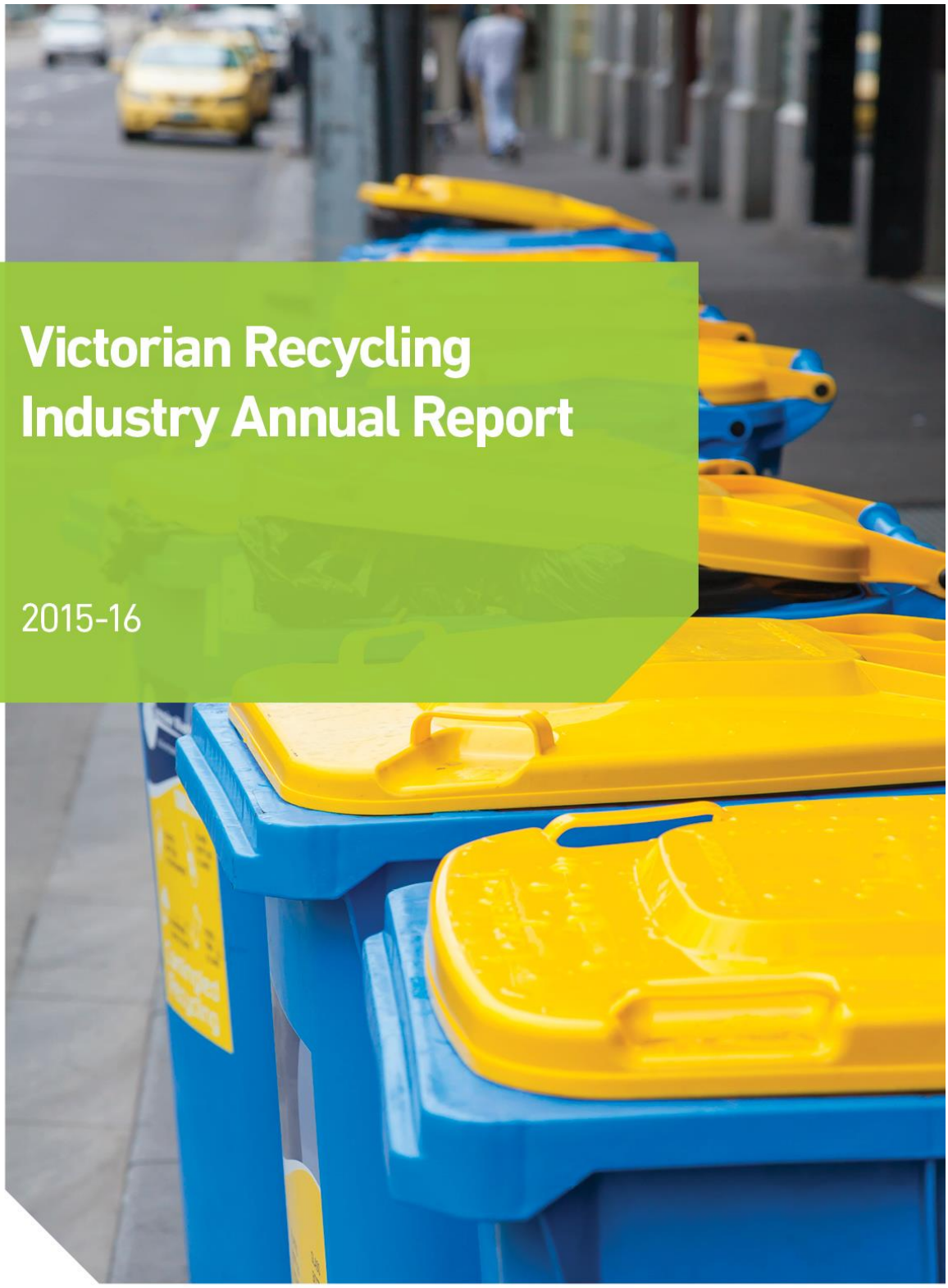

Victorian Recycling Industry Annual Report

2015-16

Sustainability Victoria

VICTORIA State Government

Victorian Recycling Industry Annual Report 2015-16

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Contents

1. Introduction

Sustainability Victoria (SV) has surveyed Victorian waste reprocessors since 1999 regarding the amount of material diverted from landfill (recovered). The Victorian Recycling Industry Annual Report (VRIAR) details the amount of waste generated, landfilled and recovered in Victoria, as well as the composition of these waste materials, sources of recyclables, material exports and recovered resource product markets.

In 2014-15, a new methodology for calculating recovery rates and landfill data was introduced to provide a better estimate of the total waste disposed to landfill and waste generated in Victoria. From 2014-15, landfill data now includes a 15 per cent daily cover which had been excluded in past reports. This will enable improved comparison with other states in the *National Waste Report* produced by the Department of the Environment and Energy. Historical landfill data in previous editions of the VRIAR has been modified to reflect this updated and improved methodology. This change resulted in an approximate 4 percentage point decline in previously published recovery rates.

Historical figures have also been recalculated and updated using rebased Gross State Product (GSP) and population figures sourced from the Australian Bureau of Statistics (ABS). The survey methodology can be found in Appendix B, while waste composition, source sector and recovery trends are presented in Appendix C.

Background

Recycling and reprocessing are well-established industries in Victoria, employing over 8,000 Victorians and generating over $2.2 billion in annual revenues.

Recycling describes the combined set of activities that are undertaken to collect, sort, process and remanufacture waste materials, while *reprocessing* is the act of transforming the physical structure of the waste material itself. For the purposes of this report, the term 'recycling' will address the sector as a whole.

The recycling industry recovers a range of recyclable material from waste for reuse. The principle waste material streams are categorised as: *Aggregate, masonry and soil*; *Glass*; *Metal*; *Organics* (including timber); *Paper and cardboard*; *Plastics*; *Rubber*; and *Textiles*. These materials are recycled into a range of products, including recycled forms of their original state (e.g. concrete and plastics), entirely new products (e.g. animal feed and bedding), soil conditioners (e.g. fertilisers) and energy (e.g. combustion or biological treatment).

Materials recovered by the recycling industry are predominantly generated within Victoria, with a small amount received from other states and territories. While the majority of material recovered is reprocessed in Victoria, some waste material is exported.

Waste material for reprocessing is sourced from three sectors: 'Municipal Solid Waste' (MSW); 'Commercial & Industrial' (C&I); and 'Construction & Demolition' (C&D). The primary reprocessing industries in Victoria are:

- Smelters and foundries of steel, aluminium and other non-ferrous metal
- Crushing plants and auxiliary screening of concrete, brick, asphalt and related materials
- Paper/cardboard and de-inking pulp mills
- Composting facilities
- Glass product manufacturers
- Rubber product manufacturers
- Plastics reprocessors

These and other reprocessing operations make a significant contribution to the Victorian economy in employment and investment, and generate substantial cost savings in the production of more affordable (but as-effective) recycled materials.

The environmental benefits of reprocessing materials are:

- Savings in the extraction of raw materials such as mineral ores used in virgin metal production, timber in paper production and oil in plastic manufacturing.
- Savings in water and electricity in the production of virgin metals, concrete, paper and glass.
- Reduced greenhouse gases (methane emissions) from landfill and energy-intensive primary production processes.
- Reduced groundwater and soil contamination from landfill, and the preservation of landfill space.

Key findings for 2015-16

With Victoria's rapidly growing population and waste generation, the state continues to increase its total recovery of waste by weight. However, the recovery rate itself remains steady at 67 per cent. Encouragingly, local industry has demonstrated resilience to ongoing uncertainties in global commodities markets, with growth in particular streams (*Aggregates, masonry and soil*, *Paper and cardboard*) and declines in others (*Glass* and *Rubber*).

In 2015-16:

Over 12.67 million tonnes of waste was generated in Victoria and of this:

- 4.18 million tonnes (33 per cent) were sent to landfill; and
- 8.49 million tonnes (67 per cent) were diverted from landfill for recycling.

Of the 8.49 million tonnes of material diverted:

- 7.27 million tonnes (86 per cent) of the material remained in Victoria;
- 1.21 million tonnes (14 per cent) of the material was exported overseas, an annual decline of 6 per cent; and
- No waste materials were *reported* to have been transported interstate.

