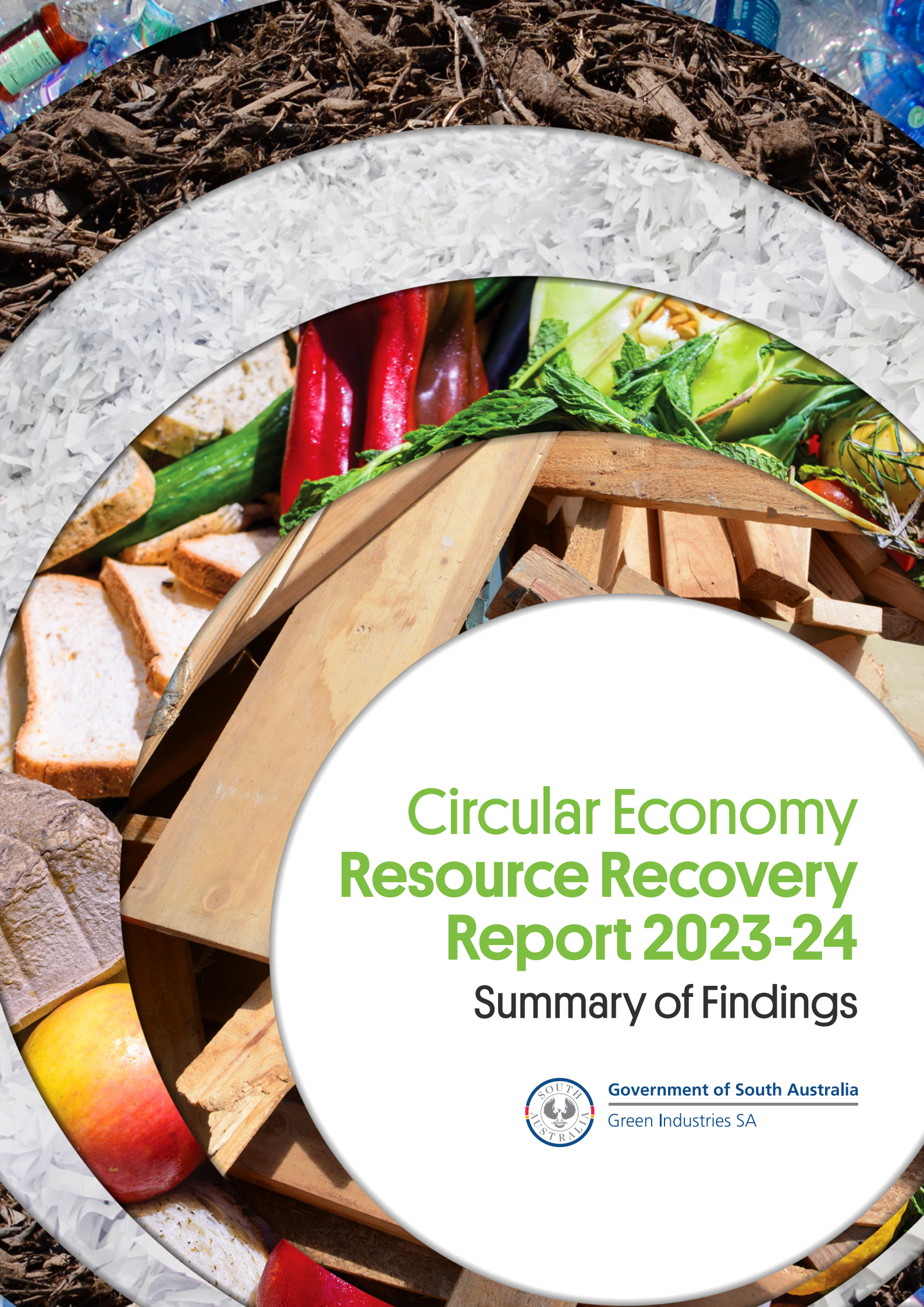


Circular Economy Resource Recovery Report 2023-24

Summary of Findings

Government of South Australia
Green Industries SA

Disclaimer

This report has been prepared by Green Industries SA based on the results of a survey of the waste recovery sector by Blue Environment Pty Ltd in accordance with the terms and conditions of appointment dated 10 October 2024, and is based on the assumptions and exclusions set out in the scope of work. Information in this document is current as of 14 April 2025. While all professional care has been undertaken in preparing this report, GISA and Blue Environment Pty Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Blue Environment Pty Ltd
ABN 78 118 663 997
Suite 209, 838 Collins St, Docklands Vic 3008

Email: blue@blueenvironment.com.au
Web: www.blueenvironment.com.au
Phone: 03 9081 0440

Green Industries SA acknowledges and respects the Traditional Custodians whose ancestral lands we live and work upon, and pays respect to their Elders past, present and emerging.

We acknowledge and respect their deep spiritual connections, and the relationship that Aboriginal and Torres Strait Islander people have to Country.

We extend our respect to all Aboriginal and Torres Strait Islander peoples and their nations in South Australia, and across Australia.

Learn about our commitment to Reconciliation

Contents

Abbreviations and glossary

Alternative fuels and raw materials	Non-traditional fuels and raw materials that are co-processed in cement kilns or other thermal facilities, potentially including refuse derived fuels, solid recovered fuels, spent catalysts and others
Biosolids	Waste organic solids derived from biological wastewater treatment plants
C&D	Construction and demolition
C&I	Commercial and industrial
CDL	Container deposit legislation
CERRR	Circular Economy Resource Recovery Report
Circular economy	Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste and pollution out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: design out waste and pollution; keep products and materials in use (ideally at their highest and best value); and regenerate natural systems.
CO_2-e	Carbon dioxide equivalent
Diversion	Sending waste for recycling or energy recovery instead of landfill.
Energy recovery	Processes through which wastes are collected, sorted and processed to recover energy in usable form, for example process heat, steam or in electricity generation.
EPA	Environment Protection Authority
GHG	Greenhouse gas
GSP	Gross state product
HDPE	High density polyethylene
kg	Kilogram
kt	Kilotonne
LDPE	Low density polyethylene
LHV	Lower heating value
MFA	Material flow analysis
ML	Megalitre
MSW	Municipal solid waste
PET	Polyethylene terephthalate
PP	Polypropylene
PS	Polystyrene
PS-E	Expanded polystyrene
PVC	Polyvinyl chloride

Recovered materials	Waste materials separated, sorted or processed for the purposes of reuse, recycling or energy recovery
Recycling	Material that has been reprocessed from recovered (reclaimed) material by means of a manufacturing process and made into a final product or into a component for incorporation into a product. The term recycling is used to cover a wide range of activities, including collection, sorting, reprocessing, and manufacture into new products. Waste materials that are reclaimed and reutilised within the same manufacturing processes that generated it as a matter of course to the efficient operation of the site (i.e., process scrap) are not defined as recycling for the purpose of this study. Recycling does not include waste materials that have been received at a recycling facility but have not been processed.
Reprocessing	Processing of recovered materials to make raw materials for use in making new products or direct use. May also be called 'secondary processing'
Resource recovery	Activities through which wastes are collected, sorted, processed (including through composting), and/or converted into raw materials for use in a production system. For data reporting purposes, the quantity of waste allocated to the fate 'resource recovery' is the sum of the quantities allocated to waste reuse, recycling and energy recovery.
Solid waste	Waste materials ranging from municipal garbage to industrial waste, but excluding gaseous, liquid, hazardous, clinical, and intractable wastes
The survey	The Circular Economy Resource Recovery Survey 2023-24
TJ	Terajoule
Waste reuse	Reuse of a product or material that has entered a waste and resource recovery facility (for example, the sale of goods from a reuse shop).

Summary

Green Industries SA measures annual recycling and disposal activity in South Australia (SA) to assess how the state is performing on waste management and recycling. The findings are used to track progress against South Australia's state waste targets. This report summarises the results for the 2023-24 financial year.

Summary of 2023-24 results

In SA the resource recovery sector contributes
$783 million
to the state economy

An estimated
5,380,000 tonnes
of wasted material was generated in SA

Of recovered materials
92.0%
was reprocessed in SA

4,470,000 tonnes
of this material was recovered for further use

903,000 tonnes
was sent to landfill

SA achieved a recovery rate of all materials
83.2%

Energy was recovered from
159,000 tonnes
of waste

Local government collected
693,000 tonnes
of kerbside waste

Environmental savings are estimated to be
1,760,000 tonnes
Greenhouse gas equivalents

20,300 Terajoules
Energy savings

SA local government achieved
49.6%
recovery rate

7,760 Megalitres
Water savings

Metropolitan councils achieved
52.2%
recovery rate

Table S1 Summary of resource recovery, landfill disposal and waste generation, SA, 2023-24

	Standard reporting materials	Separately reported materials	Total
Resource recovery (million tonnes)	3.39	1.08	**4.47**
Landfill disposal (million tonnes)	0.87	0.03	**0.90**
Waste generation (million tonnes)	4.26	1.11	**5.38**
Recovery rate (%)	79%	97%	**83%**

Recovery by material

Table S2 Summary of resource recovery by material type, SA, 2023-24

Recovered material	Tonnes	Trend (compared to previous year)
Masonry (inc. clays, fines, rubble and soil)	2,270,000	▼
Metals	437,000	▼
Organics	1,400,000	▲
Cardboard and paper	223,000	▲
Plastics	42,000	▲
Glass	74,000	◆
Other Materials	37,000	▲

Performance against state waste targets

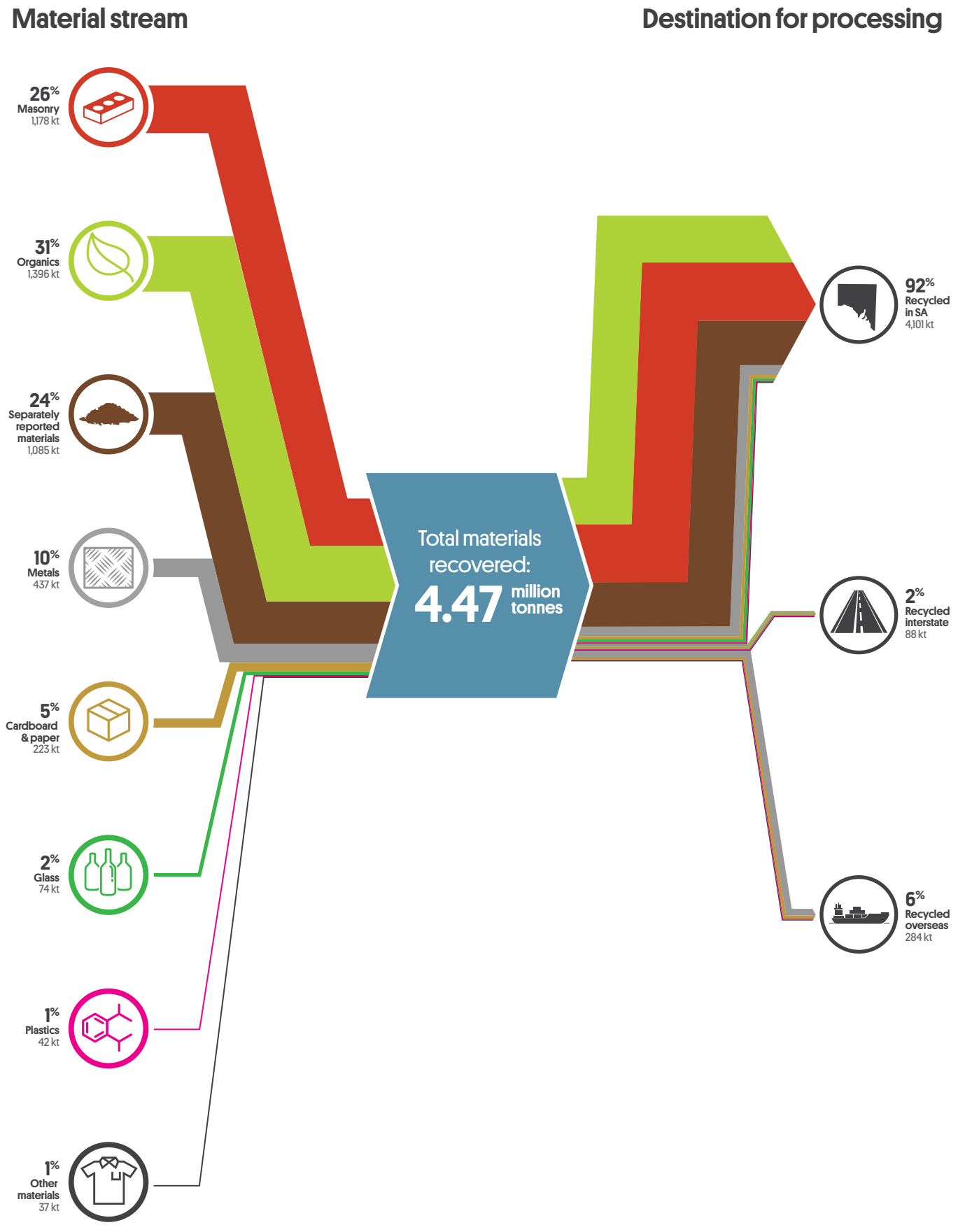
In 2020, Green Industries SA released *South Australia's Waste Strategy 2020-25*. The strategy sets waste recovery[1] and reduction targets which are guided by an overall target of zero avoidable waste to landfill by 2030. Zero avoidable waste to landfill equates to the diversion of all waste from landfill where it is technologically, environmentally and economically practicable to do so. 'Unavoidable' waste therefore refers to wastes for which no other current treatment is available including (but not limited to) asbestos, quarantine waste and some hazardous waste. A summary of progress so far based on 2023-24 data is provided in Table S2. The 2025 recovery target for metropolitan C&D has been exceeded by one percentage point but MSW and C&I are still lagging their targets.

Table S3 Summary of state waste targets and progress on them

Topic	Target	Progress
Landfill diversion	Zero avoidable waste to landfill by 2030	SA disposed about 903,000 t of waste to landfill in 2023-24 a decrease from 914,000 t in 2022-23
Waste generation	5% reduction in waste generation per capita from a 2020 baseline	Waste generation per capita showed 4% increase in 2023-24 compared to 2019-20.
Metropolitan recovery	Recovery rates by 2025: - MSW 75% - C&I 90% - C&D 95%	Recovery rates achieved by metropolitan SA in 2023-24: - MSW 67% - C&I 78% - C&D 96%

1 *South Australia's Waste Strategy 2020-25* refers to 'diversion' targets used synonymously with 'recovery'. In the CERRR, this is consistently referred to as 'recovery' to mean waste materials sorted, separated or processed for reuse, recycling or energy recovery, while 'diversion' refers to material to sending material to an alternative facility to landfill.

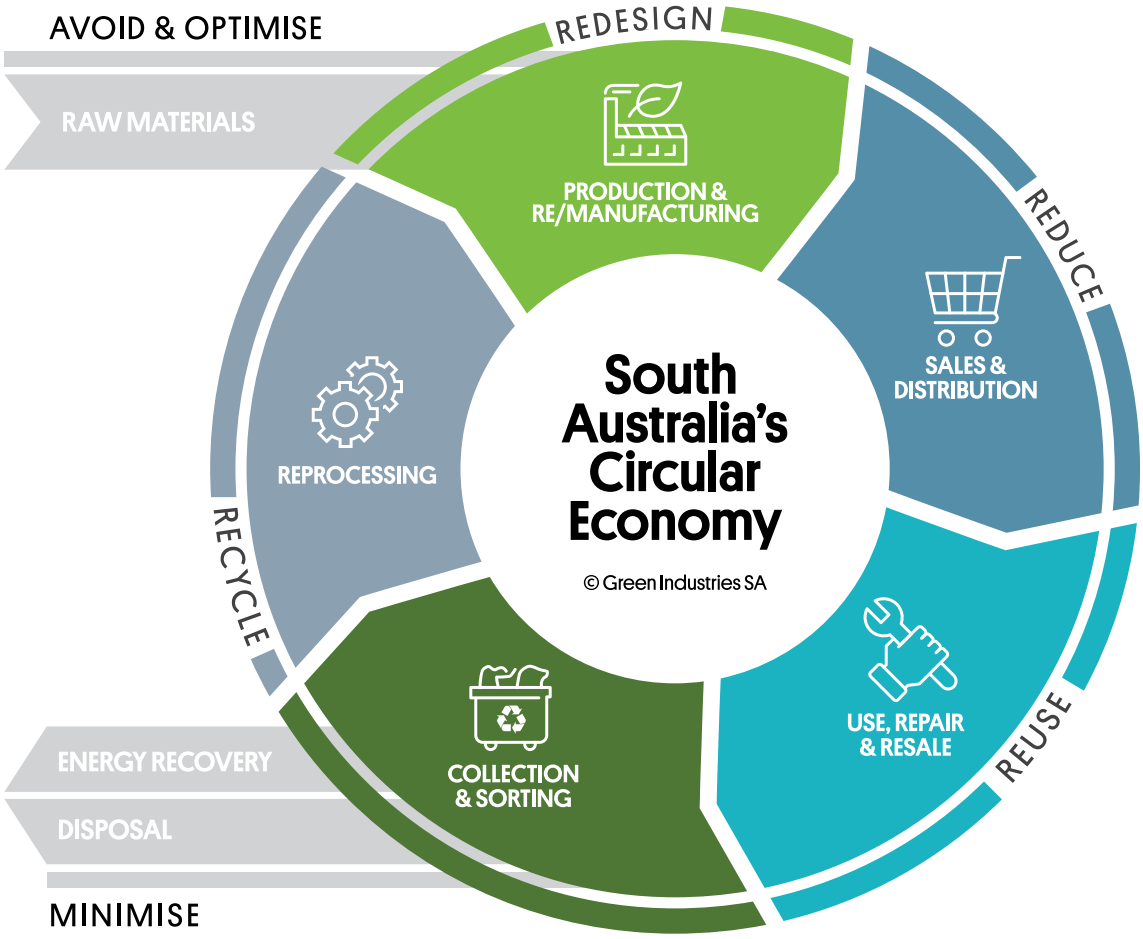
Figure S1 Resource recovery, including energy recovery, SA, 2023-24, by material and destination, not including e-waste



1 Introduction

A circular economy utilises resources to their fullest potential. Waste avoidance, reuse and recycling are maximised while raw material extraction and landfilling are minimised. South Australia (SA) continues to lead the way on resource recovery performance as it pushes towards a circular economy. This report provides a summary of the status of SA's resource recovery sector, including data on reuse, recycling and energy recovery, as well as the environmental, social and financial benefits that the sector provides. The findings are used to assess progress on the targets set out in *South Australia's Waste Strategy 2020-25* (Green Industries SA 2020), which defines targets for waste reduction and waste recovery[2] from landfill to 2025. Table 1 (overleaf) summarises SA's waste targets.

Figure 1 South Australia's circular economy



Source: South Australia's Waste Strategy 2020-2025 (Green Industries SA 2020)

2 In the CERRR 'diversion' refers to material to sending material to an alternative facility to landfill.

Table 1 Summary of SA's waste targets

Overall targets				
2025	Per capita waste generation 5% reduction from a 2020 baseline			
2030	Zero avoidable waste to landfill by 2030			
Metropolitan waste targets				
	% diversion household bin system	% recovery all MSW[3]	% recovery C&I	% recovery C&D
2023	60%	65%	85%	90%
2025	70%	75%	90%	95%
Non-metropolitan waste targets (all source streams)				
2020	Maximise recovery to the extent practically and economically achievable			
2023	Regional Waste Management Plans are in place for all South Australian regional local government areas and/or regional city clusters and set regionally appropriate and progressive waste recovery targets			

The *Circular Economy Resource Recovery Survey 2023-24* (the survey) asked recyclers, reprocessors, the reuse sector and the energy recovery industry in SA about their operations in 2023-24. Data were sought on tonnes of materials recovered, including information on:

- source stream – municipal solid waste (MSW), commercial and industrial (C&I) waste, or construction and demolition (C&D) waste
- geographical origin – metropolitan or regional SA
- final reprocessing location – in SA, interstate or overseas
- value of recovered materials
- proportion of material derived from post-consumer packaging
- the type of productive use made of the recovered material.

3 Quantities arising from total MSW material comprising household bin systems, hard waste services, street sweepings, council-operated parks and gardens, public place locations, waste collected at drop-off facilities, and council-operated commercial services.

2 Circular economy resource recovery statistics

2.1 Resource recovery and landfill disposal

Overview

SA recovered about 4.47 million tonnes of material in 2023-24, a 5% increase compared to 2022-23. Disposal to landfill decreased this year; about 903,000 tonnes of waste was landfilled in 2023-24 compared to 914,000 tonnes in 2022-23. Overall waste generation was 5.38 million tonnes, an increase from 5.16 million tonnes in the previous year. SA achieved a recovery rate of 83.2% in the 2023-24 financial year, slightly higher than the 2022-23 rate of 82.3%.

Table 2 Annual SA resource recovery and landfill diversion performance for 2023-24 and previous years

Parameter	2003-04	2022-23	2023-24	Change 03-04 to 23-24
Resource recovery ('000 tonnes)				
Standard reporting materials	1,880	3,180	3,390	80%
Separately reported materials	162	1,060	1,080	570%
Total	**2,040**	**4,240**	**4,470**	**119%**
Landfill disposal ('000 tonnes)				
Standard reporting materials	1,258	886	875	-30%
Separately reported materials	20.0	28.0	28.0	40%
Total	**1,280**	**914**	**903**	**-29%**
Waste generation ('000 tonnes)				
Standard reporting materials	3,140	4,070	4,260	36%
Separately reported materials	182	1,090	1,110	512%
Total	**3,320**	**5,160**	**5,380**	**62%**
Recovery rate (%)				
Standard reporting materials	59.9%	78.2%	79.5%	20%
Total	**61.5%**	**82.3%**	**83.2%**	**22%**
SA population (persons)	**1,530,000**	**1,850,000**	**1,880,000**	**21%**
Per capita recovery (kg/person/yr)				
Standard reporting materials	1.23	1.72	1.83	49%
Total	**1.33**	**2.29**	**2.41**	**82%**
Per capita disposal (kg/person/yr)				
Standard reporting materials	0.82	0.48	0.47	-42%
Total	**0.83**	**0.49**	**0.49**	**-41%**
Per capita waste generation (kg/person/yr)				
Standard reporting materials	2.05	2.20	2.30	12%
Total	**2.16**	**2.79**	**2.90**	**34%**
SA Gross State Product (GSP) ($ millions)	**$91,000**	**$134,000**	**$142,000**	**56%**
Performance metrics per GSP ('000 t/$ million GSP)				
Total recovery	22.4	31.6	31.5	40%
Total disposal	14.0	6.81	6.35	-55%
Total waste generation	**36.5**	**38.4**	**37.8**	**4%**

Note: The change in recovery rates over time shows change in percentage points, rather than a rate of change.

