Cyfoeth Naturiol Cymru
Natural Resources Wales

# Survey of Industrial and Commercial Waste Generated in Wales 2018

Rev No Final

# Executive Summary

This study provides information on the types, quantities, origins (by industry sector and geographic region), and fate (management method) of Industrial and Commercial (I&C) wastes generated by businesses and the public sector in Wales in 2018. This updates the data from the last survey for the 2012 calendar year.

This information is required by Welsh Government (WG) for a variety of reasons including:

- statutory reporting on waste generation in compliance with the EU Waste Statistics Regulations 2002[1] and Part 2 of Schedule 1 of the Waste (England and Wales) Regulations 2011;
- informing the development of national waste policy;
- monitoring progress against national waste prevention and recycling targets;
- informing waste planners and the regulator;
- supporting investment decisions such as the selection of the type and scale of new waste management facilities required by local authorities and the waste industry; and
- providing businesses with a better understanding of their current waste practices and for developing sustainable waste management support strategies by Welsh Government for improving environmental performance of businesses.

## The survey

The survey of Industrial and Commercial (I&C) waste generated in Wales for 2018 calendar year was carried out by SLR Consulting Ltd in partnership with Anthesis (UK) Ltd and managed by Natural Resources Wales on behalf of the Welsh Government that funded the project. Ainsworth & Parkinson and Groundwork Wales provided fieldwork on the project.

Data for 2018 was collected from a representative sample of 1,755[2] business sites of differing sectors and sizes throughout Wales between April 2019 and October 2019. The data was grossed up using Office for National Statistics (ONS) business site population data to regional and national level in Wales. The ONS data showed that there were 97,999 Industrial and Commercial business sites in Wales in 2018 with 7% in Industrial sectors and 93% in Commercial sectors. Of these business sites, 65% had fewer than five employees and 2% had one hundred or more employees. The methodology used in this survey was mainly comparable with the previous I&C surveys completed in Wales, of which the most recent provided data for the 2012 calendar year.

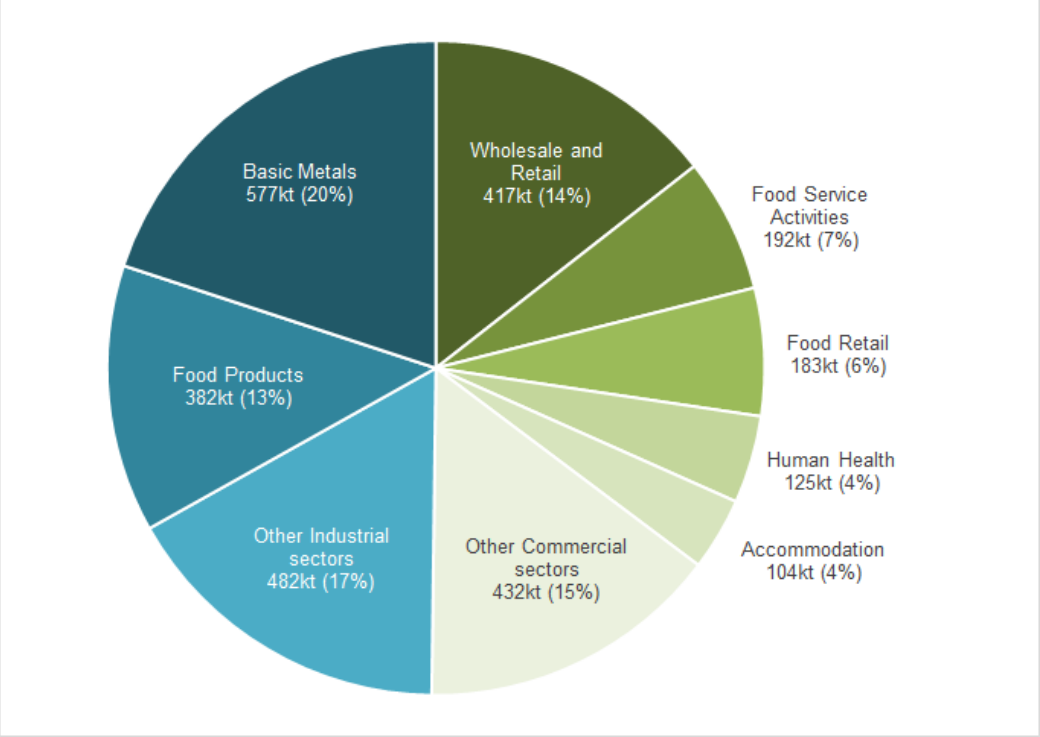
[1] https://ec.europa.eu/eurostat/web/waste/legislation

[2] Data for 1,438 sites was obtained by surveyor visits, with the remainder from data supplied centrally by the businesses themselves, e.g. the major supermarket chains, where data on waste arisings by store is collated centrally.

## Headline results

- In 2018 the Welsh Industrial and Commercial sectors generated an estimated 2.9 million tonnes of waste split 50% from Industrial and 50% from Commercial sector businesses[3], see Figure 1.
- The precision for the total waste generated is +/- 4.54% at 90% confidence.

**Figure 1: Total waste by sector, Wales 2018**




- 67% of the waste was Preparation for Reuse, Recycling and Composting with the break down as shown in Table 1.

**Table 1: Summary of how waste was managed, Wales 2018**

| Sector | Preparation for Reuse, Recycling and Composting rate | Energy Recovery rate | Land Disposal rate |
|---|---|---|---|
| Industrial | 69% | 6% | 9% |
| Commercial | 64% | 9% | 12% |
| **Total[4]** | **67%** | **8%** | **11%** |

- The 2.9 million tonnes are broken down by region as shown in Table 2. [5]

[3] This 2018 survey split the 2012 sector Wholesale and Retail Trade into separate Wholesale and Retail Trade (excluding Food Retail) and Food Retail sectors; and 2012 Accommodation and Food Services sector into separate Accommodation and Food Services sectors.
[4] There may be some discrepancies in the tables where, due to rounding, the components do not sum up to the totals.
[5] This 2018 survey uses the Welsh economic regions of North Wales, Mid & South West Wales and South East Wales which is a different regional definition than used in 2012.

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Natural Resources Wales

**Table 2: Summary of waste generated, Wales 2018**

| Sector | Quantity of waste generated per region 2018 (thousand tonnes per annum and % of sector) | | | | | | |
|---|---|---|---|---|---|---|---|
| | South East Wales | | Mid & South West Wales | | North Wales | | All Wales |
| Industrial | 566 | 39% | 512 | 36% | 364 | 25% | 1,441 |
| Commercial | 679 | 47% | 427 | 29% | 347 | 24% | 1,453 |
| **Total** | **1,245** | **43%** | **938** | **32%** | **710** | **25%** | **2,894** |

When compared to the results of the 2012 waste generation survey:

- The quantity of waste generated in the I&C sector in Wales decreased significantly from 3.7 million tonnes in 2012 to 2.9 million tonnes in 2018.
- The quantity of waste generated in the Industrial sector in Wales decreased significantly from 2 million tonnes in 2012 to 1.44 million tonnes in 2018.
- The quantity of waste generated in the Commercial sector in Wales has also decreased from 1.7 million tonnes in 2012 to 1.45 million tonnes in 2018 (marginally statistically significant).

and

- The rate of Preparation for Reuse, Recycling and Composting of I&C sector waste in Wales has significantly increased from 58% in 2012 to 67% in 2018.
- The rate of Preparation for Reuse, Recycling and Composting for Industrial sector waste has significantly increased from 50% in 2012 to 69% in 2018.
- The rate of Preparation for Reuse, Recycling and Composting in the Commercial sector has changed from 68% in 2012 to 64% in 2018 (not statistically significant).
- 2018 saw an increase in Incineration but a dominance of Incineration with Energy Recovery. In 2012, 143 thousand tonnes (3.9%) of waste went to Incineration (2.2% without Energy Recovery and 1.7% with Energy Recovery). In 2018 this increased to 236 thousand tonnes (8.2%) of waste (0.4% without Energy Recovery and 7.8% with Energy Recovery.