Other findings

The amount of material recovered was 8.49 million tonnes, a 1 per cent increase over the previous year. Of that, recovery within the primary material streams in 2015-16 was as follows:

- *Aggregates, masonry and soil*: 4.01 million tonnes, an annual increase of 3 per cent
- *Paper and cardboard*: recovered in Victoria increased by 1.3 per cent to 1.55 million tonnes
- *Glass*: 173,000 tonnes, an annual decline of 12 per cent
- *Plastics*: 149,000 tonnes, a 7 per cent annual decline
- *Rubber*: 54,000 tonnes, a 23 per cent annual decline
- *Organics*: 1.04 million tonnes, unchanged from 2014-15 but the second highest amount of organic material recovered in Victoria since the collection of waste data began
- *Metal*: 1.4 million tonnes, unchanged from 2014-15

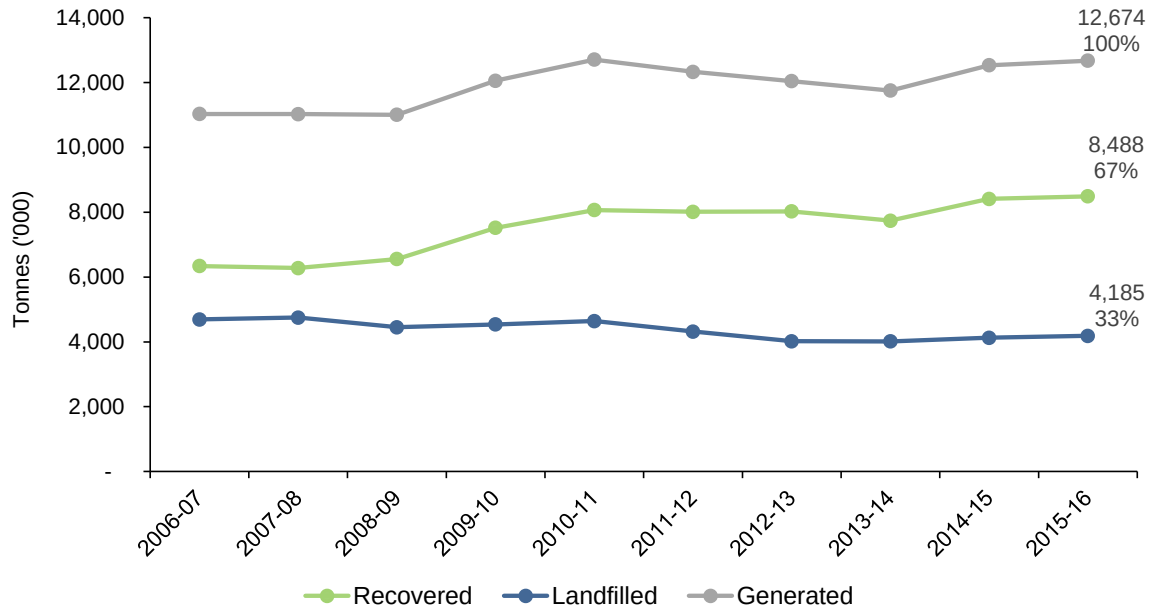
2. Total materials generated and recovery rates

In 2015-16, Victoria:

- generated 12.67 million tonnes of waste, a 1.1 per cent annual increase
- landfilled 4.18 million tonnes of waste, a 1.5 per cent annual increase
- recovered 8.49 million tonnes of waste, a 1.0 per cent annual increase

Figure 1 illustrates Victoria's waste generation, landfilling and recovery rates over the last 10 years. Per capita waste generation has been relatively stable despite the overall trend of growth in total waste generation (see Table 1 and Figure 2).

Figure 1: Waste generation, Victoria 2006-07 to 2015-16



In 2015-16, waste generation per capita remained at 2.1 tonnes per person. The amount of material recovered per capita decreased to 1.4 tonnes, a decline of approximately 0.01 tonnes per person or 1 per cent than the previous year (Table 1). Waste generation relative to Gross State Product (GSP) declined by 4.2 per cent in 2015-16 to 31.8 tonnes of waste generated for every million dollars of GSP (Table 1 and Figure 2).

This may reflect broader changes in the Victorian economy, including:

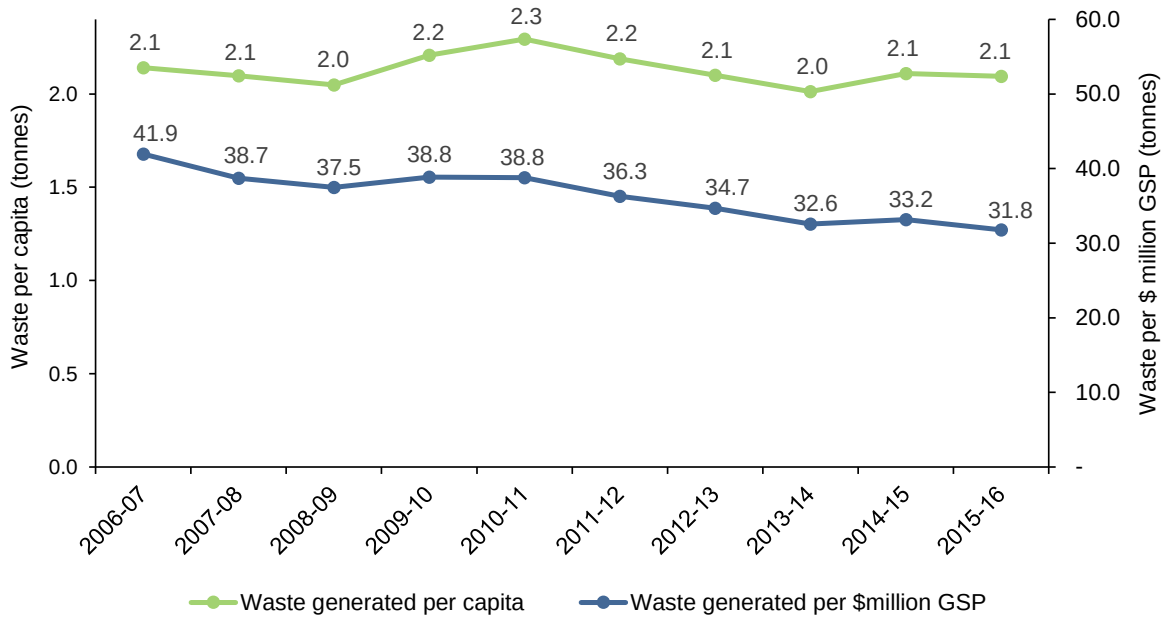
- the shift from traditional manufacturing to niche manufacturing and service sector activity;
- the ongoing trend of "lightweighting" through the development and use of new materials; and
- industry efforts to reduce upfront weight generation through improved resource management.

Consequently, we can attribute growth in total waste generation to population growth. Where there is variation, this appears largely attributable to C&D waste, reflecting the cyclical nature of construction activity in Victoria and its responsiveness to economic conditions (e.g. the 2008 global financial crisis).

Table 1: Total waste generation relative to economic and population trends, Victoria 2006-07 to 2015-16

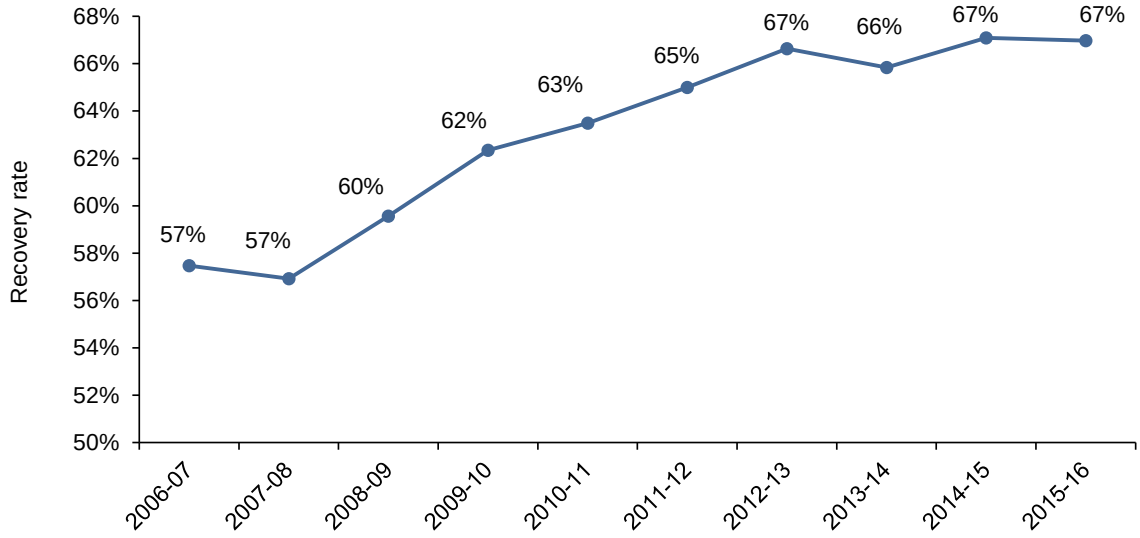
Report year	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Tonnes										
Waste generated per capita	2.1	2.1	2.0	2.2	2.3	2.2	2.1	2.0	2.1	2.1
Tonnes										
Waste generated per $million GSP	41.9	38.7	37.5	38.8	38.8	36.3	34.7	32.6	33.2	31.8
Tonnes (million)										
Total Waste Generation	11.0	11.0	11.0	12.1	12.7	12.3	12.0	11.8	12.5	12.7

Figure 2: Total waste generation relative to economic and population trends, Victoria 2006-07 to 2015-16



In 2015-16, the proportion of Victoria's solid waste rate recovered for recycling remained relatively stable, recovering 8.49 million tonnes of materials and achieving a recovery rate of 67 per cent. Figure 3 illustrates the increase in resource recovery rate of solid waste since 2006-07.

Figure 3: Resource recovery rate of solid waste, Victoria 2006-07 to 2015-16



Note: Since 2014-15 Historical landfill data has been modified to reflect the inclusion of the 15 per cent daily coverage which until now then not been included in the VRIAS. This change in methodology is reflected in the recovery rate and had been used to recalculate previous year's recovery rates to provide the trend in the above graph.

3. Composition of material

The types of solid material recovered for reprocessing in 2015-16 is presented in Figure 4. *Aggregates, masonry & soil* accounted for 48 per cent of all material recovered for reprocessing by weight and *Metal* and *Paper and cardboard* accounted for 17 per cent and 18 per cent respectively.

