

# Analysis of NSW Kerbside Red Lid Bin Audit Data Report

Results of the 2011 - 2019 audits

March 2020

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## Summary

This report compares kerbside residual waste bin audit results from 64 New South Wales (NSW) councils in the waste levy area. The audits were conducted between 2011 and 2019 (8% from 2011 – 2013, remaining 92% from 2014 – 2019) and contained data from 13,437 household residual waste bins (80% single unit dwellings (SUDs), 17% multi-unit dwellings (MUDs) and 3% unknown or unspecified dwelling type). This report considers the residual waste only and includes the overall findings as well as results across groups, including by:

- region (Sydney Metropolitan Area (SMA), Extended Regulated Area (ERA) and Regional Regulated Area (RRA)),
- whether councils offer a garden organics (GO), food and garden organics (FOGO) services or no organics service and
- residual waste bin size.

The report is an update of the 2008 and 2011 [NSW domestic kerbside waste and recycling reports](#).

### Key findings

#### *Kilograms per bin per week*

In this report, kilograms per bin per week (kg/bin/wk) is the kilograms of material disposed in residual waste bins, per week equivalent. In line with 2011, it does not consider presentation rate and therefore cannot be extrapolated out to a wider population's waste generation tonnages. It is for comparison purposes only. Key findings from kg/bin/wk include:

- Overall, the average kg/bin/wk of residual waste in the waste levy area was 10.1
- This is the same as 2011 (10.1 kg/bin/wk) however significant differences now exist between areas and therefore an average is not a true representation
- By region:
  - SMA households disposed 11.7 kg/bin/wk in their residual waste bin
  - ERA households disposed 9.3 kg/bin/wk in their residual waste bin
  - RRA household disposed 8.0 kg/bin/wk in their residual waste bin
- This is different from 2011, which showed similar kg/bin/wk results by region. Initiatives by councils in the ERA and RRA regions appear to be reducing the volumes residents are discarding in residual waste bins.
- For different residual bin sizes:
  - Those with <=140L weekly available residual waste bin space disposed 8.9 kg/bin/wk
  - Those with 240L weekly bins disposed 14.6 kg/bin/wk
- Residents in local government areas with FOGO services dispose less to residual bins:
  - Households in council areas with FOGO services disposed 6.5 kg/bin/wk
  - Households in council areas with GO services disposed 10.6 kg/bin/wk
  - Households in areas with no bin based organics service disposed 14.9 kg/bin/wk.

#### *Composition – dry recycling*

- Overall, 21.6% (2.2 kg/bin/wk) of the content of residual bins is dry recyclables that could be diverted to dry recycling bins. This proportion is similar to 2011 (22.1%) and the same kg/bin/wk.

- By region, the amount (and proportion) of potentially dry recyclables in the residual waste bin per region has changed.
  - In 2011, SMA had the lowest proportion (21.6% or 2.2 kg/bin/wk) and RRA the highest (24.0% or 2.4 kg/bin/wk). ERA had 22.4% or 2.3 kg/bin/wk.
  - In 2019 SMA had a slightly smaller proportion (20.6%) to 2011, but the kg/bin/wk has increased to 2.4. ERA and RRA had lower kg/bin/wk of potentially dry recyclables (both 2.0), while RRA's proportion remained similar to 2011 (24.5% in 2019), ERA's proportion was lower (21.3%) compared to 2011.
- FOGO vs Non-FOGO councils:
  - FOGO councils disposed a higher proportion but lower kg/bin/wk of dry recyclables in residual bins (24.6% or 1.6 kg/bin/wk) compared to those with a garden organics service (22.1% or 2.3 kg/bin/wk) and council areas without a kerbside organics bin based service (17.7% or 2.6kg/bin/wk).
- For different residual bin sizes:
  - Those with <=140L weekly residual bin space had a higher proportion (22.2%) but lower kg/bin/wk (2.0 kg/bin/wk) of dry recyclables compared to those with 240L weekly residual bins (20.1% or 2.9 kg/bin/wk).
  - Those with GO and <=140L weekly residual bin space had 21.6% (2.2 kg/bin/wk) dry recyclables compared to 24.0% (3.1 kg/bin/wk) in 240L weekly residual bins.
  - Those with no bin service for organics and <=140L weekly residual bin space had 15.7%<sup>1</sup> (1.1 kg/bin/wk) dry recyclables compared to 17.8% (2.8 kg/bin/wk) in 240L weekly bins.
  - All FOGO councils had <=140L weekly residual bin space and the dry recyclables data is therefore captured above under FOGO vs Non-FOGO councils.

#### *Composition - food and garden organics*

- By region:
  - The key change in the composition of the residual bin by region since 2011 is the proportion of food and garden organics. In 2011, the proportion of food and garden organics overall was 45% and was highest for the ERA region. All regions had more than 42% food and garden organics by weight (SMA 45.3% or 4.6 kg/bin/wk, ERA 46.3% or 4.7 kg/bin/wk, RRA 42.1% or 4.3 kg/bin/wk).
  - In 2019, the proportion of food and garden organics overall was 41%. The SMA (46.2% or 5.4 kg/bin/wk) had a higher proportion of food and garden organics in residual waste bins compared to ERA (36.8% or 3.4kg/bin/wk) and RRA (32% or 2.6 kg/bin/wk)
  - The SMA region is the only region to increase the proportion and kg/bin/wk of food and garden organics since 2011. The ERA and RRA both reduced the proportion and kg/hh/wk of food as well as garden organics in residual bins.
- FOGO vs Non-FOGO councils:
  - FOGO councils disposed a lower proportion and kg/bin/wk of food and garden organics per residual waste bin per week, at 24.8% or 1.6 kg/bin/wk, compared to councils with a GO service (41.2% or 4.3 kg/bin/wk) and councils with no bin based organics service (53.6% or 8.0 kg/bin/wk).

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<sup>1</sup> Note there was only one council that met these criteria. Given the low number these figures should be met with caution.

- For different residual bin sizes:
  - Those with  $\leq 140\text{L}$  weekly residual bin space had 38.1% (3.4 kg/bin/wk) food and garden organics in the residual bin while councils with 240L bin space per week had 47.5% (6.9 kg/bin/wk).
  - Those with GO and  $\leq 140\text{L}$  weekly residual bin space had 41.9% (4.2 kg/bin/wk) food and garden organics compared to 38.3% (4.9 kg/bin/wk) in 240L weekly residual bins.
  - Those with no bin service for organics and  $\leq 140\text{L}$  weekly residual bins had 64.1% (4.7 kg/bin/wk)<sup>2</sup> food and garden organics compared to 53.0% (8.4 kg/bin/wk) in 240L weekly residual bins.
  - All FOGO councils had  $\leq 140\text{L}$  weekly residual bin space and the data is therefore captured above under FOGO vs Non-FOGO councils.

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<sup>2</sup> Note there was only one council that met this criteria. Given the low number these figures should be met with caution.

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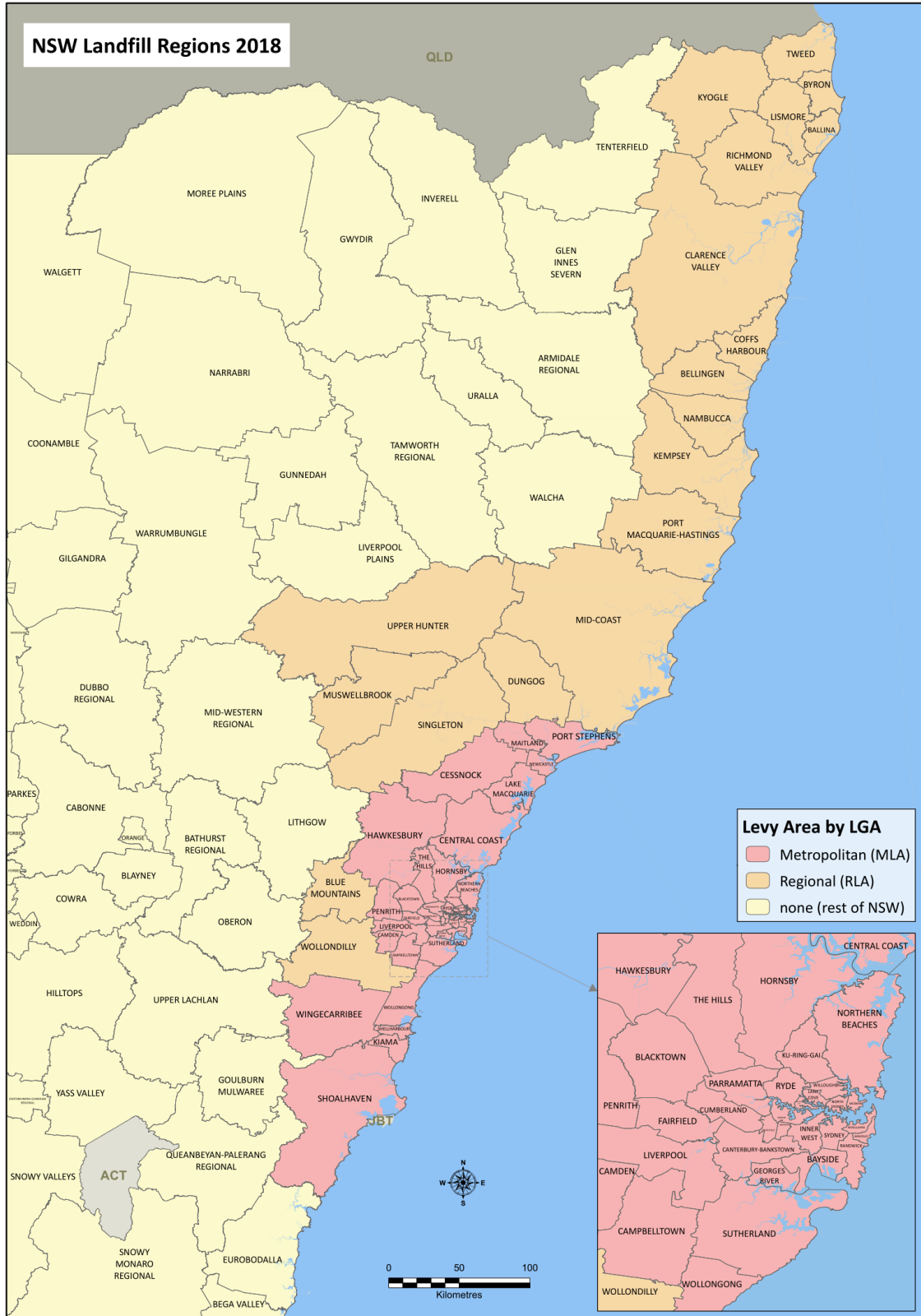


## Glossary/Description of Terms

Term	Description
Extended Regulated Area (ERA)	The ERA is one of the three landfill levy regions within NSW (up until the 2013-14 financial year each had different landfill levy rates). The SMA and ERA now pay the same levy and are collectively known as the Metropolitan Levy Area (MLA, see map overleaf). This report refers to the councils in the MLA as either SMA or ERA to allow comparison to the 2011 report. Councils in the ERA include Port Stephens, Newcastle, Maitland, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Wollongong, Shellharbour, Kiama, Wingecarribee and Shoalhaven.
FOGO	Food organics and garden organics. Used to describe the organics service offered by councils that allow food and garden waste to be placed in the green lid bins.
General waste	The term 'general waste' is not used in this report. It is referred to as 'residual waste'.
GO	Garden organics. Used to describe the organics service offered by councils that allow garden waste to be placed in green lid bins, but not food waste.
Household generation	Household generation in the 2011 report has been reworded to kg/bin/wk in this report. It is not adjusted for presentation rate, and is based on the number of bins collected for analysis, not the number of households visited to find bins for analysis.
Kilograms per bin per week (kg/bin/wk)	The average one week equivalent weight of household bins (in kilograms) across the audits. Previously called household generation, it is not adjusted for presentation rates.
Kilograms per household per week (kg/hh/wk)	The quantity of waste a typical household produces per year that is collected at the kerbside, divided by 52. It accounts for presentation rate and is based on number of households visited to find bins for analysis, not number of bins analysed. It enables extrapolation to annual tonnes collected per household and across a council where the number of households is known. Appendix 4 provides kg/hh/wk data.
Multi-Unit Dwelling (MUD)	According to the NSW Kerbside Audit Guidelines (2012), a MUD is classified as a unit, flat, apartment, townhouse, villa, duplex or mixed-use building (e.g. a building containing residential and commercial space). Generally, there are three or more households in the MUD, and these have adjoining walls or an adjoining roof.
MUD block	The entire group of Multi-Unit Dwellings.
MUD household	Each unit/apartment within the MUD block.
MUD unit	This is the same as a MUD household.
NSW	New South Wales
Regional Regulated Area (RRA)	The RRA is now known as the Regional Levy Area (RLA, see map overleaf) and councils in this region have lower levy rate for waste sent to landfill compared to the SMA and ERA regions. This report refers to the councils in the RLA as RRA to allow comparison to the 2011 report. See overleaf for a waste levy area map
Residual Waste	Residual waste, or general waste, is the waste disposed in red-lidded bins and is either sent to landfill or an alternative waste treatment facility, depending on the council arrangement.
Single Unit Dwelling (SUD)	Individual, detached dwellings.
Sydney Metropolitan Area (SMA)	The SMA is one of the three landfill levy regions within NSW (up until the 2013-14 financial year each had different landfill levy rates). The SMA and ERA now pay the same levy and are collectively known as the Metropolitan Levy Area (MLA, see map overleaf). This report refers to the councils in the MLA as either SMA or ERA to allow comparison to the 2011 report.