## Progress against targets

### Waste prevention

The waste prevention target for industrial waste is a reduction of 1.4% every year until 2050 (using 2007 as baseline). The data should therefore be reducing every year by 26,546 tonnes towards a total tonnage of 1,604 thousand tonnes in 2018.

The data (see Table 3) suggests that there has been progress towards this target. There is a statistically significant decrease in the quantity of Industrial waste generated in Wales.

**Table 3: Comparison of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Target Industrial waste generation | Estimated Industrial waste generation | |
|---|---|---|---|
| | (thousands of tonnes) | | |
| 2018 | 1,604 | 1,441 | +/- 6.76% |
| 2012 | 1,763 | 2,001 | +/- 11.7% |
| 2007 | Base year | 1,896 | +/- 11.4% |

The waste prevention target for commercial waste is a reduction of 1.2% every year until 2050 (using 2007 as baseline). The data should therefore be reducing every year by 20,124 tonnes towards a total tonnage of 1,456 thousand tonnes in 2018.

The data (see Table 4) suggests that there has been progress towards this target with a reduction in the estimated amount. However, given the confidence range there is no statistically significant difference in the quantity of Commercial waste generated in Wales.

**Table 4: Comparison of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Target Commercial waste generation | Estimated Commercial waste generation | |
|---|---|---|---|
| | (thousands of tonnes) | | |
| 2018 | 1,456 | 1,453 | +/- 6.05% |
| 2012 | 1,576 | 1,665 | +/- 10.4% |
| 2007 | Base year | 1,677 | +/- 7.4% |

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## Recycling

Towards Zero Waste sets a Preparation for Reuse, Recycling and Composting target of 67% by 2019/20, and 70% by 2024/25, for the Industrial Sector and for the Commercial Sector.

The data in Table 5 suggests that there has been progress towards this target for the Industrial sector with a statistically significant increase in the Preparation for Reuse, Recycling and Composting rate for Industrial waste; the rate was 50% in 2012 and 69% in 2018. In 2012 this rate was heavily influenced by the management of Combustion wastes from the Energy Supply sector, a large proportion of which was landfilled.

**Table 5: Comparison of Recycling rate of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated total Industrial waste recycled | |
|---|---|---|
| | Quantity (thousands of tonnes) | Recycling rate |
| 2018 | 992 | 69% |
| 2012 | 1,002 | 50% |
| 2007 | 1,128 | 59% |

The data in Table 6 suggests that the Commercial waste producing sectors' performance has receded slightly to below the 2019/20 target, from a previous marginal exceedance of the target in the 2012 survey. However, this is not a statistically significant difference in the Preparation for Reuse, Recycling and Composting rate for Commercial waste; the rate was 68% in 2012 and 64% in 2018.

**Table 6: Comparison of Recycling rate of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated total Commercial waste recycled | |
|---|---|---|
| | Quantity (thousands of tonnes) | Recycling rate |
| 2018 | 936 | 64% |
| 2012 | 1,131 | 68% |
| 2007 | 628 | 37% |

In 2012 the rate for the Commercial sector was heavily influenced by the management of wastes from the Wholesale and Retail Trades sector. In 2018 the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) sector still accounted for 29% of Commercial waste, which is more than any other Commercial sector and recycled 73% of its waste. By removing the data for the this sector, the total Preparation for Reuse, Recycling and Composting rate for the remaining Commercial sectors was 61% in 2018 compared with 55% in 2012.

## Energy Recovery

There is a target for no more than 30% of Industrial waste to be sent to Energy Recovery by 2024/25. Table 7 shows that there is a statistically significant increase in the Energy Recovery rate since 2012 but the ceiling for 2024/25 has not been exceeded.

**Table 7: Comparison of the Energy Recovery rate of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated total Industrial waste sent to Energy Recovery | |
|---|---|---|
| | Quantity (thousands of tonnes) | Energy Recovery rate |
| 2018 | 90 | 6.2% |
| 2012 | 43 | 2.1% |
| 2007 | 8 | 0.4% |

There is a target for no more than 30% of Commercial waste to be sent to Energy Recovery by 2024/25. Table 8 shows that there is a statistically significant increase in the Energy Recovery rate since 2012, but the ceiling for 2024/25 has not been exceeded.

**Table 8: Comparison of Energy Recovery rate of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated total Commercial waste sent to Energy Recovery | |
|---|---|---|
| | Quantity (thousands of tonnes) | Energy Recovery rate |
| 2018 | 135 | 9.3 |
| 2012 | 20 | 1.2 |
| 2007 | 15 | 0.9 |

## Landfill

There is a target for no more than 10% of Industrial waste to be Landfilled by 2019/20, and no more than 5% by 2024/25. As shown in Table 9, there is a statistically significant decrease in the waste to Landfill to 9% in 2018 compared to 27% in 2012.

The 2012 landfill rate was previously heavily influenced by the management of combustion wastes from the energy sector which is significantly reduced in 2018. By removing the

data for the energy supply sector from the 2012 data the total Landfill rate for the remaining Industrial sectors was 7% in 2012.

**Table 9: Comparison of Landfill rate of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated total Industrial waste Landfilled | |
|---|---|---|
| | Quantity (thousands of tonnes) | Landfill rate |
| 2018 | 133 | 9% |
| 2012 | 534 | 27% |
| 2007 | 550 | 29% |

There is a target for no more than 10% of Commercial waste to be Landfilled by 2019/20, and no more than 5% by 2024/25. As shown in Table 10, the Landfill rate for 2018 is 12%, a significant reduction since 2012 when it was 26%.

**Table 10: Comparison of Landfill rate of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Commercial waste Landfilled | |
|---|---|---|
| | Quantity (thousands of tonnes) | Landfill rate |
| 2018 | 173 | 12% |
| 2012 | 429 | 26% |
| 2007 | 848 | 51% |

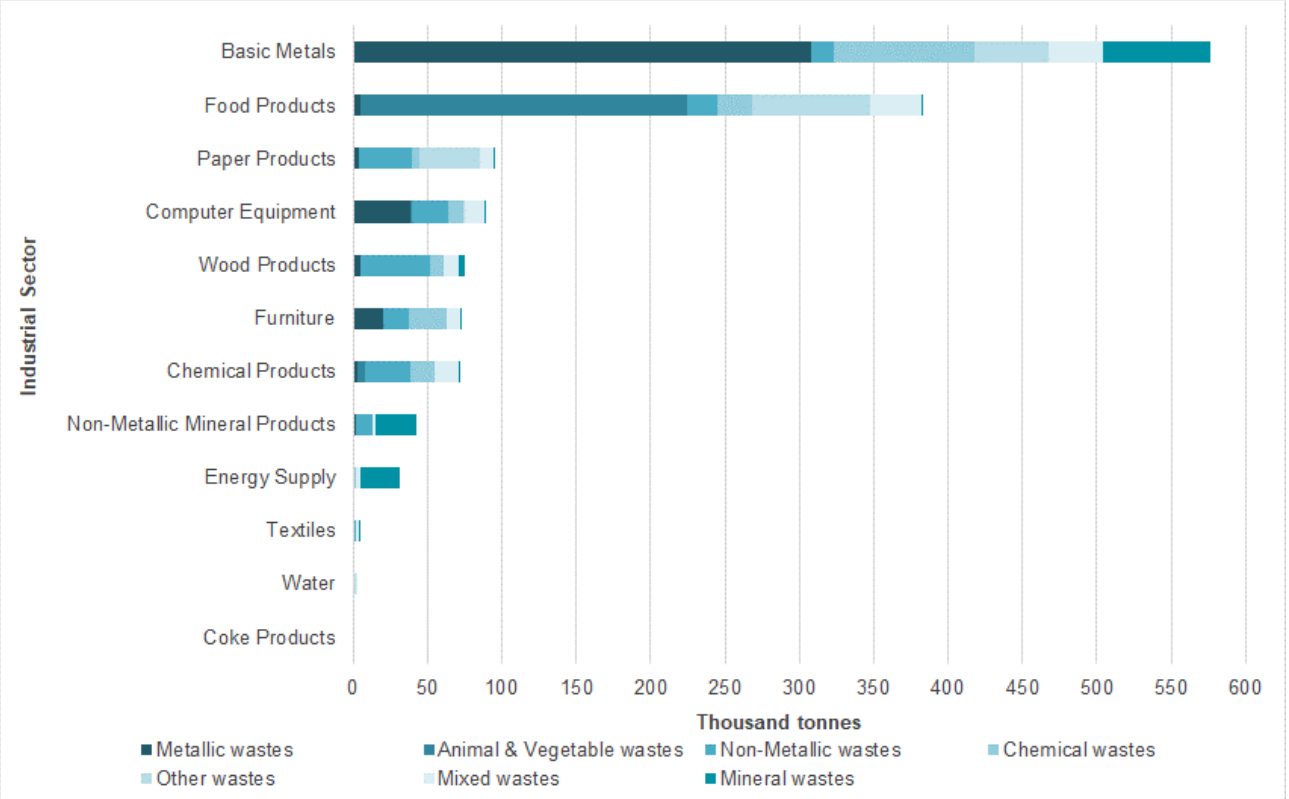
## Waste generated by sector and material stream in Wales