Progress since the first survey year (2003-04)

Since 2003-04, waste generation has increased, but the trend shows increasing recovery and declining disposal over time. The recovery rate has been consistently around 82-83% for the past five years.

Figure 2 Trend in resource recovery and landfill disposal in SA since 2003-04

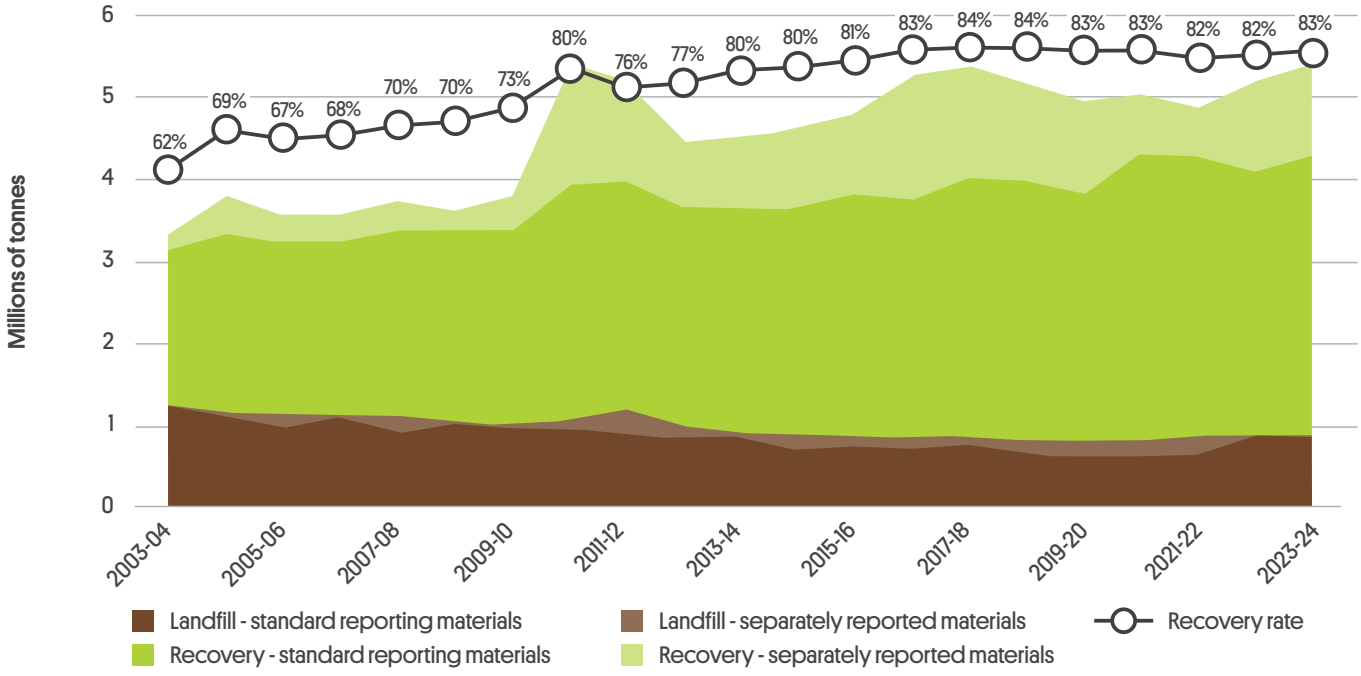


Figure 3 Trend in resource recovery in SA since 2003-04 by material category, including tonnes per million dollars of gross state product (GSP)

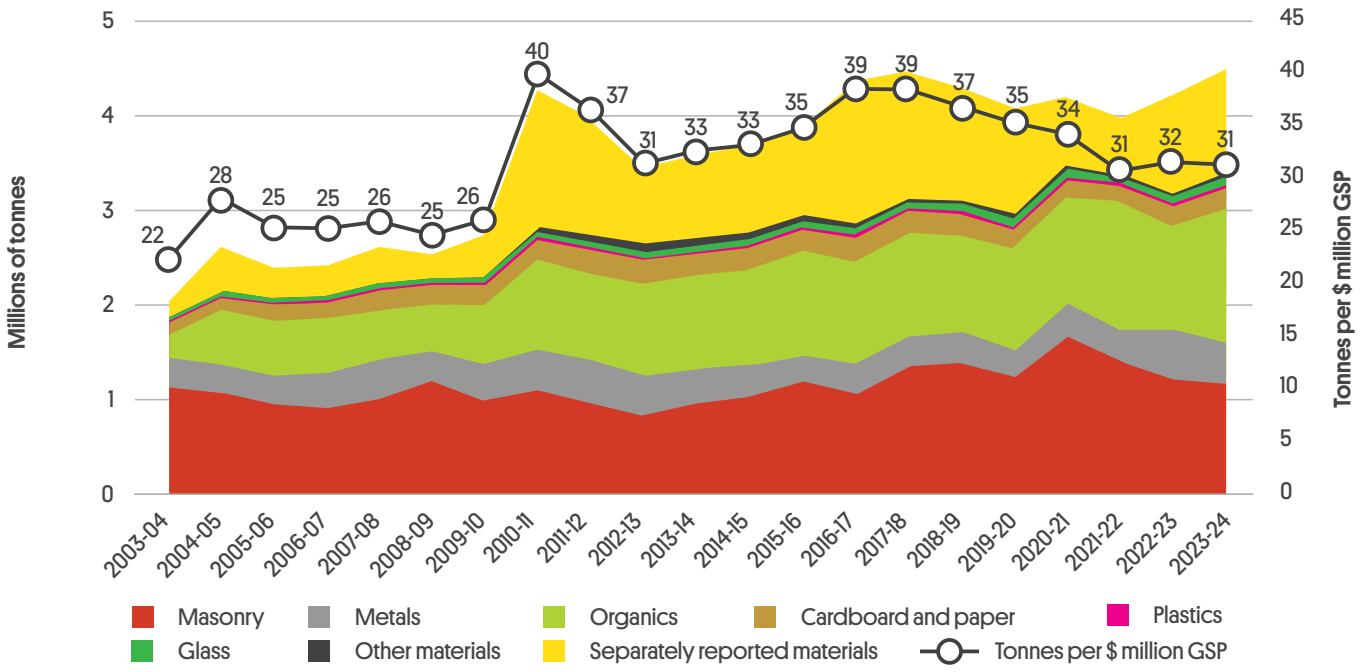
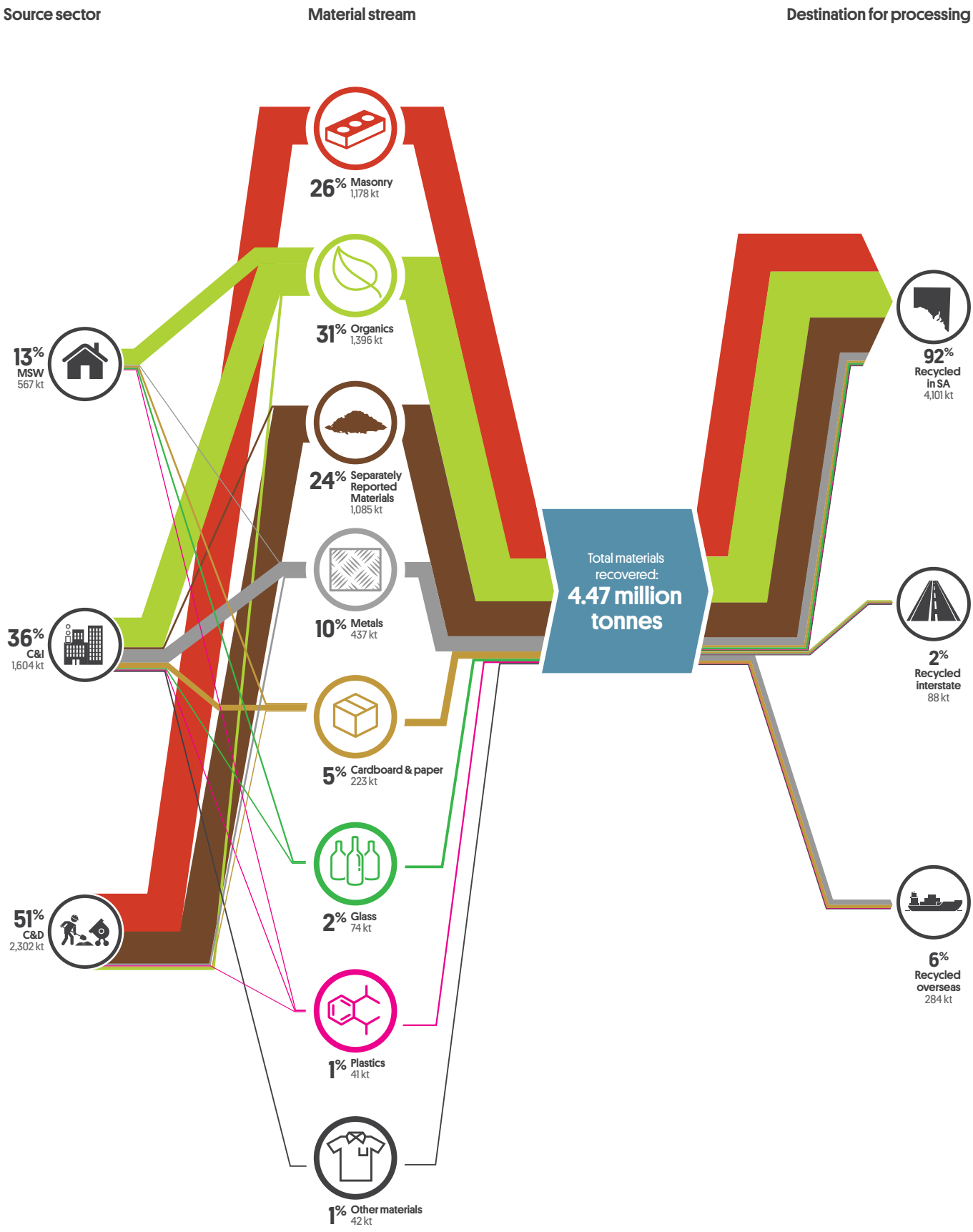


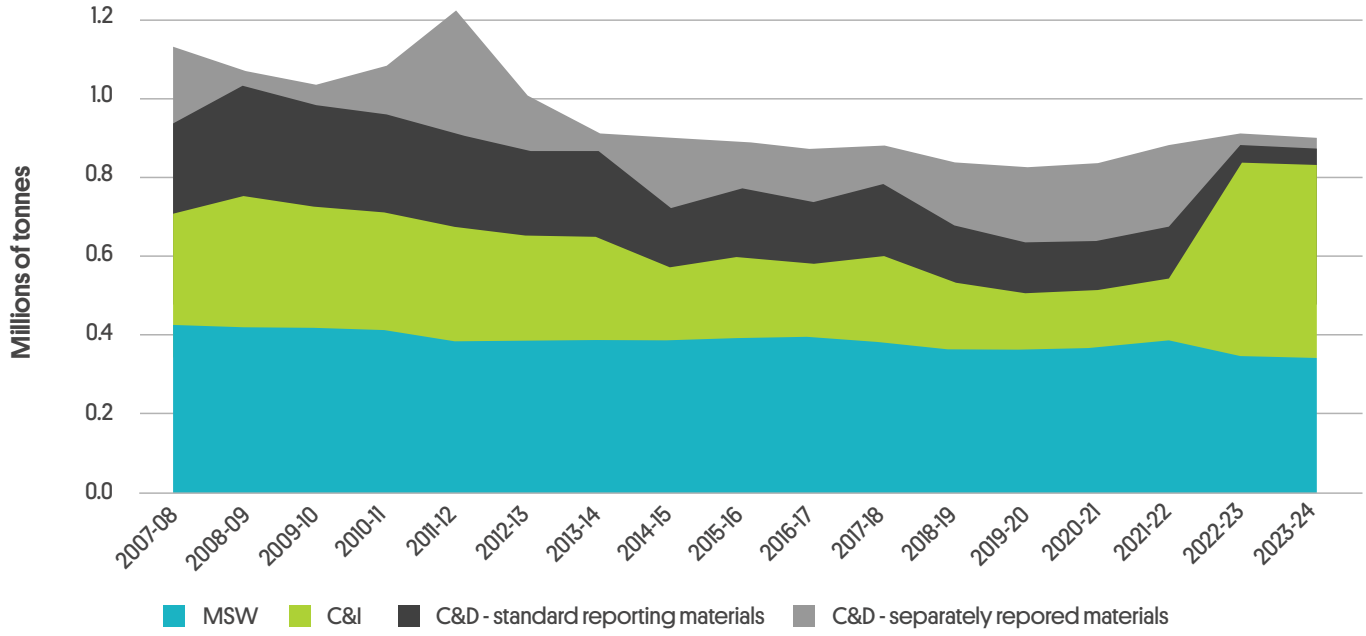
Figure 4 Resource recovery, including energy recovery, SA, 2023-24, by material, source stream and destination, not including e-waste



Landfill disposal

SA disposed about 903,000 tonnes of waste to landfill in 2023-24, a decrease from the 914,000 tonnes landfilled in 2022-23. Figure 5 displays trends for disposal by source stream[4], and shows that most landfill waste is from the C&I stream.

Figure 5 Landfill disposal in SA since 2007-08 by source stream



Source streams

The source stream origin for SA waste and recovered materials in 2023-24 is shown in Table 3, Figure 6 and Figure 7. Recovered materials mostly comprised C&D waste (51%), C&I (36%) and MSW (13%).

The estimated recovery rate for C&D was the highest in 2023-24 at 97%, followed by C&I at 77% then MSW at 62%.

Table 3 South Australia recovery and landfill disposal by source stream in 2023-24[5]

	Recovery		Landfill disposal		Recovery rate
Sector	'000 tonnes	% of total	'000 tonnes	% of total	
MSW	567	13%	343	38%	62%
C&I	1,604	36%	488	54%	77%
C&D	2,300	51%	72.2	8%	97%
Total	**4,470**	**-**	**903**	**-**	**83%**

4 The partitioning method for source streams of waste to landfill was changed in 2022-23 based on an audit of several C&I transfer station in 2022 and SA EPA mass balance reporting data.

5 Recovery rates by source stream listed in Table 4 include material from metropolitan and regional SA. In contrast, only metropolitan recovery is included in Table S2 and Table 12.

Figure 6 Resource recovery in SA since 2007-08 by source stream

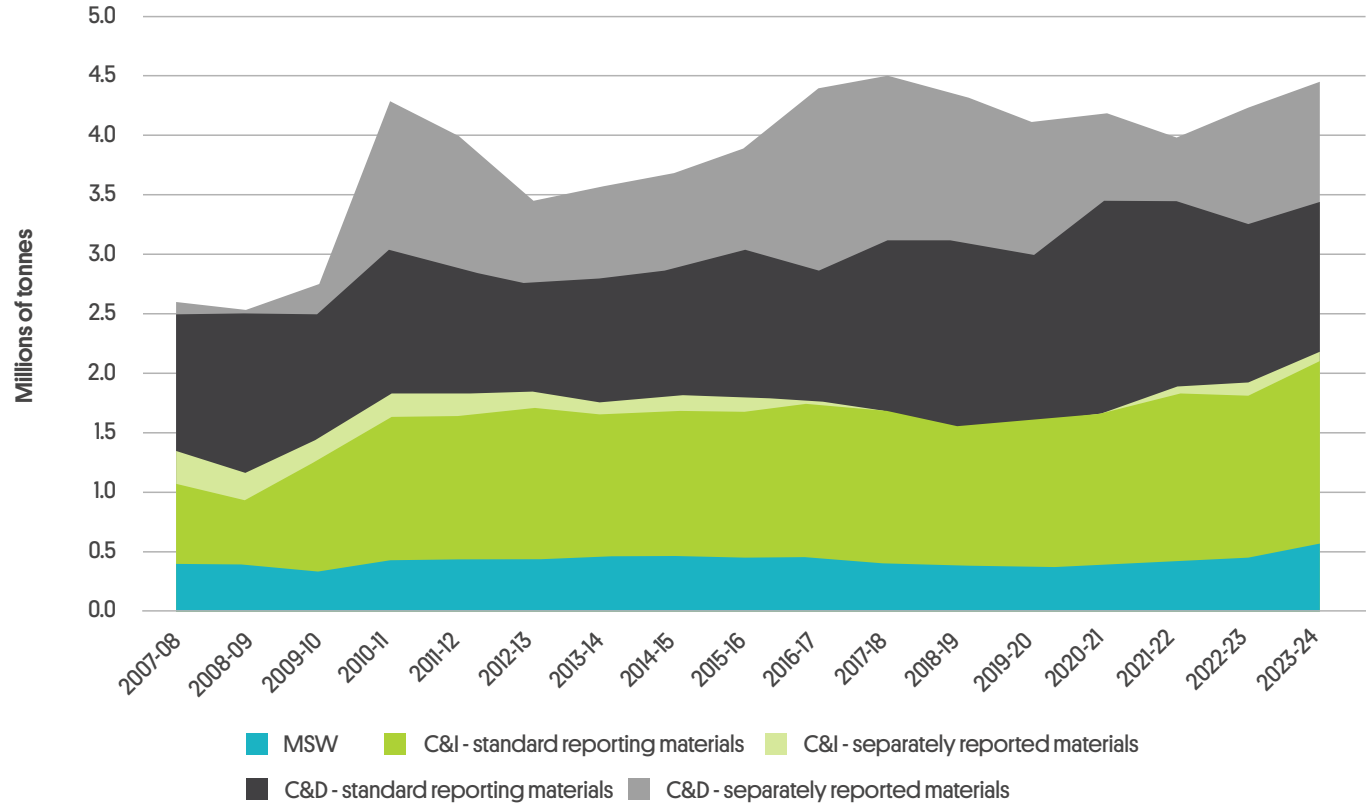
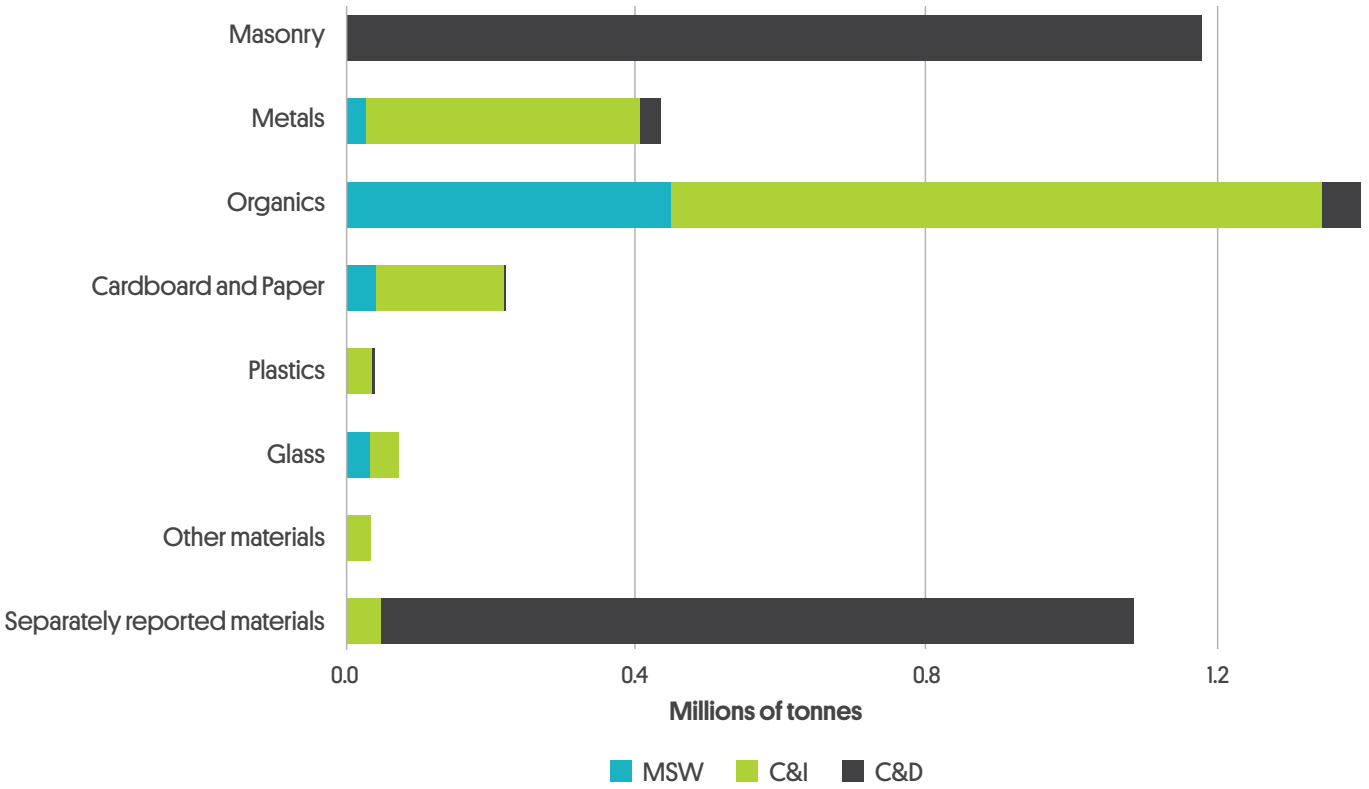


Figure 7 Source stream of recovered materials by material category, SA, 2023-24



Geographical origin

Metro SA contributed about 3,830,000 tonnes (86%) of the state's total recovered materials in 2023-24, and 636,000 tonnes (70%) of total disposed waste.

Regional recovery fell to 645,000 tonnes while regional disposal rose to 267,000 tonnes, resulting in a decreased regional recovery rate of 71%. A significant portion of this decrease is due to less waste fill recovered from regional areas in 2023-24.

Table 4 SA recovery and landfill disposal by geographical origin in 2023-24

	Recovery		Landfill disposal		Recovery rate
Sector	'000 tonnes	% of total	'000 tonnes	% of total	Percentage
Metro	3,830	86%	636	70%	86%
Regional	645	14%	267	30%	71%
Total	**4,470**	**-**	**903**	**-**	**83%**

Destination for recovered materials

In 2023-24, about 4,100,000 tonnes (92%) of recovered materials were reprocessed in SA, 2% of materials were reported as reprocessed interstate and 6% reprocessed overseas.