## Map of waste levy areas

The below map displays the current NSW landfill regions; MLA and RLA. To compare to the 2011 report, this report refers to councils in the SMA, ERA and RRA regions rather than MLA or RLA. The SMA and ERA are in the MLA region below, and the RRA is the RLA councils.





## Introduction

This report provides an analysis of the household kerbside residual waste bin data from audits conducted by New South Wales (NSW) local governments in the NSW waste levy area. The aim was to source a recent waste audit report from each of the former local government areas (pre amalgamations) and to determine if there have been major compositional changes since a similar analysis in 2011. Pre amalgamated local government areas were chosen as in many cases waste management services have not yet been standardised across the entire new council areas. The results include analysis of data from 65 councils, including:

- 45 of 51 councils in the metropolitan waste levy area including
  - 32 of 38 councils in the former Sydney Metropolitan Area (SMA)
  - 13 of 13 councils in the former Extended Regulated Area (ERA)
- 19 of 21 councils from the Regional Regulated Area (RRA).

These areas represent approximately 87% of the NSW population.

The age of audits varied, from 2011 to 2019, with the majority (92%) from 2014 - 2019<sup>3</sup> Audit reports and raw data sheets (where available) were examined and adjusted where necessary to provide a consistent base for the analysis. The results presented in this report consider overall results, as well as comparison between groups. These groups included different levy regions, FOGO versus non-FOGO councils and audits from councils that provide higher volumes of residual waste bin space (240L per week equivalent) with those that provide lower volumes. Comparisons included:

- kilograms per bin per week
- composition of the residual waste stream
- potential dry recyclables and organics in the residual waste stream.

As per the 2011 analysis of audits from the waste levy area councils, kg/bin/wk data in this report generally does not account for presentation rate. Presentation rates vary for example by bin type, across the year and between councils. Additionally, a single snapshot in time (one audit) may not provide accurate information on average presentation rates. Appendix 4 provides the results that accounts for presentation rate.

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<sup>3</sup> Two audits from 2019, two from 2018, 22 from 2017, 10 from 2016, 18 from 2015, five from 2014 and five from 2011.

## Method and data set

### Method

Audit reports and audit raw data sets (where possible) from between 2011 and November 2019 were collected, and the key data was collated and captured. The data was adjusted to be comparable across audits and different auditors. Any audits that were missing key information or the methodology was not in line with the NSW EPA Audit Guidelines were assessed as to whether they should be excluded from some or all analyses. Only the most recent available audit per council in the waste levy was used. These included bin-by-bin (52%) and aggregated (48%) audit methodologies.

Key data captured included:

- Council region (SMA, RRA, ERA)
- Number of households included in the residual waste sample
- Number of bins (single unit dwelling (SUD) equivalent<sup>4</sup>) included in the residual waste sample
- Presentation rate of residual bins at the time of the audit
- Predominant residual waste configuration offered to residents (size of bins, frequency of collection)
- Predominant organics configuration/service offered to residents (FOGO or GO weekly or fortnightly, or no bin-based organics service offered).
- Total weight of residual waste audited, equivalent to one week<sup>5</sup>
- Weight of each material stream audited in residual waste bins, one week equivalent (see Appendix 2 for a list of material streams).

Comparisons of the residual waste data were made to the 2011 report.

### Data set

The data set included:

- Data from 64 councils<sup>6</sup>, including 32 SMAs, 13 ERAs and 19 RRAs.
- 10,807 residual bins from SUDs (80%), 2,265 bins from MUDs (17%) and 365 bins from unknown or unspecified property types (3%).
- At the time of the audits 16 councils had a FOGO service, 40 offered a garden organics service and the remaining eight councils offered no bin based organics service as part of their main service.
- The data set included 50 councils that offered a 140L or smaller residual waste collection per SUD household per week ( $\leq 140$  litre). This was provided as a weekly small bin or fortnightly 240L bin.
- The data set included 14 councils that offered 240L residual waste collection per SUD household per week, including seven councils that offered no organics service.

An outline of the data set including sample sizes, bin configuration, age of audit etc is included in Appendix 3.

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<sup>4</sup> If multi-unit dwellings (MUDs) were included in the audit sample, the total residual waste bins audited at MUDs was calculated to the single unit dwelling equivalent. For example, if two MUD households share a 240-litre (240L) residual waste bin, and each SUD has a 240L bin, the total MUD bins included in the sample would be half the number of MUD households included in the audit (so in this example if 10 MUD household bins were audited, this counts as a bin sample size of five).

<sup>5</sup> Where councils provide a fortnightly service, the total of audit material was halved to get the weeks' worth of material.

<sup>6</sup> One council had two datasets available as two separate audits were conducted - one for urban residents and one for rural residents. As urban residents have a GO service and rural have no service, this data was split and as such 65 audit datasets from 64 councils were included in the sample.

## Residual waste - kg/bin/wk

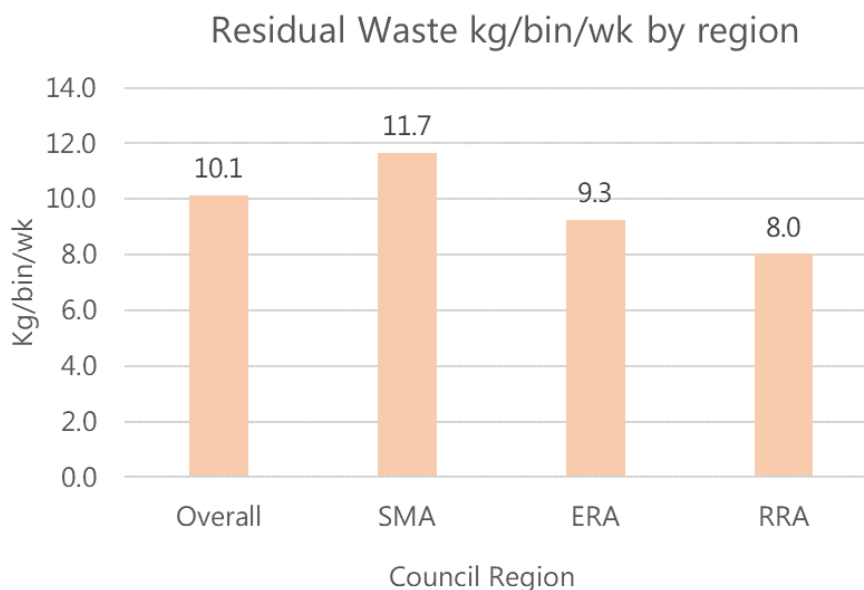
The household residual waste generation (kg/bin/wk) is based on the average weight (in kilograms) per residual bin per week equivalent. It is not adjusted for presentation rate and is therefore based on the bins audited not the number of households visited to collect those bins.

In line with 2011, kg/bin/wk is calculated by using the total weight of the residual bin contents collected for each council audit in kilograms and normalised for weekly collection. This is then divided by the number of bins the material was collected from in the audit. Where multi-unit dwellings (MUDs) were included in the sample, the bins audited was calculated to the single unit dwelling equivalent <sup>7</sup>.

### Generation results across entire sample

On average, 10.1 kg/bin/wk of residual waste was generated from 13,437 bins audited across 64 councils. This is the same as 10.1 kg/bin/wk found in 2011. There were significant differences between the regions, with SMA generating the highest amount of waste (11.7 kg/bin/wk based on 6,740 bins and 32 audits), the ERA less at 9.3 kg/bin/wk (based on 3,157 bins and 13 audits) and the RRA the lowest, at 8.0 kg/bin/wk (based on 3,540 bins and 19 audits). The kg/bin/wk data is summarised in Figure 1 below.

Figure 1: Average household waste generation for residual waste, by council area



When considering presentation rate and households audited, a similar trend was found. Across NSW overall 8.8 kilograms per household per week (kg/hh/wk) was put out for collection in residual waste bins; 9.6 kg/hh/wk in the SMA, 8.3 kg/hh/wk in the ERA and 7.5 kg/hh/wk in the RRA. Further household generation results are available in Appendix 4.

<sup>7</sup> For example, if two MUD households share a 240-litre (240L) residual waste bin, and each SUD has a 240L bin, the total MUD bins included in the sample would be half the number of MUD households included in the audit (so in this example if 10 MUD household bins were audited, this counts as five bins).

## Comparison to 2011 analysis

A comparison of kg/bin/wk overall and by region to a previous analysis in 2011<sup>8</sup> is provided below (Table 1). The overall average 2019 kg/bin/wk is in line with 2011. However, when observing the results by region, there are differences between 2019 and 2011. In 2019, residents in the SMA region disposed the highest volume of waste to residual waste bins, ERA disposed slightly less on average and RRA the lowest of all the regions (8.0 kg/bin/wk). Strategies introduced by councils since 2011 to reduce the amount residents dispose in residual waste bins in these regions appear to have had significant impact.

Table 1: Kg/bin/wk residual waste figures overall and by region compared to previous reports

Category	Waste levy area		SMA		ERA		RRA	
	2011	2019	2011	2019	2011	2019	2011	2019
Kg/bin/wk <sup>9</sup>	10.1	<b>10.1</b>	10.2	<b>11.7</b>	10.2	<b>9.3</b>	9.9	<b>8.0</b>

## Comparison based on available weekly residual bin capacity

Residual waste bin services offered include 55, 80, 120, 140 and 240L weekly as well as 140 and 240L fortnightly. Table 2a compares the kg/bin/wk<sup>9</sup> in the residual waste bin for councils that offer 140 litre bin space or smaller per week (titled ≤140L bin space per week), versus those that offer 240 litre residual waste space per week.

As can be seen, residents living in council areas that offer smaller bin space per week discard lower volumes of residual waste per bin per week (8.9 kg) than those with larger available weekly bin space (14.6 kg).

Table 2a: Kg/bin/wk figures of Councils with ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week

	≤140L bin space per week	240L bin space per week	Total
No. audits included in dataset	50	14	64
No. bins included in dataset	10,496	2,941	13,437
<b>Kg/bin/wk</b>	<b>8.9</b>	<b>14.6</b>	<b>10.1</b>

The above figures do not account for the type of organics bin service offered to residents. To test if these differences were influenced by the organics service being offered, the analysis was repeated (Table 2b-2d overleaf). The analysis showed that the kg/bin/wk is affected by both bins size and organics service. However, it is likely that other factors that were not assessed also influence behaviour, such as education, length of service and dwelling size. In addition, no audits from councils that offer FOGO service and a 240L weekly residual waste bin are in the data set, so the influence of bin size on this group remains unknown.