Figure 4: Composition of material recovered for reprocessing (by weight), Victoria 2015-16

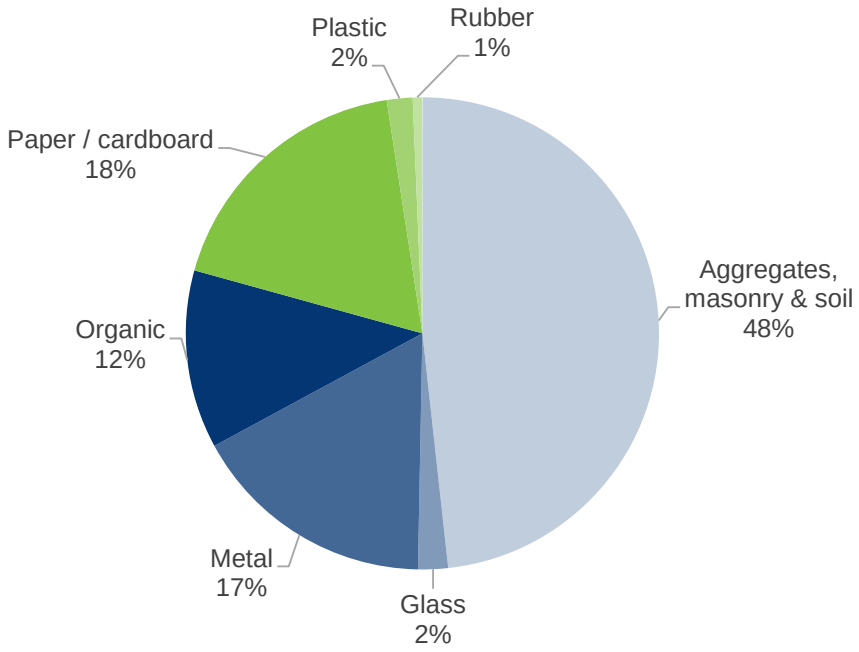


Table 2 details the summary of material recovered in Victoria for reprocessing in 2015-16. While most materials experienced only marginal changes in recovery rates, some, such as *Rubber*, *Plastics*, *Glass* and *Textiles* showed significant change.

Table 2: Total material types recovered for reprocessing, Victoria 2015-16 and 2014-15

Material Recovered	2015-16 (tonnes)	2014-15 (tonnes)	Change since 2014-15
Aggregates, masonry & soil	4,093,270	3,990,642	3 per cent
Glass waste	173,189	197,026	-12 per cent
Metal waste	1,424,726	1,415,153	1 per cent
Organic waste	1,035,354	1,044,651	-1 per cent
Paper/cardboard waste	1,550,708	1,530,187	1 per cent
Plastic waste	149,128	160,534	-7 per cent
Rubber waste	53,672	69,348	23 per cent
Textile waste	2,034	2,173	-6 per cent
E-waste	6,369	0	n/a
Total waste recovered	**8,488,450**	**8,409,714**	**1 per cent**

In 2015-16, the recovery of:

- *Aggregates, masonry & soil* material increased by 3 per cent to 4.09 million tonnes.
- *Metal* increased by 1 per cent to 1.42 million tonnes.
- *Glass* waste decreased by 12 per cent to 173,000 tonnes.
- *Plastic* waste decreased by 7 per cent to 149,000 tonnes.
- *Rubber* waste decreased by 23 per cent to 1.53 million tonnes.

Table 3 shows that the recovery of most waste materials has increased considerably over the past 10 years, with the exceptions of *Glass* and *Textiles.*

- The total amount of waste recovered in Victoria in 2015-16 is 2.15 million tonnes higher than in 2006-07, an increase of 34 per cent.
- *Glass* recovery by weight peaked in 2006-07 was the year with the highest reported *Glass* recovered in Victoria since records began. Over the past 10 years, the total amount of *Glass* recovered has fluctuated between the 150,000 and 200,000 tonnes mark.
- The recovery of *Paper and cardboard* and *Rubber* waste has nearly doubled in the past 10 years.

Table 3: Total material types recovered for reprocessing, Victoria 2015-16 and 2006-07

Material Type	Total recovery in Victoria 2015-16	Total recovery in Victoria 2006-07	Change since 2006-07
	Tonnes ('000)	Tonnes ('000)	(per cent)
Aggregates, Masonry and Soils	4,093	3,170	29 per cent
Glass	173	202	-14 per cent
Metals	1,425	1,261	13 per cent
Organics	1,035	736	41 per cent
Paper/Cardboard	1,551	822	89 per cent
Plastics	149	109	36 per cent
Rubber	54	30	81 per cent
Textiles	2	8	-73 per cent
E-waste	6	0	n/a
Total	8,488	6,338	34 per cent

4. Sources of recyclables

In 2015-16, 51 per cent of all material received for reprocessing came from the construction and demolition (C&D) sector (see Figure 5). Combinbing with commercial and industrial (C&I) waste, industry accounted for 86 per cent of all recovered material in 2015-16, an increase from 85 per cent in the previous year.

The dominance of C&D waste materials stems from the measurement of waste by weight, and the nature of C&D waste is that it is comprised of high-weight materials (concrete, brick, masonry, timber, glass), particularly when compared to MSW (plastics, paper and food)

Figure 5: Source sectors of secondary-use materials received for reprocessing (by weight), excluding imports, Victoria 2015-16 and 2014-15.

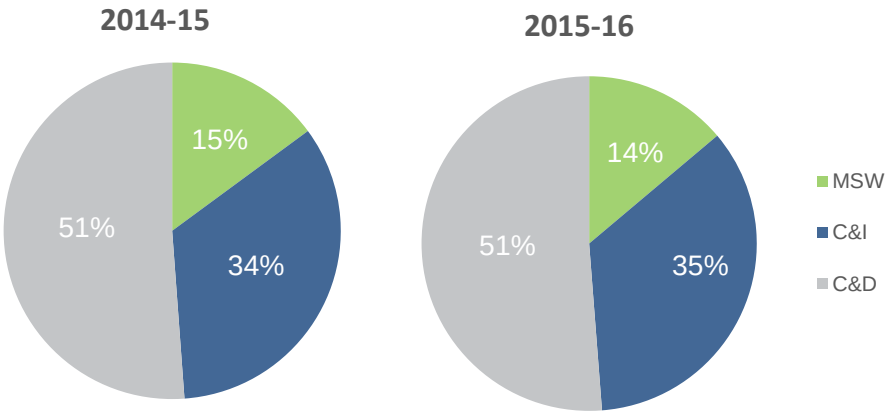


Table 4 details the estimated tonnages of material recovered in Victoria for reprocessing in 2015-16 from each source sector.

Table 4: Source sectors of material received by reprocessors, Victoria 2015-16

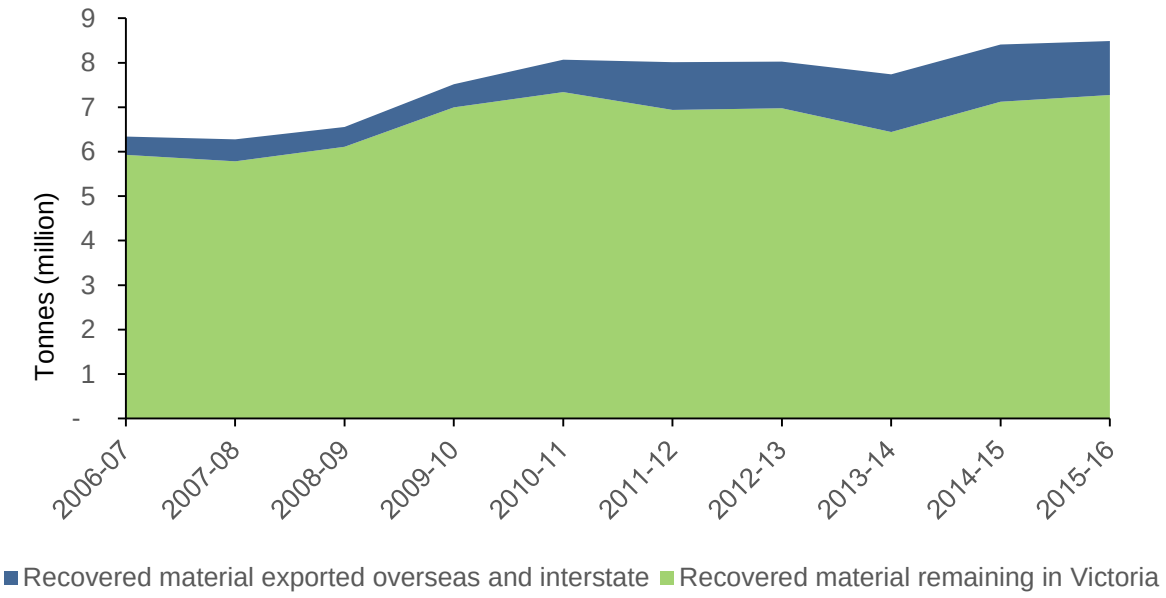
Material type	MSW	Commercial & Industrial	Construction & Demolition
	Tonnes ('000)		
Aggregates, masonry & soil	11	13	4,069
Metal	352	870	203
Paper/cardboard	239	1,311	480
Organic	313	651	72
Glass	163	9	1
Plastic	88	58	3
Rubber	1	52	0
Textiles	2	0	0
E-waste	6	0	0
Total	1,175	2,965	4,348

Note: Figures reported for the material received by source sector have been extrapolated to include the relative proportions derived from reported data and applied to surveys that did not provide a source sector for the different material types and the export data from the Australian Bureau of Statistics. These proportions were not applied to imports. Figures reported in the table have been rounded to the nearest thousand and individual columns may therefore not add up to the totals reported elsewhere.

