



Victorian Recycling Industry Annual Report

2016–17

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Authorised and published by
Sustainability Victoria,
Level 28, Urban Workshop
50 Lonsdale Street Melbourne
Victoria 3000 Australia

Victorian Recycling Industry Annual Report 2016-17
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September 2018

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Introduction

The Victorian Recycling Industry Annual Report (VRIAR) outlines the amount of waste managed, landfilled and recovered in Victoria. Sustainability Victoria (SV) has collated this information through surveying Victorian waste reprocessors since 1999¹ about the amount of material diverted from landfill (recovered) as well as using landfill data provided by the Environment Protection Authority Victoria (EPA).

Historical figures have 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. For more information on specific materials see Appendix C.

Background

Recycling and reprocessing are well-established activities in Victoria. The reprocessing industry recovers a wide range of recyclable material from the waste stream for reuse or recycling such as metal, concrete, plastics, glass, compost and energy. Materials recovered by the reprocessing industry are predominantly from within Victoria, with a small amount received from interstate. Although most material recovered is reprocessed within Victoria, some waste material is exported interstate or overseas for reprocessing.

Material for reprocessing is sourced from three sectors: Municipal, '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 similarly effective) recycled materials. The [environmental benefits](#) of reprocessing materials are:

- Reduced greenhouse gases (methane emissions) from landfill and energy-intensive primary production processes
- Savings in water and electricity in the production of metal, concrete, paper and glass by using recycled feedstock
- Savings of raw materials, for example mineral ores used in virgin metal production and timber and oil used in paper production
- Reduced groundwater and soil contamination from landfill, and the preservation of landfill space.

¹ 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 in Victoria. From 2014-15, landfill data now includes a 15% daily cover which had been previously excluded in past reports. This will enable comparison with other states and the National Waste Report produced by the Department of the Environment and Energy. Historical landfill data in the Victorian Recycling Industry Annual Reports has been modified to reflect this updated methodology. This change has resulted in an approximate four percentage point drop in previously published recovery rates.

Key findings for 2016-17

In 2016-17:

12.87 million tonnes of waste was managed by Victoria's waste and resource recovery system and of this:

- 4.25 million tonnes were sent to landfill
- 8.62 million tonnes were diverted from landfill for reuse or recycling representing a 67% diversion rate.

Of the 8.62 million tonnes of material diverted:

- 7.50 million tonnes (86%) of the material remained in Victoria
- 1.21 million tonnes (14%) of the material was exported overseas
- No material was reported to have been sent interstate.

Other findings:

- Waste per capita remained at 2.1 tonnes
- The amount of material recovered was 1.6% more than in the previous year
- The amount of metals recovered reached 1.7 million tonnes. This is an increase of 19% from 2015-16 and the highest amount of metal recovered in Victoria since collection started
- The amount of recovered glass decreased by 21% to 137,000 tonnes
- The amount of plastics recovered was 131,000 tonnes or 12% less than in 2015-16
- The amount of rubber recovered for reprocessing was 41,000 tonnes. This represents a decrease of 23% from 2015-16
- The amount of organics recovered for reprocessing was 1.10 million tonnes. This is a 6% increase from 2015-16 and represents the highest amount of organic material recovered in Victoria since collection started
- Recovered aggregate, masonry and soil remained largely unchanged at 4.1 million tonnes compared to 2015-16
- The amount of paper and cardboard recovered decreased by 7% to 1.44 million tonnes
- The proportion of material recovered and was exported overseas remained unchanged at 1,119,000 tonnes.

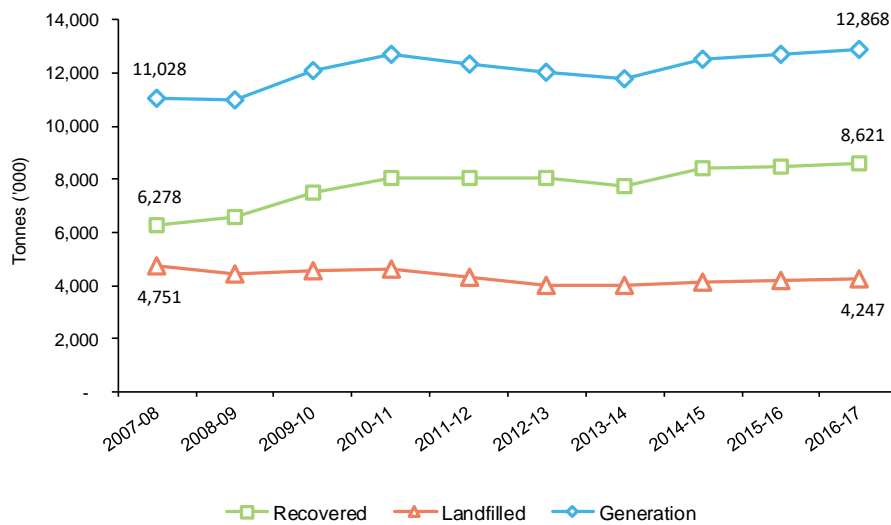
Note: This data is accurate to end June 2017 – impacts of changes in China's policy from January 2018 was not measured in this survey.

Total materials managed and recovery rates

In 2016-17 the amount of waste managed in Victoria was 12.87 million tonnes, an increase of 1.5% from the previous year. Approximately 4.25 million tonnes of waste was sent to landfill. This represents 1.5% more than in 2015-16. The amount of waste diverted from landfill for recycling increased from 8.49 million tonnes to 8.62 million tonnes.

Figure 1 shows waste managed, landfilled and recovered rates in Victoria over the last 10 years. During this time, a direct correlation has been clearly identified between waste managed and population growth.