<sup>8</sup> See *Domestic Kerbside Waste and Recycling in NSW: Results of the 2011 Waste Audits* (<https://www.epa.nsw.gov.au/your-environment/waste/local-council-operations/local-council-waste-and-resource-recovery>)

<sup>9</sup> Kg/bin/wk cannot be extrapolated out to the region more broadly or used to calculate annual kilograms disposed, as presentation rate is not considered. See Appendix 4 for these figures.

Table 2b: Kg/bin/wk figures of Councils with FOGO and ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week

	≤140L bin space per week	240L bin space per week
No. audits included in dataset	16	0
No. bins included in dataset	3,399	0
<b>Kg/bin/wk</b>	<b>6.5</b>	<b>NA</b>

Table 2c Kg/bin/wk figures of Councils with GO and ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week

	≤140L bin space per week	240L bin space per week	Total (GO)
No. audits included in dataset	33	7	40
No. bins included in dataset	6,877	1,252	8,129
<b>Kg/bin/wk</b>	<b>10.1</b>	<b>12.9</b>	<b>10.6</b>

Table 2d: Kg/bin/wk figures of Councils with no organics and ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week

	≤140L bin space per week	240L bin space per week	Total (no organics service)
No. audits included in dataset	1	8 <sup>10</sup>	9
No. bins included in dataset	220	1,689	1,909
<b>Kg/bin/wk</b>	<b>7.3</b>	<b>15.9</b>	<b>14.9</b>

<sup>10</sup> An additional dataset was available for this analysis, as one council in the sample offered garden organics to urban households and no organics service to rural residents.

**FOGO vs. non-FOGO councils (kg/bin/wk in residual waste bins)**

The kg/bin/wk of the residual bin is impacted by other provided services. Sixteen councils in the sample offered a weekly FOGO service, 40 councils offered a garden organics (mandatory or opt in), and nine did not offer a kerbside bin based organics service.

*Table 3: Kg/bin/wk figures of the residual waste bins for councils that have a FOGO service compared to those that have garden organics bin or no organics bin*

	<b>FOGO Councils</b>	<b>GO Councils</b>	<b>No organics service</b>	<b>Total</b>
No. audits included in dataset	16	40	9 <sup>11</sup>	65 audits (64 councils)
No. bins included in dataset	3,399	8,129	1,909	13,437
<b>Kg/bin/wk</b>	<b>6.5</b>	<b>10.6</b>	<b>14.9</b>	<b>10.1</b>

<sup>11</sup> An additional dataset was available from one council that offers garden organics to urban households but no organics service to rural residents.

## Composition profile of residual waste bin

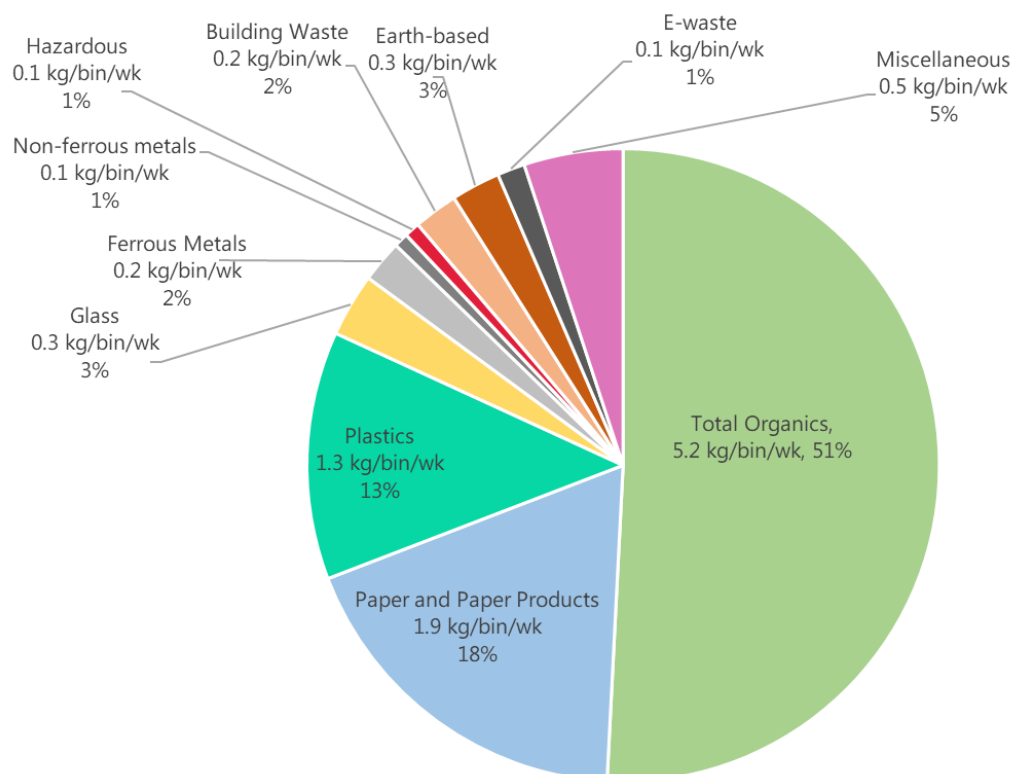
The composition profile of the residual waste bin provides insight into the material types that are placed into the bin including those that could be recycled through dry recycling and organics bins. The proportion of each category is the total weight of the material compared to the total weight of all materials. The material types are based on the NSW EPA Audit Guidelines and may contain both recyclable and non-recyclable streams. For example, Paper and Paper Products includes disposable nappies, contaminated soiled paper and composites made predominantly of paper. Total Organics contains food, garden, wood, textiles, leather, rubber, oils and other putrescibles. Appendix 2 lists the material category, items and whether they have been counted as potentially recyclable.

### Overall and per region composition of residual waste bins

Figure 2 illustrates the composition of materials in red residual waste bins in the waste levy area. Total organics (food, garden, wood, textiles, leather, rubber, oils and other putrescibles) made up the largest proportion of residual waste bins, at 51% (5.2 kg/bin/wk). Paper and Paper Products was the next largest material in residual waste bins by weight, at 18% (1.9 kg/bin/wk), followed by Plastics at 13% (1.3 kg/bin/wk). Glass and Metals together made up 6% or 0.6 kg/bin/wk, and the remaining materials (hazardous, building materials etc) comprised 12% (1.2 kg/bin/wk) of the overall bin content.

Due to the large variation in the kg/bin/wk of total organics in the residual bins between the regions, and some variation in paper and plastics, regional composition profiles are a more accurate representations (see Figures 3, 4 and 5 on the following pages).

Figure 2: Composition of the residual waste bins based on the 2019 review<sup>12</sup>



<sup>12</sup> Note that the composition profile analysis included 133,497 kilograms of waste audited (one week equivalent) across 63 councils. One council was removed from the analysis due to likely inaccurate reporting of the residual waste bin composition.

Figure 3: Composition of the residual waste bins based on the 2019 review - SMA Councils<sup>13</sup>

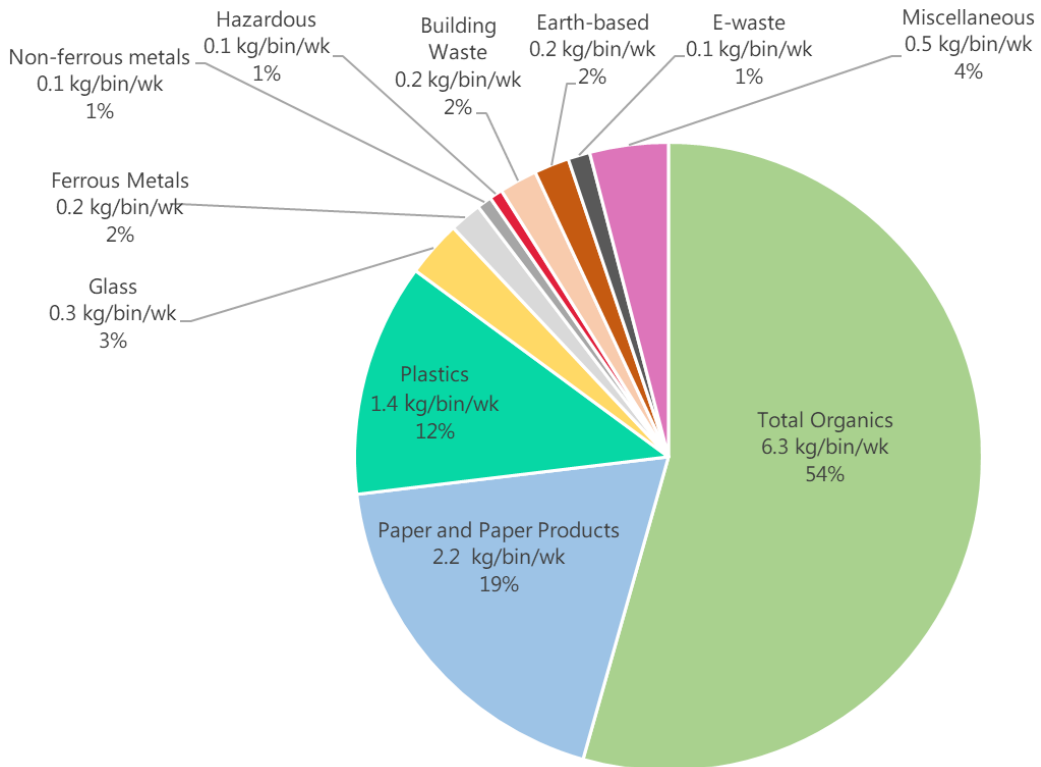
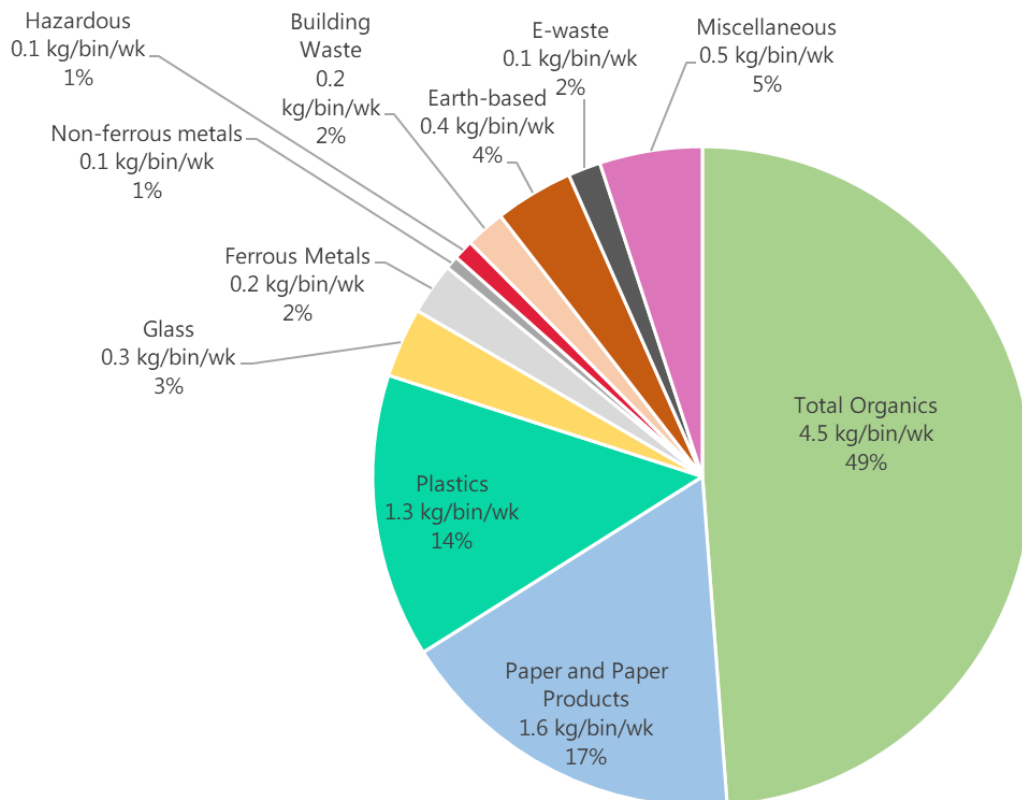