The Industrial sector generated 1.44 million tonnes of waste. Within this the largest generation, as shown in Figure 2, was from

- The Manufacture of Basic Metals and Metal Products with 577 thousand tonnes (40%)
- The Manufacture of Food and Drink sector with 382 thousand tonnes (27%).

These were the third and second largest waste generators, respectively, in 2012. Generation of Electricity, Gas, Steam and Air Conditioning Supply (Energy Supply) was the Industrial sector generating the largest amount of waste in 2012 with 613 thousand tonnes (31%). This sector's waste generation dropped to 31 thousand tonnes (2%) in 2018 due to significantly reduced operations at a single coal-fired power station.

**Figure 2: Industrial waste by sector[7] split by material stream, Wales 2018**

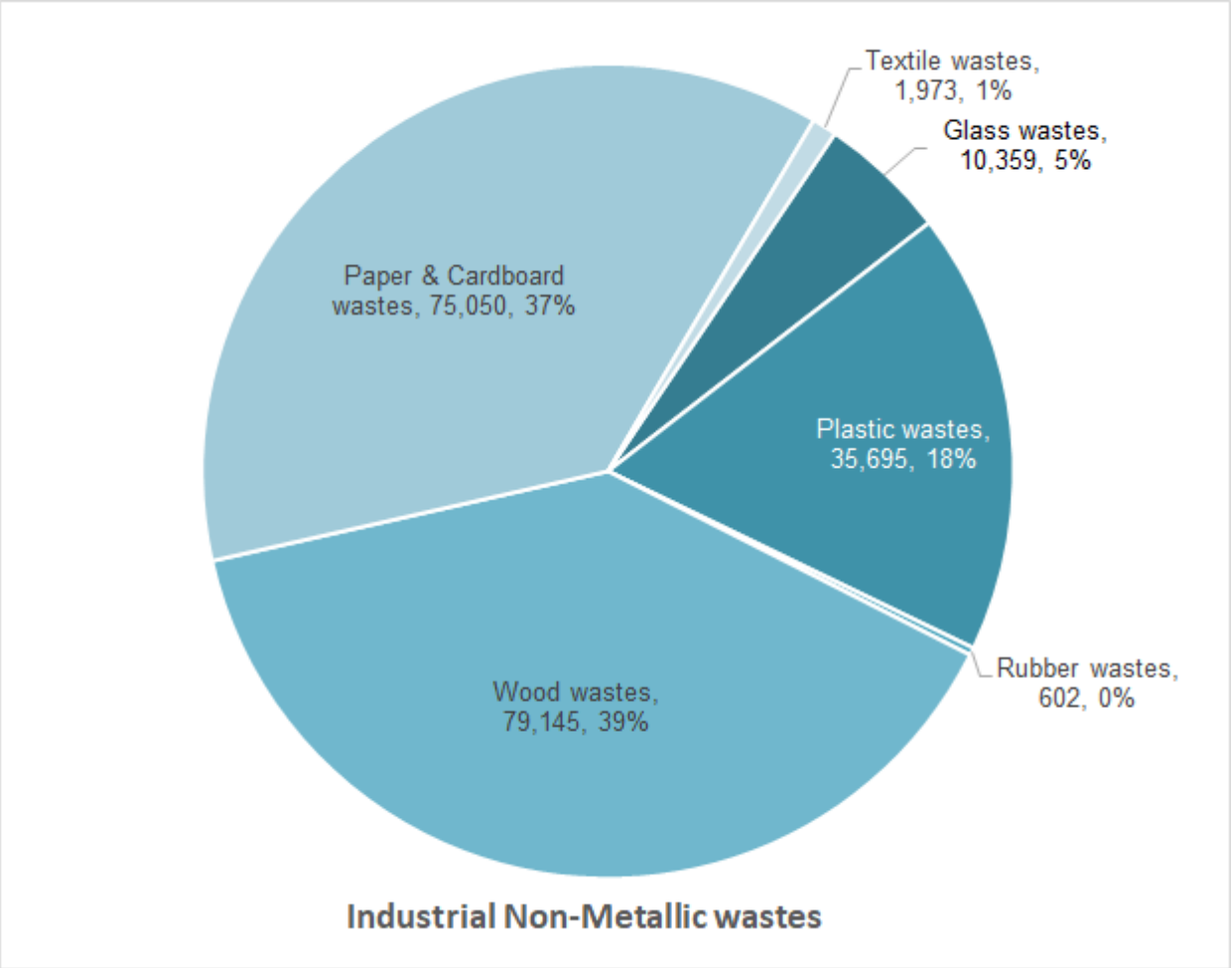



[7] To allow for better spacing on tables and charts the SIC descriptions have been abbreviated see Table 4. The full description has been used in the text.

Non-Metallic wastes are the main Dry Recyclables and Packaging of Glass waste, Plastic waste, Rubber waste, Wood waste, Textile waste and Paper & Cardboard waste.

As Figure 3 shows the majority of this waste from Industry sectors is Wood waste.

**Figure 3: Industrial Non-Metallic waste by sub-material stream, Wales 2018**



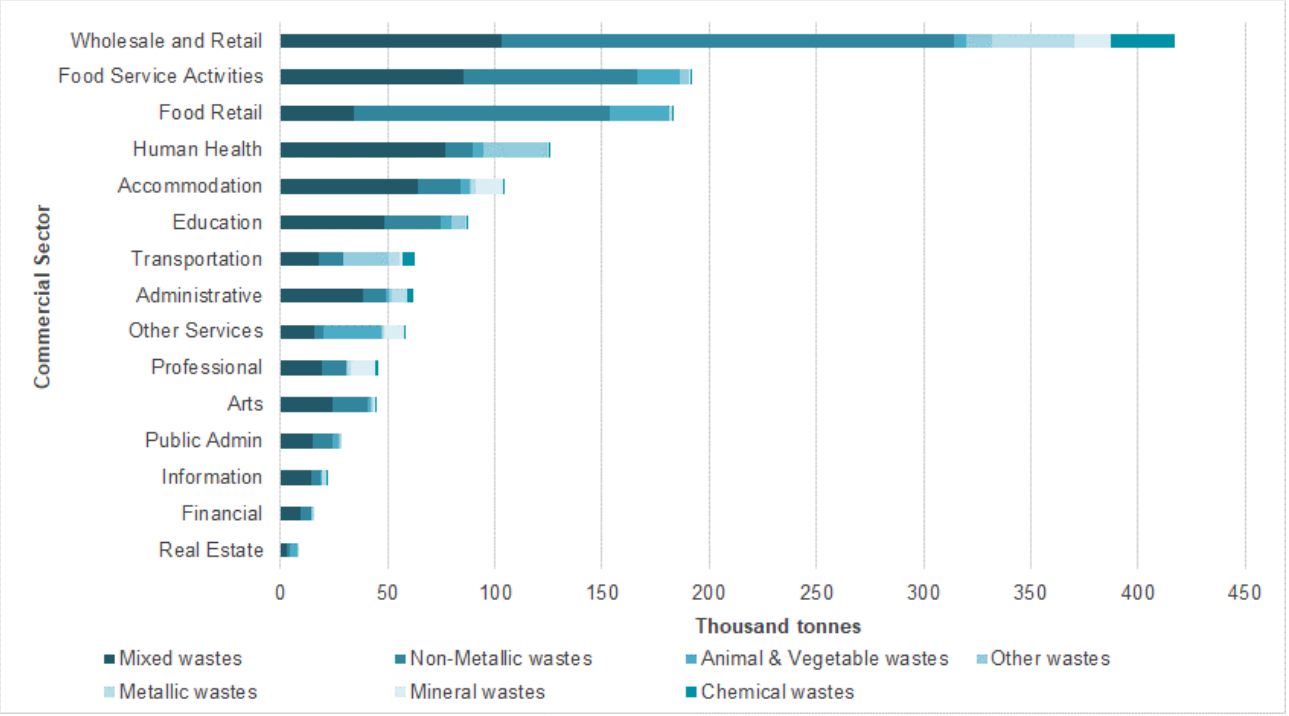

The Commercial sector generated 1.45 million tonnes of waste. Figure 4 shows the break down by sector and material stream.