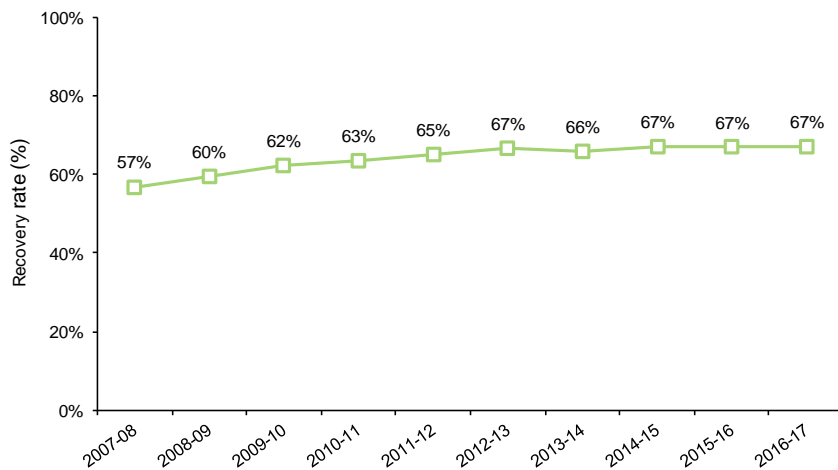
Figure 1 Waste managed, Victoria 2007-08 to 2016-17



In 2016-17, Victoria's diversion from landfill rate remained relatively unchanged from the previous year; diverting 8.62 million tonnes of materials at a diversion rate of 67%. Figure 2 shows the increase in diversion rate of solid waste since 2007-08.

In 2016-17 waste per capita remained at 2.1 tonnes and the amount of material recovered per capita (Table 1) also remained unchanged at 1.4 tonnes. Waste managed relative to Gross State Product (GSP) decreased by 3% in 2016-17 to 30 tonnes of waste managed for every million dollars of GSP (Figure 3 and Table 1).

Figure 2 Diversion rate of solid waste, Victoria 2007-08 to 2016-17

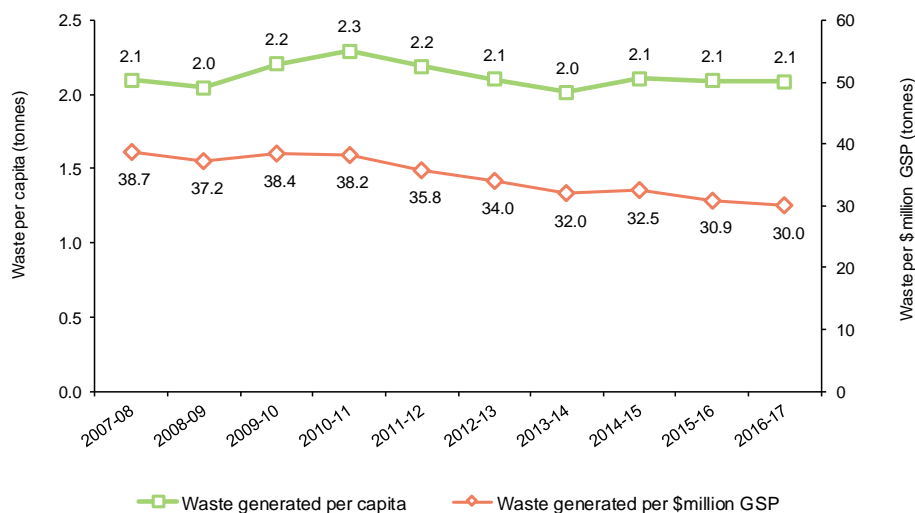


Note: Since 2014-15 Historical landfill data has been modified to reflect the inclusion of the 15% daily coverage which until then had not been included in the VRIAS. This change in methodology is reflected in the recovery rate and had been used to recalculate previous year's recovery rates to provide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

Table 1 Total waste managed relative to economic and population trends, Victoria 2007-08 to 2016-17

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Tonnes (millions)										
Waste managed per capita	2.1	2.0	2.2	2.3	2.2	2.1	2.0	2.1	2.1	2.1
Waste managed per \$million GSP	38.7	37.5	38.8	38.8	36.3	34.7	32.6	33.2	31.8	30
Total Waste Managed	11.0	11.0	12.1	12.7	12.3	12.0	11.8	12.5	12.7	12.9

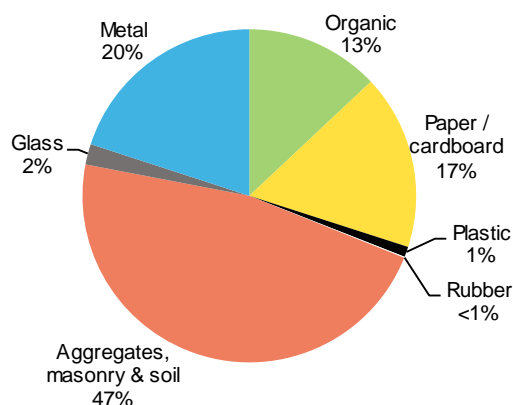
Figure 3 Total waste managed relative to economic and population trends, Victoria 2007-08 to 2016-17



Composition of recovered material

The types of solid material recovered for reprocessing in 2016-17 is presented in Figure 4. *Aggregates, masonry & soil* accounted for 47% of all material recovered for reprocessing by weight and *metal* and *paper / cardboard* accounted for 20% and 17% respectively.

Figure 4 Composition of material recovered for reprocessing (by weight), Victoria 2016-17



A summary of material recovered in Victoria for reprocessing in 2016-17 is shown in Table 2.

Table 2 Total material types recovered for reprocessing, Victoria 2016-17 and 2015-16

Material Recovered	2016-17 (tonnes)	2015-16 (tonnes)	Change since 2015-16
Aggregates, masonry & soil	4,067,526	4,093,270	-1%
Glass	137,318	173,189	-21%
Metal	1,699,132	1,424,726	19%
Organic	1,095,832	1,035,354	6%
Paper / cardboard	1,445,332	1,550,708	-7%
Plastic	130,695	149,128	-12%
Rubber	41,438	53,672	-23%
Textile	3,464	2,034	-70%
Other	0	6,369 ²	
Total recovered	8,620,737	8,488,450	1.6%

² In 2015-16 the category of "Other" included e-waste material, this has now been apportioned into its component parts such as metal, plastic etc. hence no data is shown for 2016-17.