Figure 4: Composition of the residual waste bins based on the 2019 review - ERA Councils<sup>14</sup>

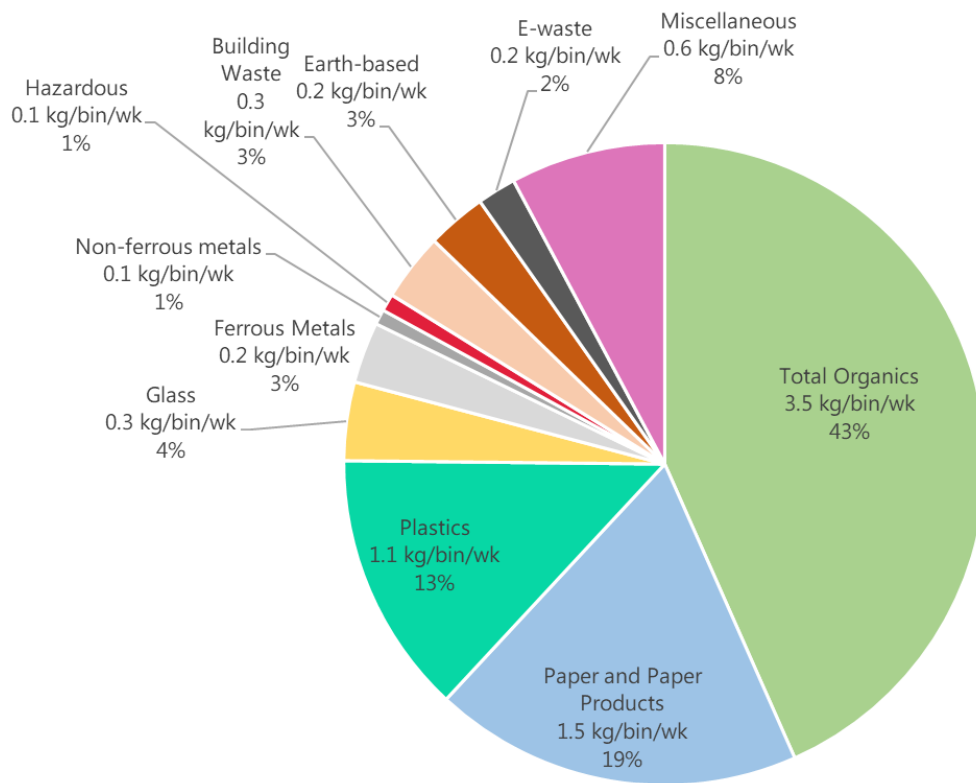


<sup>13</sup> Note that the composition profile analysis included 75,705 kilograms of waste audited (one week equivalent) across 31 councils. One Council was removed from the analysis due to likely inaccurate reporting of the residual waste bin composition.

<sup>14</sup> Note that the composition profile analysis included 29,333 kilograms of waste audited (one week equivalent) across 13 councils.



Figure 5: Composition of the residual waste bins based on the 2019 review – RRA Councils<sup>15</sup>



The data from Figures 2-5 is also provided in Table 4 overleaf.

<sup>15</sup> Note that the composition profile analysis included 28,458 kilograms of waste audited (one week equivalent) across 19 councils.

As can be seen in the table below, there is a lower proportion and kg/bin/wk of total organics in residual bins from the ERA and RRA regions compared to SMA. This aligns with expectations, given a higher proportion of these councils provide a FOGO service, which should shift food and garden organics from residual waste bins to the FOGO bins (note matched FOGO bin audit data was not available to confirm this).

The kg/bin/wk of Paper and Paper Products is lower in the ERA and RRA, and kg/bin/wk of total plastic is lower in the RRA. The RRA has higher kg/bin/wk of Other materials - items such as hazardous, building waste, earth based, e-waste and miscellaneous materials.

Table 4: Composition of the residual waste bin by levy region, % breakdown and kg/bin/wk equivalent<sup>\*16</sup>

	Overall (%)	SMA (%)	ERA (%)	RRA (%)	Overall (kg/bin /wk)	SMA (kg/bin /wk)	ERA (kg/bin /wk)	RRA (kg/bin /wk)
Total paper and paper products	<b>18.4%</b>	18.7%	<b>17.3%</b>	18.6%	<b>1.9</b>	<b>2.2</b>	<b>1.6</b>	<b>1.5</b>
Total organics	<b>50.8%</b>	<b>54.4%</b>	48.8%	<b>43.4%</b>	<b>5.2</b>	<b>6.3</b>	<b>4.5</b>	<b>3.5</b>
Total glass	<b>3.2%</b>	<b>2.9%</b>	<b>3.4%</b>	<b>4.0%</b>	<b>0.3</b>	0.3	0.3	0.3
Total plastics	<b>12.7%</b>	<b>12.1%</b>	<b>13.9%</b>	13.2%	<b>1.3</b>	<b>1.4</b>	1.3	<b>1.1</b>
Total ferrous material	<b>2.2%</b>	<b>1.7%</b>	<b>2.5%</b>	<b>3.1%</b>	<b>0.2</b>	0.2	0.2	0.2
Total non-ferrous material	<b>0.7%</b>	0.8%	0.7%	0.8%	<b>0.1</b>	0.1	0.1	0.1
Total other**	<b>12.0%</b>	<b>9.6%</b>	<b>13.4%</b>	<b>17.0%</b>	<b>1.2</b>	<b>1.1</b>	1.2	<b>1.4</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>10.1</b>	<b>11.7</b>	<b>9.3</b>	<b>8.0</b>

\*Sums may not equate due to rounding. Figures that are highlighted in **red** are streams that are at least 5% greater than the overall value (either % or kg/bin/wk), while those in **green** are 5% lower (either % or kg/bin/wk).

\*\* Total other constitutes total of hazardous, building waste, earth based, e-waste and miscellaneous materials.

<sup>16</sup> Kg/bin/wk cannot be, extrapolated out to the region more broadly or used to calculate annual kilograms disposed, as presentation rate is not considered. See Appendix 4 for these figures.

## Comparison to 2011 analysis

A comparison of the residual waste composition to 2011 is made below (Table 5a and 5b). The key change by region since 2011 is the proportion and kg/bin/wk of total organics, which has decreased in the ERA and RRA regions. While the proportion of Paper and Paper Products in 2019 SMA is lower than 2011, the kg/bin/wk data is similar (Table 5b). Similarly, while Plastics proportions have increased from 2011 to 2019 in each region, the kg/bin/wk has increased by 0.3 on average in SMA, and 0.2 in ERA, but not in the RRA region. 'Other materials' has increased in the ERA and RRA regions in both the proportion and kg/bin/wk.

Table 5a: Composition of the residual waste bin compared to previous audit reports (% breakdown)<sup>\*17</sup>

Material	Overall %		SMA		ERA		RRA	
	2011	2019	2011	2019	2011	2019	2011	2019
Total paper & paper products	19.6%	<b>18.4%</b>	21.2%	<b>18.7%</b>	16.3%	<b>17.3%</b>	17.5%	<b>18.6%</b>
Total organics	53.8%	<b>50.8%</b>	53.2%	54.3%	56.0%	<b>48.8%</b>	53.4%	<b>43.4%</b>
Total glass	3.7%	<b>3.2%</b>	3.3%	<b>2.9%</b>	4.3%	<b>3.4%</b>	4.5%	<b>4.0%</b>
Total plastics	10.5%	<b>12.7%</b>	10.4%	<b>12.1%</b>	10.3%	<b>13.9%</b>	11.0%	<b>13.2%</b>
Total ferrous material	2.2%	2.2%	2.1%	<b>1.7%</b>	2.3%	2.5%	2.5%	<b>3.1%</b>
Total non-ferrous material	0.6%	<b>0.7%</b>	0.6%	<b>0.8%</b>	0.7%	0.7%	0.9%	<b>0.8%</b>
Total other**	9.6%	<b>12.0%</b>	9.3%	9.6%	10.3%	<b>13.4%</b>	10.4%	<b>17.0%</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\*Sums may not equate due to rounding. Figures that are highlighted in **red** are streams that are at least 5% greater than the overall value (either % or kg/bin/wk), while those in **green** are 5% lower (either % or kg/bin/wk).

\*\* Total other constitutes total of hazardous, building waste, earth based, e-waste and miscellaneous materials.

Table 5b: Composition of the residual waste bin compared to previous audit reports (kg/bin/wk)\*

Material	Overall kg/bin/wk		SMA		ERA		RRA	
	2011	2019	2011	2019	2011	2019	2011	2019
Total paper & paper products	2.0	1.9	2.2	2.2	1.7	1.6	1.7	<b>1.5</b>
Total organics	5.4	5.2	5.4	<b>6.3</b>	5.7	<b>4.5</b>	5.3	<b>3.5</b>
Total glass	0.4	<b>0.3</b>	0.3	0.3	0.4	<b>0.3</b>	0.4	<b>0.3</b>
Total plastics	1.1	<b>1.3</b>	1.1	<b>1.4</b>	1.1	<b>1.3</b>	1.1	1.1
Total ferrous material	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total non-ferrous material	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total other**	1.0	<b>1.2</b>	0.9	<b>1.1</b>	1.1	<b>1.2</b>	1.0	<b>1.4</b>
<b>Total</b>	<b>10.1</b>	<b>10.1</b>	<b>10.2</b>	<b>11.7</b>	<b>10.2</b>	<b>9.3</b>	<b>9.9</b>	<b>8.0</b>

\*Sums may not equate due to rounding. Figures that are highlighted in **red** are streams that are at least 5% greater than the overall value (either % or kg/bin/wk), while those in **green** are 5% lower (either % or kg/bin/wk).

\*\* Total other constitutes total of hazardous, building waste, earth based, e-waste and miscellaneous materials.

<sup>17</sup> Note that each report year included a different number of bins and households in the sample. The councils audited may not be exactly the same from report to report. Note kg/bin/wk cannot be extrapolated out to the region more broadly or used to calculate annual kilograms disposed, as presentation rate is not considered. See Appendix 4 for these figures.

## Comparison based on available weekly residual bin capacity

Residual waste bin services offered include 55, 80, 120, 140 and 240L weekly as well as 140 and 240L fortnightly. Table 6a compares the kg/bin/wk and percentage breakdown of the composition of the residual waste bin for councils that offer 140 litre bin space or smaller per week, versus those that offer 240 litre residual waste space per week. Table 6b, 6c and 6d show the same data but for councils that offer FOGO, GO and no organics service respectively.

As can be seen, residents living in councils that offer smaller bins discard lower volumes of waste in residual waste bins overall. Volumes (kg/bin/wk) of paper, total organics and 'other' materials were substantially lower for residents with smaller bins compared to those with 240 litres of space in their residual waste bin per week.

*Table 6a: Composition of the residual waste bin for councils that have less than or equal to 140 litre residual waste bin space per week compared to those with 240 litre residual waste bins per week<sup>\*18</sup>*

	≤140L bin space per week		240L bin space per week	
	% breakdown	Kg/bin/wk	% breakdown	Kg/bin/wk
Total paper and paper products	19.3%	1.7	16.4%	2.4
Total organics	48.2%	4.3	56.3%	8.2
Total glass	3.2%	0.3	3.3%	0.5
Total plastics	13.8%	1.2	10.3%	1.5
Total ferrous material	2.1%	0.2	2.2%	0.3
Total non-ferrous material	0.7%	0.1	0.7%	0.1
Total other	12.6%	1.1	10.9%	1.6
<b>Total</b>	<b>100%</b>	<b>8.9</b>	<b>100%</b>	<b>14.6</b>
Total audits		49 <sup>19</sup>		14
Total bins		10,256		2,941

*\*Sums may not equate due to rounding*

The above figures do not account for the type of organics bin service offered to residents. To test if these differences were influenced by the organics service being offered, the analysis was repeated. Tables 6b - 6d show that FOGO councils with small bins (Table 6b) discard the lowest volumes of total organics and paper products into residual waste bins, although interestingly the proportion of paper was highest (likely due to low kg/bin/wk). Those that offer no organics bin service and larger residual waste bins discarded the highest proportion and volume of total organics in residual waste bins.