- The Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) accounted for 417 thousand tonnes (29%)
- Food Service Activities generated 192 thousand tonnes (13%)
- Food Retail Only generated 183 thousand tonnes (13%) and
- The Accommodation sector generated 104 thousand tonnes (7%)

Collectively these were also the largest waste generating commercial sectors in 2012 and 2007, however in 2012 and 2007 Accommodation and Food Service Activities were combined. The Food Retail Only and the Human Health and Social Work Activities sectors

both generated higher quantities of waste in 2018, compared independently to the newly segregated Accommodation sector.

**Figure 4: Commercial waste by sector split by material stream, Wales 2018**



Non-Metallic wastes are the main Dry Recyclables and Packaging of Glass waste, Plastic waste, Rubber waste, Wood waste, Textile waste and Paper & Cardboard waste.

As Figure 5 shows the majority of this waste from Commercial sectors is Paper & Cardboard waste.

**Figure 5: Commercial Non-Metallic waste by sub-material stream, Wales 2018**

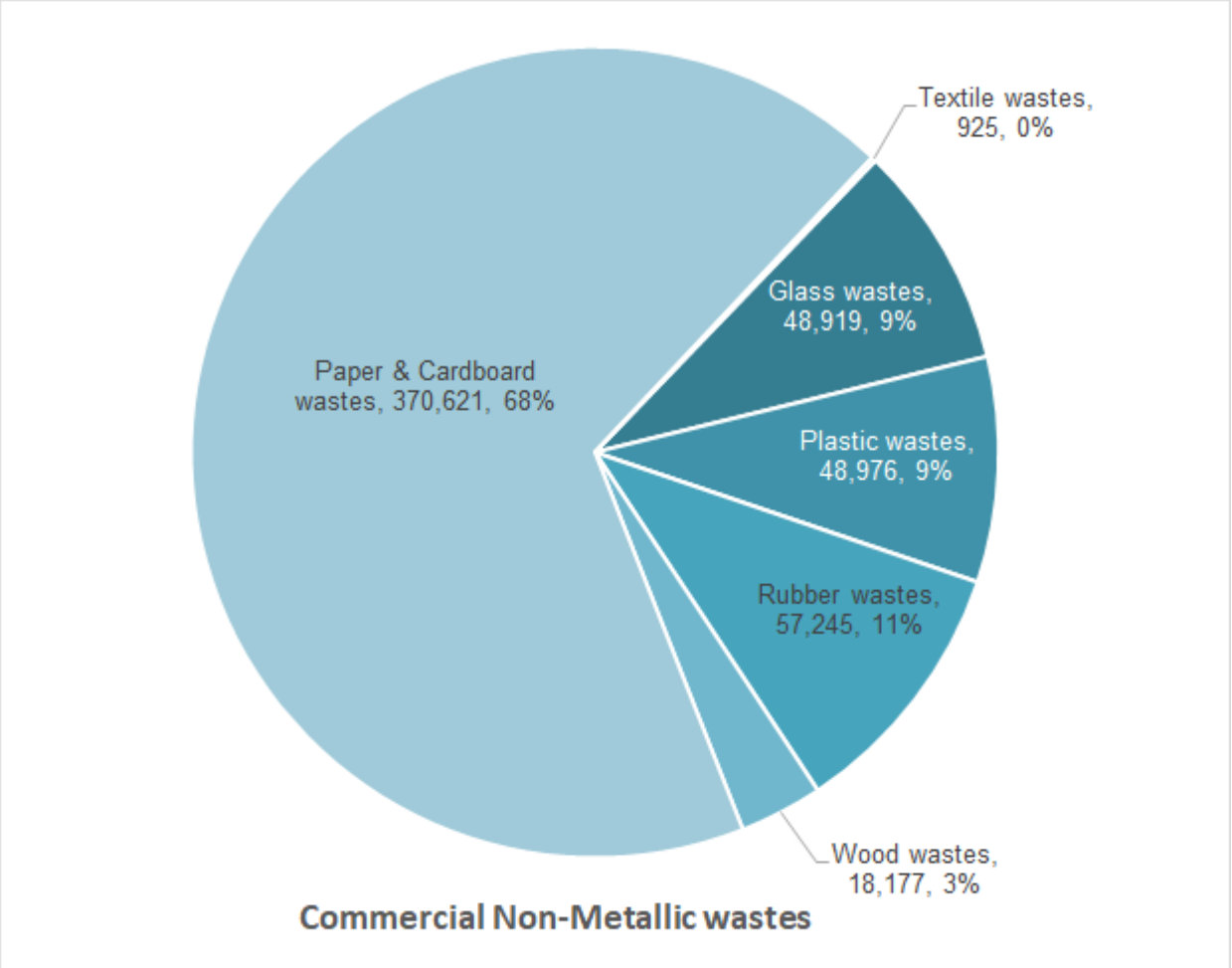
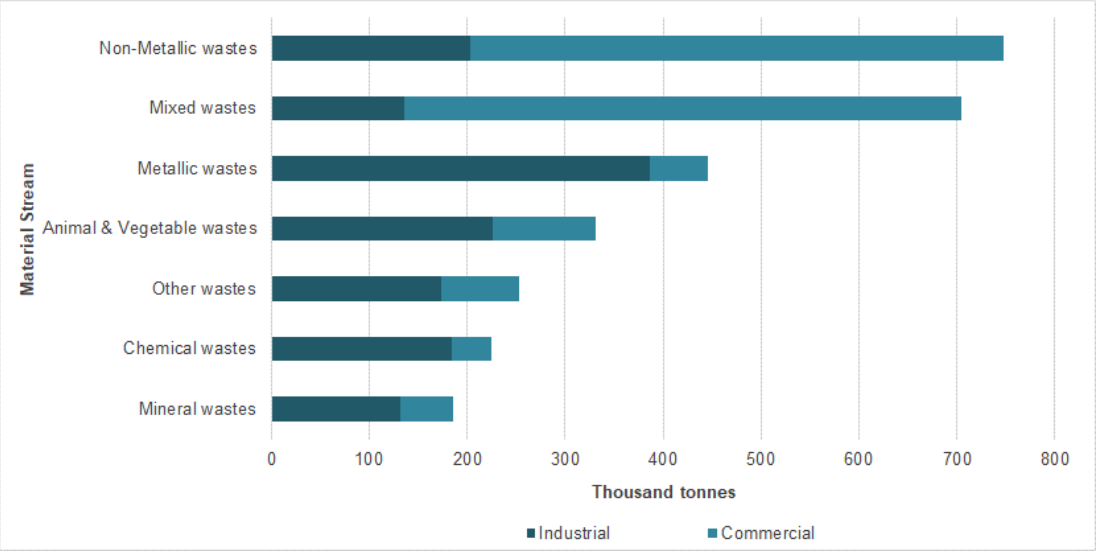