In 2016-17, the recovery of:

- *Aggregates, masonry & soil* material decreased by 1% to 4.07 million tonnes.
- *Metal* increased by 19% to 1.70 million tonnes.
- *Glass* decreased by 21% to 137,000 tonnes.
- *Paper / cardboard* decreased by 7% to 1.45 million tonnes.
- *Plastic* decreased by 12% to 131,000 tonnes.
- *Rubber* decreased by 23% to 41,000 tonnes.

Table 3 shows that the recovery of most material categories have increased considerably over the past 10 years, with the exceptions being the recovery of *glass*:

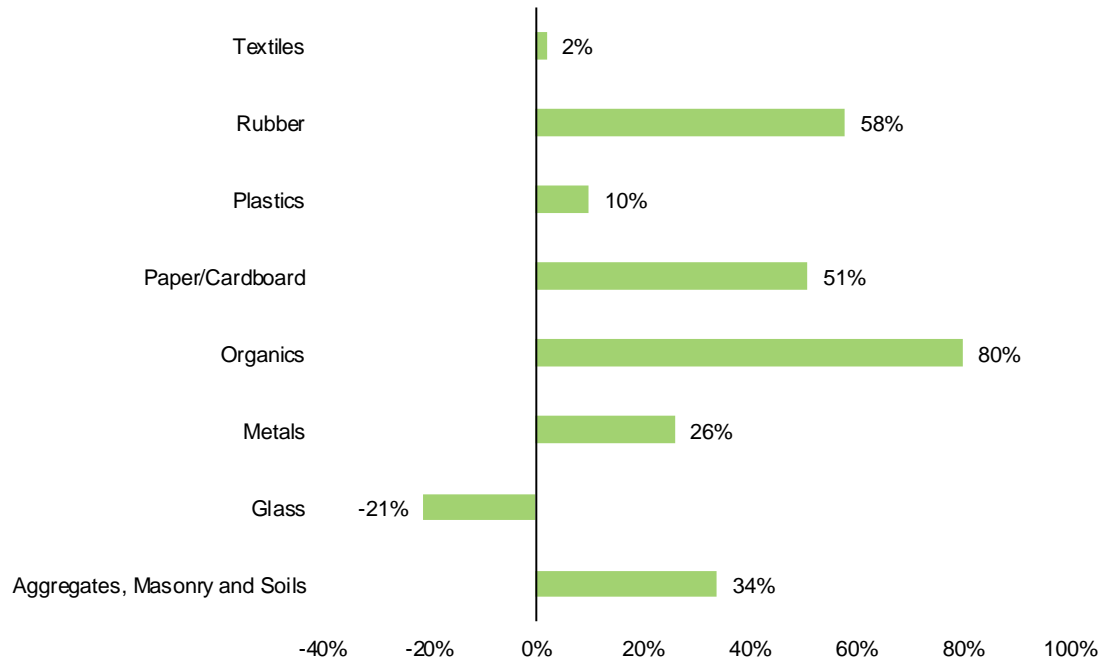
- The total amount of materials recovered in Victoria in 2016-17 is 2.34 million tonnes higher than in 2007-08. This is an increase of 37%.
- 2016-17 was the year with the lowest reported *glass* recovered in Victoria since records began. Over the past 10 years, the total amount of *glass* recovered had fluctuated between 150,000 and 200,000 tonnes until 2016-17, when it dropped below 150,000 tonnes.
- *Paper and cardboard* and *rubber* recovery have increased by more than 50% in the past 10 years and organics by 80%.

Table 3 Total material types recovered for reprocessing, Victoria 2016-17 and 2007-08

Material Type	Total recovery in Victoria 2016-17	Total recovery in Victoria 2007-08	Per cent change since 2007-08
	Tonnes ('000)	Tonnes ('000)	(%)
Aggregates, masonry and soils	4,068	3,042	34%
Glass	137	174	-21%
Metals	1,699	1,350	26%
Organics	1,095	610	80%
Paper/cardboard	1,445	954	51%
Plastics	131	119	10%
Rubber	41	26	58%
Textiles	3	3	2%
Total	8,621	6,278	37%

Figure 5 shows that the recovery of most material categories have increased considerably over the past 10 years, with the exceptions being the recovery of *glass*:

Figure 5 Percentage change of tonnes of material types recovered for reprocessing, Victoria 2016-17 from 2007-08



Sources of materials

In 2016-17, 49% of all material received for reprocessing came from the C&D sector (Figure 6). The combined industry sectors (C&I and C&D) accounted for 85% of all recovered material, down from 86% in the previous year.

Figure 6 shows the slight changes per source sector of secondary-use materials received for reprocessing from 2015-16 to 2016-17.

Figure 6 Source sectors of secondary-use materials received for reprocessing (by weight), excluding imports, Victoria 2016-17 and 2015-16.

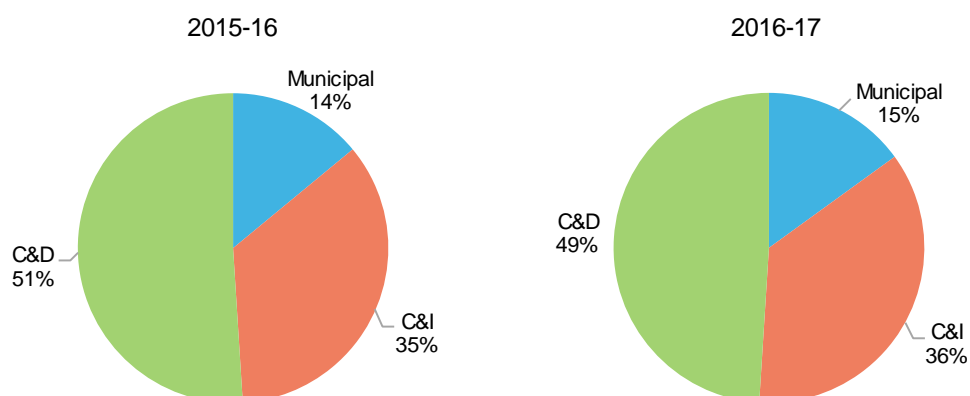


Table 4 details the estimated tonnages of material recovered in Victoria for reprocessing in 2016-17 from each source sector.