Figure 8 Destination for recovered materials

All masonry, organics and separately reported materials (clay, fines, rubble and soil) were reprocessed locally.

A high proportion of glass (97%), scrap plastic (69%), 'other materials' (61%) and scrap metal (56%) were reported as reprocessed in SA.

Energy recovery

Table 5 shows total resource recovery of SA materials in 2023-24, split between waste reuse, recycling and energy recovery. Energy recovery is defined as processes through which wastes are collected, sorted and processed to recover energy in usable form, for example process heat, steam or in electricity generation. Waste reuse is the reuse without processing of a product or material that has entered a waste and resource recovery facility. The tonnages allocated to this fate are all waste soils.

About 159,000 t of SA materials were estimated as recovered for their energy value in 2023-24.

Table 5 Material and energy recovery, SA, 2023-24

Recovery type	'000 tonnes	Contribution to recovery rate (%)
Material recovery	4,120	92%
Energy recovery	159	4%
Waste reuse	192	4%
Total (resource recovery)	**4,470**	-

Market value of resource recovery

The total value of resource recovery in SA in 2022-23 is estimated at about $783 million.

The top 3 contributors were:

- Scrap metals ($360 million)
- Recovered organics ($399 million)
- Cardboard and paper ($35 million).

2.2 Performance against state targets

In 2020, Green Industries SA released *South Australia's Waste Strategy 2020-25*. The strategy defines waste recovery and reduction targets to 2025, which are guided by an overall target of zero avoidable waste to landfill by 2030.[6] This section details SA's progress in achieving these targets.

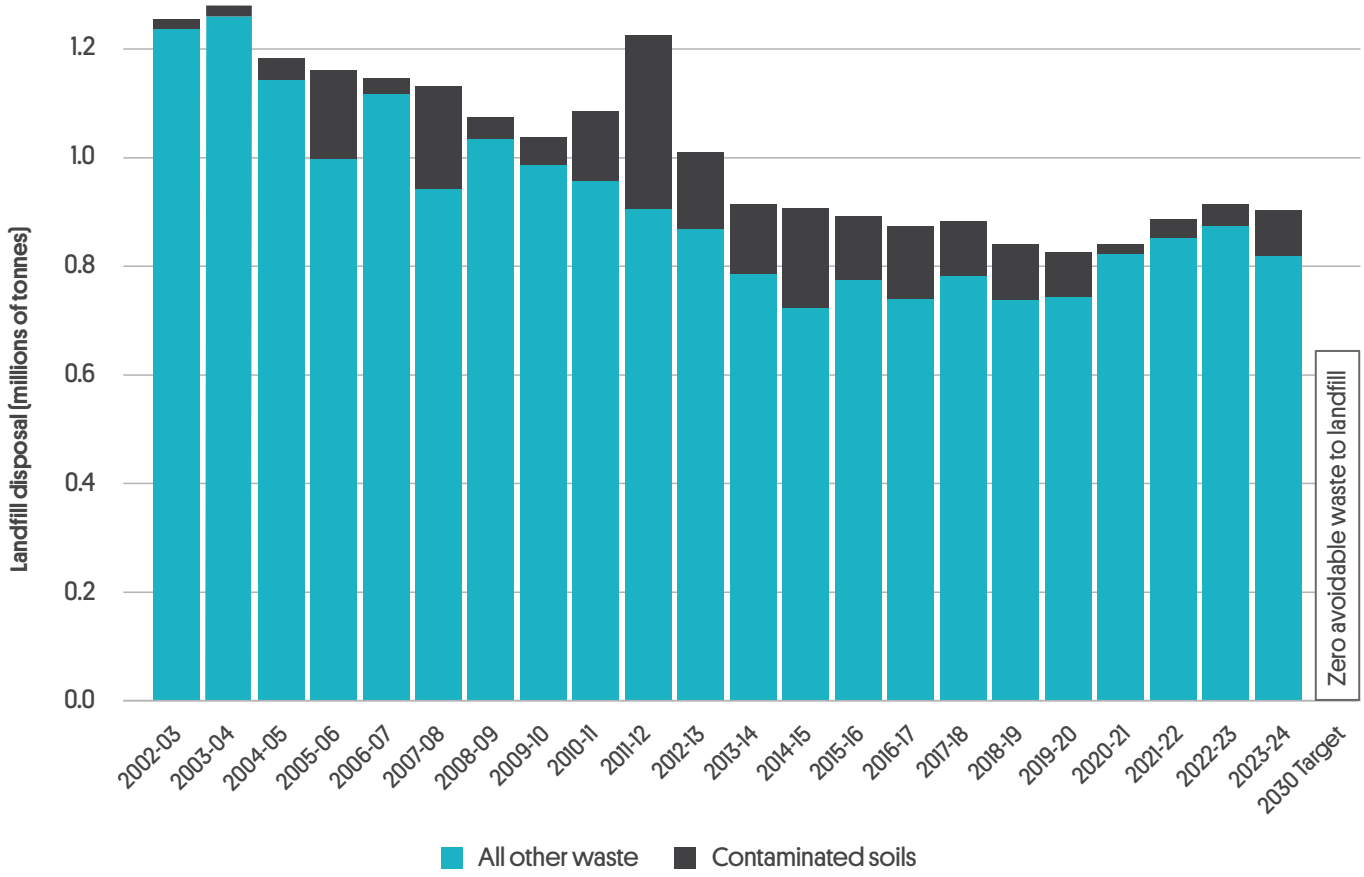
Landfill diversion target

South Australia's Waste Strategy 2020-25 sets out a goal for zero avoidable waste to landfill by 2030[7]. The State disposed of about 902,000 t of waste to landfill in 2023-24, a decrease from 914,000 t of in 2022-23. A range of actions will need to be implemented to achieve SA's ambitious landfill target for 2030.

Figure 12 shows SA's landfill disposal trend since 2002-03.

The landfill quantities in 2023-24 are equivalent to a reduction of 29% against the 2002-03 levels.

Figure 9 Landfill disposal trend since 2002-03, including state target for 2030



6 Zero avoidable waste to landfill equates to the diversion of all waste from landfill where it is technologically, environmentally, and economically practicable to do so. 'Unavoidable' waste therefore refers to wastes for which no other current treatment is available including (but not limited to) asbestos, toxic and quarantine waste.

Waste generation target

South Australia's Waste Strategy 2020-25 sets a target for a 5% reduction in waste generation per capita from a 2019-20 baseline by 2025. Table 6 summarises a five-year trend in waste generation per capita for all reported materials. Waste generation per capita rose by 70 kilograms (2.5%) in 2023-24 compared to 2022-23 and was 2.2% higher than 2019-20.

Table 6 Waste generation per capita since 2019-20, including the state target for 2025

						Change (%)	Target
Recovery type	2019-20	2020-21	2021-22	2022-23	2023-24	22-23 to 23-24	2025
Waste generation per capita (kg/person/yr)	2,800	2,840	2,680	2,790	2,860	2.5%	5% reduction from 2020 baseline

Metropolitan recovery target

SA has established targets for waste recovery from landfill from its metropolitan region by source stream. The State goal for 2023 is 65% recovery for MSW, 85% recovery for C&I, and 90% recovery for C&D. Table 7 presents the recovery rate achieved in metropolitan SA in 2023-24, together with State targets for 2023 and 2025.

In 2023-24, the metropolitan C&D recovery rate was 96%, C&I source stream recovery rate was 78%, and the MSW recovery rate was 66%. Similarly, in 2022-23, the C&I recovery rate was 75.6%, the C&D recovery rate was 97.4%, and the MSW recovery rate was 61.7%.

Table 7 Metropolitan recovery rate for standard reporting materials in SA, 2023-24, including state targets to 2025

	2023-24 recovery rate	Metropolitan recovery target	
Source sector		2023	2025
MSW	67%	65%	75%
C&I	78%	85%	90%
C&D	96%	90%	95%

2.3 Local government diversion

Table 8 below shows data on materials collected in household bins at kerbside for disposal or recycling are presented and discussed in this section. About 693,000 tonnes of kerbside materials were collected, of which 530,000 tonnes were from the metro region and 163,000 tonnes were from regional areas.

SA's recovery rate for kerbside waste in 2023-24 was an estimated 49.6%, a decrease from the previous year's rate of 51.2%. Recovery was higher for metropolitan councils (52.2%) than regional councils (41.3%), both of which were slightly lower than in 2022-23.

Table 8 Materials collected from households at kerbside in SA in 2023-24

Region	Collected at kerbside (tonnes)				Recovery rate (%)
	Residual	Recycling	Organics	Total	
Metro	254,000	99,000	178,000	530,000	52.2%
Regional	96,000	31,000	37,000	163,000	41.3%
SA	**349,000**	**129,000**	**214,000**	**693,000**	**49.6%**

Coverage

Nearly all households in SA are provided a kerbside service. According to the *National waste and resource recovery report 2024* (Blue Environment 2024), about 91% of SA's population are provided with a residual waste service, 90% have a recycling service and 87% have an organics service.

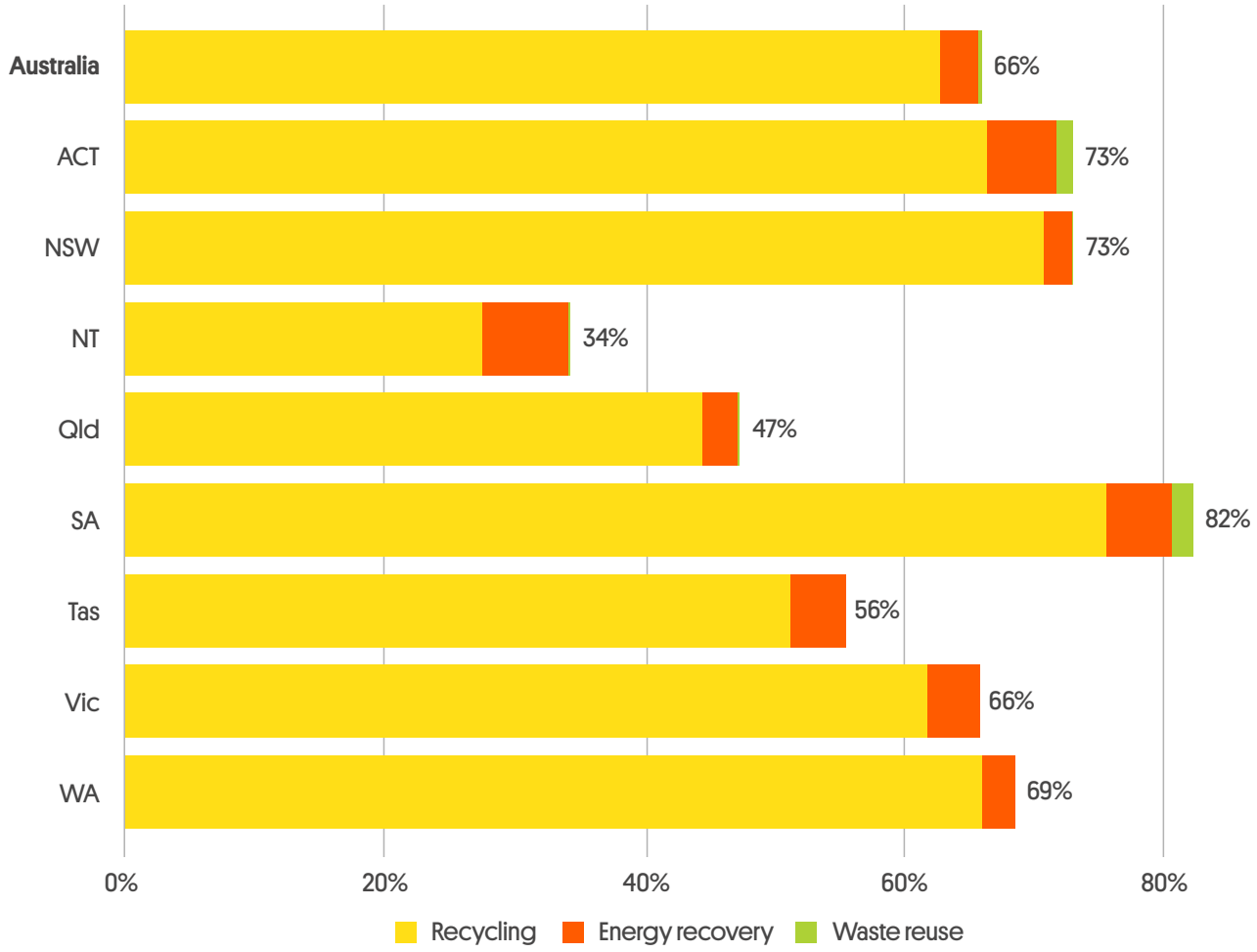
2.4 Comparative performance with other jurisdictions

SA has led recycling and resource recovery performance in Australia for many years.

The methods used by states and territories to measure and report waste vary. The *National waste and resource recovery report 2024* (Blue Environment 2024), released by the Department of Climate Change, Energy, the Environment and Water, adjusts these methods to present a consistent as possible comparison of recovery rates across states and territories.

Figure 10 is taken from the *National Waste and Resource Recovery Report 2024* and shows recycling, waste reuse and energy recovery and overall recovery rates for each Australian jurisdiction in 2022-23. SA had the highest recovery rate of 82%.[7] The next highest rate was 73%, achieved by ACT and NSW. Overall, Australia achieved a recovery rate of 66% in 2022-23.

Figure 10 Resource recovery and recycling rates by jurisdiction, 2022-23



7 This differs from the value reported in the CERRR 2022-23 due to differences in method.

3 Material resource recovery reports

3.1 Masonry

About 1.18 million tonnes of masonry was recovered in SA in 2023-24, a 4% decrease from 2022-23 (1.23 million tonnes).

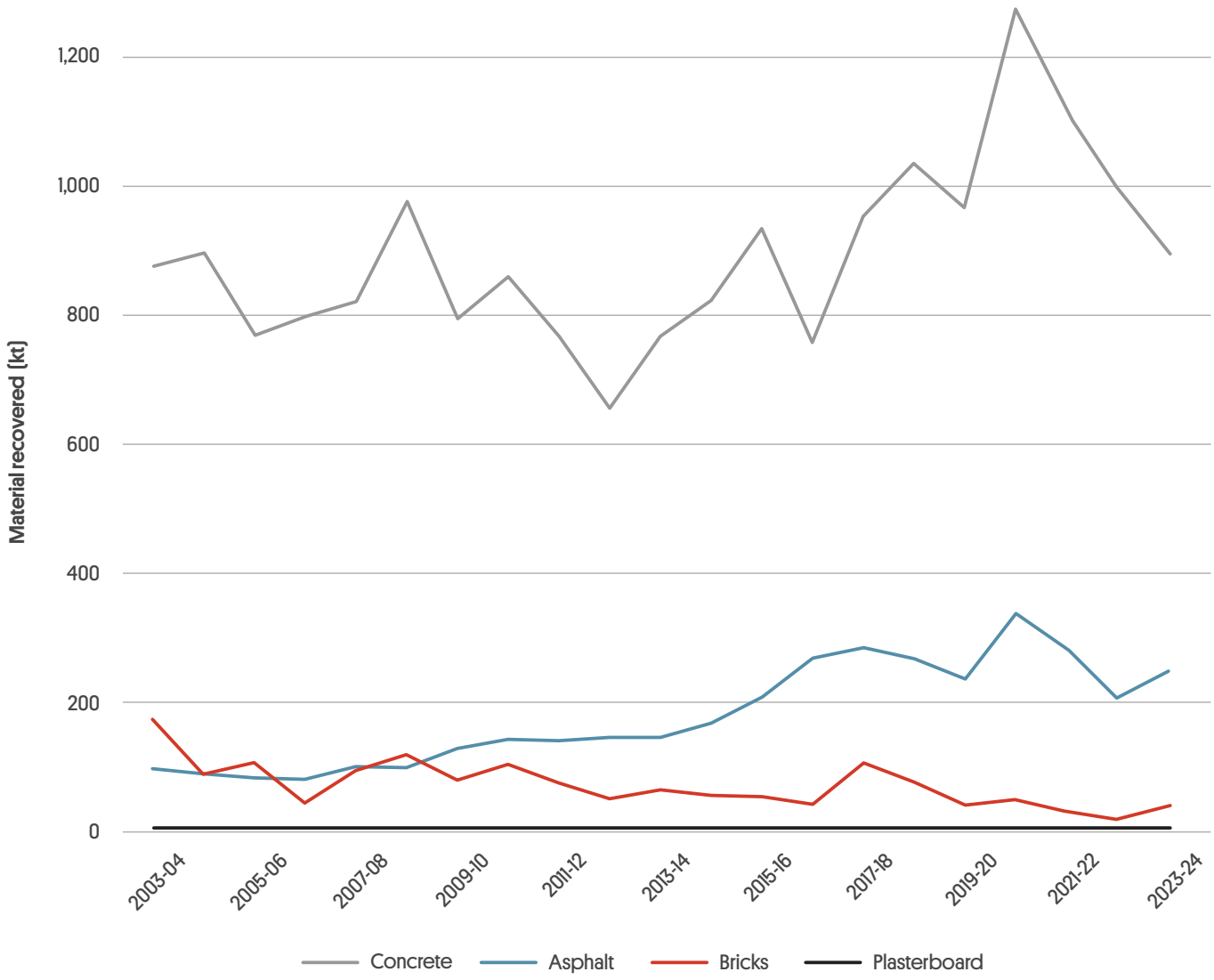
Concrete contributed the greatest proportion of reported masonry materials (76%), asphalt (21%), bricks (3%) and plasterboard (<1%). Concrete recovery was approximately 10% lower than in 2022-23. This may be due to reduced major demolition and construction activity in the period – recyclers commented that while demand for material is high, it is difficult to obtain material. Reported recovery of bricks increased to be closer to the recovery rates reported prior to 2020.

Table 10 Masonry recovered, SA, 2023-24

Material type	Net recovery ('000 t)	Emissions saved '000 tonnes CO_2-e	Energy saved TJ LHV	Water saved ML
Asphalt	245	7	582	215
Bricks	35.3	1	10	45
Concrete	898	18	314	1,150
Plasterboard	0.34		0	
Total	**1,180**	**26**	**907**	**1,410**

1 shows trends in masonry materials types recovered since the first survey for the 2003-04 financial year.

Figure 11 Masonry recovered since 2003-04



3.2 Metals

Recovery of scrap metals declined in 2023-24 to about 437,000 tonnes. Recovered metals were mostly steel (379,000 tonnes), followed by aluminium (42,000 tonnes), non-ferrous metals (excluding aluminium) (15,800 tonnes). Table 11 summarises metals recovery in SA in 2023-24.

Table 11 Metals recovered, SA, 2023-24

Material type	Net recovery ('000 t)	Emissions saved '000 tonnes CO_2-e	Energy saved TJ LHV	Water saved ML
Steel	379	167	2,840	-895 *
Aluminium	42.0	700	8,680	1,230
Non-ferrous metals (ex. aluminium)	15.8	14	569	94
Total	**437**	**881**	**12,100**	**432**

* This figure is negative as more water is used in recycling scrap steel than producing iron from ore.

Figures 13 and 14 show the trends in annual metal recovery by material type since 2003-04.

Figure 13 Metals recovered since 2003-04 – steel

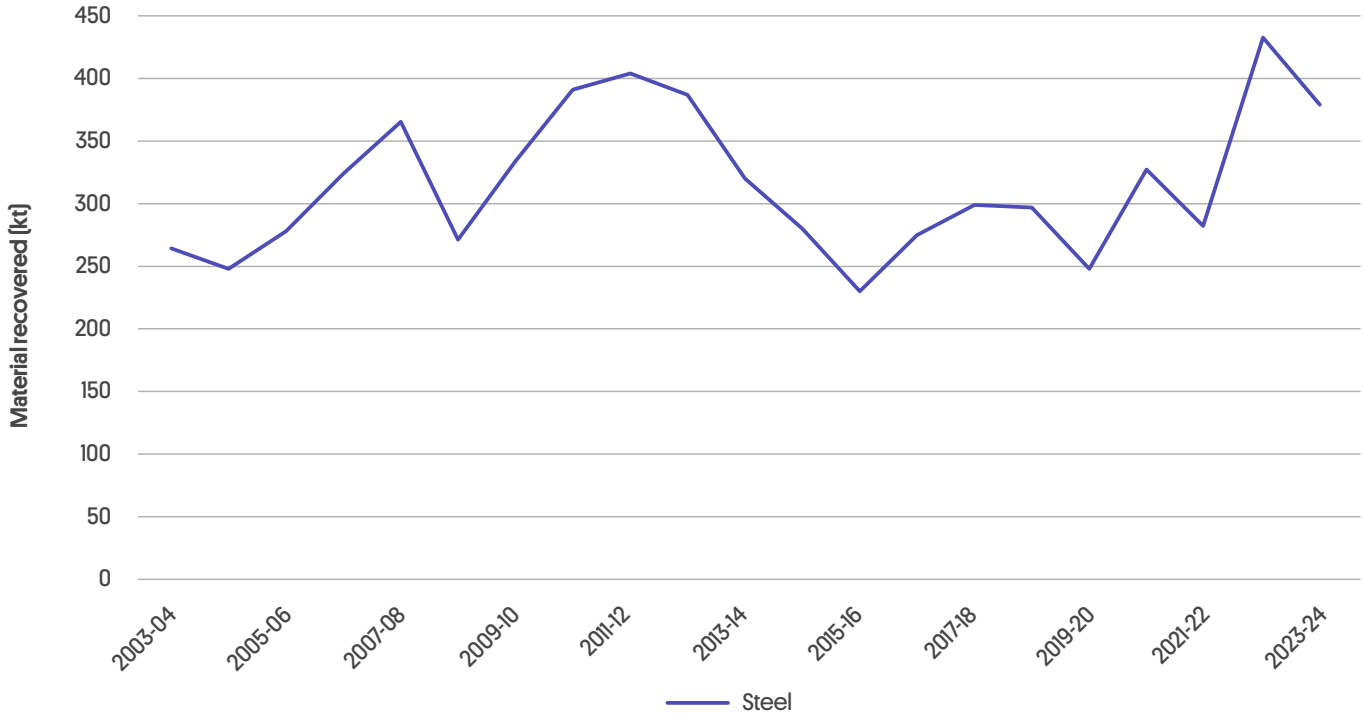
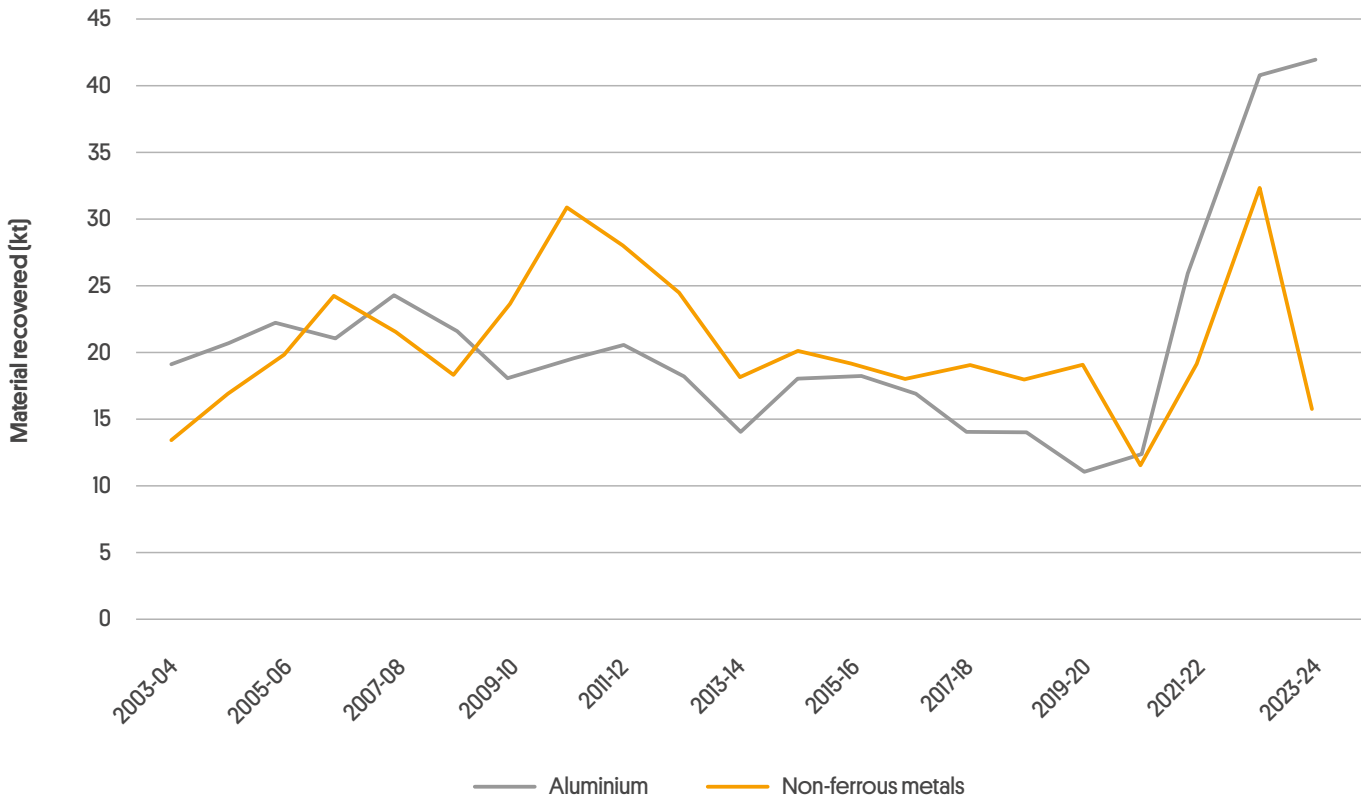