<sup>18</sup> Kg/bin/wk cannot be extrapolated out to the region more broadly or used to calculate annual kilograms disposed, as presentation rate is not considered. See Appendix 4 for these figures.

<sup>19</sup> One council was removed from the analysis due to likely inaccurate reporting of the residual waste bin composition.

Table 6b: Composition of the residual waste bin for councils with FOGO that have less than or equal to 140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week\*

	≤140L bin space per week		240L bin space per week	
	% breakdown	Kg/bin/wk	% breakdown	Kg/bin/wk
Total paper and paper products	21.2%	1.4	NA	NA
Total organics	36.3%	2.3	NA	NA
Total glass	3.3%	0.2	NA	NA
Total plastics	17.2%	1.1	NA	NA
Total ferrous material	2.9%	0.2	NA	NA
Total non-ferrous material	0.7%	0.04	NA	NA
Total other	18.5%	1.2	NA	NA
<b>Total</b>	<b>100%</b>	<b>6.5</b>	<b>0%</b>	<b>0.0</b>
Total audits		16		0
Total bins		3,399		0

\*Sums may not equate due to rounding

Table 6c: Composition of the residual waste bin for councils with GO that have less than or equal to 140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week\*

	≤140L bin space per week		240L bin space per week	
	% breakdown	Kg/bin/wk	% breakdown	Kg/bin/wk
Total paper and paper products	18.9%	1.9	19.5%	2.5
Total organics	51.6%	5.2	48.7%	6.3
Total glass	3.2%	0.3	3.5%	0.5
Total plastics	12.9%	1.3	12.1%	1.6
Total ferrous material	1.9%	0.2	2.7%	0.3
Total non-ferrous material	0.8%	0.1	0.8%	0.1
Total other	10.8%	1.1	12.7%	1.6
<b>Total</b>	<b>100%</b>	<b>10.1</b>	<b>100%</b>	<b>12.9</b>
Total audits		33		7
Total bins		6,877		1,252

\*Sums may not equate due to rounding

Table 6d: Composition of the residual waste bin for councils that do not offer an organics service and have less than or equal to 140 litre residual waste bin space per week, compared to those with 240 litre residual waste bins per week\*

	≤140L bin space per week		240L bin space per week	
	% breakdown	Kg/bin/wk	% breakdown	Kg/bin/wk
Total paper and paper products	10.5%	0.8	14.5%	2.3
Total organics	69.2%	5.0	60.8%	9.7
Total glass	3.0%	0.2	3.1%	0.5
Total plastics	7.7%	0.6	9.2%	1.5
Total ferrous material	1.3%	0.1	1.9%	0.3
Total non-ferrous material	0.6%	0.0	0.7%	0.1
Total other	7.6%	0.6	9.8%	1.6
<b>Total</b>	<b>100%</b>	<b>7.3</b>	<b>100%</b>	<b>15.9</b>
Total audits		1 <sup>20</sup>		8 <sup>21</sup>
Total bins		220		1,689

\*Sums may not equate due to rounding

<sup>20</sup> Given this dataset is from one council only, this data should be met with caution.

<sup>21</sup> An additional dataset was available from one council that offers garden organics to urban households but no organics service to rural residents.

## FOGO vs. GO councils residual waste bins compositional profile in 2019

As can be seen in Table 7, the proportion and kg/bin/wk of total organics in the residual waste bins of FOGO councils is lower than in councils offering a GO service. The data suggests that providing a FOGO service not only impacts on kg/hh/wk food, garden and other organics in the residual waste bin but also paper, plastics and glass. Matched bin matched recycling bin and FOGO bin audit data was not available to confirm if the material has been avoided, recycled or become contamination in the FOGO bin.

However, a separate report on FOGO bin audit analysis<sup>22</sup> found average contamination of FOGO bins was 0.3 kg/hh/wk and therefore could not account for the differences. Another finding from the table below is that FOGO councils have lower amounts of garden organics in residual waste bins (% and kg/bin/wk) than GO councils.

*Table 7: Composition of the residual waste bin for Councils offering a FOGO service and Councils that offer GO or no service*

	FOGO Councils		GO Councils		Councils with no organics	
	% breakdown	Kg/bin/ wk	% breakdown	Kg/bin/ wk	% breakdown	Kg/bin/ wk
Total paper and paper products	21.2%	1.4	19.0%	2.0	14.3%	2.1
Total organics	36.3%	2.3	51.0%	5.4	61.3%	9.1
<i>Total food</i>	<i>22.7%</i>	<i>1.5</i>	<i>37.6%</i>	<i>4.0</i>	<i>26.9%</i>	<i>4.0</i>
<i>Total garden</i>	<i>2.1%</i>	<i>0.1</i>	<i>3.5%</i>	<i>0.4</i>	<i>26.7%</i>	<i>4.0</i>
<i>Total other organics<sup>23</sup></i>	<i>11.5%</i>	<i>0.7</i>	<i>9.9%</i>	<i>1.0</i>	<i>7.7%</i>	<i>1.1</i>
Total glass	3.3%	0.2	3.3%	0.3	3.1%	0.5
Total plastics	17.2%	1.1	12.7%	1.3	9.1%	1.4
Total ferrous material	2.9%	0.2	2.1%	0.2	1.9%	0.3
Total non-ferrous material	0.7%	0.04	0.8%	0.1	0.7%	0.1
Total other	18.5%	1.2	11.1%	1.2	9.7%	1.4
<b>Total</b>	<b>100%</b>	<b>6.5</b>	<b>100%</b>	<b>10.6</b>	<b>100%</b>	<b>14.9</b>
Total audits	16		39 <sup>24</sup>		9	
Total bins	3,399		7,889		1,909	

*\*Sums may not equate due to rounding.*

<sup>22</sup> Titled *Analysis of NSW Food and Garden Bin Audit Data, NSW EPA 2018*

<sup>23</sup> Other organics in the composition section of this report includes soiled paper, timber, leather, rubber, oil, other putrescible and textiles/rags

<sup>24</sup> One audit was removed from this analysis due to likely inaccurate reporting of the residual waste bin composition.

## Potentially recyclables profile

Residual waste bins often contain significant amounts of materials that could be separated and recycled. This includes items that could be placed into the yellow lid recycling bin (i.e. glass, paper, cardboard, plastics and ferrous and non-ferrous metals) and organics that could be placed into a food and garden organics service (e.g. food, garden materials, soiled paper).

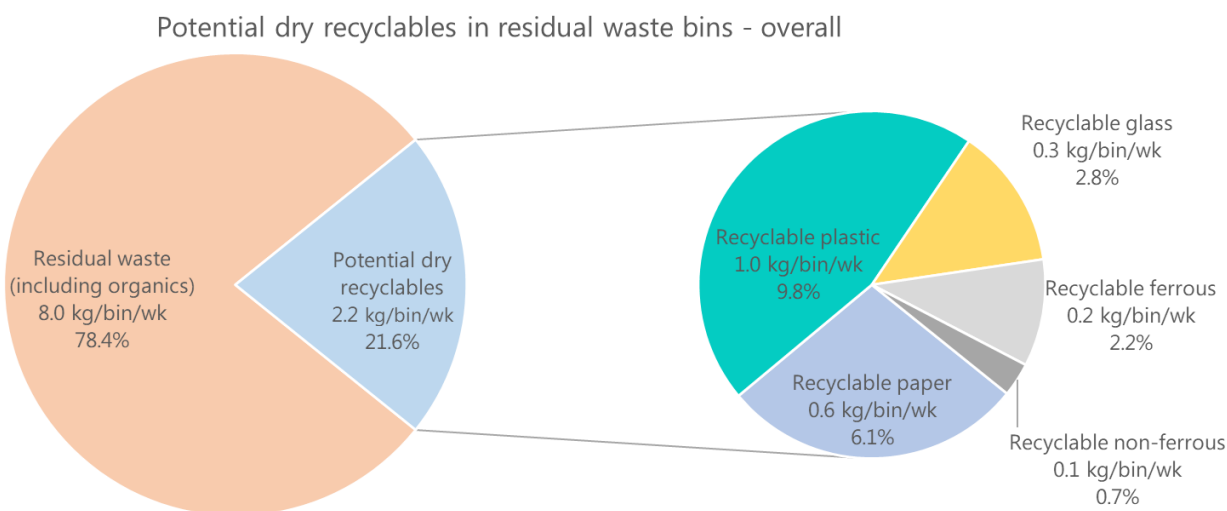
The materials considered potentially recyclable in this section are based on materials that are acceptable through a kerbside service. For a list of acceptable materials, see Appendix 2. The calculation for the proportion of each material is in line with 2011<sup>25</sup>.

### Dry recycling in residual waste bins

An estimated total of 21.6% of materials in residual waste bins could be placed directly into the yellow lidded recycling bin. The largest proportion by weight of material in the residual waste that could be recycled through the yellow bin is plastic followed by paper and glass. While the proportion and kg/hh/wk of dry recycling is similar to the 2011 data (2.3 kg/bin/wk or 22.1% overall in 2011<sup>26</sup>), there are variations between regions.

Figures 6b - 6d overleaf show some variation in the kg/bin/wk and proportion of dry recyclables by region. As can be seen, although the proportion of potential dry recyclables is higher for ERA and RRA when compared to the SMA, the kg/bin/wk are lower (2.0 for ERA and RRA versus 2.4 for SMA).

Figure 6a: Potentially dry recyclable materials in residual waste bins - overall



<sup>25</sup> Calculated by the weight audited (kgs) of recyclable material in residual waste bins x 100/ total weight of residual waste bin content

<sup>26</sup> 2011 found 8.2% recyclable paper, 8.4% recyclable plastic, 1.7% recyclable ferrous, 0.6% recyclable non-ferrous and 3.2% recyclable glass in residual bins.