Table 4 Source sectors of material received by reprocessors, Victoria 2016-17

Material type	Municipal	Commercial & Industrial	Construction & Demolition
	Tonnes ('000)		
Aggregates, masonry & soil	35	29	4,004
Metal	393	1,173	133
Paper / cardboard	220	1,220	5
Organic	406	618	72
Glass	137	0	0
Plastic	71	57	3
Rubber	13	29	0
Textiles	3	0	0
Total	1,277	3,127	4,217

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.

Reprocessing and exports

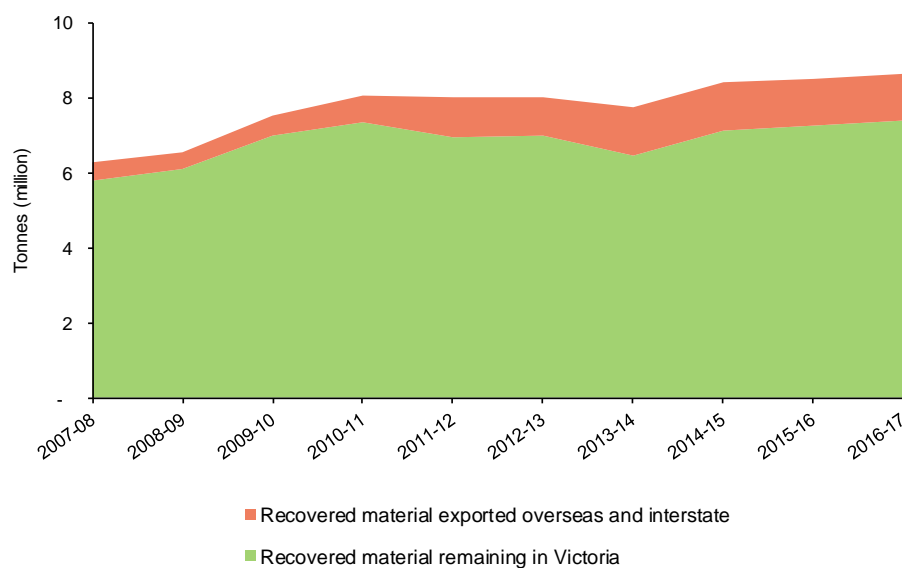
Victoria's current resource reprocessing is still predominantly local (Figure 7). During 2016-17, over 7.40 million tonnes of recovered material remained in Victoria to be reprocessed in local plants. This represents an increase of 2% since 2015-16 (7.27 million tonnes) and accounts for 86% of all recovered material.

In 2016-17 the export of materials for reprocessing overseas slightly increased to 1.22 million tonnes. The key materials exported are scrap metal, paper and plastics; all globally traded commodities used in recycling operations worldwide.

Metal exports increased to 422,000 tonnes. This is an 18% increase from 2015-16. The amount of *Plastic* exported remained unchanged at 97,000 tonnes, whilst the amount of *Paper/cardboard* decreased by 8% to 661,000 tonnes. *Organics* and *glass* do not contribute highly to overall export however, they also had a decrease from 2015-16 with 1% and 11% respectively.

Lower value materials, such as waste from construction and demolition activities, garden organics and glass fines, are rarely, if at all, exported as it is financially prohibitive to do so. Most of the recovered material currently exported had previously been sent to landfill, with a proportion of it coming from stockpiles.

Figure 7 Material reprocessed and exported overseas or interstate, Victoria 2007-08 to 2016-17



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

Figure 8 shows materials sent overseas and interstate for reprocessing. *Metal and paper / cardboard* waste account for most the exported material equating to 89% combined. *Plastics* accounted for 8% and the rest of the categories accounted for the remaining. No *aggregates, masonry and soil* left the state. Figure 9 shows the proportions of material that remains in Victoria.

Figure 8 Recovered material exported overseas by material type, 2016-17

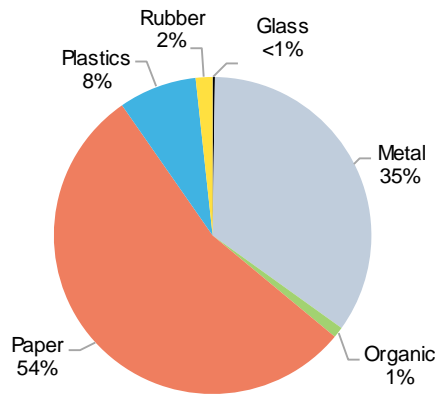
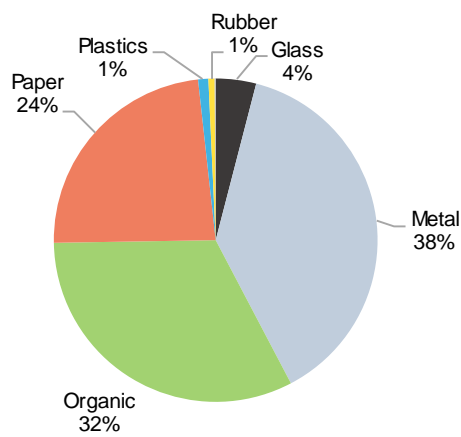


Figure 9 Recovered material remaining in Victoria by material type (excl. *Aggregates, masonry & soil*), 2016-17



Product markets

Once reprocessed, materials are directed into different markets according to quality and degree of processing required. Commonly reprocessed industrial materials, such as *metal* and *rubber*, are generally sold into the manufacturing industry for production of new metal or rubber products. Recovered *glass* and *paper* are usually manufactured back into glass and paper. Although paper can be recycled seven or eight times before it loses its 'recyclability', glass bottles and jars can generally be recycled indefinitely.

Aggregates, masonry and soil material 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 typically 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 are reprocessed into an ever-growing range of valuable packaging, construction, household and automotive goods. The *2016-17 Australian Plastics Recycling Survey*³ lists the major product types within each application area (Table 5).