5. Reprocessing and exports

Victoria reprocesses the majority of its recovered waste materials locally (Figure 6). In 2015-16, 7.27 million tonnes of recovered material remained in Victoria for reprocessing. This represents an increase of 2 per cent since 2014-15 (7.12 million tonnes) and accounts for 86 per cent of all recovered material.

Figure 6: Material reprocessed and exported overseas or interstate, Victoria 2006-07 to 2015-16



Note: The two data sources in the above figure combine to create a cumulative total.

The key materials exported are scrap metal, paper, plastics and rubber, all globally traded commodities. Lower value materials, such as waste from construction and demolition activities, garden organics and glass fines, are rarely exported, as it is financially prohibitive to do so. Most of the recovered material currently exported had previously been sent to landfill, with a component of it sourced from existing stockpiles.

In 2015-16, the export of waste materials overseas decreased by 6 per cent to 1.21 million tonnes. The overall decline in exports is mostly due to a considerable reduction in exports of *Metal* and *Rubber* waste.

Key changes in 2015-16 waste exports from 2014-15 were:

- *Metal* waste decline of 26 per cent
- *Rubber* waste decline of 33 per cent
- *Plastic waste* decline of 4 per cent
- *Paper and cardboard* waste increased by 10 per cent
- Note that while *Organics* and *Glass* waste do not contribute highly to overall exports by weight they did increase from 2014-15 at 8 per cent and 300 per cent respectively.

Figure 7 illustrates the composition waste material exported overseas for reprocessing. *Paper and cardboard* accounts for 59 per cent of all waste exports, while *Metal* and *Plastics* waste are the other significant export materials, accounting for 30 per cent and 8 per cent respectively. No *Aggregates, masonry and soil* was reported to have been exported from Victoria in 2015-16.

Figure 7: Recovered material exported overseas by material type, 2015-16

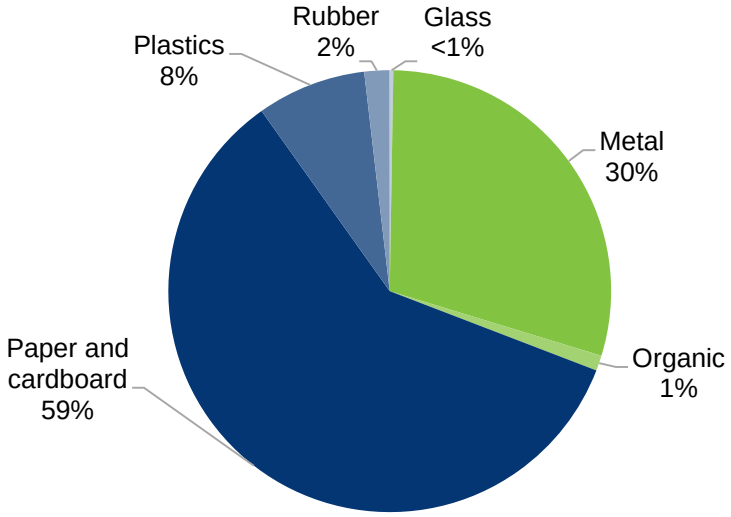
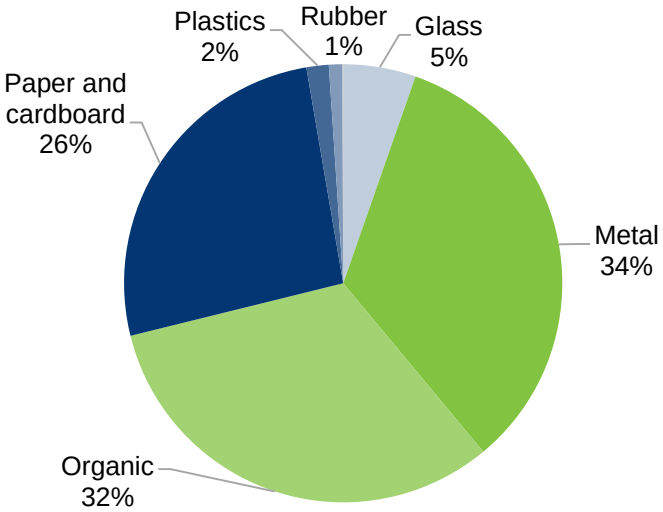


Figure 8 illustrates the composition of the waste material that remains in Victoria for reprocessing, but excludes *Aggregates, masonry and soil* due to the overwhelming nature of its share of the market (56 per cent). Of the remaining recovered waste streams, *Metal*, *Organic* and *Paper and cardboard* waste combined account for 92 per cent of local waste material reprocessing.

Figure 8: Recovered material remaining in Victoria by material type (excl. *Aggregates, masonry & soil* material), 2015-16



6. Product markets

Recovered waste materials are directed to different markets according to the quality and degree of processing required, and the latent demand for their use. Commonly used reprocessed waste materials, such as *Metal* and *Rubber*, are generally sold into the manufacturing industry for production of new products with multiple consumer and industrial applications.

Recovered *Glass* and *Paper and cardboard* are usually reprocessed into their original form. While *Paper and cardboard* can be recycled seven or eight times before it loses its 'recyclability', *Glass* can generally be recycled indefinitely.

Aggregates, masonry and soil is usually directed back into the construction industry as recycled concrete, brick and rubble, which is used to build the load-bearing 'base' layers of roads and pavements.

Organic waste is processed at licensed facilities where it is turned into composted soil conditioner and mulch products. Often these materials are then blended with other soil products to be sold by nurseries or used in the landscaping industry. More recycled organic products are now used in high-value applications such as intensive horticulture and viticulture.

Plastics recovered from the waste stream are reprocessed into an ever-growing range of valuable packaging, construction, household and automotive goods. The *2015-16 Australian Plastics Recycling Survey*[1] lists the main products derived from Australian plastics reprocessing operations (Table 5).

Table 5: Summary of end products for reprocessed plastics

Plastics code	Polymer	Major uses
1	PET	Beverage bottles
2	PE-HD	Film, blow-moulded containers, pipes
3	PVC	Pipe, floor coverings
4	PE-LD / LLD	Film (including building and agricultural film, concrete lining, freight packaging, garbage bags, shopping bags), agricultural piping
5	PP	Crates, boxes and plant pots
6	PS	Bar chairs and industrial spools
6	PS-E	Waffle pods for under slab construction of buildings
7	ABS / SAN	Injection-moulded products
7	PU	Carpet underlay
7	Nylon	Injection moulding compound
7	Other and mixed	Agricultural piping

Source: Envisage Works, *2015-16 Australian Plastics Recycling Survey*

[1] Envisage Works, *2015-16 Australian Plastics Recycling Survey*

Appendix A: Glossary

Commercial & industrial (C&I): Comprises solid waste generated by the business sector as well as solid waste created by state and federal government entities, schools and tertiary institutions. Unless otherwise noted, C&I waste does not include waste from the Construction & demolition (C&D) sector.

Commingled materials: Materials mixed together, such as paper, plastic bottles with glass and metal containers. Commingled recyclable materials require sorting after collection before they can be recycled.

Construction & demolition (C&D): Comprises solid waste generated by the construction and demolition sector. Unless otherwise noted, C&D waste does not include waste from the C&I sector.

Garden organics: Organics derived from garden sources e.g. grass clippings and tree prunings.

High density polyethylene (HDPE): A member of the polyethylene family of plastics, used to make products such as milk bottles, pipes and shopping bags. HDPE may be coloured or opaque.

Kerbside collection: Collection of household materials that are left at the kerbside for collection by local collection services generally includes residual waste, garden organics and recyclables (either separated or commingled).

Landfill: Sites that are licensed by EPA Victoria for the disposal of materials (both waste and potentially recyclable material). Also known as tips.

Linear low density polyethylene (LLDPE): A member of the polyolefin family of plastics, LLDPE is a strong and flexible plastic usually used in film for packaging, bags and for industrial products such as pressure pipe.

Low density polyethylene (LDPE): A member of the polyolefin family of plastics, LDPE is a flexible material usually used as film for packaging or as bags.

Mulch: Any composted or non–composted organic material, excluding plastic, which is suitable for placing on soil surfaces to restrict moisture loss from the soil and to provide a source of nutrients to aid plant growth.

Municipal Solid Waste (MSW): Solid waste generated from domestic premises (residual and hard waste) and council activities such as street sweeping, litter collection and street tree lopping. Also includes waste dropped-off at transfer stations and construction waste from residential owner / occupier renovations.

Non–ferrous metals: Those metals that contain very little or no iron e.g. copper, brass, bronze and aluminium.

Polyethylene terephthalate (PET): A clear, tough, light and shatterproof type of plastic, used to make products such as soft drink bottles, film packaging and fabrics.