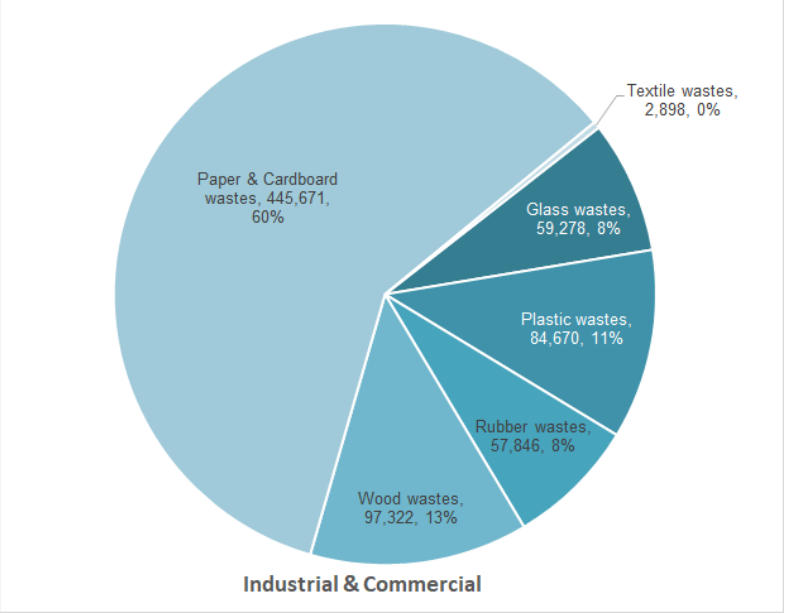
**Figure 6: Industrial and Commercial waste by material stream, Wales 2018**




*Other wastes includes Healthcare, Discarded Equipment and Common Sludges

In terms of material stream, Figure 6 shows that of the total estimated Industrial and Commercial waste generated, 748 thousand tonnes consisted of Non-Metallic wastes (26%) broken down as shown in Figure 7; 705 thousand tonnes of Mixed wastes (24%), 445 thousand tonnes of Metallic wastes (15%), and 331 thousand tonnes of Animal and Vegetable wastes (11%).

**Figure 7: Non-Metallic waste by sub-material stream, Wales 2018**

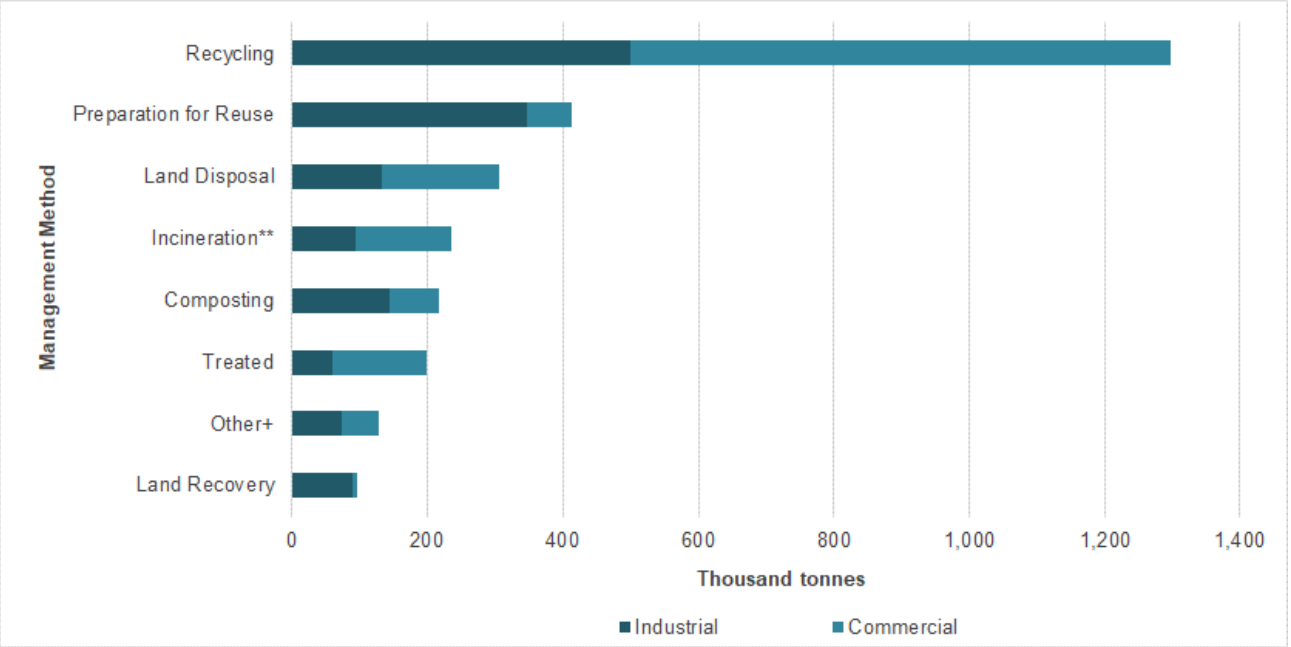



The category Mixed wastes is made up of 63% Mixed Residual waste, 35% Dry Mixed Recyclables and Packaging, 2% Sorting Residues and 0.3%Bulky waste.

## Management Methods for waste generated in Wales

As shown in Figure 8, almost 1.3 million tonnes of Industrial and Commercial waste was Recycled (45%) with a further 413 thousand tonnes (14%) prepared for Reuse and 305 thousand tonnes disposed via Landfill (11%). 236 thousand tonnes were managed by Incineration, of which 225 thousand included Energy Recovery and 11 thousand went to Incineration without Energy Recovery.

**Figure 8: Industrial and Commercial waste by waste management method, Wales 2018**




+ Other includes wastes managed through a Transfer Station and management method was Don't Know.
+ Incineration includes With and Without Energy Recovery.

Preparation for Reuse, Recycling and Composting (including Anaerobic Digestion) contribute towards the Recycling rate. The Preparation for Reuse, Recycling and Composting rate for the combined total of all Industrial and Commercial sectors was 67%.