³ Envisage Works, *2016-17 Australian Plastics Recycling Survey*

Table 5 Summary of major product types within each application area

Application area	Product types
Agriculture	Flexible film Twine and rope Other agricultural applications
Automotive	Vehicle body Tyres Other automotive
Built environment	Pipes and cables Windows and doors Insulation Fit-out Carpet and other floor coverings Other built environment
Electrical & electronic	TVs and computers Power tools Toys White goods and small appliances Other electrical and electronic
Packaging – municipal	Flexible packaging Rigid packaging Other packaging
Packaging – C&I	Flexible packaging Rigid packaging Other packaging
Other application area	Household products Furniture Clothing and footwear Rope, cable, twine and thread Textiles All other applications

Source: Envisage Works, 2016-17 Australian Plastics Recycling Survey

Appendix A: Glossary

Commercial & industrial (C&I): Comprises solid waste managed 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 managed 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 (and in some instance also includes food) 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 managed predominantly from domestic premises (residual and hard waste) and council activities such as street sweeping, litter collection and street tree lopping. Municipal waste 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 2016-17 (VRIAS) was conducted in September 2017 to February 2018. VRIAS sought data from 70 Victorian waste reprocessing businesses. Data on plastics recovery from 22 plastic reprocessors in Victoria was also obtained from the 2016-17 Australian Plastics Recycling Survey, and incorporated into the VRIAR 2016-17.

Resource recovery covers a wide range of activities, including collection, sorting, reprocessing and manufacture of new products, or energy from waste. Recycling (or reprocessing) of recovered materials, typically an industrial process, results in a material or product that can be productively used. Energy recovery is the process by which embodied energy is captured for use; it is a form of resource recovery, but is not recycling.

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 2016-17 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 63 of the 70 Victorian reprocessing businesses responded, representing a 90% response rate. VRIAS aims at getting all large reprocessors in the State to respond to allow a comprehensive analysis of the data. However, for 2016-17 a large aggregate, masonry and soil as well as a metal reprocessor did not provide any data. The average for the last five years of reported data was used to estimate the 2016-17 response. Nevertheless, it is estimated that the 63 responding reprocessing businesses recover more than 85% by weight of all material recovered in Victoria.

Additional information was sought from the ABS on the export of materials from Australia to overseas markets for reprocessing during the 2016-17 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 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

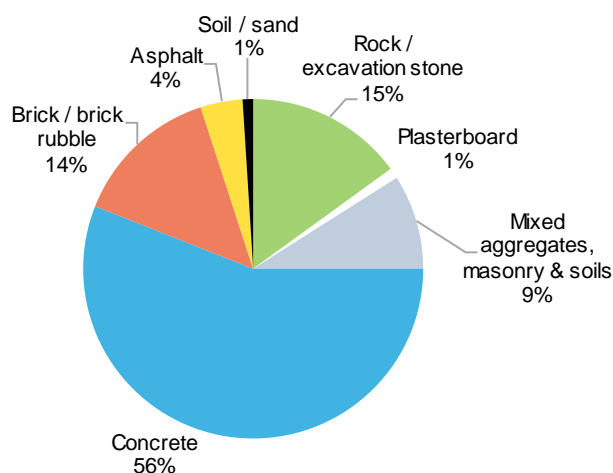
Aggregates, masonry and soil

In 2016-17 the amount of *aggregates, masonry and soil* recovered for reprocessing in Victoria decreased half a percentage point from 2015-16 to 4.1 million tonnes. The C&D sector again contributed almost 100%.

In 2016-17, of the total *aggregates, masonry and soil* recovered:

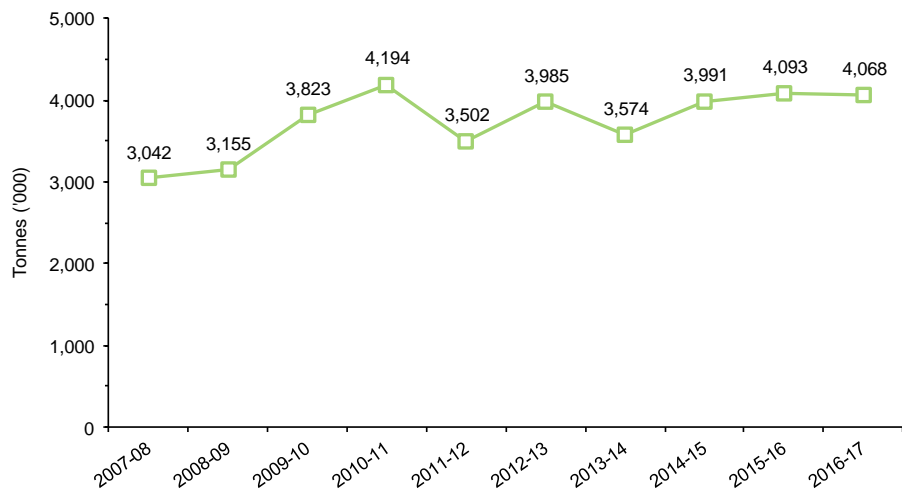
- concrete accounted for 56% and decreased by 5% from the previous year to 2.26 million tonnes
- mixed *Aggregates, masonry and soil* accounted for 8% and decreased from 553,000 to 345,000 tonnes
- rock/excavation stone accounted for 15% and increased by 32% to 622,000 tonnes
- brick whole/ brick rubble accounted for 14% and increased by 38% to 586,000 tonnes
- asphalt accounted for 4% and increased by 1% to 159,000 tonnes
- soil / sand accounted for 1% and decreased by 15% to 59,000 tonnes
- plasterboard accounted for 1% and decreased by 7% to 34,000 tonnes.

Composition of aggregates, masonry & soil material recovered for reprocessing (by weight), Victoria 2016-17



The following chart 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 the continuous increase in construction.