Polypropylene (PP): A member of the polyolefin family of plastics. PP is light, rigid and glossy and is used to make products such as washing machine agitators, clear film packaging, carpet fibres and housewares.

Polystyrene (PS): A member of the styrene family of plastics, PS is easy to mould and is used to make refrigerator and washing machine components. It can be foamed to make single-use packaging, such as cups, meat and produce trays.

Polyvinyl chloride (PVC): A member of the vinyl family of plastics, PVC can be clear, flexible or rigid and is used to make products such as fruit juice bottles, credit cards, pipes and hoses.

Appendix B: Survey methodology

The Victorian Recycling Industry Annual Survey 2015-16 was conducted in October 2016 to February 2017. The survey sought data from 72 Victorian waste reprocessing businesses. Data on plastics recovery from 18 plastic reprocessors in Victoria was also obtained from the 2015-16 Australian Plastics Recycling Survey, and incorporated into the Victorian Recycling Industry Annual Report 2015-16.

Recycling is a term used to cover a wide range of activities, including collection and sorting, reprocessing and manufacture of new products. Recovery is the process of obtaining matter or energy from discarded materials.

To avoid double counting, the focus of this survey is only on material recovered for reprocessing and not other stages of the recovered material life cycle, such as collection, sorting and manufacturing. The survey does not include materials that have been collected and baled only, or that have been resold in their original state for reuse, such as clothing sold through second-hand or charity stores. The omission of reused materials is not in any way intended to undervalue this important activity.

Each reprocessing business was emailed a survey developed for their specific industry category and asked to provide information for the 2015-16 financial year about the amount of material diverted from landfill (recovered) for reprocessing, including:

- tonnes received by their Victorian site
- tonnes received from other facilities
- tonnes imported or exported for reprocessing, both interstate and overseas
- tonnes stockpiled (unprocessed and processed)
- tonnes reprocessed on-site
- amount of material disposed of to landfill due to contamination or as processing waste
- sector/s from which the recovered materials for reprocessing were received
- major products made from their reprocessing operations and the subsequent markets (defined by the ANZSIC code divisions for all materials excluding organics) to which the products are sold
- number of full time equivalent staff directly employed in the company's recycling operations
- levels of expenditure on research and development and capital investment for activities associated with the reprocessing of secondary use materials.

The survey collects data from businesses that respond. Estimates are generally not undertaken for non-responding companies except if the volume of material is significant and an estimation based on historical trends can be made with some certainty. Due to the voluntary nature of the survey, it is expected that there will be a degree of variation from year to year. Every attempt is made to include the large reprocessing businesses to ensure that yearly variations are minimised. Data has been aggregated for reporting purposes at the state level to retain confidentiality.

A total of 65 of the 72 Victorian reprocessing businesses responded to the survey, representing a 90 per cent response rate. The survey aims at getting all large reprocessors in the State to respond to the survey to allow a comprehensive analysis of the data. However, for 2015-16 a large Aggregate, masonry and soil reprocessor did not provide any data. The average for the last 5 years of reported data was used to estimate the 2015-16 response. Nevertheless, it is estimated that the 65 responding reprocessing businesses recover more than 85 per cent by weight of all material recovered in Victoria.

Additional information was sought from the Australian Bureau of Statistics on the export of materials from Australia to overseas markets for reprocessing during the 2015-16 financial year. This data aims to capture materials exported from companies not surveyed by SV, such as export traders.

Data on solid waste disposed to licensed landfills was sourced from the Environment Protection Authority Victoria's (EPA's) landfill levy returns.

The reporting of food organics material recovery data no longer includes any prescribed industrial waste figures, such as meat leftover from rendering processes or grease traps.

Appendix C: Material specific recovery data

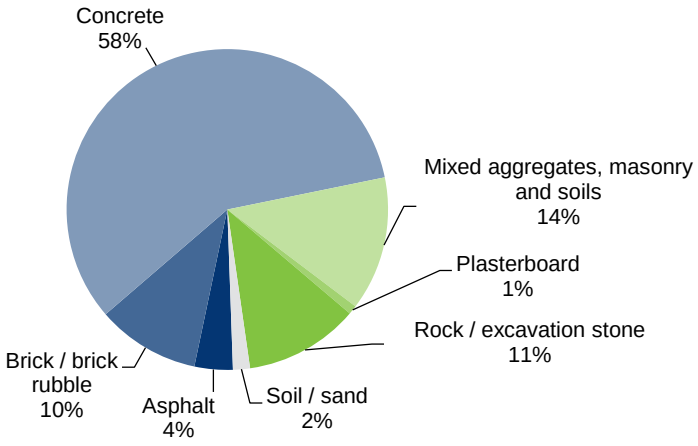
Aggregates, masonry and soil recovery in Victoria

In 2015-16 the amount of aggregates, masonry and soil recovered for reprocessing in Victoria was **4.1 million tonnes.** This is an increase of 3 per cent from 2014-15.

Of the total aggregates, masonry and soil recovered in 2015-16 (compared to 2014-15):

- Concrete accounted for 58 per cent and decreased by 37 per cent to 2.37 million tonnes.
- Mixed aggregates, masonry and soil waste accounted for 14 per cent and decreased to 554,000 tonnes from 1 million tonnes.
- Rock/excavation stone accounted for 11 per cent and decreased by 29 per cent to 471,000 tonnes.
- Brick whole/brick rubble accounted for 10 per cent and increased by 30 per cent to 425,000 tonnes.
- Asphalt accounted for 4 per cent and decreased by 2 per cent to 158,000 tonnes.
- Soil/sand accounted for 2 per cent and increased by 7 per cent to 70,000 tonnes.
- Plasterboard accounted for 1 per cent and decreased by 3 per cent to 36,000 tonnes.

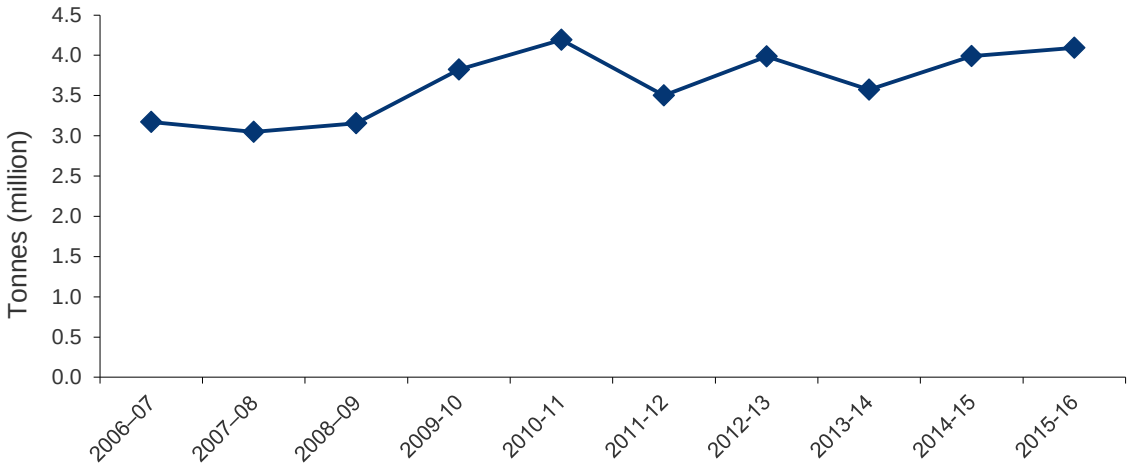
Composition of aggregates, masonry & soil material recovered for reprocessing (by weight), Victoria 2015-16



In 2015-16, the C&D sector contributed almost 100 per cent of *Aggregates, masonry and soil* for reprocessing, a slight increase from 98 per cent in 2014-15. The remaining 2 percent was equally distributed between the MSW and C&I sectors.

The figure below shows the change in the recovery of *Aggregates, masonry and soil* material over the past 10 years. Incoming material to reprocessors varies from year to year according to available stockpile space in Victoria which, in turn, is impacted by both available feedstock and market demand for processed product. This year's recovery increase is likely attributed to the reprocessing of stockpiled material over previous years and ongoing strength in the construciton sector.

Recovered aggregates, masonry & soil waste recovered for reprocessing, Victoria 2006-07 to 2015-16



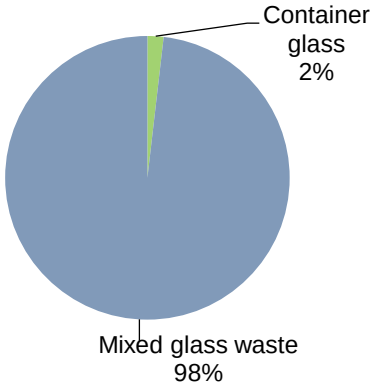
Glass recovery in Victoria

In 2015-16 the amount of glass recovered for reprocessing in Victoria was **173,000 tonnes**, a 12 per cent decrease from 2014-15.

Of the total glass recovered in 2015-16 (compared to 2014-15):

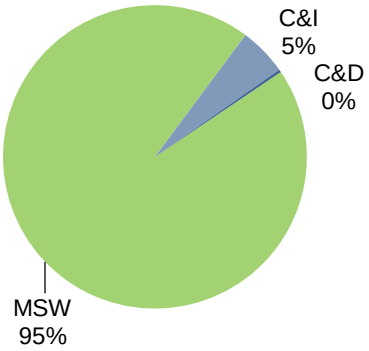
- Mixed glass accounted for 98 per cent of total glass waste, and increased by 1 per cent to 170,000 tonnes.
- Container glass accounted for 2 per cent of total glass waste and decreased by 89 per cent to 3,000 tonnes.