Figure 14 Metals recovered since 2003-04 – aluminium and other non-ferrous metals



3.3 Organics

Organics recovery remained strong in 2023-24, with almost 1.40 million tonnes of organic materials recovered. 'Other' organics, which includes meat rendering, waste grease and fat, waste sludge and biosolids and miscellaneous organics, contributed about half of overall organics recovery, at 47%, accounting for 656,000 tonnes recovered.

About 357 ,000 of garden organics were recovered in SA, contributing about 26% towards overall organics recovery. Reported food organics recovery increased to 89,100 tonnes, continuing a significant increase since 2021-22. About 4% of the recovered food, all from C&I sources, was used for energy recovery.

Reported timber recovery improved in 2023-24 to 294,000 tonnes. Timber comprised 21% of total organics recovery in 2023-24.

Table 12 Organics recovered, SA, 2023-24

Material type	Net recovery ('000 t)	Emissions saved '000 tonnes CO_2-e	Energy saved TJ LHV	Water saved ML
Food organics	89.1	49	15	38
Garden organics	357	237	109	1,980
Timber	294	40	2,380	-9
Other organics	656	315	1,420	151
Meat rendering	219			
Waste grease and fat	84.4			
Waste sludge and biosolids	130			
Organics – other	223			
Total	**1,396**	**641**	**3,920**	**2,160**

Figure 15 Organics recovered since 2003-04

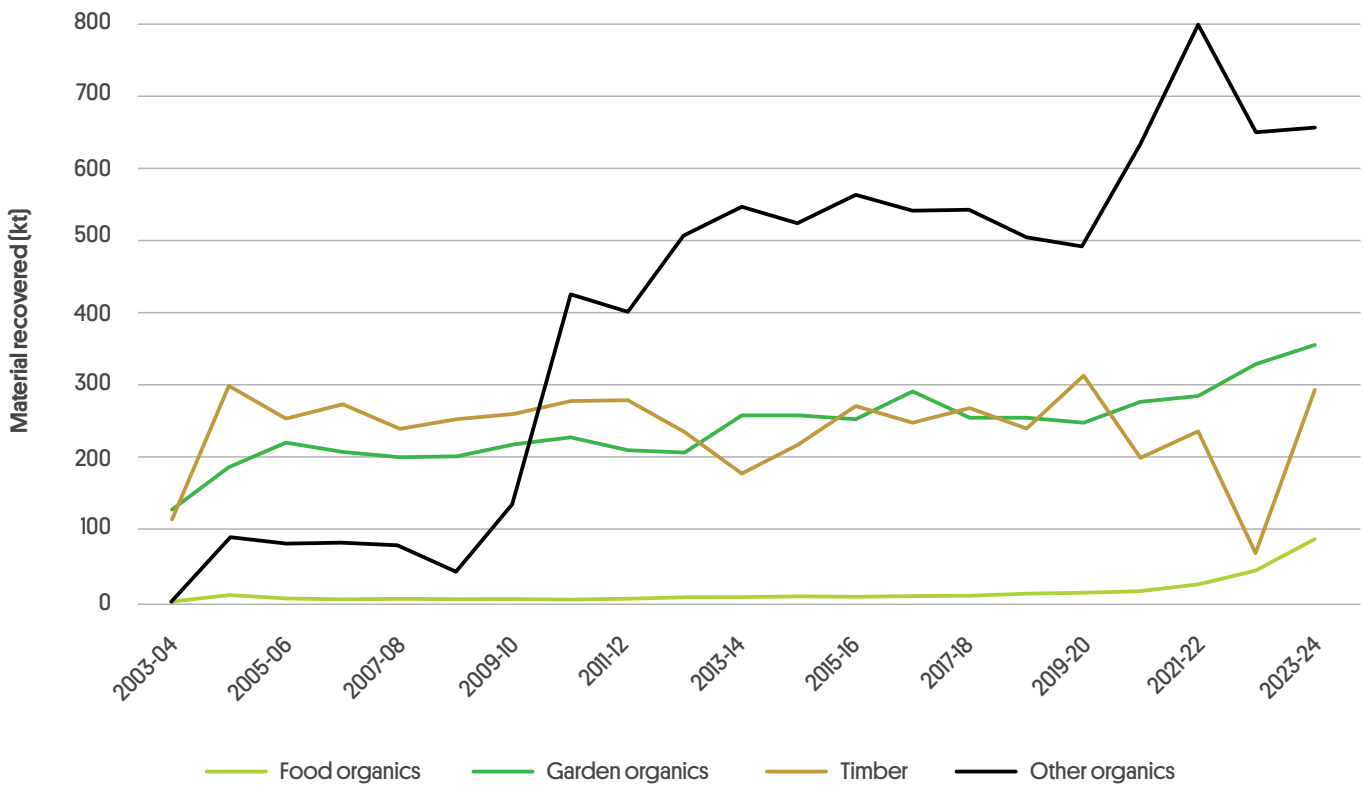


Figure 16 Other organics recovered since 2009-10

3.4 Cardboard and paper

Recovery of scrap cardboard and paper was similar in 2023-24 to the previous year, with about 223,000 tonnes of cardboard and paper recovered in SA, compared to 216,000 tonnes in 2022-23. Cardboard was the largest portion of the category with 140 ,000 tonnes reported as recovered in 2023-24. Recovery of magazines and newsprint accounted for about 55,600 tonnes and printing and writing paper totalled 26.8,000 tonnes. A small amount of liquid paperboard was recovered (648 tonnes). Reported mixed paper and cardboard were apportioned into the sub-categories of cardboard, magazines and newsprint, and printing and writing paper.

Table 12 Cardboard and paper recovered, SA, 2023-24

Material type	Net recovery ('000 t)	Emissions saved '000 tonnes CO_2-e	Energy saved TJ LHV	Water saved ML
Cardboard and waxed cardboard	140	20	56	1,330
Liquid paperboard	0.65	0	0	7
Magazines and newsprint	55.6	20	16	479
Printing and writing paper	26.8	28	-15	237
Total	**223**	**68**	**58**	**2,060**

The trends in annual cardboard and paper recovery by material type since 2003-04 are shown in Figures 17 and 18.

Figure 17 Cardboard and paper recovered since 2003-04 – cardboard, magazines and newsprint and printing and writing paper

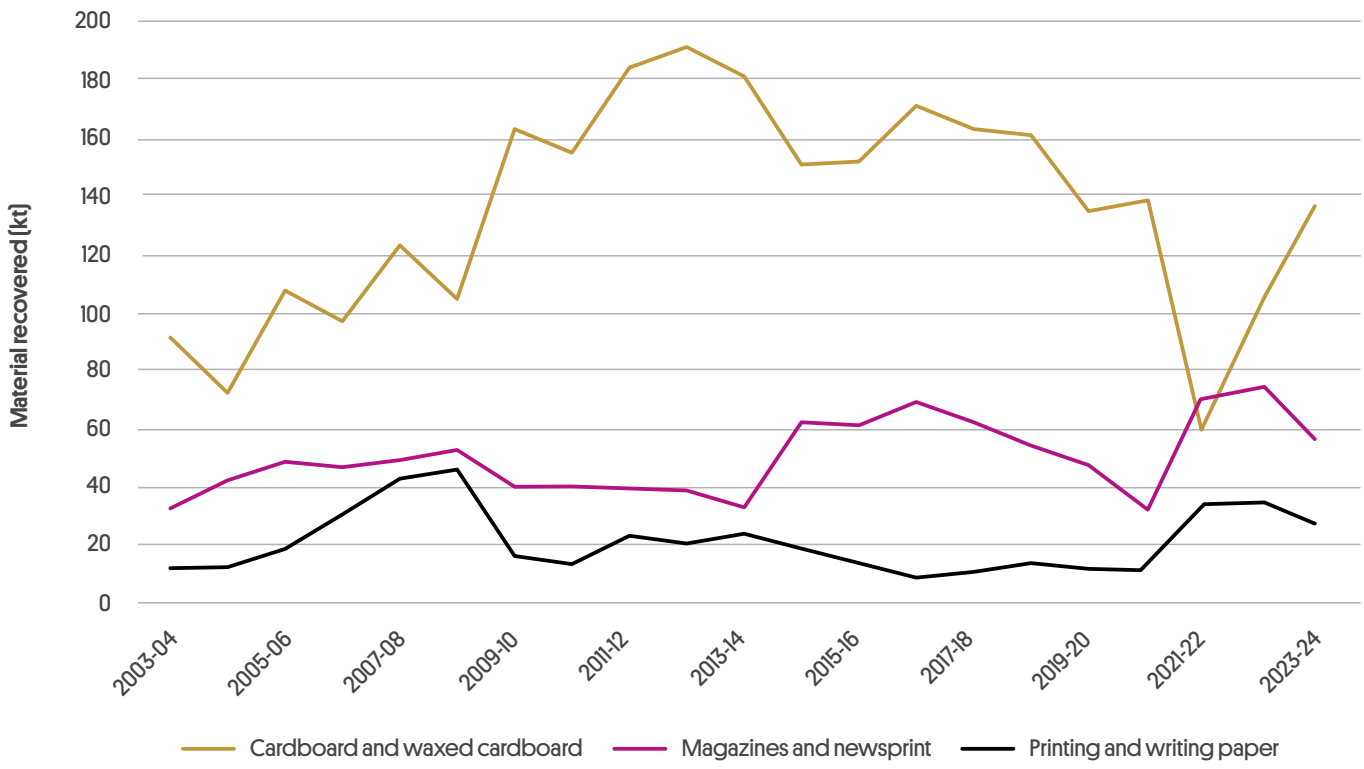
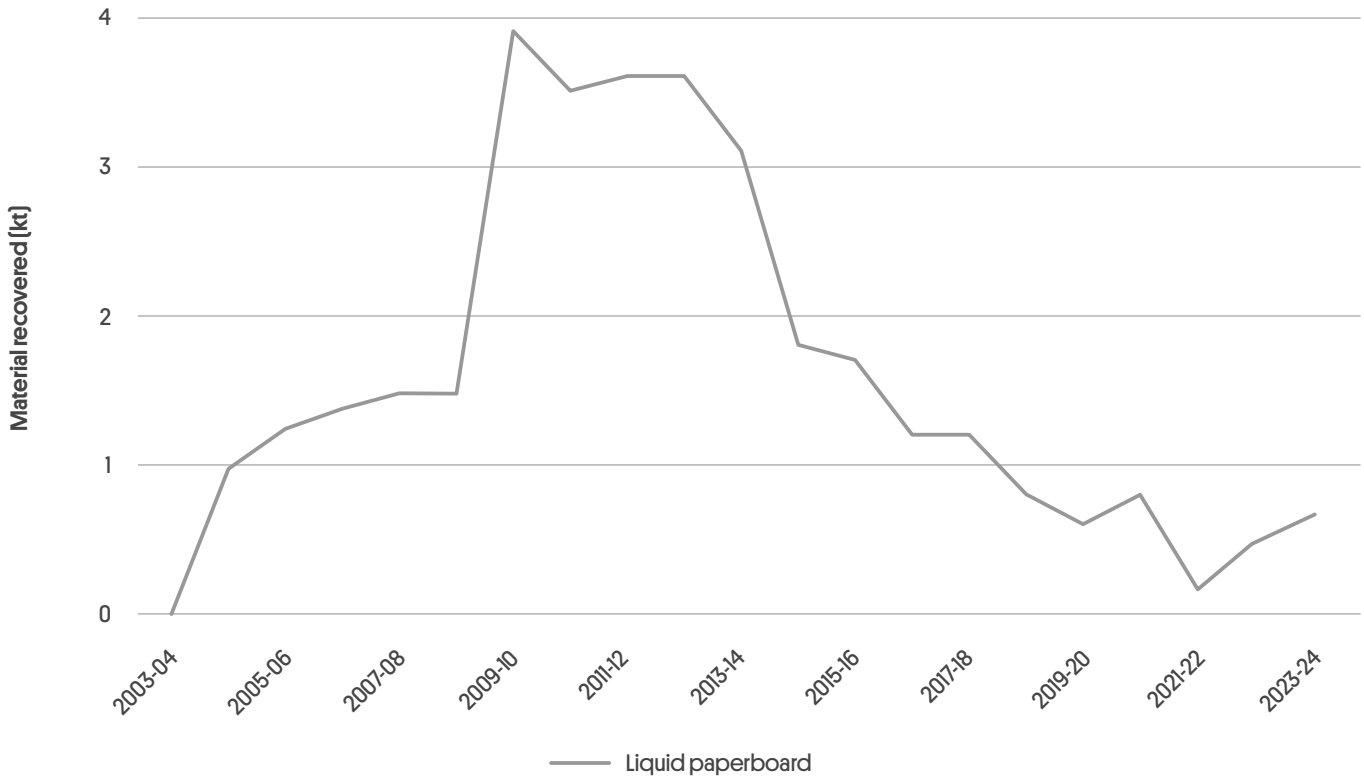


Figure 18 Cardboard and paper recovered since 2003-04 – liquid paperboard



3.5 Plastics

SA recovered 42,200 tonnes of plastics in 2023-24. This reflects improved insights about plastics in mixed waste streams and about scrap plastic generated in SA that is reprocessed outside of SA. Table 14 summarises 2023-24 plastics recovery and Figure 19, Figure 20 and Figure 21 show plastics recovery trends since 2003-04.

Low density polyethylene (LDPE) accounted for 32% of plastics recovered. LDPE recovery is higher, in part reflective of stockpiled RedCycle plastics being recovered for energy and the introduction of trials of bag-in-bin kerbside soft plastics recycling in SA. About 42% of LDPE was recycled and the rest used for its energy value. High density polyethylene (HDPE) and mixed and other plastics each accounted for 21% of recovered plastics.

Table 14 Plastics recovered, including energy recovery, SA, 2023-24

Material type	Net recovery ('000 tonnes)	Emissions saved '000 tonnes CO_2-e	Energy saved TJ LHV	Water saved ML
Polyethylene terephthalate	3.9	4	170	213
High density polyethylene	8.7	6	358	163
Polyvinyl chloride	0.3	0	2	2
Low density polyethylene	13.6	5	285	130
Polypropylene	4.9	1	93	82
Polystyrene	2.0	0	0	0
Mixed and/or other plastics	8.9	0	47	41
Total	**42.2**			

Figure 19 Plastics recovered since 2003-04 – PET, HDPE, LDPE, PP and mixed and other plastics

