based on estimates of CD eligible packaging disposal to landfill at the household level, and public place disposal where recycling systems are not available.

Table E-12 – CD eligible packaging to landfill in 2021–22 by material type and jurisdiction (tonnes).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Beverage aluminium	140	4,970	160	7,830	580	2,640	16,320
Tin-plate steel	10	180	0	80	0	70	340
Amber glass	160	10,960	20	9,040	1,430	4,500	26,120
Flint glass	200	13,620	30	11,230	1,740	5,590	32,410
Green glass	130	8,630	20	7,120	1,120	3,540	20,570
PET (1) – Natural	230	5,640	260	9,950	1,050	3,220	20,350
PET (1) – Coloured	50	1,320	60	860	250	180	2,730
HDPE (2) – Natural	20	740	50	1,200	120	330	2,460
HDPE (2) – Coloured	10	160	10	260	30	70	540
Other plastic (7)	0	10	0	0	0	0	10
PCPB – Aseptic	90	1,710	30	1,780	450	880	4,950
PCPB – Gable top	20	430	10	450	60	220	1,180
Other material	10	20	0	0	0	0	40
Total	**1,060**	**48,390**	**650**	**49,810**	**6,820**	**21,260**	**128,010**

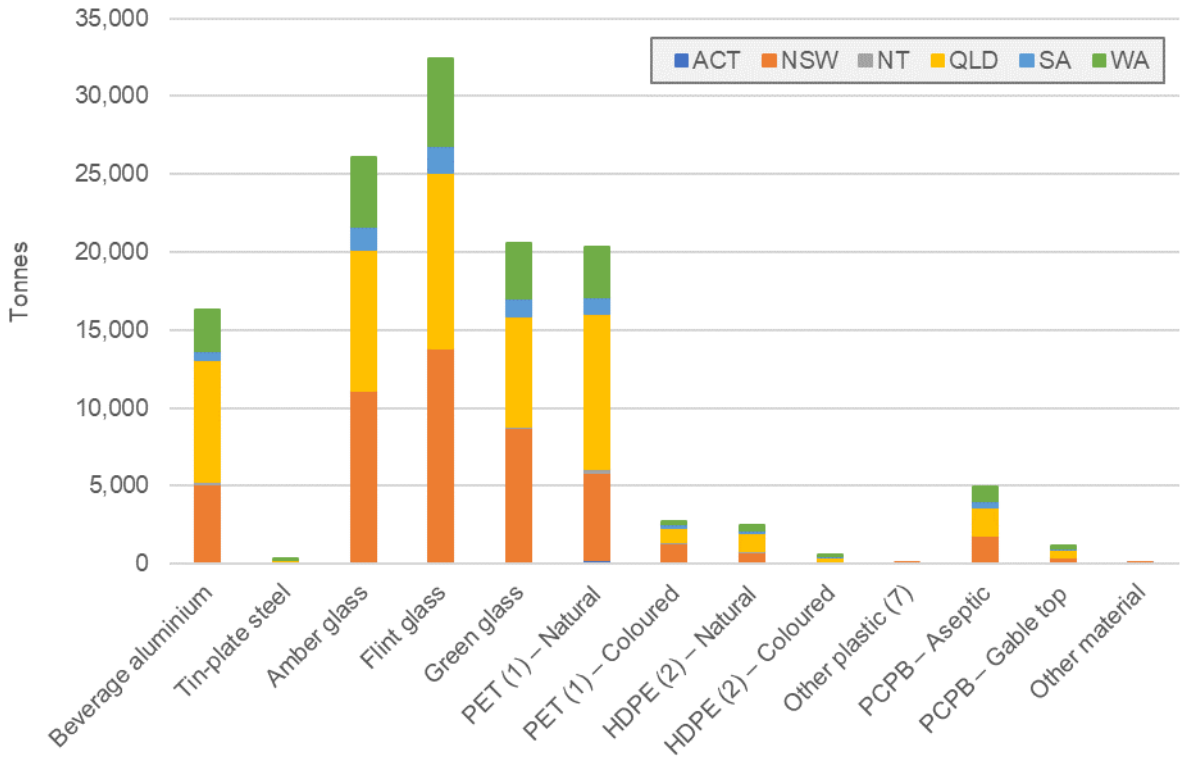

Figure E-12 – CD eligible packaging to landfill in 2021–22 by material type and jurisdiction (tonnes).

Table E-13 – CD eligible packaging to landfill in 2021–22 by material type and jurisdiction (million packs).