Composition of glass material recovered for reprocessing (by weight), Victoria 2015-16



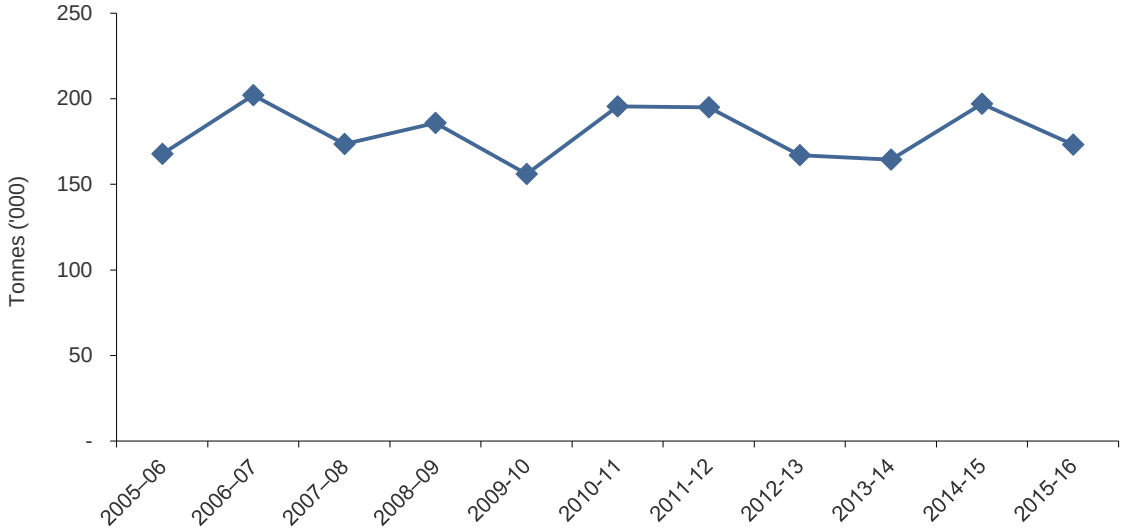
In 2015-16, reprocessed glass waste was sourced from MSW (95 per cent) and C&I (5 per cent) streams, with a negligible (<1 per cent) contribution from C&D. MSW's share increased from 85 per cent and C&I's share declined from 15 per cent in 2014-15.

Source sectors of glass received for reprocessing (by weight), Victoria 2015-16



The recovery of *Glass* waste over the past 10 years has consistently fluctuated between 150-200,000 tonnes per annum. After having achieved the second largest amount of reported *Glass* waste recovery in the last 10 years, the 2015-16 decline of 12 per cent can be attributed to lower amounts of stockpiled glass for recovery. This year's decline is largely attributable to reduction in reported container glass waste.

Recovered glass waste recovered for reprocessing, Victoria 2006-07 to 2015-16



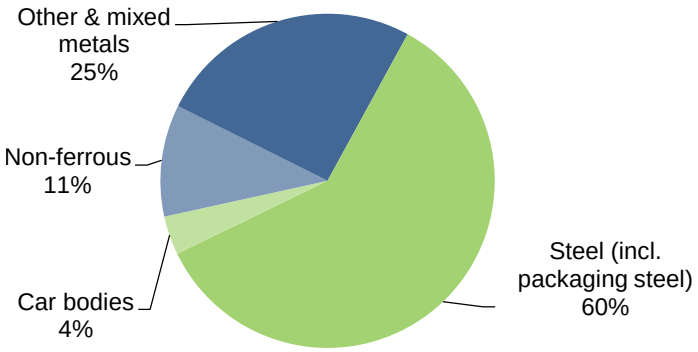
Metal recovery in Victoria

In 2015-16 the amount of *Metal* recovered for reprocessing in Victoria was **1.4 million tonnes,** an increase of less than 1 per cent.

Of the total *Metal* waste recovered in 2015-16 (compared to 2014-15):

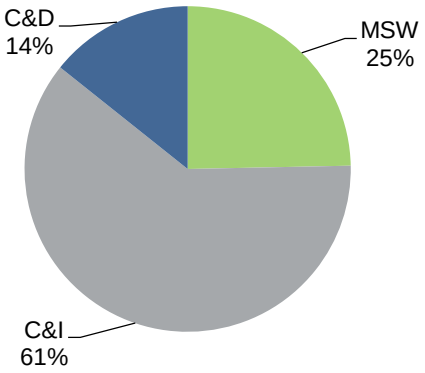
- Steel (including packaging steel) accounted for 60 per cent and decreased by 14 per to 852,000 tonnes.
- Non-ferrous metals (a mix of aluminium, copper, lead, nickel and titanium) accounted for 11 per cent and decreased 12 per cent to 154,000 tonnes.
- Car bodies accounted for 4 per cent and decreased by 2 per cent to 52,000 tonnes.
- Batteries accounted for less than 1 per cent and more than doubled to 1,600 tonnes.
- Other and mixed metals accounted for 25 per cent and increased by 86 per cent to 365,000 tonnes.

Composition of metals recovered for reprocessing (by weight), Victoria 2015-16



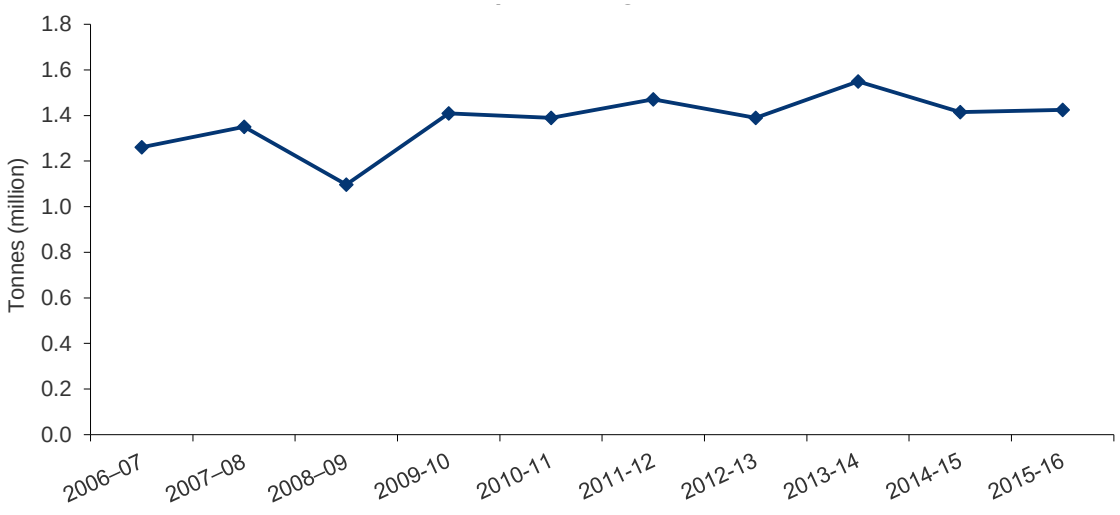
In 2015-16, the C&I sector remained Victoria's principal source of recovered *Metal*, contributing 61 per cent to the total metal recovery for reprocessing (up from 48 per cent the previous year). MSW contributed 25 per cent of the total waste (down from 28 per cent the previous year) while C&D sector contributed 14 per cent (down from 24 per cent in 2014-15).

Source sectors of scrap metal received for reprocessing (by weight), Victoria 2015–16



The graph below shows that *Metal* recovery in Victoria has remained relatively steady since 2009-10 after a large drop following the global financial crisis of 2008-9.

Metal waste recovered for reprocessing, Victoria 2006-07 to 2015-16



Organics recovery in Victoria

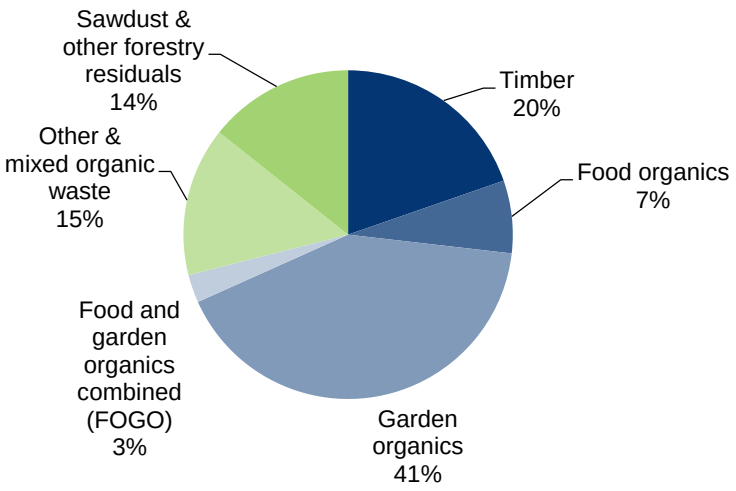
In 2015-16 the amount of *Organic* waste recovered for reprocessing in Victoria was **1.04 million tonnes**. This figure decreased by 1 per cent from 2014-15 but represents the second highest amount of organic material recovered in Victoria since organic waste data collection started.