Figure 6b: Potentially dry recyclable materials in residual waste bins - SMA

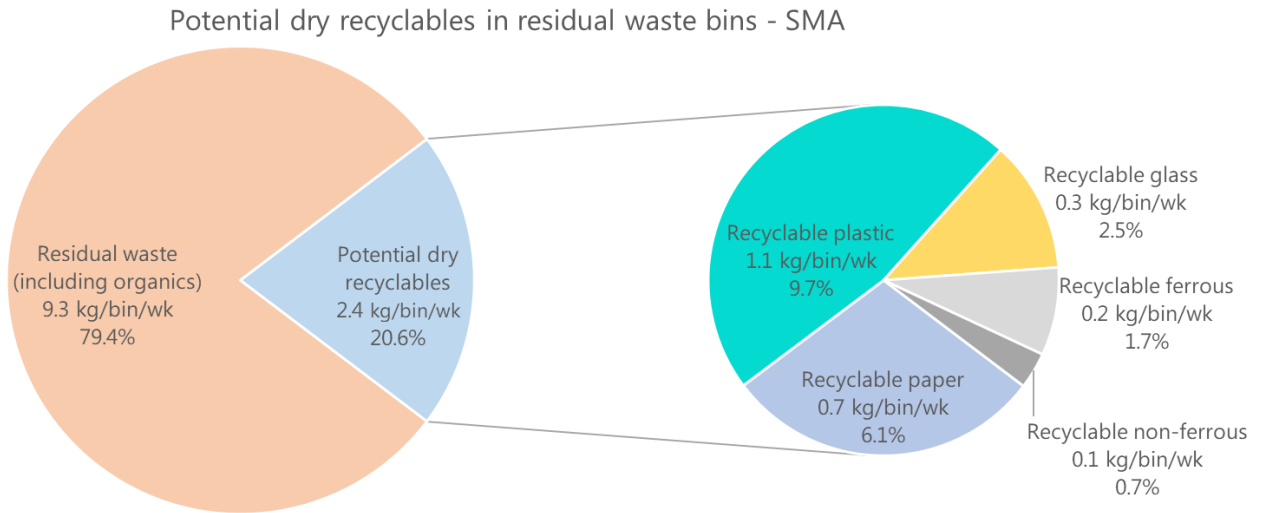


Figure 6c: Potentially dry recyclable materials in residual waste bins - ERA

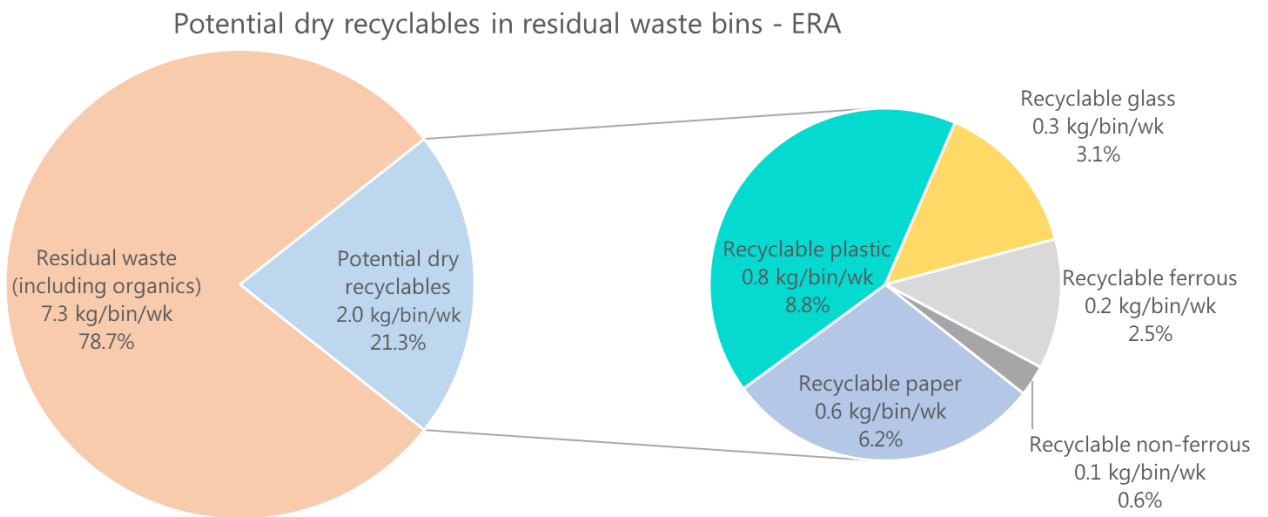
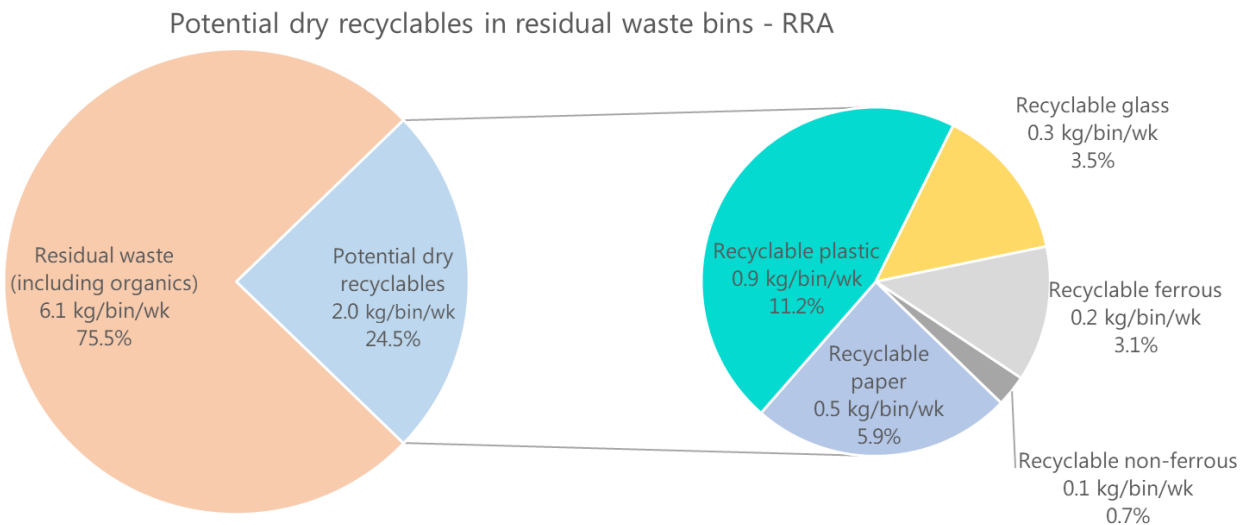


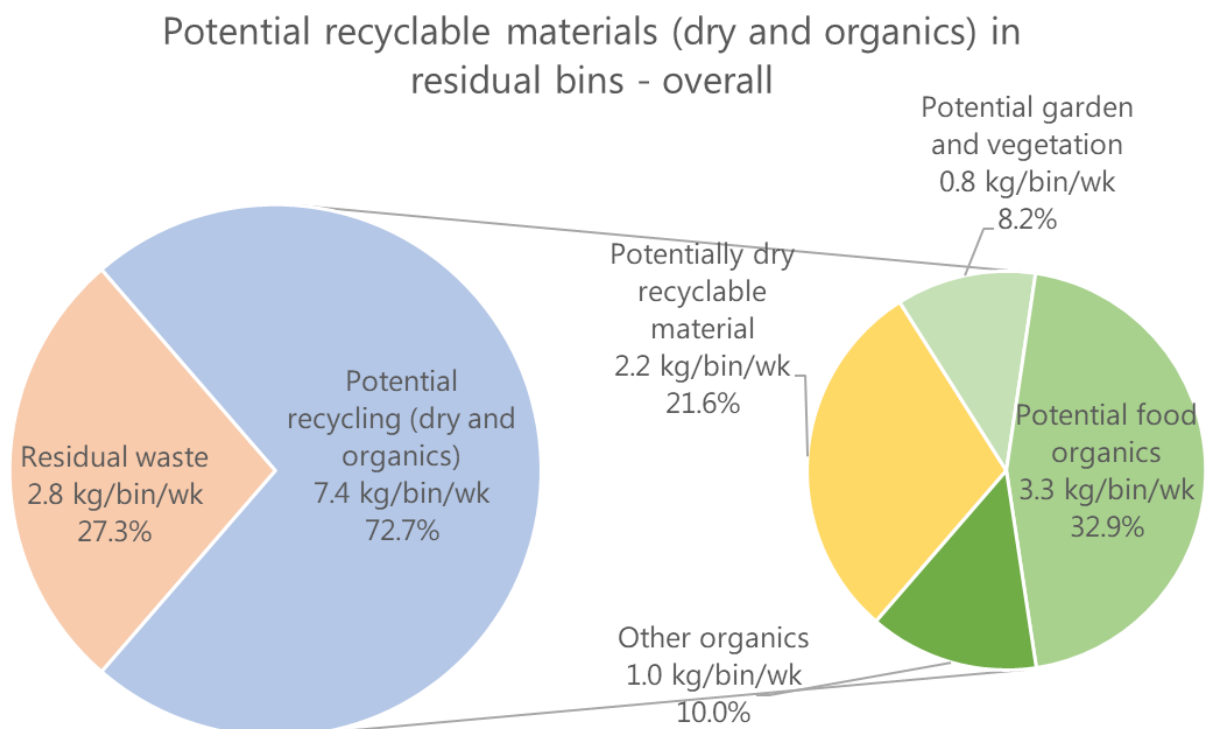
Figure 6d: Potentially dry recyclable materials in residual waste bins - RRA



## Dry recycling and organics in residual waste bins

Summing all materials recyclable through kerbside bins (dry and organics), approximately 73%<sup>27</sup> of residual waste bins could be diverted into kerbside bins (for councils offering dry recycling and FOGO bins) – Figure 7a. This varies between regions (Figure 7b – 7d) and is mainly driven by organics recycling in the RRA and ERA. As can be seen in Figures 7b – 7d, SMA had the highest proportion and volume of food waste in residual bins whereas the food organics was lower in RRA and ERA residual bins. The kg/bin/wk of garden organics and dry recyclables was highest in the SMA region. Other organics such as soiled paper, untreated timber and other putrescible items in residual bins was similar for each region.

Figure 7a: Potentially dry recyclable, food and garden materials in residual waste bins - overall



<sup>27</sup> Note that 'other organics' is included here but was not included in the 2011 report. In the potentially recyclables profile section of this report, other organics includes soiled paper, untreated timber and other putrescible items that can be composted (but not non-compostable organics such as rags, rubber and leather) and comprises 10% of residual waste bins by weight. Without Other Organics the total proportion of potential recycling would be 62.7%.

Figure 7b: Potentially dry recyclable, food and garden materials in residual waste bins - SMA

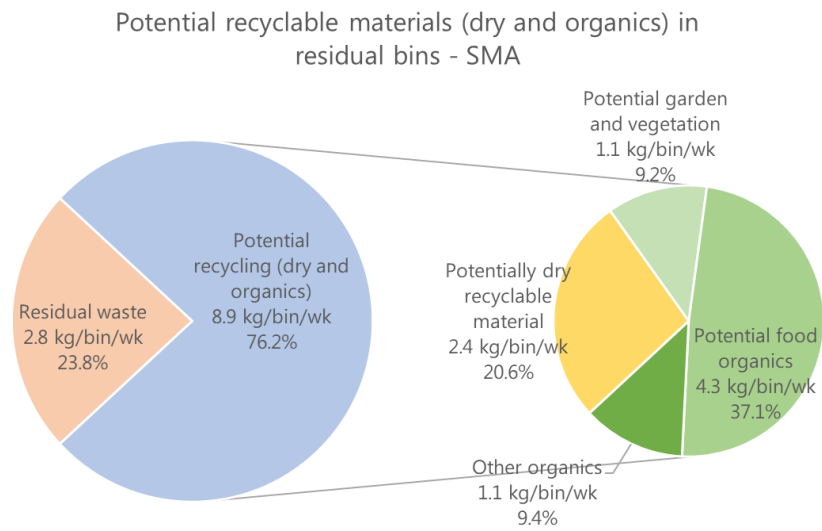


Figure 7c: Potentially dry recyclable, food and garden materials in residual waste bins - ERA