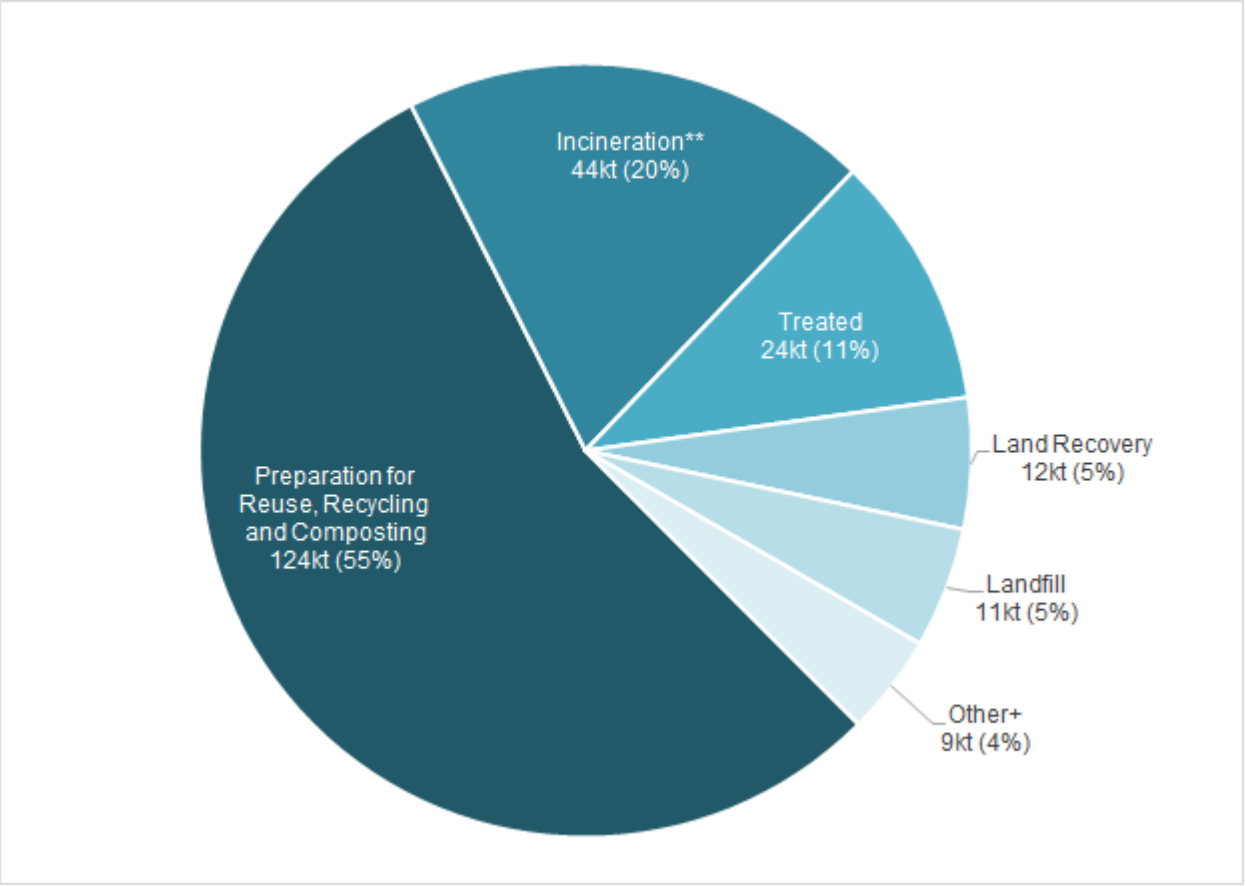
## Hazardous Waste

An estimated 225 thousand tonnes of Hazardous waste was generated by industry and commerce in 2018; this equates to 8% of the total waste generation of 2.9 million tonnes. The estimated split was 137 thousand tonnes of Industrial waste (61%) and 88 thousand tonnes of Commercial waste (39%).

Manufacture of Basic Metals, and Metal Products (64 thousand tonnes) accounted for 28% of the total Hazardous waste generated by Industry and Commerce. The second largest proportion of Hazardous waste arose from the Human Health and Social Work Activities sector, with 30 thousand tonnes (13%).

The majority of all Industrial and Commercial Hazardous waste generated was reported as Preparation for Reuse and Recycling (124 thousand tonnes), sent for Incineration (44 thousand tonnes) or sent for Treatment (24 thousand tonnes), this is shown in Figure 9.

**Figure 9: Industrial and Commercial Hazardous waste by waste management method, Wales 2018**




* Other includes Transfer Station and Don't Know

## Regional Waste Generation

Estimated Regional waste generation was as shown in Table 11:

**Table 11: Regional waste generation, Wales 2018**

| Region | Waste generated (thousand tonnes) | Precision |
|---|---|---|
| South East Wales | 1,245 | +/- 4.88% at 90% confidence |
| Mid & South West Wales | 938 | +/- 4.16% at 90% confidence |
| North Wales | 710 | +/- 5.04% at 90% confidence |

The geographical distribution of business sites in Wales is 47% in South East Wales, 29% in Mid & South West Wales and 24% in North Wales.

Industrial sectors generated the majority of waste in Mid & South West Wales (55%) and North Wales (51%). In contrast, the majority of waste generated in South East Wales was from the Commercial sectors (55%).

Recycling is the dominant waste management method across the regions. Mid & South West Wales has the highest Preparation for Reuse, Recycling and Composting rate (72%), followed by the South East (65%) and the North (63%). Landfill is the second highest waste management method across the regions (Mid & South West 10%; South East 11% and North 10%).

Note that this survey uses the Welsh economic regions of North Wales, Mid & South West Wales and South East Wales a slightly different regional grouping of local authority areas than the 2012 study. This means that regional results cannot be directly compared with the previous survey.

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Natural Resources Wales

# Contents

# Figures

## Tables

# 1. Introduction

Natural Resources Wales (NRW) is required to produce information on the types, quantities, origins (by industry sector and geographic region), and fate of Industrial and Commercial (I&C) wastes generated by businesses (including public and third sectors)[8] in Wales in 2018.

This information is required by Welsh Government (WG) for a variety of reasons including:

- reporting on waste generation in compliance with the EU Waste Statistics Regulations 2002[9], and Part 2 of Schedule 1 of the Waste (England and Wales) Regulations 2011;
- informing the development of national waste policy;
- monitoring progress against national waste prevention and recycling targets;
- informing waste planning and regulation;
- providing data to the waste management industry to inform investment decisions; and
- providing businesses with a better understanding of their current waste practices and for developing sustainable waste management support strategies by Welsh Government for improving environmental performance of businesses.

A separate document associated with this report contains the detailed results of the survey and technical appendices associated with the works.

## 1.1. Background and Need for the Survey

Some data on waste generated by permitted Industrial facilities is available to NRW via statutory returns. However, this does not cover all waste generated by those businesses and the majority of businesses in the scope of this survey do not require an environmental permit. To ensure a comprehensive set of data across all businesses, periodic surveys are required.

There are a wide variety of needs for this waste data. These include:

- European reporting purposes, such as the EU Waste Statistics Regulations that require the United Kingdom to report bi-annual data on waste generated by sector and waste type (material stream).
- Part 2 of Schedule 1 of the Waste (England and Wales) Regulations 2011 which requires the waste management plan for Wales to include the type, quantity and source of waste generated within Wales and an analysis of the current waste management situation in Wales.

The data  is used to provide evidence in support of waste policy development and the targeting of interventions, and to monitor progress against the waste prevention and recycling targets. The current targets for Industrial and Commercial waste set in the Wales Waste Strategy ‘Towards Zero Waste’ (2010) and associated sector plans are outlined below.

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[8] These are collectively referred to as business sites within the report.

[9] https://ec.europa.eu/eurostat/web/waste/legislation

Waste prevention targets:

- For Industrial waste, a reduction of 1.4 per cent every year to 2050 based on 2006/7 baseline; and
- For Commercial waste, a reduction of 1.2 per cent every year to 2050 based on 2006/7 baseline.

Preparation for Reuse, Recycling and Composting (including Anaerobic Digestion) targets:

- By 2019/20 to achieve a recycling target of 67% for both Commercial waste and Industrial waste; and
- By 2024/25 to achieve a recycling target of 70% for both Commercial waste and Industrial waste.

Energy from Waste ceiling:

- By 2024/25 a maximum of 30% of Industrial and Commercial waste to be managed by Energy from Waste.

Landfill targets:

- By 2019/20 to Landfill a maximum of 10% of Industrial and Commercial waste; and
- By 2024/25 to Landfill a maximum of 5% of Industrial and Commercial waste.

The information will be used by the Welsh Government and Local Authorities to inform waste planning. It will also provide information to the waste management industry to inform decision making for future investment. Furthermore, it will provide businesses with the information needed to benchmark their current waste practices against other businesses of similar size and sector, and for developing policies to encourage efficient use of resources, waste prevention and the sustainable management of Industrial and Commercial waste.

Surveys of Industrial and Commercial waste have been completed periodically with the most recent previous survey providing data for the 2012 calendar year. This 2018 survey has been undertaken to assess whether there has been any change in the quantity of waste generated and the waste management practices of business sectors. The methodology used in this survey is comparable with the 2012 I&C survey completed in Wales and there have been no significant definitional changes, therefore it is valid to make comparisons between the results[10].

## 1.2. Overall Aims

The main aims of the project were to determine how much waste from Industrial & Commercial businesses in Wales was generated by waste type (material stream) and sector and how that waste was managed during the 2018 calendar year. Information obtained during the survey was also used to estimate additional splits of certain materials such as Mixed wastes and Paper & Cardboard, in line with the 2012 survey.

[10] The main differences between this survey and that delivered in 2012, are in the sector definitions applied in the sample frame (i.e. splitting of the 2012 sector Wholesale and Retail Trade into separate Wholesale and Retail Trade (excluding Food Retail) and Food Retail sectors; and splitting of 2012 sector Accommodation and Food Services into separate Accommodation and Food Services sectors and in the definition of the regions. Because of the latter, results by region cannot be compared to those generated in 2012.

### 1.3. Study Area

The geographical scope of the study was the whole of Wales, with a distribution of business sites to represent a regional level of; South East, Mid & South West and North Wales. Lists of the local authorities covered by each region are provided in section 2.8. Note that these are slightly different to those applied in 2012, meaning that regional results cannot be directly compared.

### 1.4. Project Management

The project was managed overall by NRW, on behalf of the Welsh Government who funded the survey. The actual survey was delivered by SLR Consulting Limited (SLR) in partnership with Anthesis (UK) Ltd (Anthesis). Ainsworth & Parkinson and Groundwork Wales also provided fieldwork services on the project.