The recovery rate can be partially attributed to an increased response rate from organics reprocessors to the survey and increased recovery of timber waste for energy generation purposes. Identifying trends in this waste stream is challenging, given the impact of weather conditions on biomass generation (and, hence, organic waste), including drought, rainfall, water-use restrictions and incidence of fire.

Of the total *Organic* waste recovered in 2015-16 (compared to 2014-15):

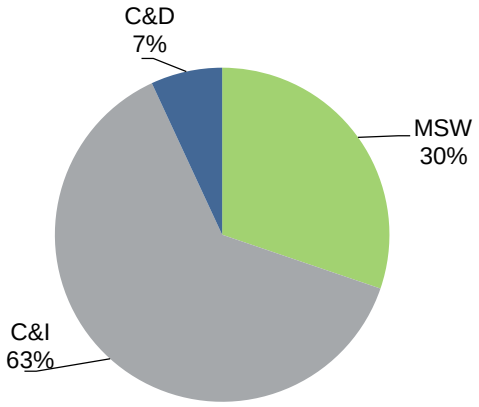
- Garden organics accounted for 41 per cent and increased by 4 per cent to 429,000 tonnes.
- Wood and timber organics accounted for 20 per cent and increased by 5 per cent to 203,000 tonnes.
- Sawdust and other forestry residuals accounted for 14 per cent and decreased by 4 per cent to 148,000 tonnes.
- Food organics accounted for 7 per cent and decreased by 9 per cent to 74,000 tonnes.
- Food and garden organics combined (FOGO) for accounted for 3 per cent, the first year that FOGO data was collected in the survey.
- Other and mixed organics waste (a mix of different types of organics that were not separated or did not fit into any other category) accounted for 15 per cent and decreased by 26 per cent to 151,000 tonnes.

Composition of organic material recovered for reprocessing (by weight), Victoria 2015-16



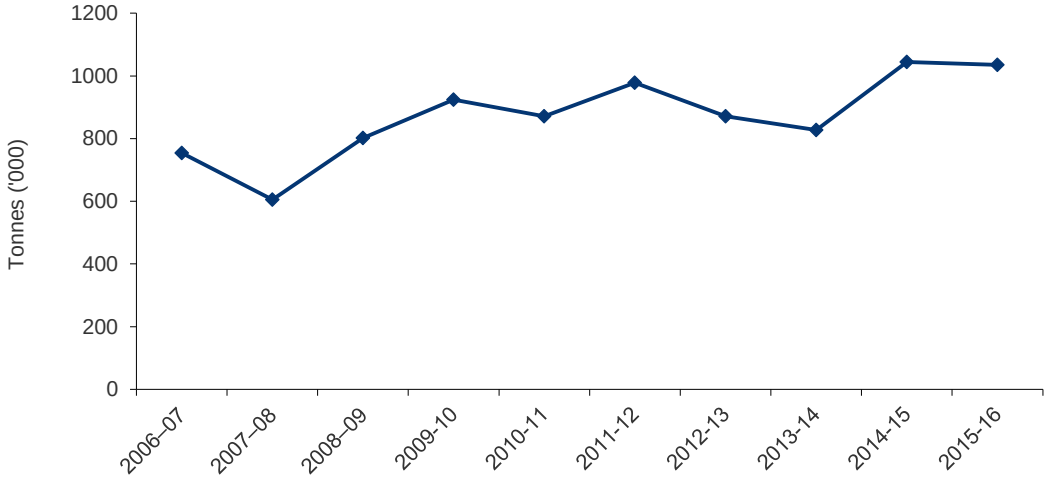
In 2015-16, the MSW sector contributed 30 per cent of the total *Organic* waste recovered (down from 42 per cent). The C&I sector contributed 63 per cent (up from 54 per cent) and the C&D contributed 7 per cent (up from 5 per cent).

Source sectors of organic material received for reprocessing (by weight), Victoria 2015–16



Organics recovery, although fluctuating from year to year, is generally trending upwards. Some of the likely reasons for this trend are the introduction of new and upgraded organics facilities, higher demand for recycled organics (RO) compost products and the increased collection of organic residues.

Organics recovered for reprocessing, Victoria 2006-07 to 2015-16



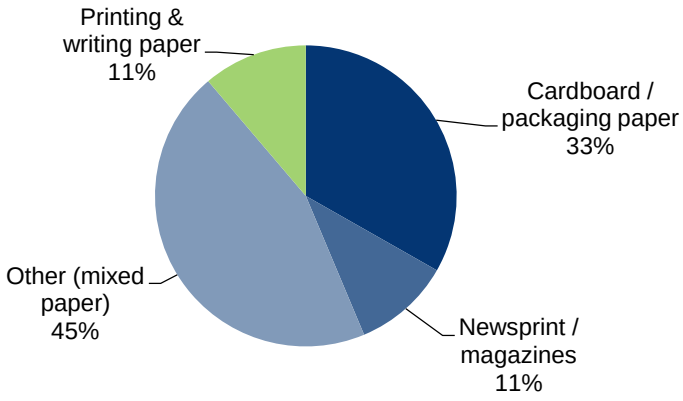
Paper and cardboard recovery in Victoria

In 2015-16 the amount of *Paper and cardboard* recovered for reprocessing in Victoria was **1.55 million tonnes.** This represents a 1 per cent increase over 2014-15.

Of the total *Paper and cardboard* waste recovered in 2015-16 (compared to 2014-15):

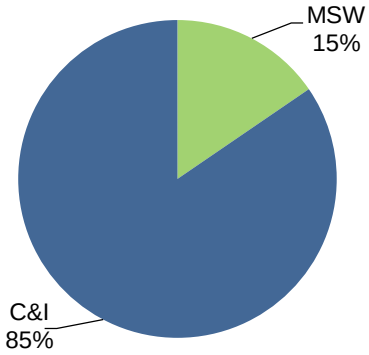
- Cardboard/packaging accounted for 33 per cent, or 515,000 tonnes, an increase of 145 per cent.
- Other (mixed paper) accounted for 45 per cent, or 699,000 tonnes, a decrease of 28 per cent.
- Newsprint/magazines accounted for 11 per cent, or 162,000 tonnes, an increase of 7 per cent.
- Printing and writing paper accounted for 11 per cent, or 174,000 tonnes, a decrease of 10 per cent.

Composition of Paper/cardboard waste (by weight) recovered for reprocessing, Victoria 2015-16



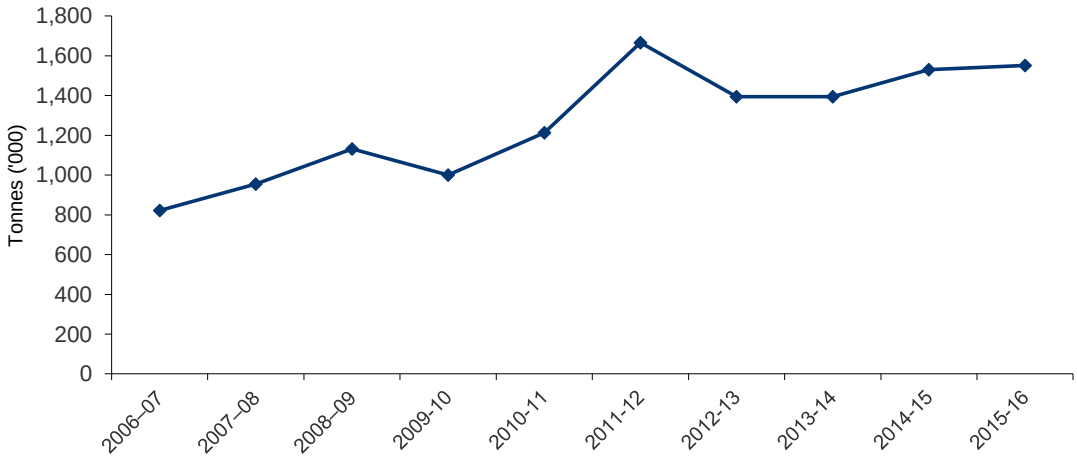
In 2015-16, C&I sector contributed 85 per cent of the total *Paper and cardboard* recovery for reprocessing (down from 89 per cent). MSW contributed 15 per cent (up from 11 per cent) and less than 1 per cent was reported sourced from C&I.

Source sectors of Paper/cardboard received for reprocessing (by weight), Victoria 2014-15



Paper/cardboard recovery has been trending upwards since 2006-07, but has remained relatively stable over the past three years.

Paper/cardboard waste recovered for reprocessing, Victoria 2006-07 to 2015-16



Plastics recovery in Victoria

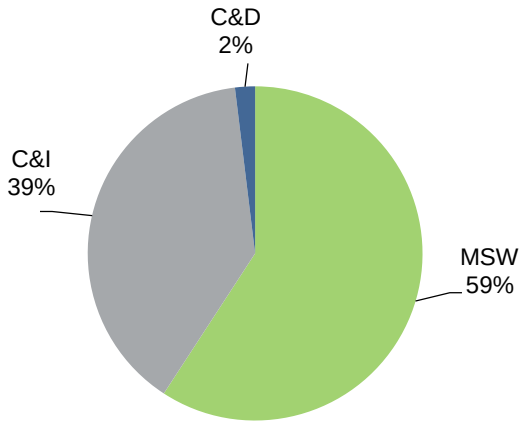
In 2015-16 the amount of plastics recovered in Victoria was **149,000 tonnes**, a 7 per cent decrease from 2014-15. Victoria remains Australia's leading plastic recycling state, responsible for reprocessing 45 per cent of Australia's total recovered plastics.