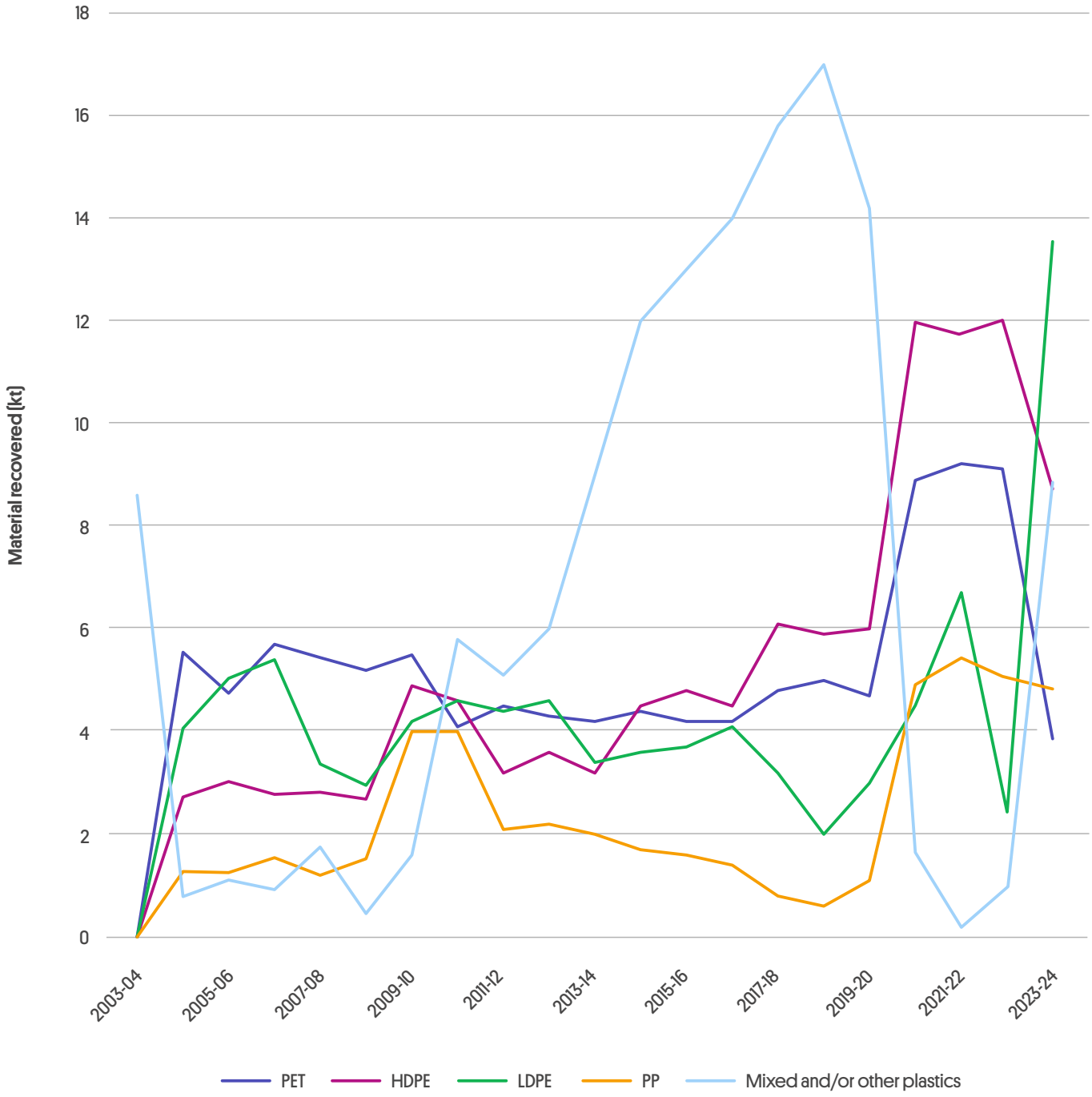


Figure 20 Plastics recovered since 2003-04 – PVC and PS

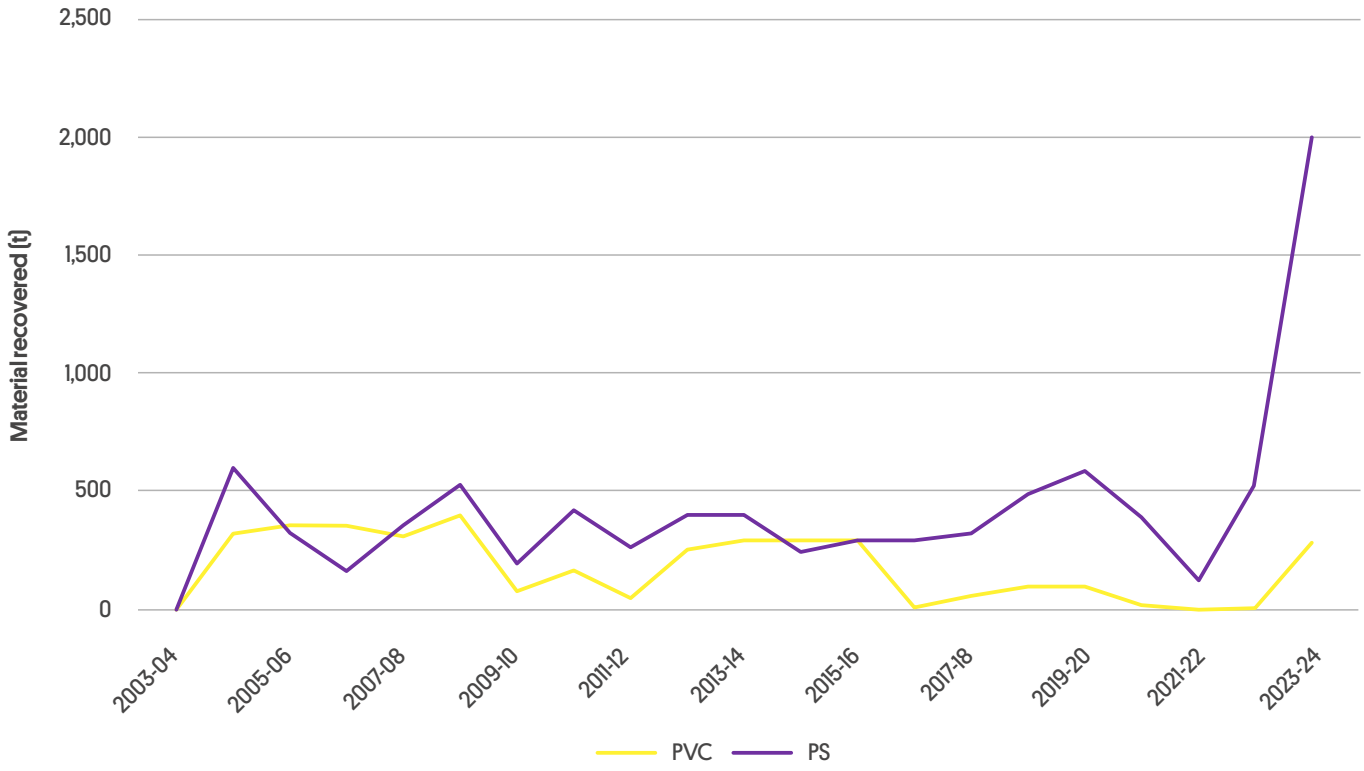


Figure 21 Plastics recovered since 2003-04 – all plastics

3.6 Glass

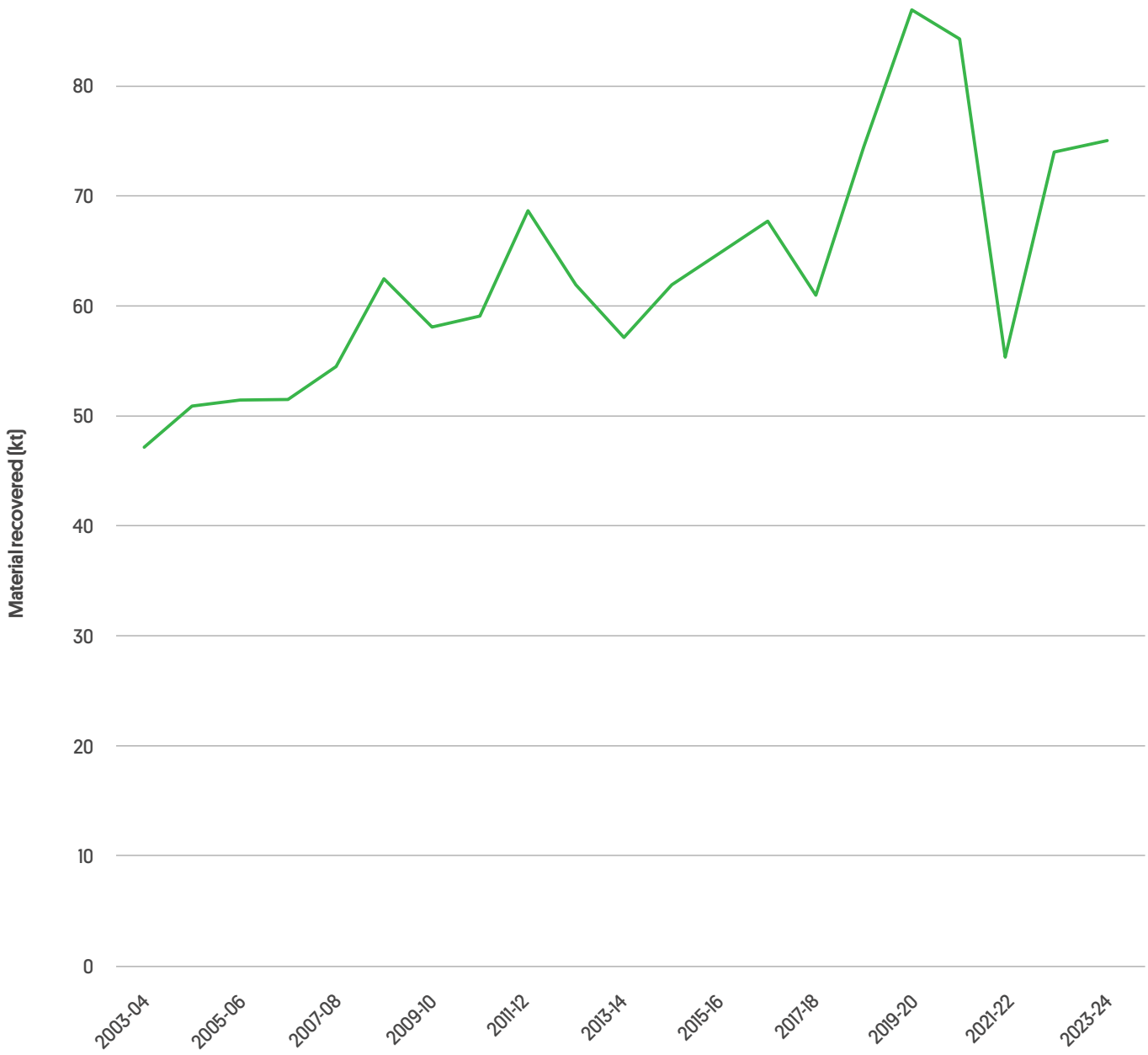
SA recovered about 74,000 tonnes of scrap glass in 2023-24, which is steady with the from 74,000 tonnes reported recovered in 2022-23. Recovered glass was mostly containers; 69% of overall volumes in 2023-24 was glass from food and beverage containers and 31% other glass. Demand for high quality glass remains strong and glass reprocessors are importing clean cullet from interstate markets.

Table 15 Glass recovered, SA, 2023-24

Material type	Net recovery ('000 tonnes)	Emissions saved '000 t CO_2-e	Energy saved TJ LHV	Water saved ML
Glass from food and beverage containers	51			
Other glass	23			
Total	**74**	**39**	**331**	**69**

Glass recovery trends since 2003-04 are shown in Figure 22.

Figure 22 Glass recovered since 2003-04



3.7 Other materials

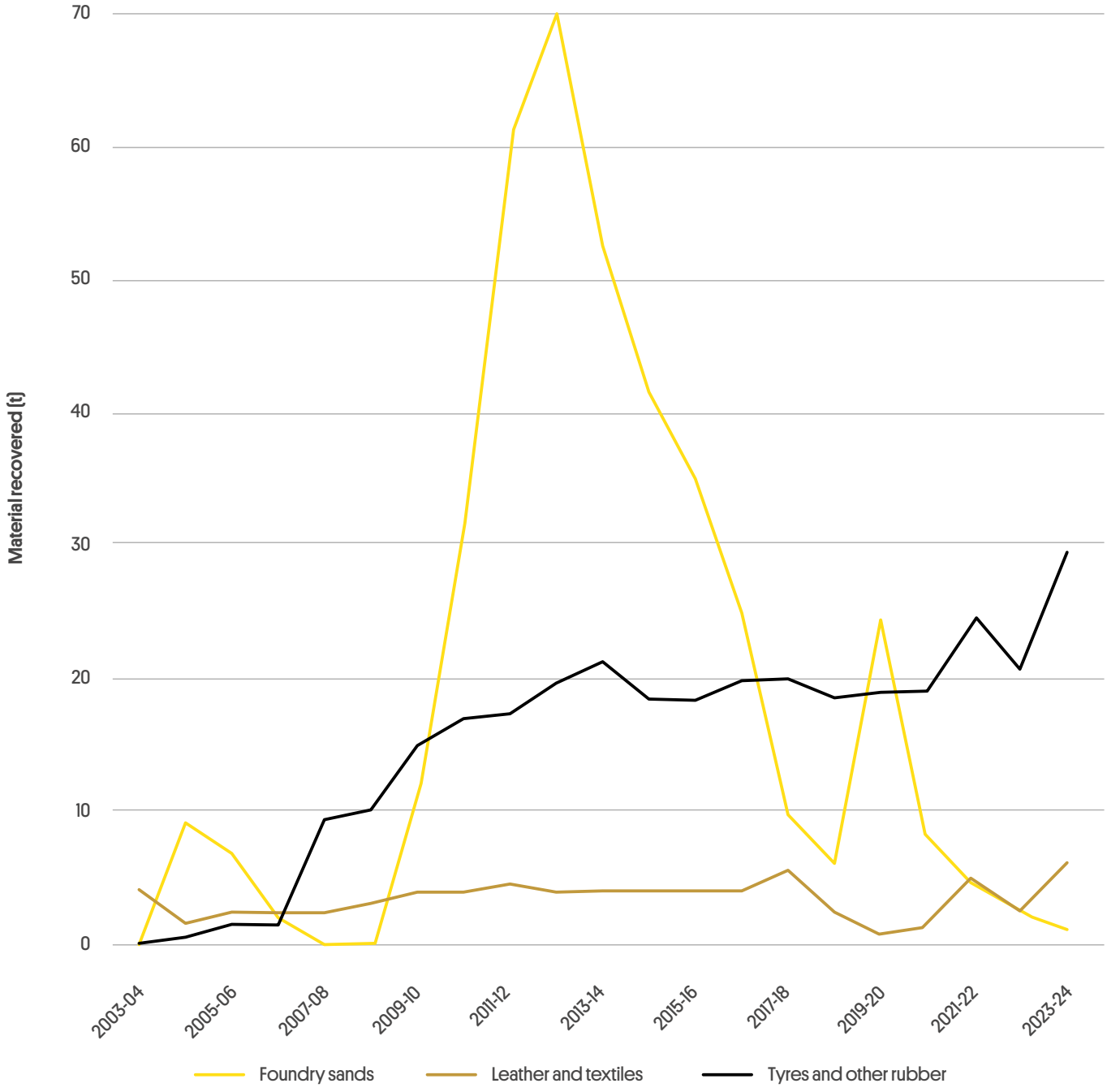
The 'other materials' category includes foundry sands, leather and textiles, and tyres and other rubber. The combined recovery of these materials in 2023-24 was about 37,000 tonnes. Minimal quantities of foundry sands have been recovered since 2019-20. A small amount of foundry sands is used in composting. Tyres and other rubber contributed the most to overall recovery in this category (81%). Leather and textiles recovery rose slightly to 6,000 tonnes.

Table 16 Other materials recovered, SA, 2023-24

Material type	Net recovery ('000 tonnes)	Emissions saved '000 t CO_2-e	Energy saved TJ LHV	Water saved ML
Foundry sands	1	0	0	0
Leather and textiles	6	0	0	0
Tyres and other rubber	30	32	1,890	1,540
Total	**37**	**32**	**1,890**	**1,540**

Figure 23 show trends in the recovery of other materials by type since 2023-24.

Figure 23 Other materials recovered since 2003-04 – foundry sands, leather and textiles and tyres and other rubber



3.8 Separately reported materials

Separately reported materials include fly ash and clay, fines, rubble and soil. These are reported separately as significant variation between years can strongly impact the trends in recovery rate for other material categories.

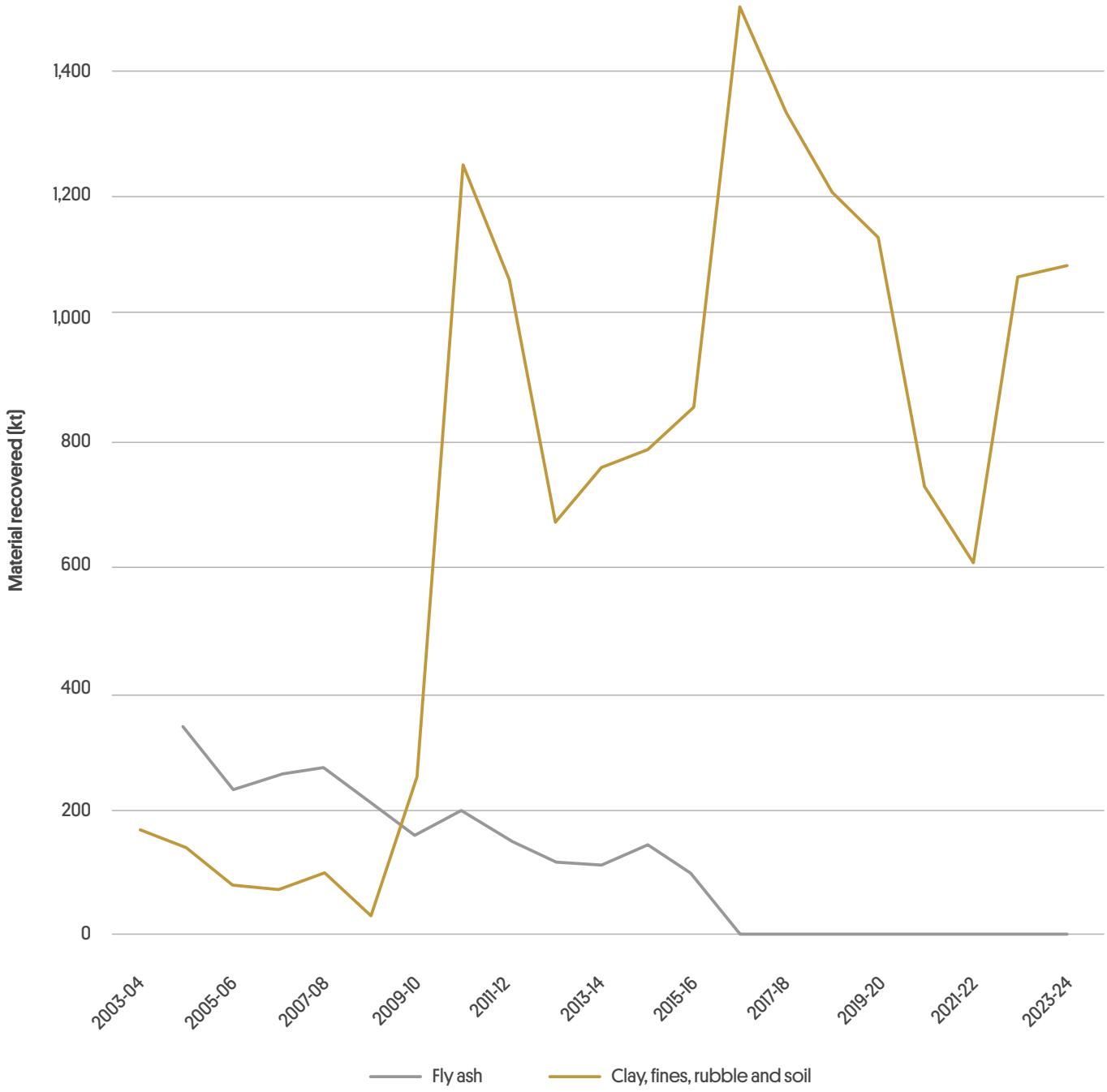
South Australia has not recovered any fly ash since the closure of the Port Augusta Power Station. Clean fill contributed the majority of recovery in this category, accounting for 1,020,000 tonnes of recovery in 2023-24. This is shown in Table 17.

Table 17 Separately reported materials recovered, SA, 2023-24

Material type	Net recovery ('000 tonnes)	Emissions saved '000 t CO_2-e	Energy saved TJ LHV	Water saved ML
Clay, fines, rubble and soil – clean fill	1,020			
Clay, fines, rubble and soil – intermediate waste soil	63.4			
Fly ash	0			
Total	**1,080**	**79**	**1,270**	**393**

Figure 24 shows the long-term annual recovery of separately reported materials. The effects that major projects have on quantities are clearly seen in the two peaks.

Figure 24 Separately reported materials recovered since 2003-04 – Clay, fines, rubble and soils and fly ash



4 Material flow analyses

4.1 Introduction to material flow analysis

Material flow analysis (MFA) uses the principal of conservation of mass to analyse the physical flows of materials into, through and out of a given system. The materials covered in this section are metals, cardboard and paper, plastics, glass, textiles, and tyres.

Table 18 Key concepts and terminology in MFA modelling

Term	Definition
System	The object of an MFA investigation.
Material	An umbrella term for both substances (homogenous materials) and goods (materials or products made up of one or more substances).
Process	The transformation, transport or storage of materials.
Flow	The mass of material into or out of a process per unit time (e.g. year).
Stock	The quantity of materials stored within a process. Any process can potentially contain stocks. Input flows into a process equals the output flows plus the change in stocks.
Residence time	The time period for which a material remains in a stock process.
Transfer coefficient	Quantities that partition materials leaving a process to downstream processes.
Final sink	A process where materials have very long residence times (>1,000 years).

Table 19 Material flow analysis processes

Process	Definition
Australian virgin	The upstream process of incoming system materials from Australian virgin sources.
Overseas virgin	The upstream process of incoming system materials from overseas imported virgin sources.
Overseas recycled	The upstream process of incoming system materials from overseas imported recycled sources.
Manufacturing	All processes that transform materials into saleable products.
Use	Use phase of the products containing the materials. Includes stocks of materials that are in use.
Sorting	Post-use processes that separate products into discrete material streams prior to reprocessing.
Reprocessing	Post-sorting processes that physically transform materials and products that are then (typically) input-ready for the manufacture of new products.
Energy recovery	The process of recovering energy that is embodied in solid waste.
Export	The downstream process of post-consumption materials going to export.
Environment	Dispersal to the open environment, and could also be termed 'leakage'. Examples include dust from tyres and other microplastics dispersed directly to the open environment. Subsequent clean-up may occur for larger objects, e.g. litter, which would then typically be disposed to landfill. From the perspective of the MFA modelling, materials dispersed to the open environment that are subsequently cleaned up are modelled as going directly to another fate rather than the 'Environment' process.
Landfill	Disposal of all materials to landfill. Includes onsite disposal.

MFAs can help to measure material circularity and assess the performance of the waste and resource recovery sector by identifying strengths and inefficiencies at different stages of recovery. A set of circular economy indicators were selected for this work:

- **Recycled content:** Performance of the manufacturing system in utilising recycled materials. Low recycled content means consumed products comprise little or no recycled materials, e.g., owing to poor product design and/or reprocessing technology limitations.
- **Collection efficiency:** Performance of the collection system. Low collection efficiency means a high proportion of material is not separated from material flows at the household or business and is directed to landfill, e.g., owing to limited source separation and/or poor disposal practices.
- **Sorting efficiency:** Performance of the system in separating materials designated for specific recovery pathways. Low sorting efficiency highlights opportunities to reduce contamination of collected materials received and/or improve sorting processes at the sorting facilities.
- **Reprocessing efficiency:** Performance of the system in reprocessing materials to be ready for specific remanufacturing or energy recovery pathways. Low reprocessing efficiency highlights opportunities to reduce contamination of sorted materials received, improve product design, and/or improve processes at the reprocessing facilities.
- **Recycling rate:** Performance of the system in recycling end-of-life materials.
- **Energy recovery rate:** Performance of the system in diverting end-of-life materials to energy recovery.
- **Recovery rate:** Performance of the system in diverting end-of-life materials to recycling and energy recovery.
- **Local material utilisation rate:** Performance of the system in on-shore remanufacturing, relative to the amount of material that is potentially available.

4.2 Metals

The MFA results for metals are summarised in Figure 25 and Table 20. It is estimated 651,000 tonnes of metals were consumed in SA in 2023-24, with 482,000 tonnes of metals waste generated. Recovery is estimated at 437,000 tonnes, or 91% of waste generation.

Figure 25 Metals material **flow diagram, SA 2023-24**

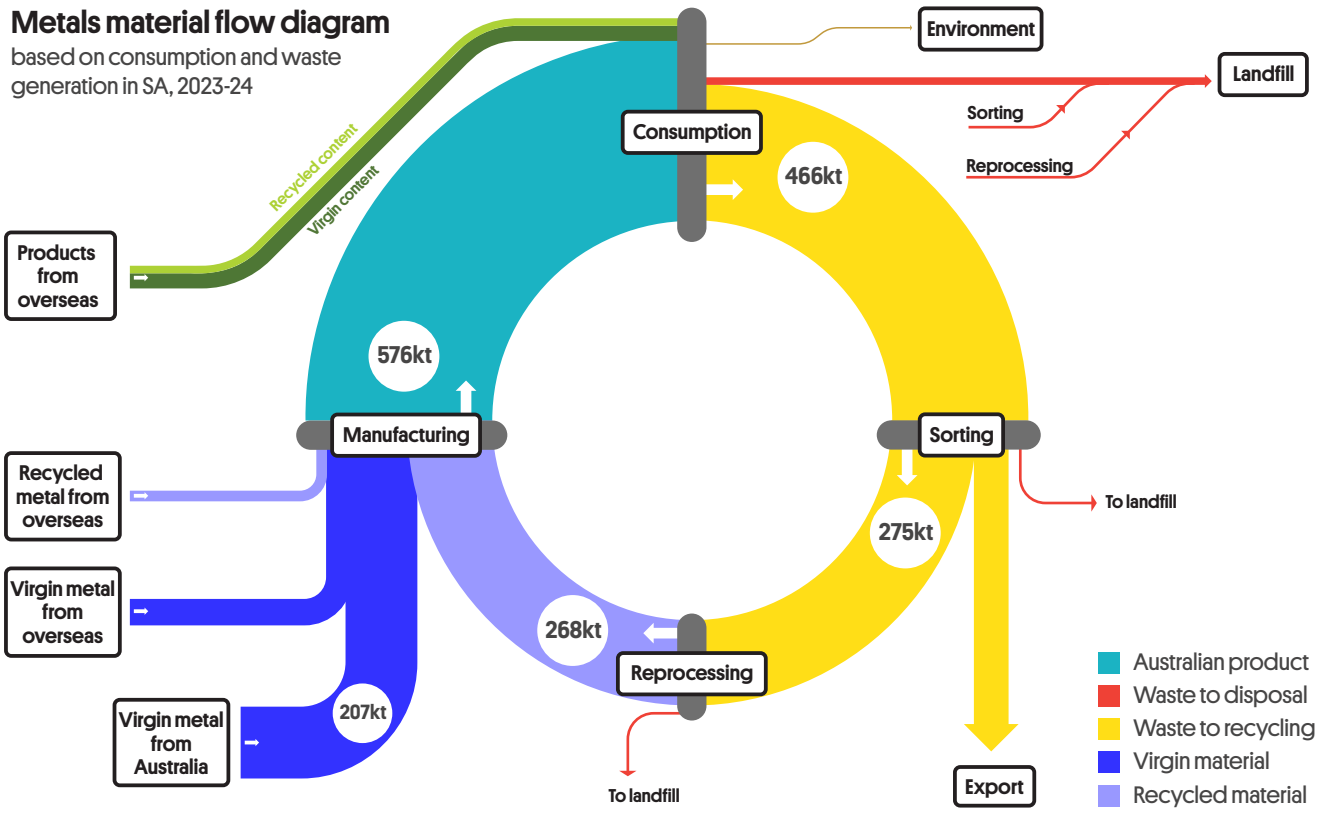


Table 20 Metals MFA indicators, SA 2023-24

Indicator	Unit	Value
Consumption	kt	651
Waste generation	kt	482
Recovery	kt	437
Recycled content	%	50%
Collection efficiency	%	97%
Sorting efficiency	%	95%
Reprocessing efficiency	%	98%
Recycling rate	%	91%
Energy recovery rate	%	0%
Recovery rate	%	91%
Local material utilisation rate	%	56%

Detailed material flows analysis – Metals

Metals are highly recyclable as they are easy to sort, maintain their quality after reprocessing and benefit from high commodity values. They are not overly affected by contamination because impurities can be removed in production or managed by sorting and dilution (World Steel Association, 2021). The MFA estimates a recovery rate for SA metals in 2023-24 of 91%.