A steering group was set up with relevant members in order to agree the survey methodology, be involved in making key decisions and review draft reports during the lifetime of the project. The steering group included:

- Dr Andy Rees - Welsh Government
- Aoife Pryor - Welsh Government
- Robert Wilson - Welsh Government
- Luned Jones - Stats Wales
- Becky Favager - Project Sponsor, NRW
- John Fry - Project Executive, NRW
- Marcus Fogarty - Project Manager, NRW
- Richard Cardwell - NRW
- Tim Morris - NRW
- Billy Harris - WRAP
- Gary Armstrong - Project Director, SLR
- Martin Garrett - Project Manager, SLR
- Peter Scholes - Delivery Manager, Anthesis
- Julian Parfitt - Project Statistician, Anthesis

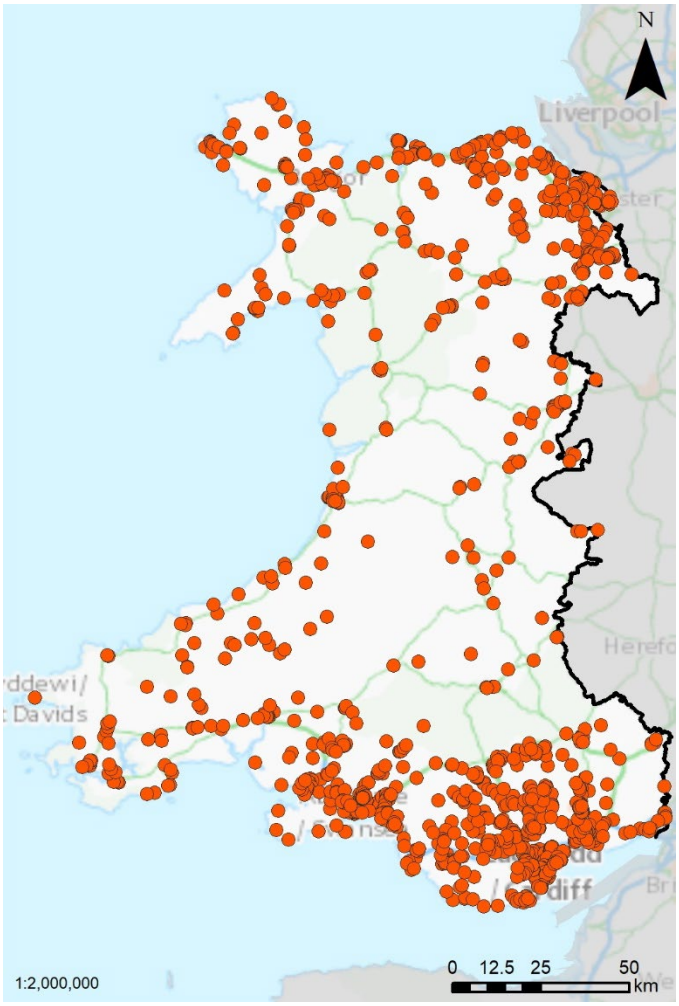
### 1.5. Survey Parameters

The survey of companies was carried out between April 2019 and October 2019, recording wastes generated by business sites for the 2018 calendar year.

The survey collected waste generation data from a total of 1,755 Industrial and Commercial business sites throughout Wales, using a structured interview process and developed questionnaire, based upon the requirements of the sample matrix developed by the project statistician.

The business sites surveyed reflect the geographical spread of business sites across Wales (Figure 10). Surveys were completed in all areas and Local Authorities in Wales. The scheduling of surveyor visits was planned to minimise travel times and the carbon impact of the project.

**Figure 10: Geographical spread of business sites surveyed in 2019**



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# 2. Survey Design and Methodology

This section of the report describes the scope and methodology for the design and delivery of the survey element of the project. There are sections on:

- the scope of businesses;
- the questionnaire design;
- the sample frame development;
- the project delivery tasks;
- how waste was classified; and
- how tonnages were calculated.

The last section details the grouping of local authorities by region.

## 2.1. Scope of businesses and waste

The survey reached 1,755 Industrial and Commercial business sites[11] and covered the primary waste generation sectors and can be summarised as follows:

What was included:

- businesses across the size range from those with single employees to >250 employees;
- all potential wastes generated onsite;
- Hazardous and Non-Hazardous wastes;
- Non-wastes such as Blast Furnace Slag, Virgin Timber and materials directly reused on the same site that it was generated[12]. Data on Non-wastes is not included in this report; and
- the waste management method used to dispose of, recycle or recover the waste.

What was not included:

- businesses involved in agriculture, forestry & fishing, mining or quarrying, and construction;
- businesses involved in waste management and recycling (to avoid potential double counting); and
- wastes generated by sewage treatment.

## 2.2. Design of the Questionnaire

The structure of the primary survey database, and therefore the survey questionnaire, was designed to fulfil EU Waste Statistics Regulation reporting requirements and to produce data compatible with the previous 'Survey of Industrial and Commercial Waste Arisings in Wales 2012' so that the two sets of results could be compared.

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[11] A business site is an individual location. A single registered business may operate at multiple business sites.

[12] The collection of these data was also part of the 2012 survey, and they have been separately identified as part of this survey. It should be noted that these wastes/materials managed directly onsite may not be considered 'waste' in accordance with the strict legal definition and are therefore not included in waste generation results in this report.

The survey questionnaire was designed to document individual waste streams, their nature (i.e. Hazardous or Non-Hazardous), form (liquid, solid, gas), description (as waste classification) and tonnage, as well as what happened to the waste (waste management method or fate) and where this happened to assess movements. This part of the data is fully compatible with previous waste surveys.

One-off wastes, such as those generated by refurbishment of office buildings or disposal of computer equipment, were recorded with the tonnage apportioned over the number of years between each refurbishment or disposal.

Detailed information on the survey questionnaire is available in the Technical Appendices.

### 2.3. Design of the Sample Matrix

The methodology used for development of the sample matrix and subsequent grossing of the survey results was based on previous surveys to ensure comparability of results. The design of the sample matrix itself was changed slightly from that applied in 2012, with emphasis on businesses involved in the production of Food wastes, so that statistically significant Food wastes arisings estimates could be generated this time around. These changes were in the definition of sectors, in that:

- 2012 sector Wholesale and Retail Trade was split into separate Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) and Food Retail Only sectors; and
- 2012 sector Accommodation and Food Services was split into separate Accommodation and Food Service Activities sectors.

Results generated per sector can therefore be compared to those generated in 2012 only by combining the results of the separated sectors.

ONS data was used to populate a population frame of business sites by number of employees and sector. The variation in 2012 data and total business sites per cell of the frame was used to create the sample matrix. The sample matrix defined how many business sites needed to be reached for each cell and was reviewed part way through the survey. This allowed for incorporation of identified inconsistencies in company size or sector that recruitment identified in the original Office of National Statistics (ONS) dataset and to reflect on actual business recruitment rates within cells. These aspects of the project are discussed in detail in the Technical Appendices.

### 2.4. Project Delivery Overview

Businesses were recruited by telephone and selection was dictated by business size and sector in the sample matrix. Surveys were delivered via a structured face-to-face interview at business sites, using a laptop and database questionnaire, with a subsequent site tour to identify any waste streams that may have been overlooked during the interview.

The project was delivered by SLR acting as the principal contractor providing overall project management, delivery scrutiny, data analysis and reporting. Anthesis was

responsible for the project methodology, systems (software), day-to-day delivery management of the fieldwork and data security.

Ainsworth & Parkinson was responsible for the telephone recruitment of businesses for the survey and for booking survey visit appointments. The face-to-face survey interviews with businesses were carried out by Groundwork Wales using the structured questionnaire and software during the survey visits. Data quality and ease of use was key from the beginning via training of the surveyors, and the survey software providing immediate data quality checks. The data was collated centrally each week, screening incoming raw data for outliers and following up to correct the data as needed.

During the survey SLR and Anthesis reviewed the progress and reported to NRW. Once the main data collection was complete Anthesis collated and reviewed the data before SLR ran a series of data validations. Statistical analysis was provided by Anthesis with analysis, tabulation and report writing led by SLR.