Recovered aggregates, masonry & soil waste recovered for reprocessing, Victoria 2007-08 to 2016-17

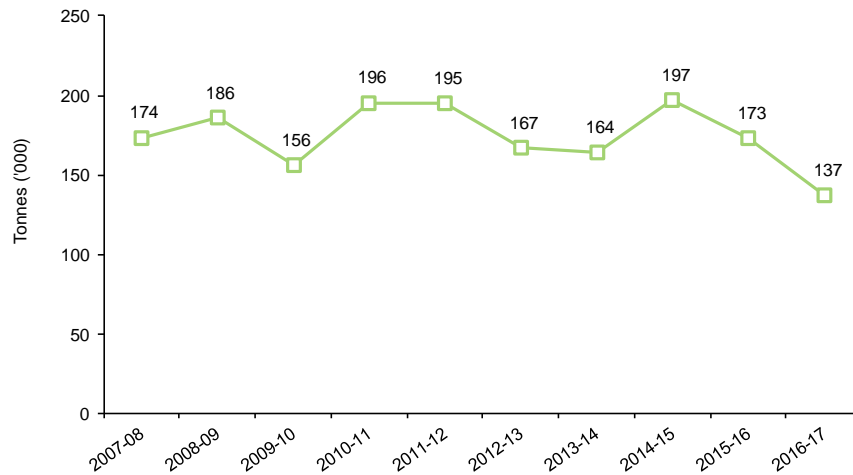


Glass

In 2016-17 the amount of glass recovered for reprocessing in Victoria was **137,000 tonnes**. This figure decreased by 21% from 2015-16.

The recovery of glass had until this year consistently fluctuated between 150,000 and 200,000 tonnes. After having achieved the second largest amount of Glass waste recovered reported in the last 10 years in 2014-15, glass recovery declined by 12% in 2015-16 and 21% in 2016-17.

Recovered glass waste recovered for reprocessing, Victoria 2007-08 to 2016-17

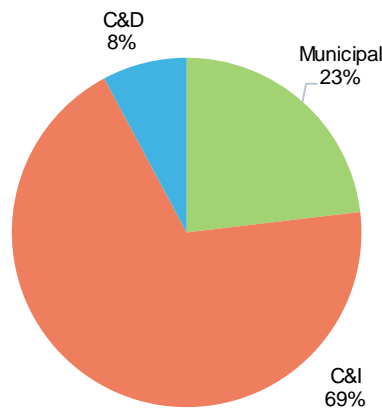


Metals

In 2016-17 the amount of metal recovered for reprocessing in Victoria was 1.7 million tonnes, an increase of 19% from the previous year and the highest reported amount since collection of data began.

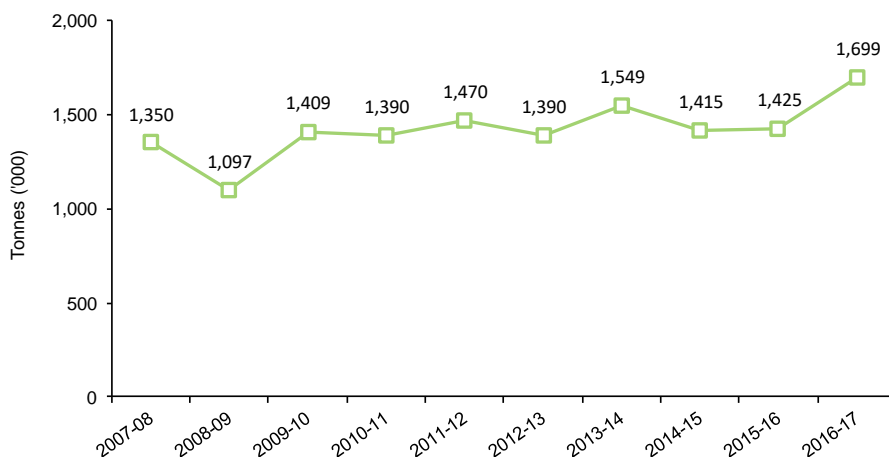
In 2016-17, the C&I sector remained Victoria's principal source of recovered metals, contributing 69% to the total of metal recovery for reprocessing (up from 61% the previous year). The Municipal sector contributed 23% of the total waste (down from 25% the previous year) and the C&D sector contributed 8% (down from 14% in 2015-16).

Source sectors of scrap metal received for reprocessing (by weight), Victoria 2016-17



The graph below shows that Metal recovery in Victoria achieved the highest ever reported amount for 2016-17. It also shows that the recovery has remained relatively steady since 2009-10 after a large drop, likely due to the global financial crisis.

Metal waste recovered for reprocessing, Victoria 2007-08 to 2016-17



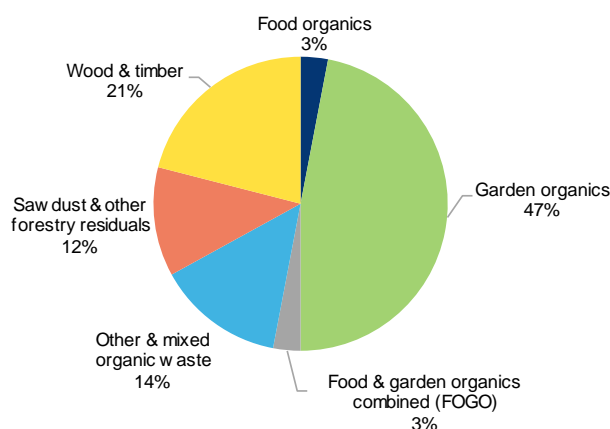
Organics

In 2016-17, the amount of organics recovered for reprocessing in Victoria was **1.1 million tonnes**. This figure increased by 6% from 2015-16 (1.04 million tonnes) and represents the highest amount of organic material recovered in Victoria since collection started. The larger amount of organics recovered can be partially attributed to a larger amount of organics reprocessors responding to the survey combined with a larger recovery of timber for energy generation purposes. Identifying trends in this waste stream poses numerous challenges, among them the impact of environmental conditions such as long-term drought and legislated water restrictions.