Of the total *Plastics* waste recovered in 2015-16 (compared to 2014-15):

- Non-packaging (e.g. pipes, cable casing) accounted for 19 per cent, a decrease of 7 per cent to 29,000 tonnes.
- Domestic and industrial packaging (material used for the containment, protection, marketing and/or handling of a product) accounted for 81 per cent and represented a 6 per cent decrease from the previous year to 120,000 tonnes.

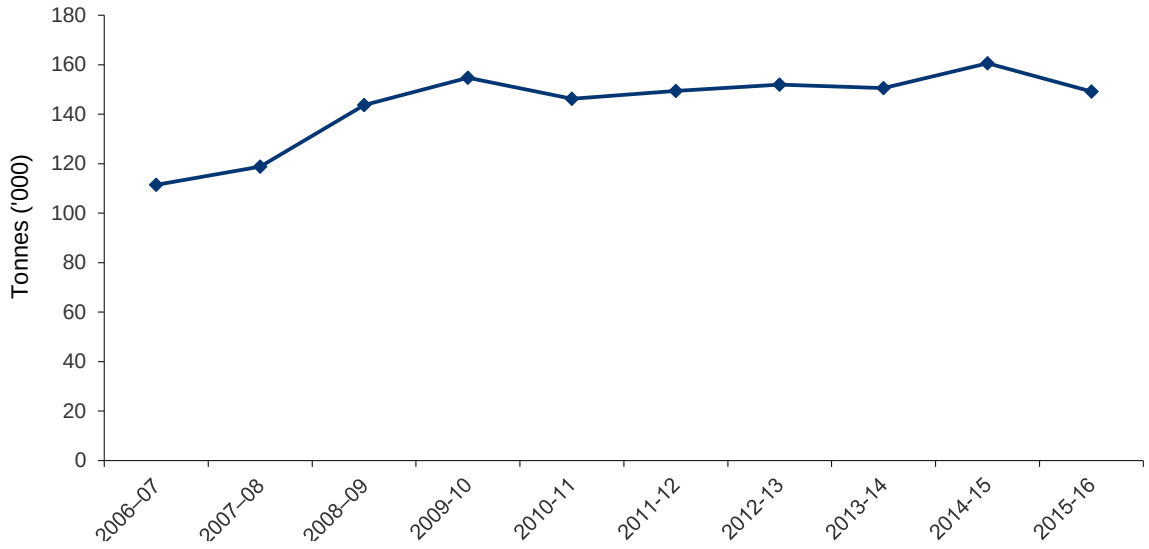
In 2015-16, the majority of *Plastics* recycled were sourced from MSW (59 per cent), such as food and domestic packaging. Councils now collect virtually every type of plastic bottle and container (polymer types 1-6) from kerbside collections and drop-off facilities. Most of the remaining plastic comes from C&I (39 per cent), with just 2 per cent from C&D.

Source sectors of plastics received for reprocessing (by weight), Victoria 2015-16



The graph below indicates that the recovery of *Plastics* has gradually increased since 2005-06, with a large increase in 2008-09. As well as improved collection systems, industry sources suggest that much of this increase can be attributed to growing public awareness of the importance of recycling. Other contributing factors include increased investment in plastic recycling technology and better quality raw materials that require less effort and expense to reprocess.

Plastic waste recovered for reprocessing, Victoria 2006-07 to 2015-16



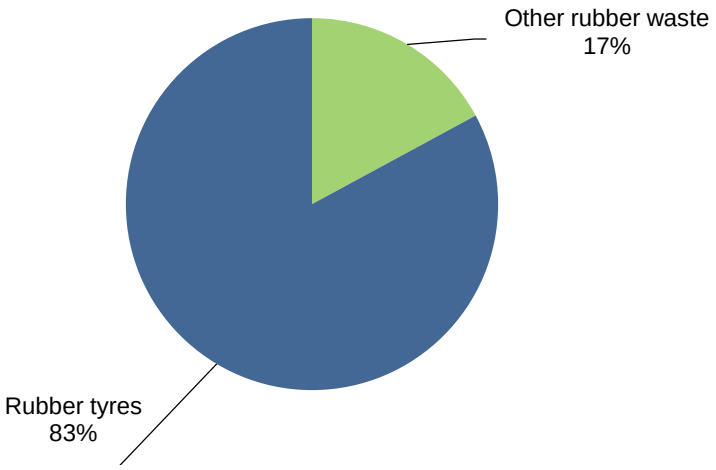
Rubber recovery in Victoria

In 2015-16 the amount of *Rubber* waste recovered for reprocessing in Victoria was **54,000 tonnes**, a decrease of 23 per cent from 2014-15 (15,000 tonnes) and following an 11 per cent decrease in 2013-14. This declining trend over the last two years is likely attributable to the slump in oil price during this period, making the reprocessing of tyres into oil less competitive. The amount of *Rubber* waste exported subsequently declined from 54,000 tonnes in 2014-15 to 22,000 tonnes in 2015-16.

Of the total *Rubber* waste recovered in 2015-16 (compared to 2014-15):

- Rubber tyres accounted for 83 per cent, a decrease of less than 1 per cent to 44,000 tonnes.
- Other rubber waste, including tyre buffings, tread ends, uncured rubber and extrusion waste accounted for 17 per cent, a 63 per cent decrease to 9,000 tonnes.

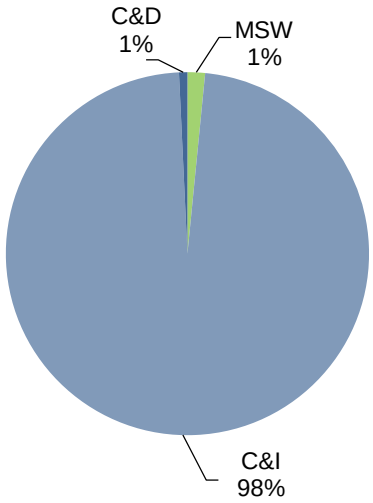
Composition of rubber recovered for reprocessing (by weight), Victoria 2015-16



In 2015-16, C&I contributed to the majority of total rubber recovery for reprocessing (98 per cent), with C&D and MSW contributing just one per cent each. This proportion has remained largely unchanged

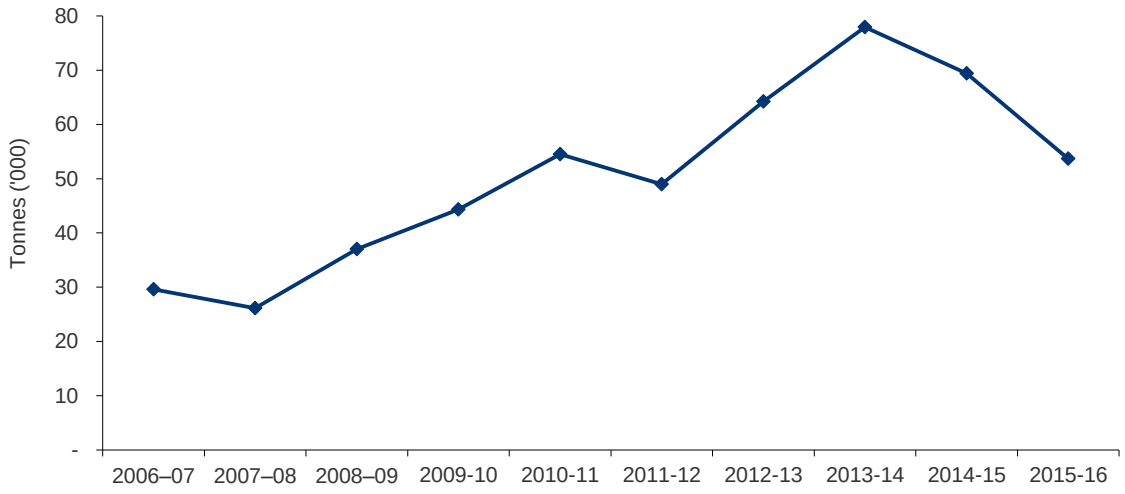
over the last ten years. As tyres for reprocessing are collected primarily through retailers, it is impossible to gauge the true quantities sourced from MSW by surveying reprocessors alone.

Source sectors of rubber received for reprocessing (by weight), Victoria 2015-16



The graph below illustrates that long-term growth in rubber recovery reversed course and began to decline in 2014-15. Since collection of data for the VRIAR began, Victoria has established a ban on tyres disposed to landfill, as well as requesting an EPA works approval license to operate tyre storage facilities in Victoria storing more than 5,000 equivalent passenger units (EPU) or 40 tonnes of waste tyres.

Rubber waste recovered for reprocessing, Victoria 2006-07 to 2015-16



E-waste recovery in Victoria

E-waste recovery data for Victoria was captured for the first time in 2015-16. A total of **6,000 tonnes** of *E-waste* was reported to have been recovered in Victoria in 2015-16.

As 2015-16 is the first year *E-waste* recovery data is collected, the degree of confidence in the data is not sufficiently high to be able to draw any conclusions, nor enable predictions on the future of *E-waste* collection will look like. As a result, further detail of *E-waste* reported data for 2015-16 will not be released at this time.