Material type	ACT	NSW	NT	QLD	SA	WA	Total
	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)	(million packs)
Beverage aluminium	10.259	368.178	11.958	380.053	42.625	186.836	999.909
Tin-plate steel	0.154	3.808	0.070	1.877	0.000	1.136	7.045
Amber glass	0.795	53.378	0.122	31.662	7.098	22.915	115.969
Flint glass	0.988	66.319	0.151	39.337	8.819	28.470	144.083
Green glass	0.626	42.056	0.096	24.946	5.593	18.054	91.370
PET (1) – Natural	10.573	263.784	11.977	285.825	39.770	148.751	760.681
PET (1) – Coloured	2.480	61.875	2.809	24.854	9.329	8.474	109.822
HDPE (2) – Natural	0.797	25.279	1.655	34.048	6.210	10.282	78.272
HDPE (2) – Coloured	0.175	5.549	0.363	7.474	1.363	2.257	17.182
Other plastic (7)	0.042	0.751	0.000	0.000	0.000	0.000	0.793
PCPB – Aseptic	6.152	120.549	2.205	85.188	18.953	50.216	283.262
PCPB – Gable top	1.538	30.137	0.551	21.297	5.036	12.554	71.113
Other material	0.306	1.104	0.000	0.000	0.000	0.164	1.574
Total	**34.884**	**1,042.766**	**31.958**	**936.562**	**144.796**	**490.109**	**2,681.075**

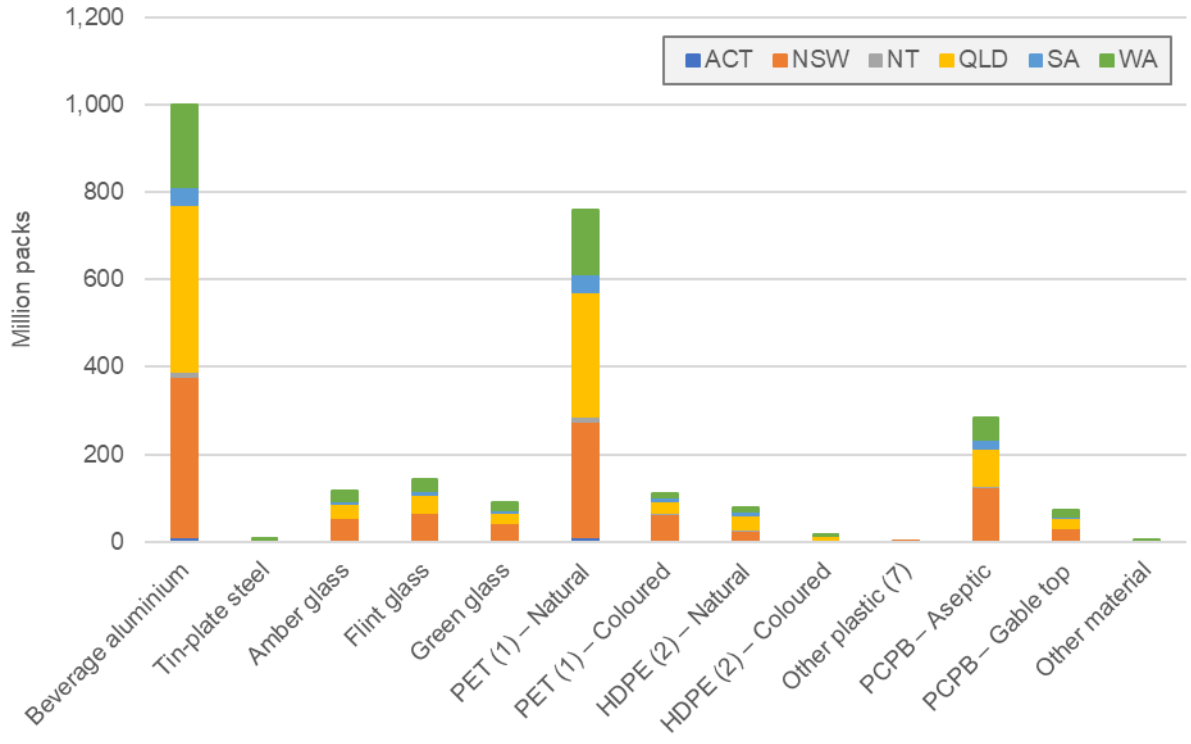

Figure E-13 – CD eligible packaging to landfill in 2021–22 by material type and jurisdiction (million packs).

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