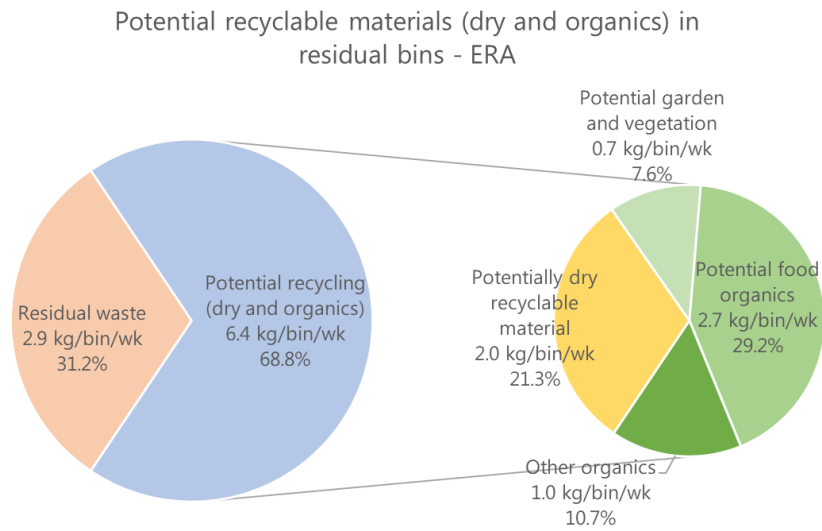
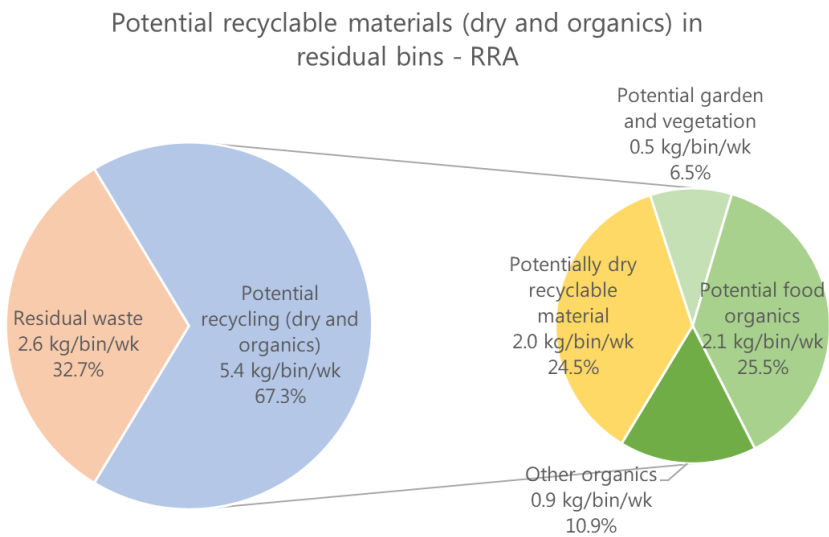


Figure 7d: Potentially dry recyclable, food and garden materials in residual waste bins - RRA



## Comparison to 2011

Compared to previous audits in 2010-11, the proportion and kg/bin/wk of potential recyclable materials in residual waste bins has decreased overall. The potential recyclables include dry recyclables, garden and vegetation, and food organics. 'Other organics' that are potentially recyclable such as timber and soiled paper have not been included in this comparison as 'other organics' were not included in the 2011 report. The 2019 changes are driven by kg/bin/wk decreases in dry recyclables, food and garden material in the RRA and ERA. These changes mask the increases in the SMA in kg/bin/wk of dry recyclables, food and garden materials disposed via residual waste bins.

Table 8a: Comparison of potential recyclables overall and by region (% breakdown), 2011 vs 2019<sup>+28</sup>

	Overall		SMA		ERA		RRA	
	2011	2019	2011	2019	2011	2019	2011	2019
Potential dry recyclables	22.1%	21.6%	21.6%	20.6%	22.4%	21.3%	24.0%	24.5%
Potential garden and vegetation	9.7%	8.2%	6.8%	9.2%	17.2%	7.6%	11.9%	6.5%
Potential food organics	35.3%	32.9%	38.5%	37.1%	29.1%	29.2%	30.2%	25.5%
<b>Subtotal</b>	<b>67.1%</b>	<b>62.7%</b>	<b>66.9%</b>	<b>66.8%</b>	<b>68.7%</b>	<b>58.1%</b>	<b>66.1%</b>	<b>56.4%</b>
Remaining waste	32.9%	37.3%	33.2%	33.2%	31.2%	41.9%	34.0%	43.6%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\* Figures that are highlighted in red are at least 5% greater than the 2011 value, while those that are 5% lower are highlighted in green. Difference in remaining waste is not highlighted.

Table 8b: Comparison of potential recyclables overall and by region (kg/bin/wk), 2011 vs 2019\*

	Overall		SMA		ERA		RRA	
	(kg/bin/wk)	(kg/bin/wk)	(kg/bin/wk)	(kg/bin/wk)	(kg/bin/wk)	(kg/bin/wk)	(kg/bin/wk)	(kg/bin/wk)
	2011	2019	2011	2019	2011	2019	2011	2019
Potential dry recyclables	2.2	2.2	2.2	2.4	2.3	2.0	2.4	2.0
Potential garden and vegetation	1.0	0.8	0.7	1.1	1.8	0.7	1.2	0.5
Potential food organics	3.6	3.3	3.9	4.3	3.0	2.7	3.0	2.1
<b>Subtotal</b>	<b>6.8</b>	<b>6.4</b>	<b>6.8</b>	<b>7.8</b>	<b>7.0</b>	<b>5.4</b>	<b>6.5</b>	<b>4.5</b>
Remaining waste	3.3	3.8	3.4	3.9	3.2	3.9	3.4	3.5
<b>Total</b>	<b>10.1</b>	<b>10.1</b>	<b>10.2</b>	<b>11.7</b>	<b>10.2</b>	<b>9.3</b>	<b>9.9</b>	<b>8.0</b>

\*Sums may not equate due to rounding. Also note figures that are highlighted in red are at least 5% greater than the 2011 value, while those that are 5% lower are highlighted in green. Difference in remaining waste is not highlighted.

<sup>28</sup> Note that each report year included a different number of bins and households in the sample. The councils audited may not be exactly the same from report to report.

## Comparison based on available weekly residual bin capacity

The 2019 report compares councils that have ≤140 litre residual waste bin space per week to those with 240 litre residual waste bins per week for the proportion of potential recyclables. The overall potential recyclables is lower (kg/bin/wk) for councils offering ≤140 litre bin space compared to 240L weekly residual waste bins (Table 9). The proportion and kg/bin/wk of garden and vegetation is much lower in councils that offer ≤140 litre of residual waste bin space per week. Although the proportion is higher in ≤140 litre bins for potential dry recyclables and food organics, the kg/bin/wk is lower for councils offering ≤140 litre bin spaces compared to weekly 240L bins. Note in the data set none of the councils with the predominant bin service of 240L of residual waste bin space per week have a FOGO service (47% have GO and 53% have no organics service), while 33% of the <140L bin space have FOGO (the remaining 67% have either a GO service (65%) or no organics service (2%)).

Table 9a: Comparison of potential recyclables, councils that have ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bin per week\*<sup>29</sup>

	≤140L bin space per week		240L bin space per week	
	%	Kg/bin/wk	%	Kg/bin/wk
Potential dry recyclables	22.2%	2.0	20.1%	2.9
Potential garden and vegetation	3.4%	0.3	18.4%	2.7
Potential food organics	34.7%	3.1	29.0%	4.2
<b>Subtotal</b>	<b>60.4%</b>	<b>5.4</b>	<b>67.6%</b>	<b>9.9</b>
Remaining waste	39.6%	3.5	32.4%	4.7
<b>Total</b>	<b>100%</b>	<b>8.9</b>	<b>100%</b>	<b>14.6</b>
Total audits included in the analysis		49 <sup>30</sup>		14

\*Sums may not equate due to rounding

Comparisons of available weekly bin space based on organics service are shown in Table 9b, 9c and 9d. The organics service and available bin space impact on potential dry recyclables, potential garden recyclables and potential food organics remaining in the residual bin. The dry recyclables are highest in GO councils that have 240L residual waste bins and lowest in FOGO councils. Garden organics is highest (kg/bin/wk), for councils with no organics service and with 240L general waste bins.

<sup>29</sup> Kg/bin/wk cannot be extrapolated out to the region more broadly or used to calculate annual kilograms disposed, as presentation rate is not considered. See Appendix 4 for these figures.

<sup>30</sup> One council excluded from this analysis due to uncertainty over the composition of the residual bins.

Table 9b: Comparison of potential recyclables, FOGO councils that have ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bin per week\*

	≤140L bin space per week		240L bin space per week	
	%	Kg/bin/wk	%	Kg/bin/wk
Potential dry recyclables	24.6%	1.6	NA	NA
Potential garden and vegetation	2.1%	0.1	NA	NA
Potential food organics	22.7%	1.5	NA	NA
<b>Subtotal</b>	<b>49.4%</b>	<b>3.2</b>	NA	NA
Remaining waste	50.6%	3.3	NA	NA
<b>Total</b>	<b>100%</b>	<b>6.5</b>	NA	NA
Total councils included in the analysis		16		0

\*Sums may not equate due to rounding

Table 9c: Comparison of potential recyclables, GO councils that have ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bin per week\*

	≤140L bin space per week		240L bin space per week	
	%	Kg/bin/wk	%	Kg/bin/wk
Potential dry recyclables	21.6%	2.2	24.0%	3.1
Potential garden and vegetation	3.0%	0.3	5.9%	0.8
Potential food organics	38.9%	3.9	32.3%	4.2
<b>Subtotal</b>	<b>63.5%</b>	<b>6.4</b>	<b>62.3%</b>	<b>8.0</b>
Remaining waste	36.5%	3.7	37.7%	4.9
<b>Total</b>	<b>100%</b>	<b>10.1</b>	<b>100%</b>	<b>12.9</b>
Total councils included in the analysis		32 <sup>31</sup>		7

\*Sums may not equate due to rounding

<sup>31</sup> One council excluded from this analysis due to uncertainty over the composition of the residual bins.

Table 9d: Comparison of potential recyclables, councils that do not offer an organics service that have ≤140 litre residual waste bin space per week, compared to those with 240 litre residual waste bin per week\*

	≤140L bin space per week		240L bin space per week	
	%	Kg/bin/wk	%	Kg/bin/wk
Potential dry recyclables	15.7%	1.1	17.8%	2.8
Potential garden and vegetation	39.7%	2.9	25.9%	4.1
Potential food organics	24.4%	1.8	27.1%	4.3
<b>Subtotal</b>	<b>79.9%</b>	<b>5.8</b>	<b>70.8%</b>	<b>11.3</b>
Remaining waste	20.1%	1.5	29.2%	4.6
<b>Total</b>	<b>100%</b>	<b>7.3</b>	<b>100%</b>	<b>15.9</b>
Total councils included in the analysis <sup>32</sup>		1		8

\*Sums may not equate due to rounding

<sup>32</sup> An additional dataset was available in the 240L bin space per week due to one council separating the audit to rural and urban households. The rural households receive no organics service, the urban households receive a GO service. Only one dataset is included in the ≤140L bin space per week and the results should therefore be met with caution for this group.

## FOGO vs GO councils' potential recyclables profile in 2019

Table 10 shows the proportion and kg/bin/wk of organics (both garden and food) in the residual waste bin of FOGO councils is much lower than non-FOGO councils. It also shows that the kg/bin/wk of dry recyclables disposed via the residual waste bin is lower in FOGO councils compared to councils offering a kerbside bin for recycling garden organics or councils with no organics service.

Table 10: Comparison of potential recyclables, FOGO versus Non-FOGO Councils<sup>33</sup>

Material	FOGO Councils		GO Councils		Councils with no organics service	
	%	Kg/bin/wk	%	Kg/bin/wk	%	Kg/bin/wk
Potential dry recyclables	24.6%	1.6	22.1%	2.3	17.7%	2.6
Potential garden and vegetation	2.1%	0.1	3.5%	0.4	26.7%	4.0
Potential food organics	22.7%	1.5	37.6%	4.0	26.9%	4.0
<b>Subtotal</b>	<b>49.4%</b>	<b>3.2</b>	<b>63.3%</b>	<b>6.7</b>	<b>71.3%</b>	<b>10.6</b>
Remaining waste	50.6%	3.3	36.7%	3.9	28.7%	4.3
<b>Total</b>	<b>100%</b>	<b>6.5</b>	<b>100%</b>	<b>10.6</b>	<b>100%</b>	<b>14.9</b>
Total audits included in the analysis	16		39 <sup>34</sup>		9 <sup>35</sup>	

*\*Sums may not equate due to rounding*

<sup>33</sup> Kg/bin/wk cannot be extrapolated out to the region more broadly or used to calculate annual kilograms disposed, as presentation rate is not considered. See Appendix 4 for these figures.

<sup>34</sup> One council was excluded from the analysis due to uncertainty over the composition of the residual bins.

<sup>35</sup> An additional dataset was available from one council that offers garden organics to urban households but no organics service to rural residents.