Recycled content is highly integrated into global metal markets. All steel plants use steel scrap as a raw material (World Steel Association, 2021). The recycled content of steel varies by production process; electric arc furnaces can produce steel with up to 100% recycled content while basic oxygen furnaces produce steel with up to approximately 30% recycled content (World Steel Association, 2023). In 2023, about 70% of Australian steel production was in basic oxygen furnaces and about 30% from electric arc furnaces, which approximately matched the global steel production profile (World Steel Association, 2024).

Almost all Australian scrap aluminium is exported as domestic smelters do not have the capability to accept post-consumer waste, although small quantities of pre-consumer scrap can be processed onshore (APCO, 2024). The MFA estimates an overall recycled content of 50% for metals consumed in SA in 2023-24. This includes recycled content in products imported from overseas.

Recycled metals enjoy strong end markets, including applications in the built environment and packaging. Exports are a major component of metals flows, and end markets and tightly linked to international metal exchange prices. About 39% of SA's recovered metals were exported in 2023-24.

Recycling metals emits significantly lower greenhouse gas emissions compared to extracting and processing virgin metals. For example, it is estimated that in SA each tonne of aluminium recycled prevents the release of 16.7 tonnes of carbon dioxide equivalent.

Opportunities for improving circularity

The MFAs estimate high (>95%) efficiencies for end-of-life metals across collection, sorting and reprocessing, demonstrating strong recovery systems across the chain. Possible opportunities for improvements include strengthening local metals manufacturing and maximising diversion of shredder floc metals from landfill.

Shredder floc is a by-product of recovering large metal products like cars, refrigerators and washing machines. These bulky items are dismantled and shredded at recovery facilities; the majority of metals are separated and recycled, but about 30% of the product turns into a residual fraction – known as shredder floc – consisting of mangled plastics, rubber, metals, textiles and various other fines (Sustainability Victoria, 2014). Shredder floc is difficult to recover and generally disposed of, with about 50,000 tonnes landfilled in SA each year. The Environment Protection Authority allows a 25% waste levy reduction for landfilling shredder floc (SA EPA, 2025). Because some of it is high in calorific value (e.g. plastics), shredder floc could be diverted to thermal energy recovery facilities in the future.

There may be an opportunity to improve recovery of metals by encouraging recycling of small metals items such as nails and fixing. These are generally not accepted in kerbside recycling bins because are difficult to sort in materials recovery facilities, where they tend to fall through conveyor belts and potentially get trapped in moving parts.

The Commonwealth Government regulates the export of waste glass, plastics, tyres and paper and cardboard to prevent environmental harm posed by Australian waste to overseas nations. A similar logic could be applied to metals – recycling in Australia would prevent potentially substandard management of shredder floc in developing countries (e.g. burning or dumping). There may be an opportunity to improve metals circularity by applying similar regulations to metals (NWRIC, 2023).

4.3 Cardboard and paper

The MFA results for cardboard and paper are shown in Figure 26 and Table 21. It is estimated about 343,000 tonnes of cardboard and paper was consumed in SA in 2023-24. Waste generation is estimated at 354,000 tonnes, which is slightly higher than consumption due to pre-consumer scrap from manufacturing. About 223,000 tonnes of cardboard and paper was recovered in 2023-24, or an estimated 63% of waste generated. This included about 37,000 tonnes to energy recovery.

Figure 26 Cardboard and paper material flow diagram, SA 2023-24

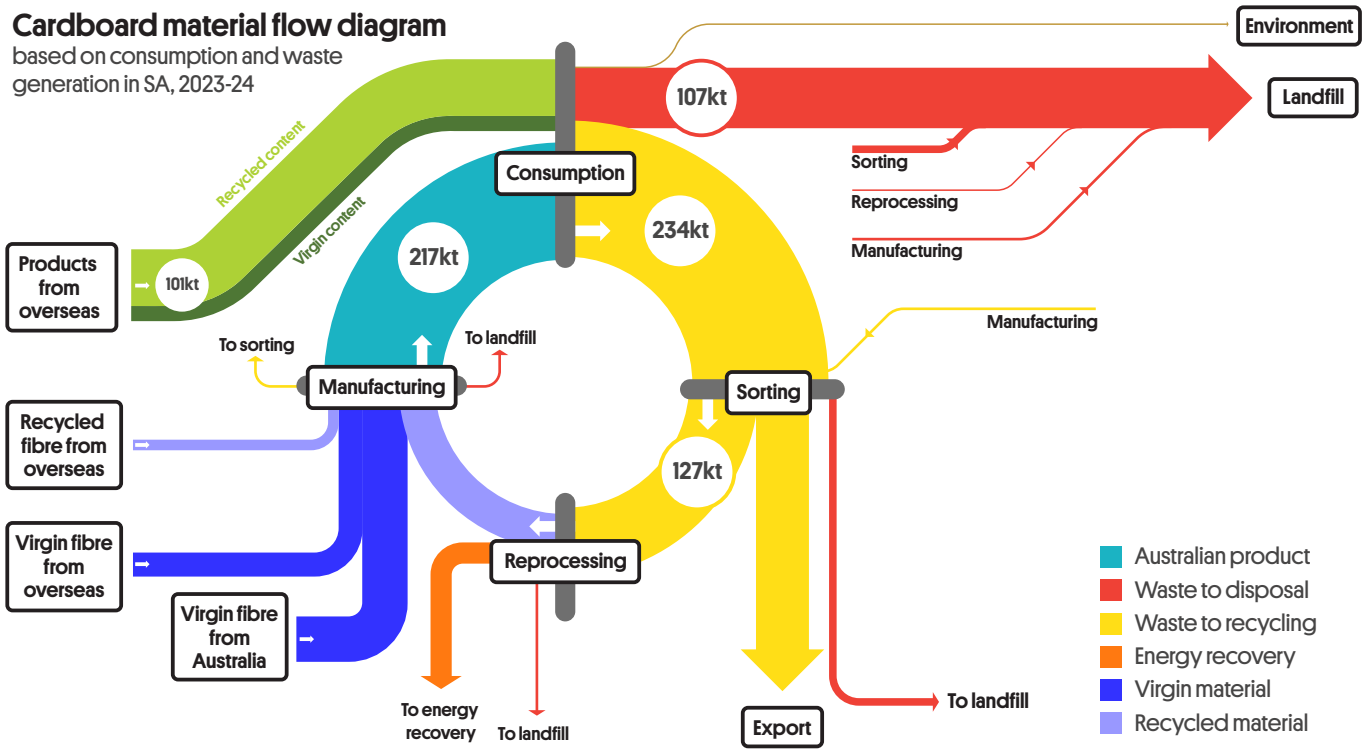


Table 21 Cardboard and paper MFA indicators, SA 2023-24

Indicator	Unit	Value
Consumption	kt	343
Waste generation	kt	354
Recovery	kt	223
Recycled content	%	61%
Collection efficiency	%	68%
Sorting efficiency	%	94%
Reprocessing efficiency	%	98%
Recycling rate	%	52%
Energy recovery rate	%	10%
Recovery rate	%	63%
Local material utilisation rate	%	25%

4.4 Plastics

The MFA results for plastics are shown in Figure 27 and Table 22. The MFA estimates about 206,000 tonnes of plastics were consumed in SA in 2023-24, with 175,000 tonnes of plastics waste generated. Recovery is estimated at 42,000 tonnes, which equated to an estimated recovery rate of 24%, split approximately equally between energy recovery and recycling.

Figure 27 Plastics material flow diagram, SA 2023-24

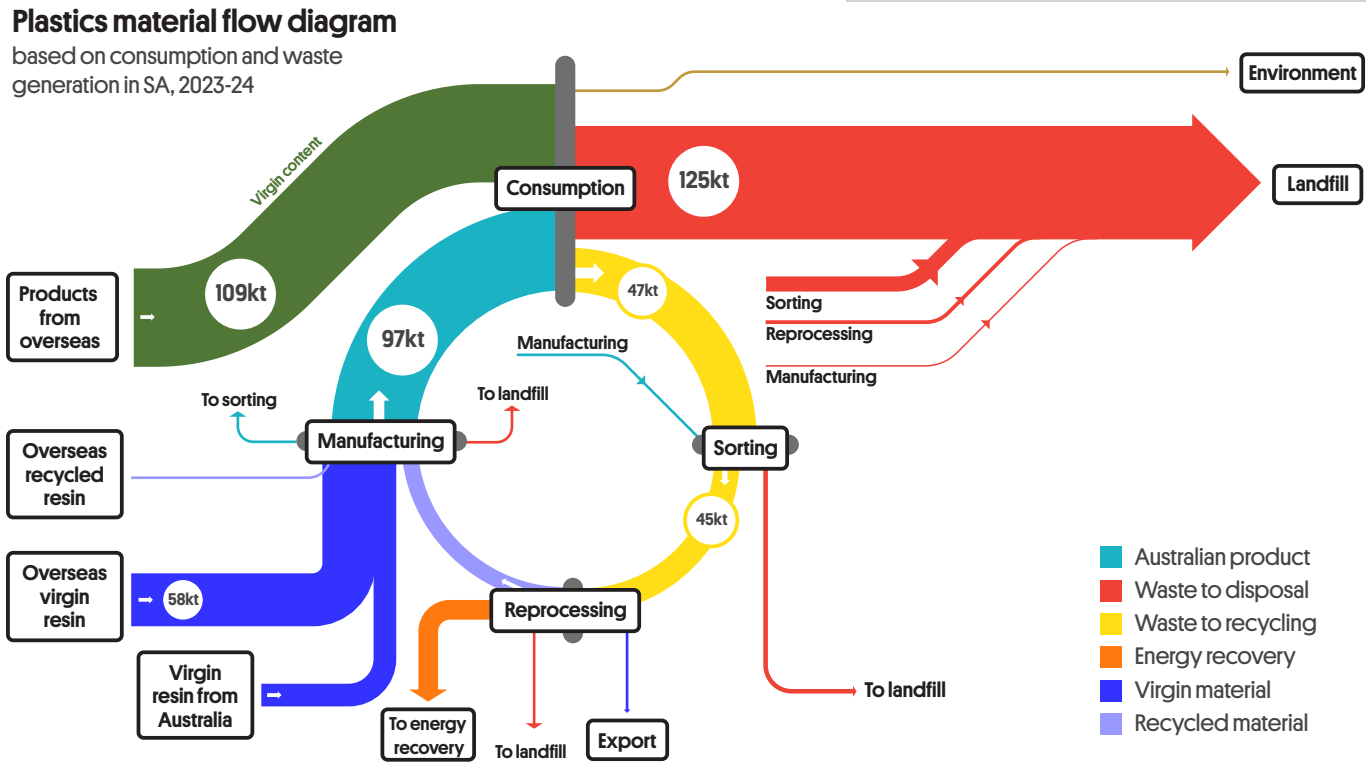


Table 22 Plastics MFA indicators, SA 2023-24

Indicator	Unit	Value
Consumption	kt	206
Waste generation	kt	175
Recovery	kt	42
Recycled content	%	8%
Collection efficiency	%	28%
Sorting efficiency	%	92%
Reprocessing efficiency	%	93%
Recycling rate	%	12%
Energy recovery rate	%	12%
Recovery rate	%	24%
Local material utilisation rate	%	10%

4.5 Glass

The MFA results for glass are summarised in Figure 28 and Table 23. Glass consumption in SA in 2023-24 is estimated at 113,000 tonnes, and waste generation at 102,000 tonnes. About 74,000 tonnes of SA's glass waste was recovered in 2023-24. The estimated recovery rate is 73%.

Figure 28 Glass material flow diagram, SA 2023-24

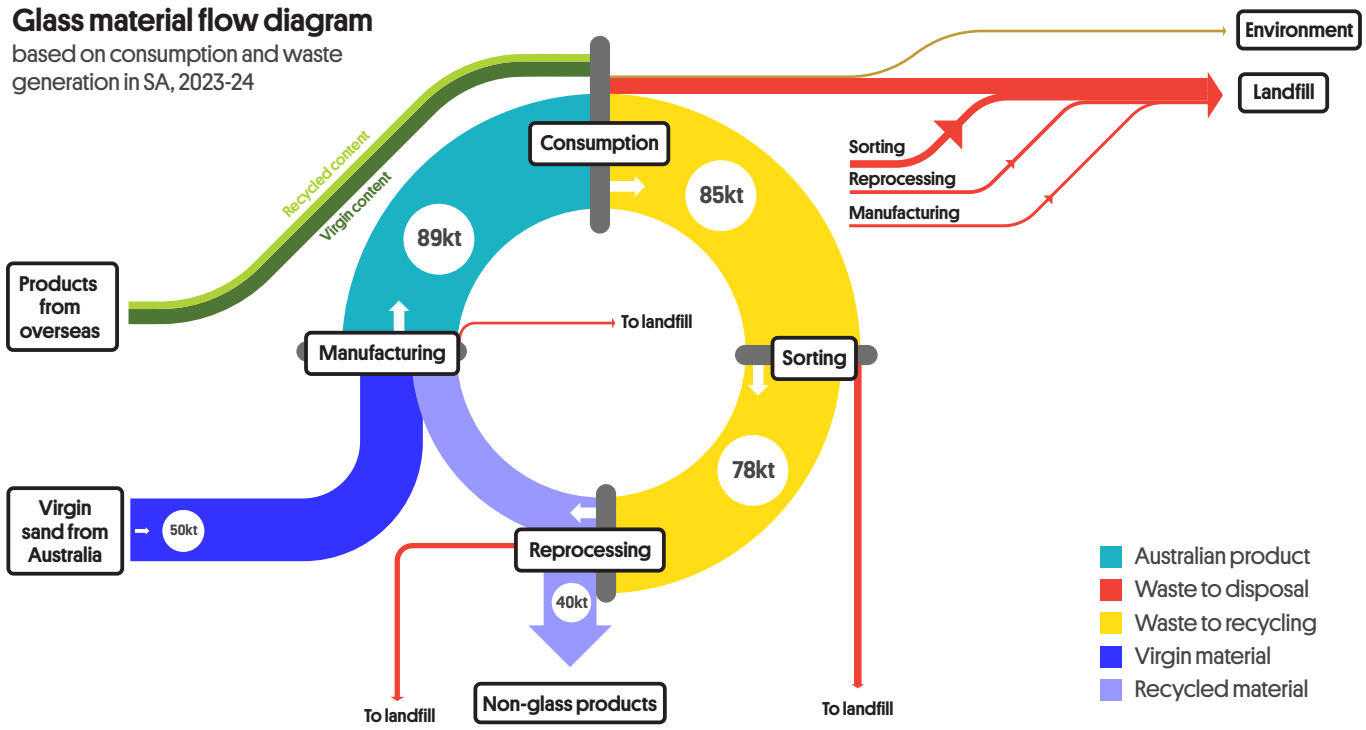


Table 23 Glass MFA indicators, SA 2023-24

Indicator	Unit	Value
Consumption	kt	113
Waste generation	kt	102
Recovery	kt	74
Recycled content	%	36%
Collection efficiency	%	83%
Sorting efficiency	%	92%
Reprocessing efficiency	%	95%
Recycling rate	%	73%
Energy recovery rate	%	0%
Recovery rate	%	73%
Local material utilisation rate	%	73%

Detailed material flows analysis – Glass

Glass is highly recyclable but suffers from breakages during collection and sorting. Source separation of glass is key to preventing losses of fines to landfill, which SA has supported since the introduction of container deposit legislation in 1977.

Markets for recycled glass are strong, consisting primarily of food and beverage packaging and crushed glass to civil construction. The circular recycling of glass back into glass packaging is environmentally preferred over crushed glass applications. Streams of clean and colour-sorted glass, as collected through container deposit schemes, are sought after because they are low in contamination and suitable for glass-to-glass manufacturing. Victoria is currently in the process of rolling out glass bins to households, in addition to its container deposit legislation.

Australia's glass manufacturers, including a major facility in SA, are actively increasing the recycled content of their product. The MFA estimates the overall recycled content of glass consumed in SA in 2023-24 at 36%; however, the rate for glass packaging was considerably higher and in the order of 50–60%.

About 74,000 tonnes of SA glass was recycled in 2023-24, of which 46% went back into glass packaging and 54% into non-glass applications like recycled sand into road base. The recovery rate is estimated at 73%. Export of glass has been regulated since January 2021 and no glass waste was reported to be exported from SA in 2023-24.

Opportunities for improving circularity

Across collection, sorting and reprocessing, the lowest modelled efficiency rate was for collection at 83%. This suggests the collection of end-of-life glass poses the most potential for improvement, with possible areas to target including building and demolition glass and commercial glass packaging. Household glass will be well collected via kerbside bins and container deposits.

Maximising the quantity of glass fines directed to recovery instead of landfill at sorting facilities is another potential opportunity.

4.6 Textiles

The MFA results for textiles are summarised in Figure 29 and Table 24. The MFA estimates about 57,000 tonnes of textiles were consumed in SA in 2023-24. Waste generation is estimated at 64,000 tonnes, of which 15,000 tonnes was recovered. This is higher than reported textiles recovery elsewhere in this report because the MFA includes estimates of textiles reuse and repurposing to local and overseas markets through charities and other networks[8]. It is worth noting textiles sent overseas for recycling or reuse may ultimately end up in another fate (e.g. landfilled or dumped). Onshore textiles recycling capability is relatively limited and less than 100 tonnes of textiles was reported to be locally recycled, although over 3,000 tonnes went to local energy recovery.

Figure 29 Textiles material flow diagram, SA 2023-24

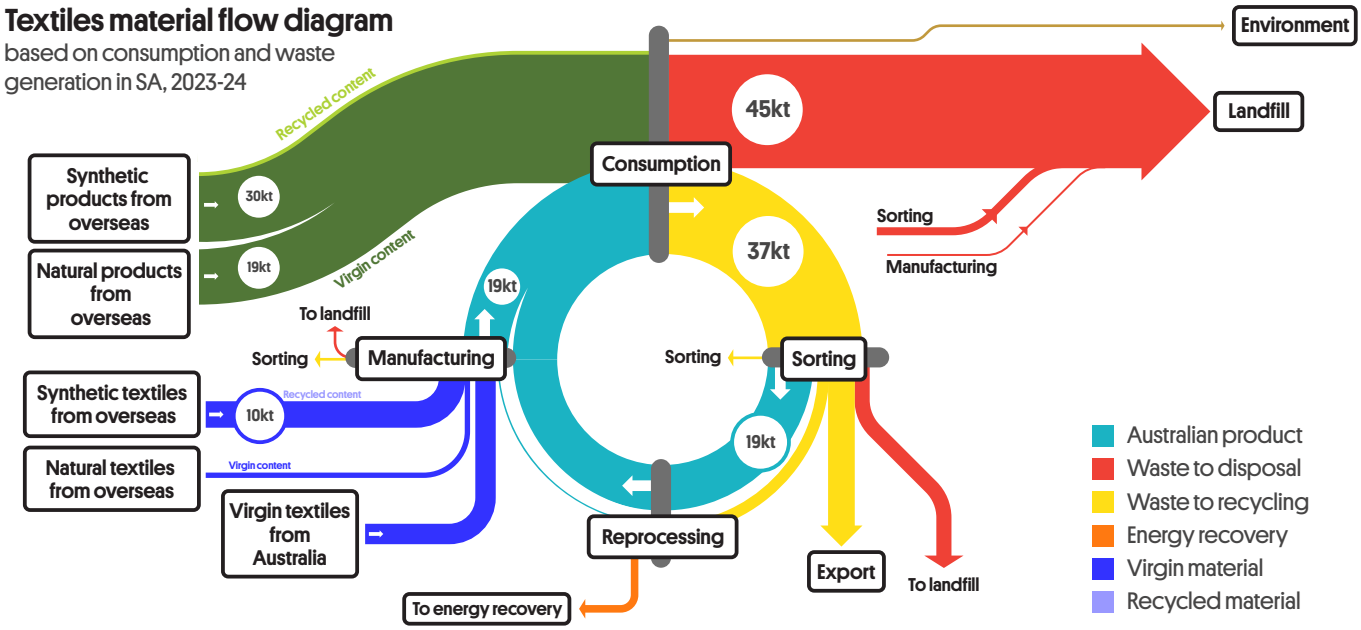


Table 24 Textiles MFA indicators, SA 2023-24

Indicator	Unit	Value
Consumption	kt	57
Waste generation	kt	64
Recovery	kt	15
Recycled content	%	1%
Collection efficiency	%	58%
Sorting efficiency	%	92%
Reprocessing efficiency	%	94%
Recycling rate	%	5%
Energy recovery rate	%	5%
Recovery rate	%	24%
Local material utilisation rate	%	0%

8 The sorting to export flow and the recovery rate for the textiles material flow analysis include both recycling and reuse.