In 2016-17 of the total organics recovered:

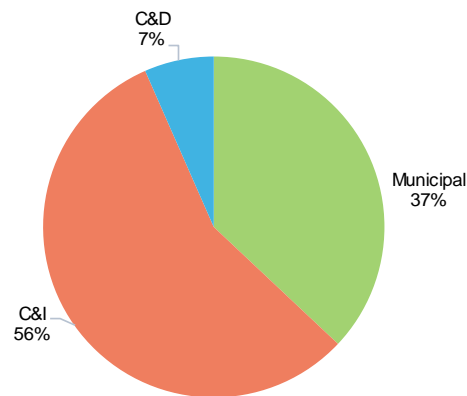
- Garden organics accounted for 47% and increased by 20% from the previous year to 515,000 tonnes.
- Wood and timber organics accounted for 21% and increased by 12% from the previous year to 228,000 tonnes.
- Sawdust and other forestry residuals accounted for 13% and decreased by 7% from the previous year to 137,000 tonnes.
- Food organics accounted for 3% and decreased by 49% from the previous year to 38,000 tonnes.
- Food and garden organics combined (FOGO) for accounted for 3% and remained unchanged from the previous year at 29,000 tonnes.
- Other and mixed organics waste (a mix of different types of organics that were not separated or did not fit into any of the above categories) accounted for 14% and decreased by 1% from the previous year to 150,000 tonnes.

Composition of organic material recovered for reprocessing (by weight), Victoria 2016-17



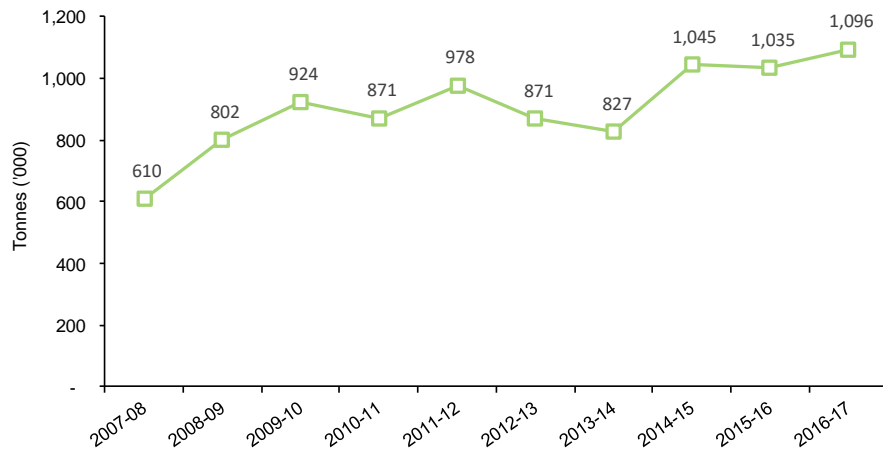
In 2016-17, the Municipal sector contributed 37% of the total organic waste recovered (up from 30% in 2015-16). The C&I sector contributed 56% (down from 63% in 2015-16) and the C&D sector contributed 7% (unchanged from previous year).

Source sectors of organic material received for reprocessing (by weight), Victoria 2016-17



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 compost products and the increased collection of organic residues.

Organics recovered for reprocessing, Victoria 2007-08 to 2016-17

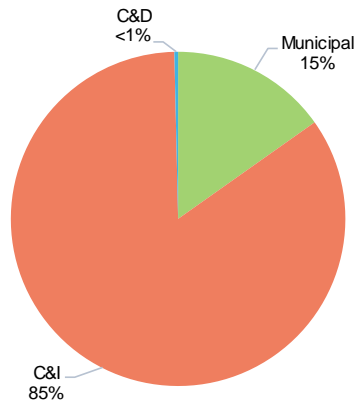


Paper and cardboard

In 2016-17 the amount of paper / cardboard recovered for reprocessing in Victoria was **1.45 million tonnes**. This represents a 7% decrease since 2015-16.

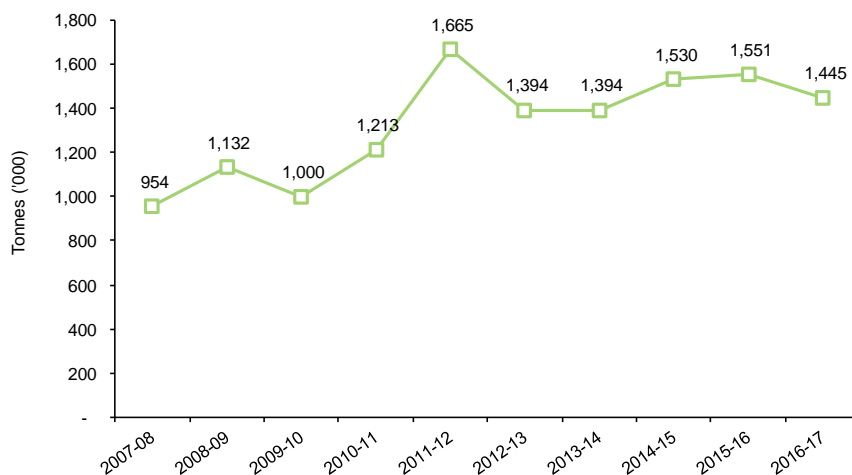
In 2016-17, the C&I sector contributed 84% to the total of paper and cardboard recovery for reprocessing (down from 85% the previous year). The Municipal sector contributed 15% (same as last year) and less than 1% was reported from the C&D sector.

Source sectors of paper / cardboard received for reprocessing (by weight), Victoria 2016-17



Paper / cardboard recovery trended upwards since 2006-07 and has remained relatively stable over the past three years. Although not particularly large, this year's decline may be attributable normal fluctuations in the recovery of paper with the addition of the loss of paper for reprocessing through a large fire in a Material Recovery Facility.

Paper / cardboard waste recovered for reprocessing, Victoria 2007-08 to 2016-17



Plastics

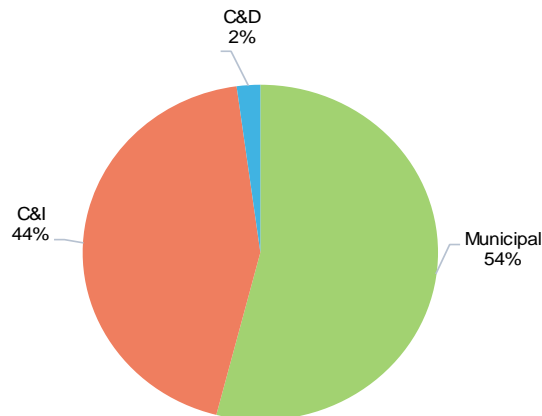
In 2016-17 the amount of plastics recovered in Victoria was **131,000 tonnes**. This is a 12% decrease from the previous year. This decrease has been driven in part by continuing low virgin resin prices internationally, loss of material through a large fire in a Material Recovery Facility in the metropolitan area and kerbside recycling sorting issues. Nevertheless, Victoria remains Australia's leading plastic recycling state responsible for reprocessing 45% of the national total.