## Appendix 1 – Overall bins and councils included in kg/bin/wk analyses

Table A1: Data included in the data analysis

Group	Bins	Councils included in sample
Overall	13,437	64
SMA	6,740	32
ERA	3,157	13
RRA	3,540	19
FOGO	3,399	16
GO	8,129	40
No organics service	1,909	9*
<=140L bin space per week	10,496	50
240L weekly bins	2,941	14

\* One council offered GO to urban residents and no organics service to rural residents. The 'no organics service' group therefore has one additional dataset.

## Appendix 2 – Materials and classification

Table A2: Materials and classification

Stream classification (for composition)	Item	Potentially recyclable? <sup>36</sup>	
		Dry recycling	FOGO
<b>Paper and paper products</b>	Newspaper	✓	
	Magazines/ brochures	✓	
	Misc. Packaging	✓	
	Corrugated cardboard	✓	
	Cardboard / package board	✓	
	Liquid paperboard containers	✓	
	Disposable paper product	✓	
	Print/ writing/ office paper	✓	
	Composite (mainly paper)		
	Nappies disposable (adult & child)		
	Contaminated soiled paper		✓ (2019 only)
<b>Organics</b>	Food/ kitchen (loose or in newspaper)		✓
	Food/ kitchen (in compostable bag)		✓
	Garden/ vegetation		✓
	Other putrescible		✓ (2019 only)
	Wood/ timber		✓ (2019 only)
	Textile/ rags		
	Leather		
	Rubber		
<b>Glass</b>	Oils		
	Glass beverage containers	✓	
	Glass non beverage containers / other packaging glass	✓	
	Miscellaneous/ other glass		
<b>Plastics</b>	Mixed glass / fines		
	PET beverage containers	✓	
	PET packaging (excluding beverage containers)	✓	
	PET other non-beverage / non packaging	✓	
	HDPE beverage containers	✓	
	HDPE packaging (excluding beverage containers)	✓	
	HDPE other non-beverage / non packaging	✓	
	PVC beverage containers	✓	
	PVC packaging (excluding beverage containers)	✓	
	PVC other non-beverage / non packaging	✓	
	LDPE packaging	✓	
	LDPE non-packaging	✓	
	PP packaging	✓	
	PP non-packaging	✓	
	PS packaging	✓	
	PS & Expanded PS non-packaging	✓	
	EPS packaging	✓	
	Other plastics		
	Composite (mostly plastic)		
	Plastic bags	✓	
Plastic film	✓		
<b>Ferrous</b>	Steel beverage containers	✓	
	Steel packaging (excluding beverage containers)	✓	
	Steel other non-packaging	✓	
	Composite (mostly ferrous)	✓	
<b>Non-Ferrous</b>	Aluminium beverage containers	✓	
	Aluminium packaging (excluding beverage containers)	✓	
	Aluminium non-packaging	✓	
	Other non-packaging non-ferrous	✓	
	Composite (mostly non-ferrous)		

<sup>36</sup> For comparison to 2011 data (note some streams may be recyclable, but are not counted as potentially recyclable here to keep consistent with 2011).

Stream classification (for composition)	Item	Potentially recyclable? <sup>36</sup>	
		Dry recycling	FOGO
<b>Hazardous</b>	Paint		
	Fluorescent tubes		
	Dry cell and car batteries (non-rechargeable)		
	Dry cell and car batteries (rechargeable)		
	Vehicle batteries		
	Household chemicals		
	Asbestos		
	Clinical pathogenic infectious		
	Gas bottles		
	Hazardous other		
<b>Building waste</b>	Building materials and fittings (NEC)		
<b>Earth-Based</b>	Ceramics dust dirt rock inert ash		
<b>E-waste</b>	Computer equipment		
	TVs		
	Mobile Phones		
	Electrical items and peripherals		
<b>Miscellaneous</b>	Toner cartridges		
	Containerised food & liquid		
	Other (specify)		

## Appendix 3 - Data set

Table A3: Data set

Co-unc- il no.	Year of audit	Reg- ion	Overall residual waste sample size (hhs sampled)	Residual waste bin numbers sampled	Kg residual waste audited (1 week equivalent)	Predominant Residual waste configuration	Organics configuration
1	2014	SMA	355	355	6006	240 L Weekly	No service
2	2017	RRA	151	151	1069	240 L Fortnightly	FOGO 240 L Weekly
3	2017	RRA	150	141	974	240 L Fortnightly	FOGO 240 L Weekly
4	2017	RRA	150	150	1122	240 L Fortnightly	FOGO 240 L Weekly
5	2016	RRA	145	145	1000	240 L Fortnightly	FOGO 240 L Weekly
6	2015	SMA	235	235	1911	120L Weekly	Garden only 240 L Fortnightly (Opt in)
7	2015	SMA	231	188	2815	240 L Weekly	Garden only All sizes Fortnightly
8	2015	SMA	236	236	2720	120L Weekly	Garden only 240 L Fortnightly
9	2015	SMA	238	225	2839	140 L Weekly	Garden only 240 L Fortnightly
10	2015	SMA	225	142	1349	55 / 80 / 120L Weekly	Garden only 120 L / 240 L Fortnightly
11	2015	SMA	226	247	2328	120L Weekly	Garden only 240 L Fortnightly
12	2015	SMA	226	206	2304	120L Weekly	Garden only 240 L Fortnightly
13	2015	SMA	225	204	2154	55 / 80 / 120L Weekly	Garden only All sizes Fortnightly
14	2015	SMA	233	221	2196	140 L Weekly	Garden only All sizes Fortnightly (Opt in)
15	2015	SMA	225	205	2205	140 L Weekly	Garden only 240 L Fortnightly
16	2015	SMA	224	182	3125	240 L Weekly	No service
17	2015	SMA	223	223	2032	120L Weekly	Garden only 240 L Fortnightly
18	2015	SMA	223	166	1922	140 L Weekly	Garden only 140 / 240L optional Fortnightly
19	2015	SMA	236	236	1902	55 / 80 / 120L Weekly	FOGO All sizes weekly
20	2017	RRA	234	234	1935	140 L Weekly	Garden only 240 L Fortnightly
21	2016	RRA	220	220	1353	140 L Fortnightly	FOGO 240 L Weekly
22	2016	SMA	226	226	2863	240 L Weekly	Garden only 240 L Weekly
23	2011	SMA	220	220	2335	140 L Weekly	Garden only 240 L Fortnightly
24	2014	SMA	250	250	2891	120L Weekly	Garden only 240 L Fortnightly
25	2015	ERA	242	262	2511	120L Weekly	Garden only 240 L Fortnightly
26	2017	ERA	223	223	2916	240 L Weekly	Garden only 240 L Fortnightly
27	2017	RRA	220	220	1035	240 L Fortnightly	FOGO 240 L Weekly
28	2016	SMA	105	127	1638	120L Weekly	Garden only 240 L Fortnightly
29	2016	SMA	178	140	2473	240 L Weekly	No service
30	2016	SMA	56	57	821	120L Weekly	Garden only 240 L Fortnightly
31	2015	SMA	300	258	5401	240 L Weekly	No service
32a	2017	ERA	127	127	1602	240 L Weekly	Garden only 240 L Fortnightly
32b	2017	ERA	93	93	1554	240 L Weekly	No service
33	2017	RRA	100	100	789	240 L Fortnightly	FOGO 240 L Weekly
34	2016	ERA	450	450	2417	140 L Fortnightly	FOGO 240 L Weekly
35	2018	ERA	233	233	1229	140/240 L Fortnightly	FOGO 240 L Weekly
36	2016	RRA	277	277	1753	140 L Fortnightly	FOGO 240 L Weekly
37	2017	SMA	320	228	3497	140 L Weekly	Garden only 240 L Fortnightly
38	2017	ERA	229	216	2708	240 L Weekly	Garden only 240 L Fortnightly
39	2011	SMA	220	190	1447	80L weekly	Garden only 240 L Fortnightly
40	2017	RRA	150	150	1291	140 L Weekly	Garden only 240 L Fortnightly
41	2017	ERA	220	190	1765	140 L Weekly	Garden only 240 L Fortnightly
42	2014	SMA	317	204	2093	55 / 80 / 120L Weekly	Garden only 240 L Fortnightly
43	2015	SMA	224	203	1891	55 / 80 / 120L Weekly	Garden only 240 L Fortnightly
44	2015	SMA	231	231	2613	140 L Weekly	Garden only 240 L Fortnightly
45	2011	ERA	220	218	2259	240 L Weekly	No service

Co-unc- il no.	Year of audit	Reg- ion	Overall residual waste sample size (hhs sampled)	Residual waste bin numbers sampled	Kg residual waste audited (1 week equivalent)	Predominant Residual waste configuration	Organics configuration
46	2018	RRA	225	225	1099	240 L Fortnightly	FOGO 240 L Weekly
47	2014	SMA	220	223	1965	140 L Weekly	Garden only 240 L Fortnightly
48	2019	ERA	221	221	2202	240 L Fortnightly	FOGO 240 L Weekly
49	2011	ERA	220	220	1598	120L Weekly	No service
50	2017	RRA	227	228	2783	240 L Weekly	Garden only 240 L Fortnightly
51	2017	SMA	220	220	2194	120L Weekly	Garden only 240 L Fortnightly
52	2017	RRA	220	220	1179	140 L Fortnightly	FOGO 240 L Weekly
53	2016	RRA	223	223	3337	240 L Weekly	No service
54	2019	ERA	230	230	2209	120L Weekly	Garden only 240 L Fortnightly
55	2017	SMA	236	221	2014	140 L Weekly	Garden only 240 L Weekly
56	2017	RRA	215	215	1317	240 L Fortnightly	FOGO 240 L Weekly
57	2017	ERA	224	224	1817	80L weekly	Garden only 240 L Fortnightly
58	2011	RRA	220	220	1936	120L Weekly	Garden only 240 L Fortnightly
59	2016	ERA	251	251	2422	140 L Weekly	Garden only 240 L Fortnightly
60	2017	SMA	271	276	3164	140 L Weekly	Garden only 240 L Fortnightly
61	2017	SMA	194	195	1489	140 L Fortnightly	FOGO 240 L Weekly
62	2014	RRA	220	220	2704	240 L Weekly	No service
63	2017	RRA	44	44	464	240 L Weekly	Garden only 240 L Fortnightly
64	2017	RRA	157	157	1318	140 L Weekly	Garden only 240 L Fortnightly
<b>Total</b>			<b>14,080</b>	<b>13,437</b>	<b>136,264</b>		

## Appendix 4 – Household Generation

To include data that can be extrapolated out to the broader region, compared to other councils or used to calculate annual kilograms disposed, household generation data is also included here. This was not included in the 2011 report. It is reported as kilograms per household per week (kg/hh/wk), and it accounts for presentation rate of kerbside bins at each council. These values are calculated by summing the total audited material for a particular group, multiplying by the collection frequency to convert to weekly kilograms, multiplying this by the presentation rate of residual waste bins for each audit within that group, and dividing by the number of households in the sample.

*Table A4: kg/hh/wk numbers overall and by group*

Group	Councils in sample*	Households in sample	Kg/hh/wk (residual waste)	kg/bin/wk**
Overall	56***	12,158	8.8	10.1
SMA	29	6,789	9.7	11.7
ERA	12	2,733	8.3	9.3
RRA	15	2,863	7.5	8.0
Councils with FOGO service	11	2,272	6.0	6.5
Councils with garden service only	36	7,726	8.7	10.6
Councils with no organics service	8	1,940	12.4	14.5
<=140L wkly residual bins	42	9,038	7.7	8.9
240L wkly residual bins	13	2,900	12.1	14.6
<i>Additional analyses</i>				
Residents with weekly FOGO, fortnightly residual	10	2,036	5.9	
Residents with fortnightly garden, weekly residual	33	7,299	8.7	
Residents with no organics service, weekly residual	8	1,940	12.4	

\* Some councils are missing from certain group analyses due to insufficient data to place in a group.

\*\* As reported in report (presentation rate not considered).

\*\*\* Overall councils in sample for this analysis is lower than the main report due to not knowing the presentation rate for selected councils. These councils were excluded from household generation (kg/hh/wk) calculations.