4.7 Tyres

The MFA results for tyres are summarised in Figure 30 and Table 25. It is estimated about 52,000 tonnes of tyres were consumed in SA in 2023-24, with 50,000 tonnes of waste generated. About 29,000 tonnes of tyres waste was recovered, which equates to an estimated recovery rate of 58%. This includes tyres processed locally into tyre-derived fuel. Tyres wear during use to generate 'tyre dust', which is represented in the 8,000 tonnes flow from consumption to environment.

Figure 30 Tyres material flow diagram, SA 2023-24

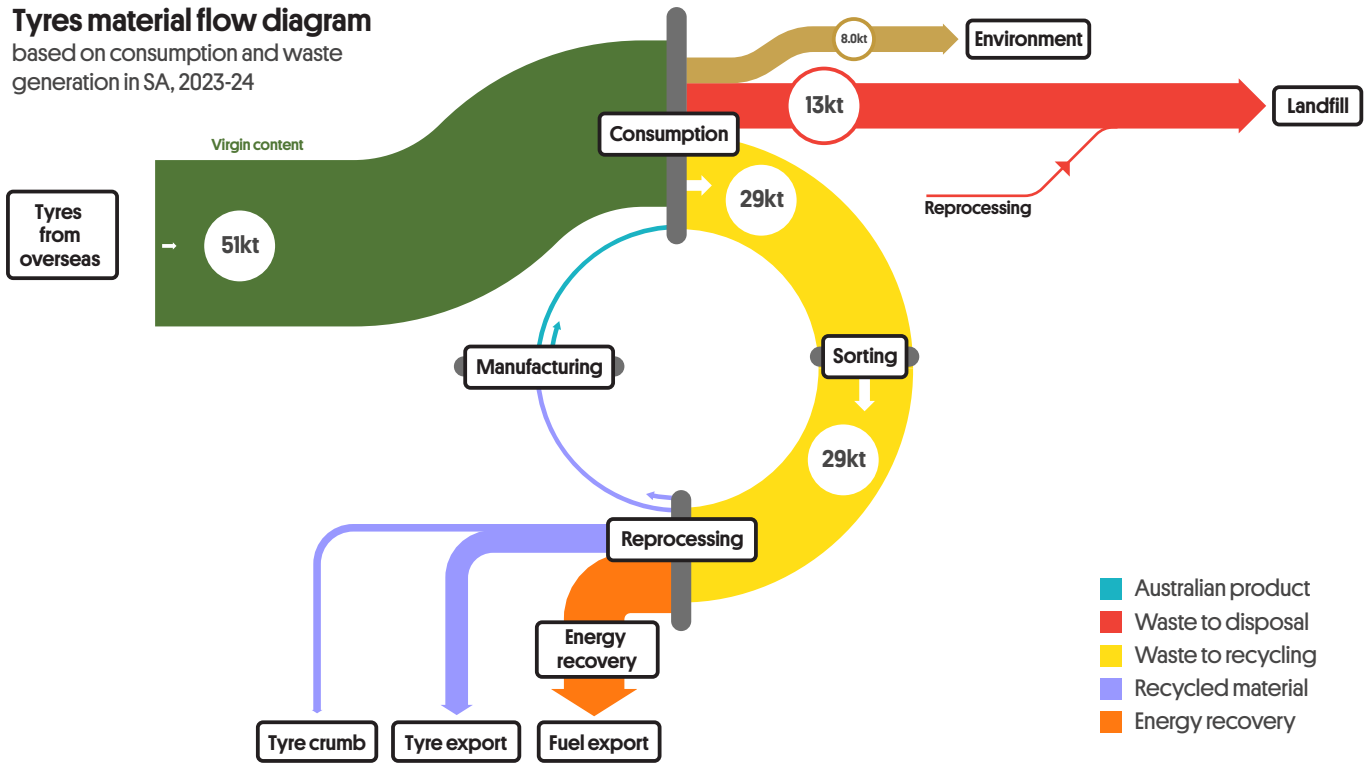


Table 25 Tyres MFA indicators, SA 2023-24

Indicator	Unit	Value
Consumption	kt	52
Waste generation	kt	50
Recovery	kt	29
Recycled content	%	2%
Collection efficiency	%	58%
Sorting efficiency	%	100%
Reprocessing efficiency	%	100%
Recycling rate	%	21%
Energy recovery rate	%	37%
Recovery rate	%	58%
Local material utilisation rate	%	7%

5 Electrical and electronic waste

Electronic waste (e-waste) means anything with a plug or battery that is no longer wanted, and includes a wide range of items such as computers, televisions and white goods.

Reported e-waste recovery in SA stayed relatively steady from 2022-23 to 2023-24, increasing by 2% from about 8,200 tonnes to about 8,400 tonnes. The quantity of batteries reportedly recovered continued to increase 2023-24, at about 4,800 tonnes.

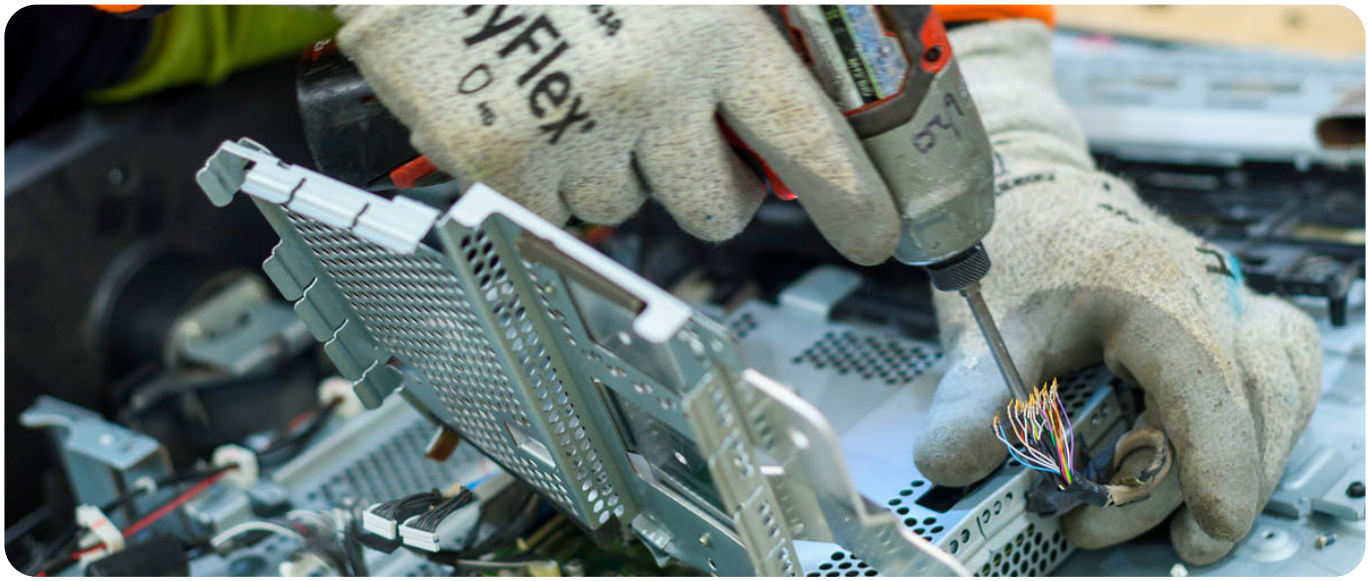


Table 26 Reported tonnes of e-waste, SA, 2019-20 to 2023-24, tonnes

E-waste type	2023-24 (tonnes)
Printer cartridges	90
Compact fluorescent lamps	120
Batteries	4,790
Computers	1,560
Televisions/monitors	1,780
Mobile phones	3.7
Other e-waste	80
Total	**8,420**

Annual trends for recovered e-waste are shown in Figure 31 and Figure 32.

Figure 31 Reported e-waste recovered since 2009-10 (batteries, televisions and monitors, computers and other e-waste)

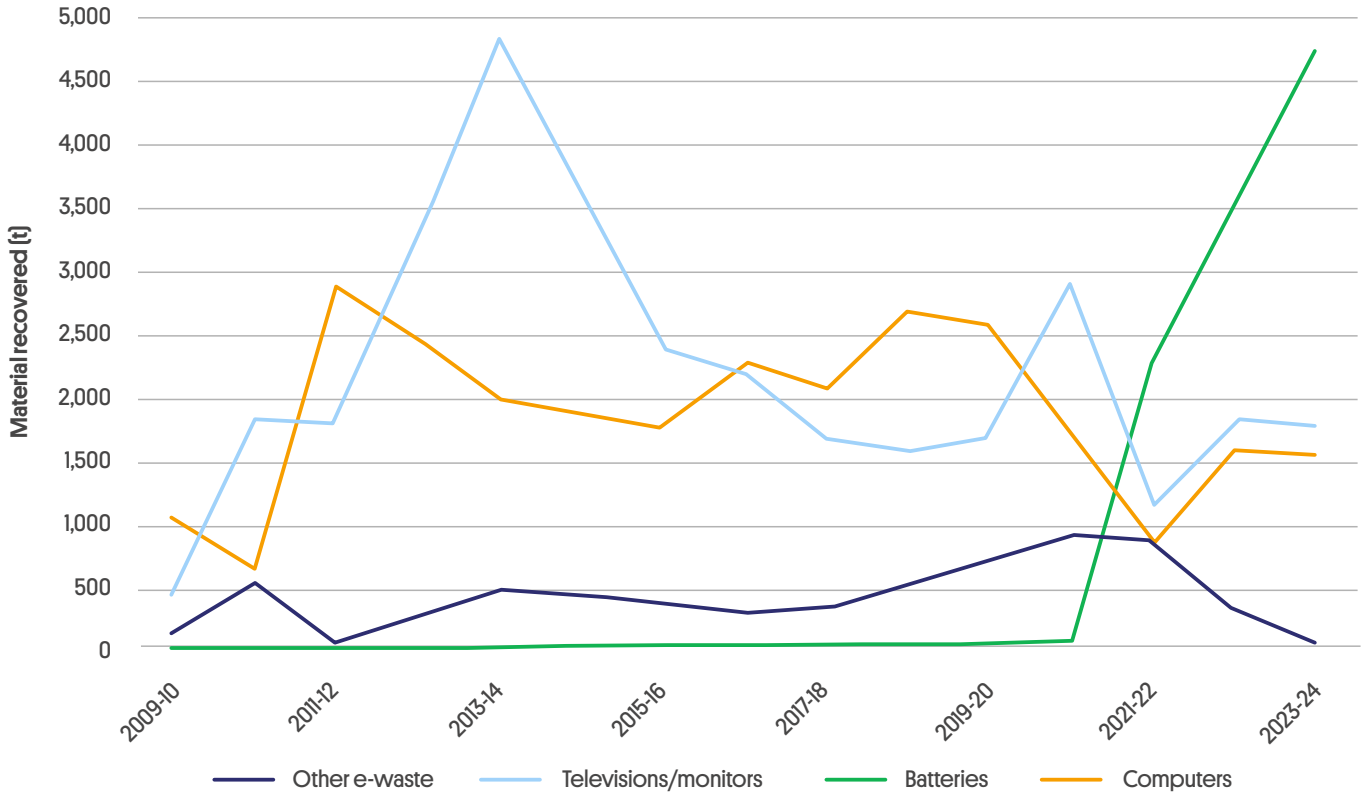
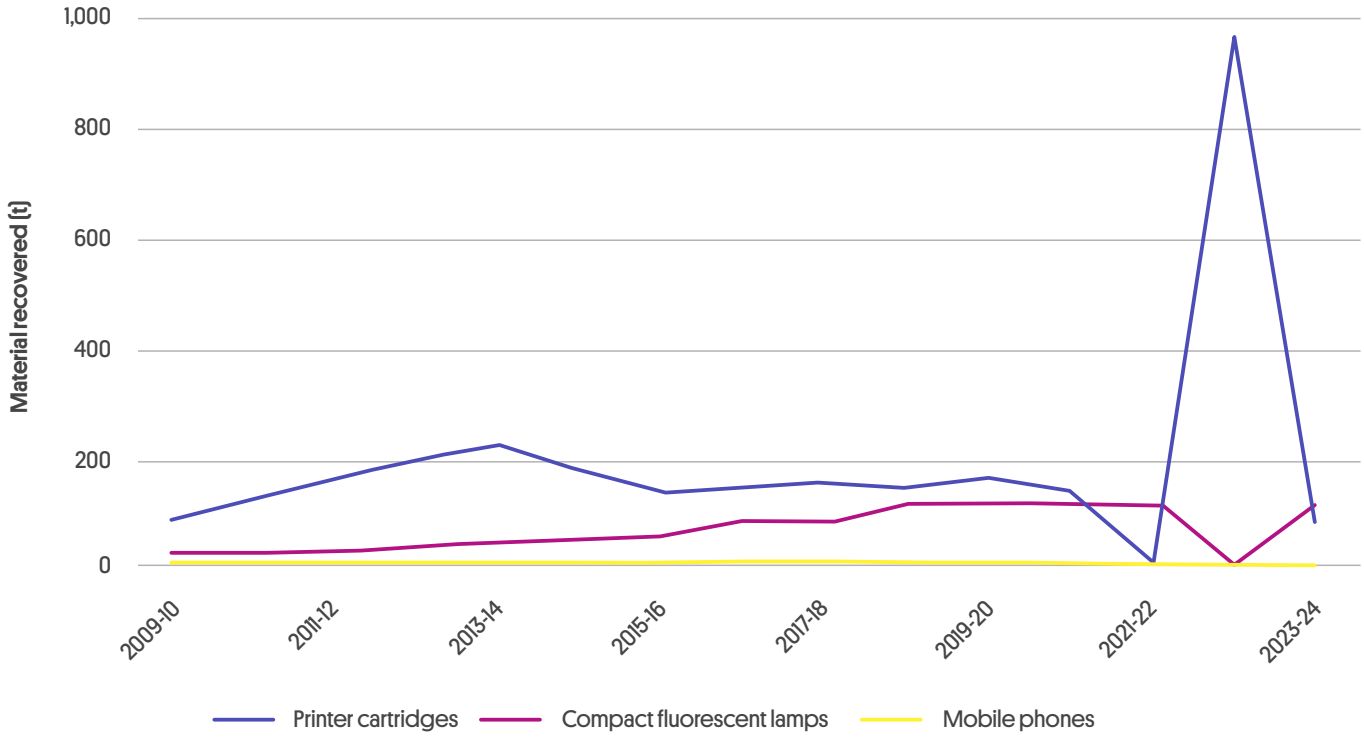


Figure 32 Reported e-waste recovered since 2009-10 (compact fluorescent lamps, printer cartridges and mobile phones)




Lactose Free
kids

6 Packaging

Australia established targets for the management of packaging waste by 2025, as follows (DCCEEW 2022):

- 100% of packaging being reusable, recyclable or compostable by 2025
- 70% of plastic packaging being recycled or composted by 2025
- 50% of average recycled content included in packaging by 2025
- the phase out of problematic and unnecessary single-use plastic packaging by 2025.

SA recovered about 249,000 tonnes of packaging materials in 2023-24, comprising 35,000 tonnes (14%) CDL materials and 212,000 tonnes non CDL materials.

Table 27 Estimated packaging recovered in SA in 2023-24 ('000 tonnes)

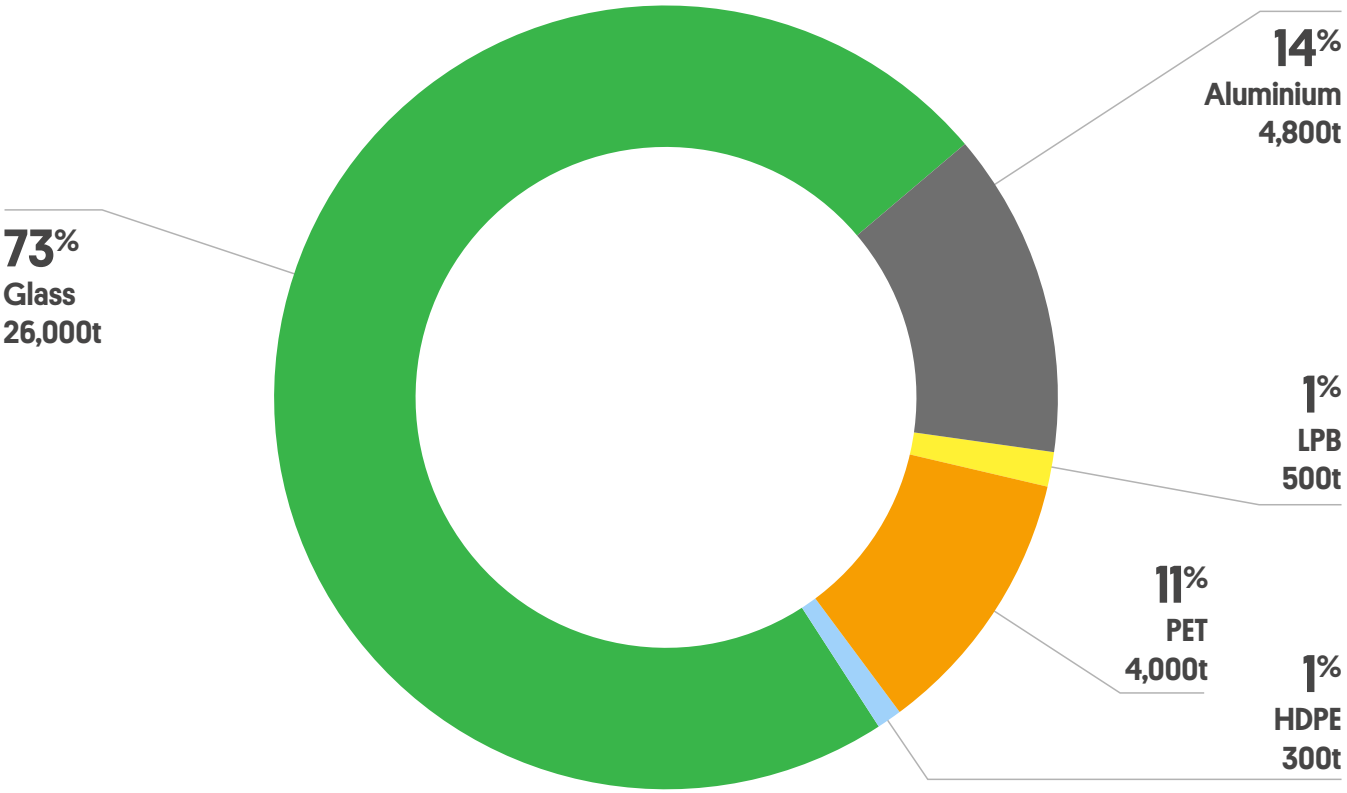
Packaging type	Recovered (tonnes)			Total recovery which is packaging
	CDL	Other	Total	
Aluminium packaging	5	0	5	11%
Steel packaging	0	6	6	2%
Cardboard packaging	0	140	140	100%
Liquid paperboard packaging	0	0.2	1	100%
Other cardboard and paper packaging	0	17	17	n/a
PET packaging	4	0	4	98%
HDPE packaging	0	7	7	83%
PVC packaging	0	<0.1	<0.1	21%
LDPE packaging	0	13	13	94%
PP packaging	0	4	4	85%
PS packaging	0	2	2	80%
Other plastic packaging	0	<0.1	<0.1	n/a
Glass bottles and jars	26	25	51	100%
Total	**35**	**214**	**249**	**n/a**

6.1 Container deposit legislation

South Australia has the longest established container deposit scheme (CDS) in Australia, having introduced its container deposit scheme in 1977.

South Australians returned about 35,000 tonnes of containers to CDS locations across the State in 2023-24. The bulk of these materials were glass containers (26,000 tonnes, 73% by weight).

Figure 33 Relative proportions of returned container deposit legislation materials by weight, SA, 2023-24



Return rates were high for glass and aluminium at over 80%, while plastics packaging and liquid paperboard exhibited more moderate returns. Return rates for aluminium, glass, PET and HDPE remained steady compared to return rates in 2022-23.

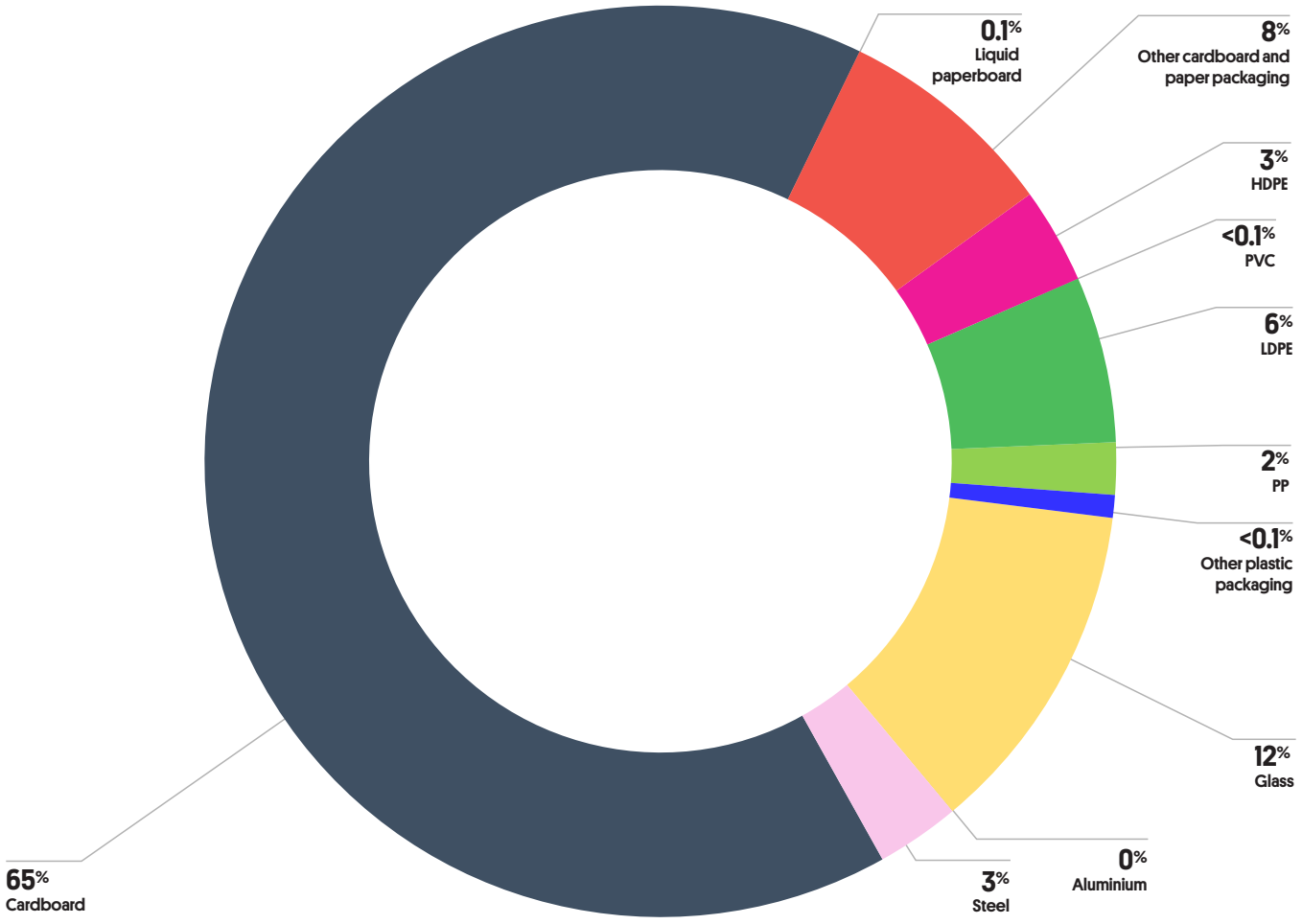
Table 28 Return rates for SA's container deposit legislation materials in 2023-24

Packaging material	'000 tonnes	Return rate (%)
Aluminium	4.8	80%
Liquid paperboard	0.5	49%
PET	4.0	66%
HDPE	0.3	55%
Glass	26	84%

6.2 Other packaging materials

Figure 34 presents the tonnes and proportions of non-CDL recovered packaging material from 2023-24. Cardboard packaging remained the highest contributor (65%). The second highest proportion was glass bottles and jars (12%).