In 2016-17, of the total plastic recovered:

- Non-packaging (e.g. pipes, cable casing) accounted for 32% of the total plastics recovered and with 17,000 tonnes.
- Domestic and industrial packaging (material used for the containment, protection, marketing and/or handling of a product) accounted for 68% with 110,000 tonnes.

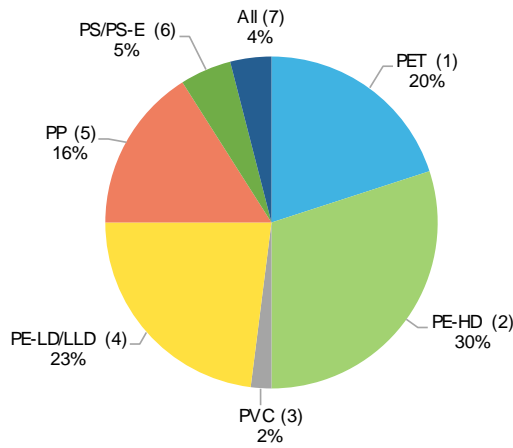
In 2016-17, the majority of plastics recycled were sourced from the Municipal sector (54%) e.g. food and domestic packaging collected by Victoria's councils. Most Councils now collect virtually every type of plastic bottle and container (polymer types 1-6) from kerbside collections and drop-off facilities. Most of the remaining plastic comes from the C&I sector (44%) and 2% comes from the C&D sector.

Source sectors of plastics received for reprocessing (by weight), Victoria 2016-17



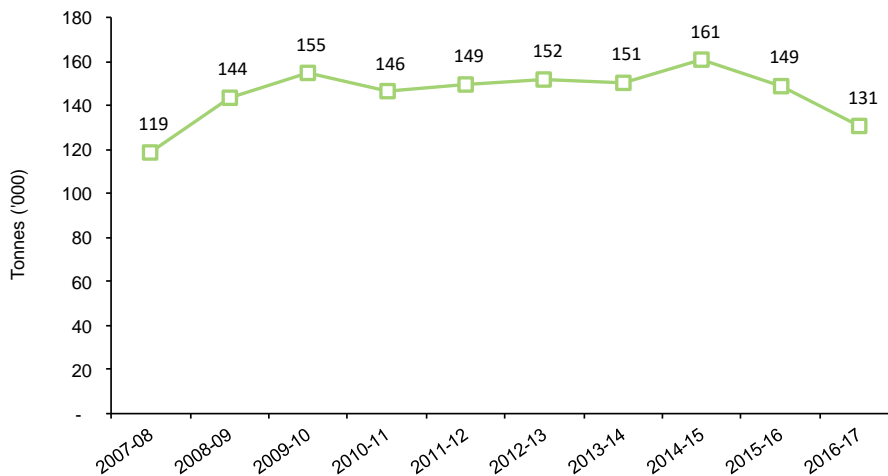
High density polyethylene (HDPE) used in pipes, film and blow-moulded containers accounted for 30% of all plastics recovered during 2016-17. Low / linear low density polyethylene (PE-LD/LLD) and Polyethylene terephthalate (PET) Accounted for 23% and 20% respectively. Polypropylene (PP), commonly used in crates, boxes and plant pots, accounted for 16%.

Composition of plastics recovered for reprocessing by polymer type (by weight), Victoria 2016-17



The graph below indicates that the recovery of plastic has lost steam in the last two years after having peaked in 2014-15. Even though improved collection systems, increased investment in plastic recycling technology and growing public awareness of the importance of recycling, loss of material through MRF fires as well as low virgin resin prices internationally can be attributed to the decline in the last two years decline. Nevertheless, 2017-18 is anticipated to be a very challenging year with the Chinese National Sword import ban starting at the beginning of 2018.

Plastic waste recovered for reprocessing, Victoria 2007-08 to 2016-17



Rubber

In 2016-17 the amount of rubber recovered for reprocessing in Victoria was **41,000 tonnes**. This figure decreased by 23% from 2015-16 (from 54,000 tonnes). Since peaking in 2013-14 at 78,000 tonnes, recovery of rubber has declined by 47%. This recoil trend over the last three years is likely attributable to the slump in oil price during this period, making the reprocessing of tyres into tyre derived fuel less competitive than oil. The amount of rubber waste exported subsequently declined from 50,000 tonnes in 2013-14 to 20,000 tonnes in 2016-17.

In 2016-17, of the total rubber recovered:

- Rubber tyres accounted for 91% decreasing by 1% from the previous year to 38,000 tonnes.
- Other rubber waste, including tyre buffings and tread ends, uncured rubber and extrusion waste, accounted for 9% or 4,000 tonnes. This was a decrease of 61%.

In 2016-17, the C&I sector contributed to the majority of total rubber recovery for reprocessing (69%) and the Municipal sector contributed with the remaining (31%). No recovery from the C&D sector was reported. This proportion has remained relatively unchanged over the years. As tyres for reprocessing are collected primarily through retailers, it is impossible to gauge the true quantities sourced from the Municipal sector by surveying reprocessors alone.

The graph below shows that after a consistent increasing trend in *Rubber* recovery in Victoria we are seeing a recoil trend over the last three years. Since collection of data for the VRIAR began, Victoria has established a ban on tyres going into landfill as well as requesting an EPA works approval license to operate a tyre storage facility in Victoria storing more than 5,000 equivalent passenger units (EPU) or 40 tonnes of waste tyres.

Rubber waste recovered for reprocessing, Victoria 2007-08 to 2016-17