Figure 34 Relative proportions of other (non-CDL) packaging materials, SA, 2023-24



7 Resource recovery value

The total value of resource recovery in SA in 2023-24 is estimated at about $783 million. The detailed resource values by material type can be seen in Table 29 and Figure 35.

Overall, metals recovery ($360m) was the greatest contributor to total resource recovery value followed by organics ($339m). These two combined make up 89% of the resource recovery value

Table 29 Estimated resource value for recovered materials in SA in 2023-24

Material category or type	Quantity recovered ('000 tonnes)	Estimated on-sale price ($/tonne)	Estimated value ($ millions)
Masonry	1,178	$13	$15
Metals – iron and steel	379	$524	$199
Metals – non-ferrous including aluminium	58	$2,796	$162
Organics – meat rendering	109	$2,000	$219
Organics – garden, food and timber	740	$164	$121
Organics – other	437	Variable	Not calculated
Cardboard and paper	223	$155	$35
Plastics	42	$393	$17
Glass	74	$54	$4
Other materials (including tyres and other rubber, leather and textiles and foundry sands)	36	$84	$3
Separately reported materials and clean fill	1,085	$9	$10

Long term trends for resource recovery values are shown in Figure 36.

Figure 35 Estimated market value of resource recovered materials, SA, 2022-23

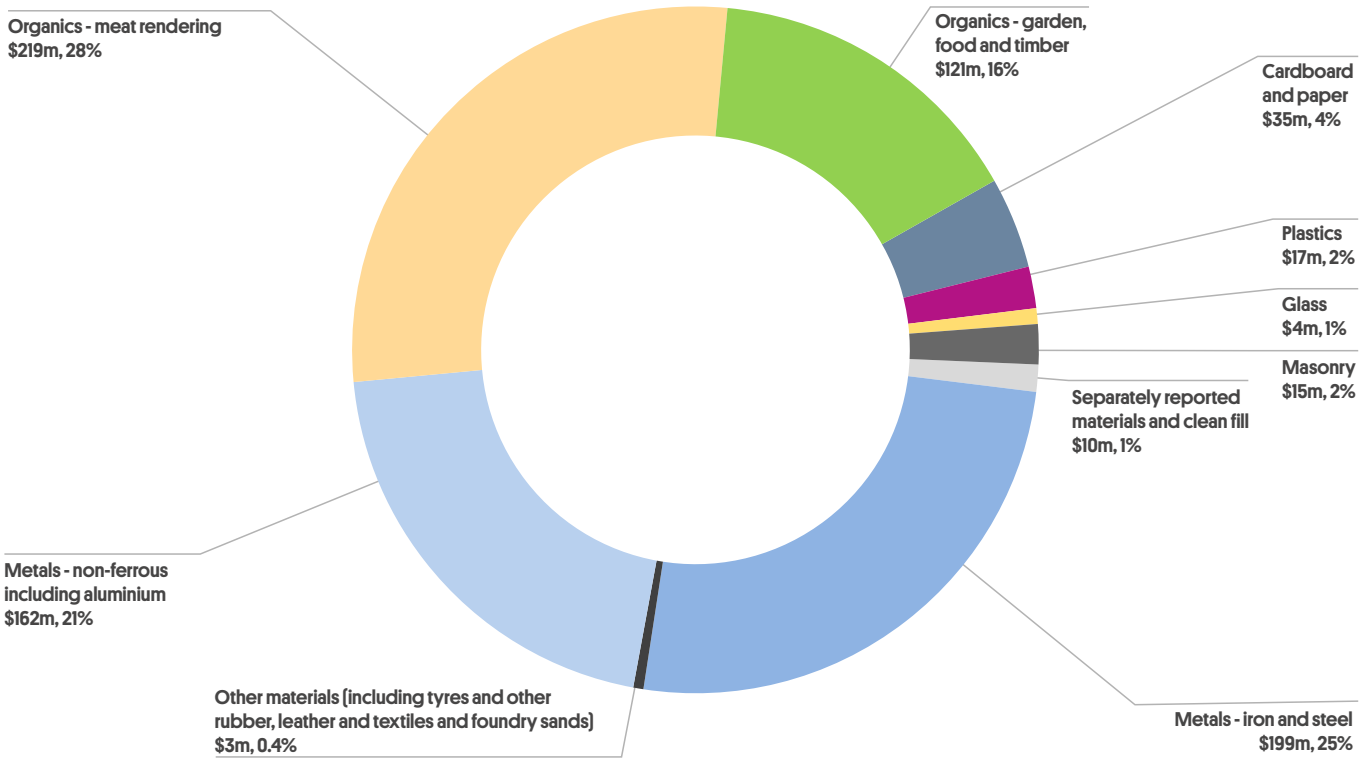
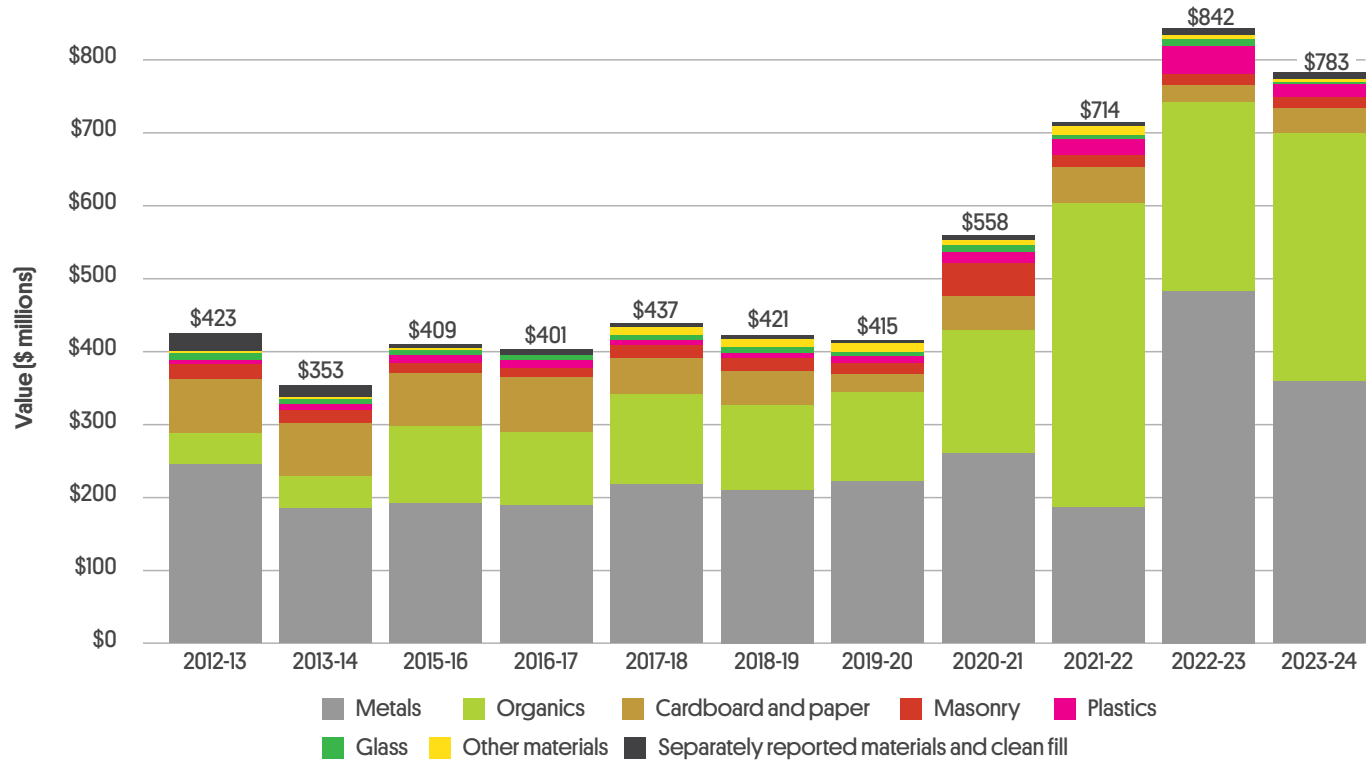


Figure 36 Estimated market value of resource recovered materials in SA, 2012-13 to 2023-24[9]



9 Historical values have been adjusted to account for inflation. No data available for 2014-15.

8 Environmental benefits of recycling

The production and consumption of materials requires the use of energy and water and emits greenhouse gases. When a recoverable material is landfilled, the resource and the energy 'embodied' within it (that is, the energy used to make it) are wasted. Additionally, when materials prone to biological decay (organics, paper and cardboard or textiles) are landfilled, they generate and release the potent greenhouse gas, methane. These benefits are summarised in Table 30.

Table 30 Estimated environmental benefits of recycling in SA in 2023-24

Material type	Recycling '000 tonnes	Emissions avoided '000 tonnes CO_2-e	Energy saved TJ LHV	Water saved Megalitres
Total	4,120	1,760	20,300	7,740

8.1 Greenhouse gas emission savings

Through recycling its materials in 2023-24, SA saved about:

1.76 million tonnes

of carbon dioxide equivalent (CO_2-e)

Emission savings due to recycling in 2023-24 are approximately equivalent to:

the CO_2 absorbed by

2.63 million trees

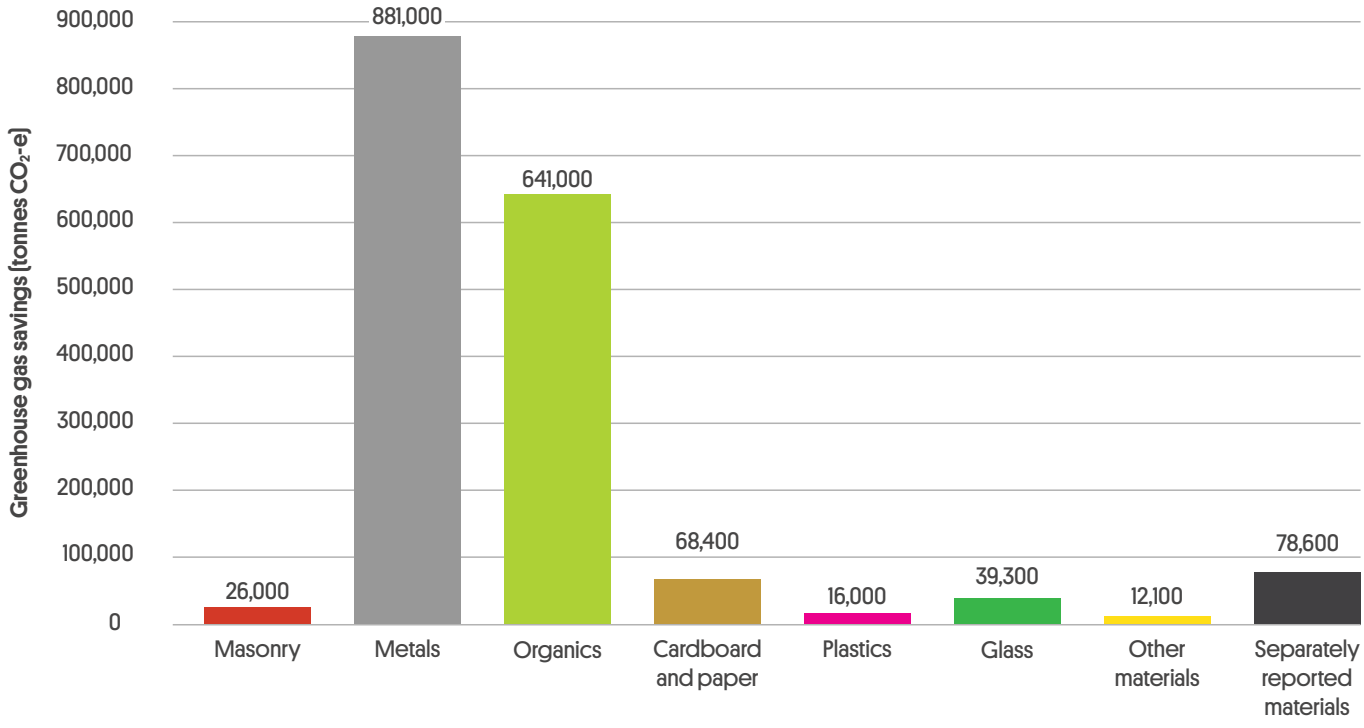
emissions from

352,000 cars

off the road in one year

Figure 37 illustrates the different contributions each material type makes to these greenhouse gas savings.

Figure 37 Estimated greenhouse gas emissions savings due to recycling, SA, 2023-24



8.2 Energy savings

Through recycling its materials in 2023-24, SA saved about:

20,300 Terajoules of energy

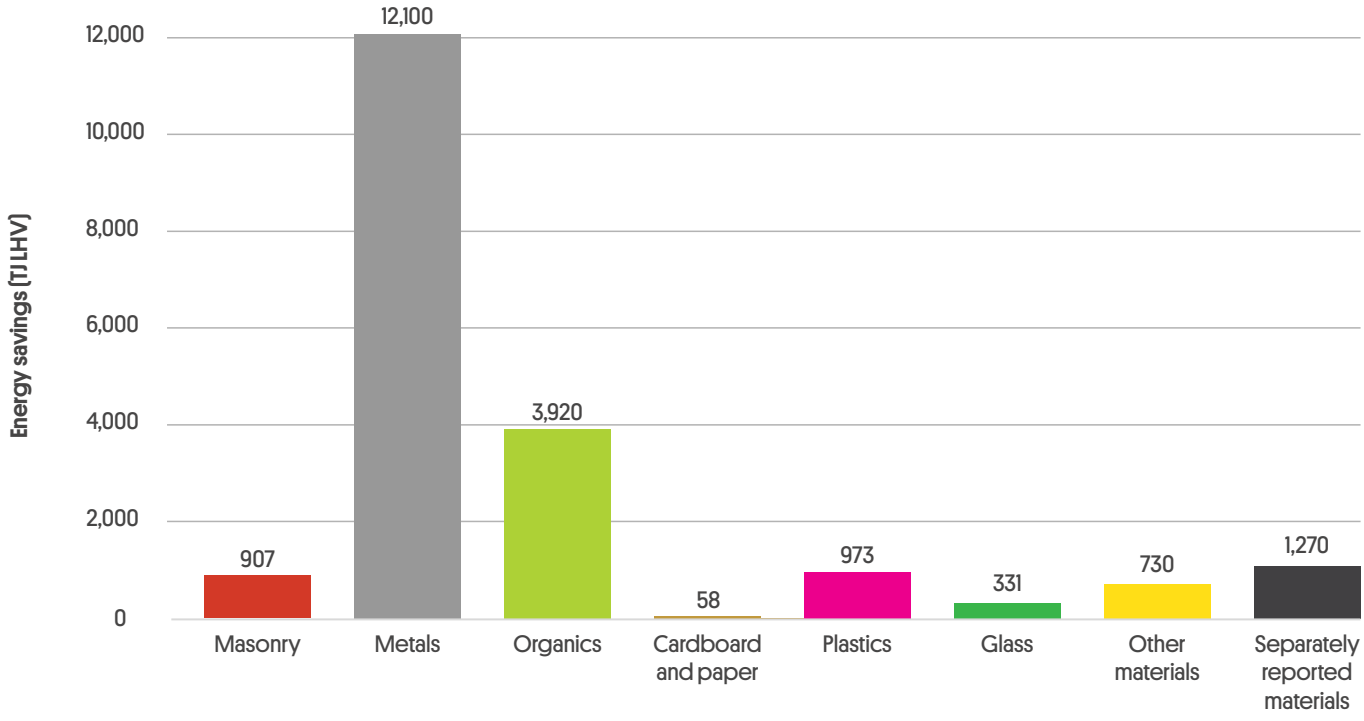
Energy savings due to recycling in 2023-24 are approximately equivalent to:

Energy use from **397k households** in one year

The energy supplied by **3,320,000 barrels of oil**

Figure 38 shows the contributions each material type makes to these energy savings from recycling in 2003-04.

Figure 38 Estimated energy savings due to recycling, SA, 2023-24



8.3 Water savings

Through recycling its materials in 2023-24, SA saved about:

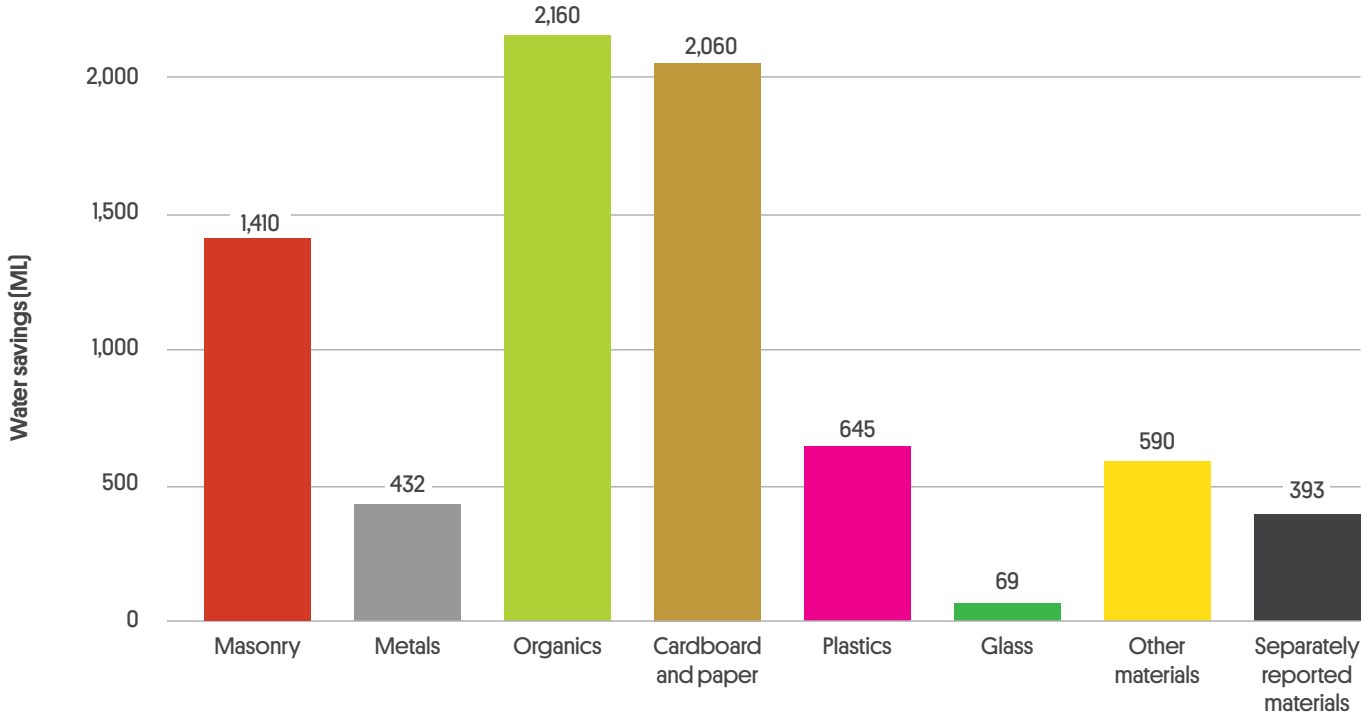
7,740 megalitres of water

Water savings due to recycling in 2023-24 are approximately equivalent to:

water use from **44,500 households** in one year

Figure 39 shows the different water savings by material type due to recycling.

Figure 39 Estimated water savings due to recycling, SA, 2023-24



Acknowledgements

Green Industries SA would like to acknowledge and thank the participants of the Circular Economy Resource Recovery Survey 2023-24 and the SA Organics Industry Survey 2023-24. The list below excludes organisations that asked not to be identified.

Adelaide Hills Region Waste Management Authority

Australian Mobile Telecommunications Association (MobileMuster)

Australia and New Zealand Recycling Platform

Boral Resources SA

Ceduna Can & Bottle

Chevron Glass

Clare Valley Waste

Corporation of The City of Adelaide

D'arenberg

Downer

Ecoplas Australia

Electronic Recycling Australia

Fleurieu Regional Waste Authority

Foamex

Gabalu

Hallett

Infrabuild Recycling

Intercast & Forge

IWS

JBS Australia - Bordertown

Jeffries Garden Soils

Marine Stores

Mobius Farms

Northern Adelaide Waste Management Authority

Nyrstar

Opal Packaging Australia

Orora

Peats Soil

Re.Group

Recycling Plastics Australia

Remondis Australia

ResourceCo

SA Composters

Shred-x

Sims Metal

South Australian Water Corporation

Transmutation

Urban Renewal Authority

Van Schaik's Bio Gro

Veolia-ResourceCo Alternative Fuels

Visy Recycling Australia

YCA Recycling


Kalaini
2
5
GIVE WEEKLY
FOGO
FOOD ORGANICS
GARDEN ORGANICS
A GOGO
CITY OF
HOLDFAST BAY

Government
of South Australia

Green Industries SA

Level 4, 81-95 Waymouth Street
Adelaide, South Australia 5001

+61 8 8204 2051

www.greenindustries.sa.gov.au