### 2.5. Classifying Waste

The Substance Oriented Classification (SOC) method was used to classify the wastes. The 9 SOC groups and 39 SOC sub-groups used are listed in the Technical Appendices. This classification method was used as these are the waste types (material streams) required for European reporting purposes and because it classifies waste into a relatively small number of easily identifiable types. The Non-wastes were added as separate lines so that these could be separated from the main dataset for reporting purposes.

The SOC codes are used in other waste surveys and there is a methodology for mapping European Waste Catalogue (EWC) codes to SOC. Therefore, results from this survey can be compared with those generated by other surveys conducted both in the UK and across Europe.

In addition to the recording of SOC group and sub-group for each waste stream, a further set of descriptions were added to each waste sub-group so that more detail could be collected. For instance, for the Non-Metallic wastes sub-group Paper & Card, the additional layer of descriptions allowed recording of whether the waste was Paper or Card or a mixed stream, and whether it was derived from packaging or another source. The full list of additional descriptions recorded is summarised in the Technical Appendices. Note that these additional descriptions are more extensive than applied for the 2012 survey, particularly for Food wastes.

#### 2.5.1. Non-Wastes

It was decided to collate data on Non-wastes in the survey to be fully comparable with previous I&C surveys but to exclude these tonnages from the results.

Blast Furnace Slag and Virgin Timber were recorded as part of the survey but are not classified as waste under the Waste Framework Directive and therefore are referred to as Non-wastes in this project. In addition, materials that were directly reused for their original

purpose without prior treatment were also recorded in the survey as Non-wastes; these had not been recorded in previous Wales I&C surveys.

With more focus on Food wastes, Food Fit for Human Consumption and Food By-Product were added to the Non-wastes category to allow recording of these materials which do not enter the waste stream. Dealing with Food wastes in this way is consistent with the revised waste framework directive and national and European Food waste reporting. These options were not available in the 2012 survey.

All Non-wastes are excluded from analysis in this report, with exception of the Food wastes analysis in section 4.2, but data is available in the Technical Appendices detailed results tables.

The waste management methods were grouped as per Table 12 below.

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**Table 12: Waste Management descriptions grouped by waste management method**

| Prime Waste Management Method | Waste Management Description – sub category |
|---|---|
| Land Disposal | Landfill |
| | Soakaway |
| | Lagoon disposal |
| | Deep injection (borehole) |
| | Other Land Disposal |
| Incineration with Energy Recovery | Incineration with Energy Recovery |
| | Pyrolysis (with Energy Recovery) |
| | Gasification (with Energy Recovery) |
| | Waste Derived Fuel (WDF) |
| | Other Thermal with Energy Recovery |
| Incineration Without Energy Recovery | Incineration Without Energy Recovery |
| | Pyrolysis (Without Energy Recovery) |
| | Gasification (Without Energy Recovery) |
| | Crematorium |
| | Other Thermal Without Energy Recovery |
| Transfer Station | Transfer (use as last resort) |
| Treatment Plant | MBT (mechanical biological) |
| | Biological Treatment |
| | Autoclave |
| | Mechanical Heat Treatment |
| | Rendering |
| | Separation (MRF) |
| | Physio/Chemical Treatment |
| | Other Treatment |
| Recycling | Source Segregated – direct to reprocessor |
| | Mixed/Co-mingled sent to MRF/Transfer Station |
| | Waste Recycling Centre/Civic Amenity site |
| | Other Recycling |
| Composting | Windrow Composting |
| | In-Vessel Composting |
| | Anaerobic Digestion (AD) |
| | Other Composting |
| Land Recovery | Landspread |
| | Injection |
| | Other Land Recovery |
| Preparation for Reuse | Preparation for Reuse on site |
| | Preparation for Reuse off site |
| | Direct Reuse on site |
| | Other Reuse |
| Other (contains options not included for the 2012 survey, related to Food waste fate) | To Animal Feed (Food waste) |
| | Redistribution (Food waste) |
| | Maceration (Food waste) |
| | Other Recovery |
| Don't Know | Don't Know |

## 2.6. Classifying Business Sectors

Business sites were classified to the SIC code as reported in ONS. To allow for formatting and presentation of tables and charts the SIC descriptions have been abbreviated. The full sector label has been used in the text. The SIC codes and abbreviations are shown in Table 13.

## 2.7. Calculating Tonnages

A key requirement of the survey was that quantities of material in each waste stream could be represented as weights and recorded in metric tonnes. The challenge was that waste data was not always available as a tonnage figure.

Surveyors were instructed to ask for documented evidence of weights wherever possible, for instance from waste transfer notes, contractor invoices, or other business records. This point was stressed during the telephone booking process and in the appointment confirmation email so that businesses could prepare these documents in advance of the visit.

Where documented evidence was not available, the surveyor was provided with a tool as part of the survey software to calculate annual tonnages from container volume and disposal frequency. The software used standard container types (summarised in the Technical Appendices) for volume, and a series of bulk density conversion factors (presented in the Technical Appendices) from which weights could be calculated by entering the number of collections per year.

All the conversion factors could be overwritten by the surveyor if the standard conditions were not relevant, and surveyors were instructed to ‘reality check’ the resultant weights with the business representative before accepting them. For some individual items of waste (e.g. a fluorescent tube) a separate list of specific items (see the Technical Appendices) was also provided as part of the software package.

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**Table 13: SIC Descriptions and abbreviations**

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| D | SIC Description | Label Abbreviation |
|---|---|---|
| | **Industrial Sector** | |
| 1 | Manufacture of Food Products, Drinks and Tobacco | Food Products |
| 2 | Manufacture of Textiles, Wearing Apparel, Leather | Textiles |
| 3 | Manufacture of Wood and Wood Products | Wood Products |
| 4 | Manufacture of Paper and Paper Products | Paper Products |
| 5 | Manufacture of Coke and Petroleum Products | Coke Products |
| 6 | Manufacture of Chemical, Pharmaceutical, Rubber & Plastic Products | Chemical Products |
| 7 | Manufacture of Other Non-Metallic Mineral Products | Other Products |
| 8 | Manufacture of Basic Metals, and Metal Products | Basic Metals |
| 9 | Manufacture of Computer, Electrical Equip, Machinery and Motors | Computer Equipment |
| 10 | Manufacture of Furniture, Other Manufacturing, Repair and Installation | Furniture |
| 11 | Generation of Electricity, Gas, Steam and Air Conditioning Supply | Energy Supply |
| 12 | Water collection, Treatment and Supply | Water |
| | **Commercial Sector** | |
| 13 | Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) | Wholesale and Retail |
| 14 | Food Retail Only | Food Retail |
| 15 | Transportation and Storage | Transportation |
| 16 | Accommodation | Accommodation |
| 17 | Food Service Activities | Food Service Activities |
| 18 | Information and Communication | Information |
| 19 | Financial and Insurance Activities | Financial |
| 20 | Real Estate Activities | Real Estate |
| 21 | Professional, Scientific and Technical Activities | Professional |
| 22 | Administrative and Support Service Activities | Administrative |
| 23 | Public Administration and Defence, Compulsory Social Security | Public Admin |
| 24 | Education | Education |
| 25 | Human Health and Social Work Activities | Human Health |
| 26 | Arts, Entertainment and Recreation | Arts |

| | | |
|---|---|---|
| 27 | Other Services | Other Services |

## 2.8. Classifying Regions

For the purposes of reporting regional data, local authorities were grouped into the following regions.

| | |
|---|---|
| North Wales: | Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesey & Wrexham. |
| South East Wales: | Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen & Vale of Glamorgan. |
| Mid & South West Wales: | Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire, Powys & Swansea |

This attribution of local authorities to regions is slightly different to that applied in 2012, and therefore results generated at regional level by the two surveys cannot be directly compared.

## 2.9. Further Detail

Further detail is provided in the accompanying Technical Appendices document. Detailed notes on how the survey was delivered, and quality assurance methods used, are given in the Technical Appendices. The data grossing and calculation of survey precision methodologies are provided in the Technical Appendices, and the lessons learned for future surveys are described in the Technical Appendices.

# 3. Survey Results

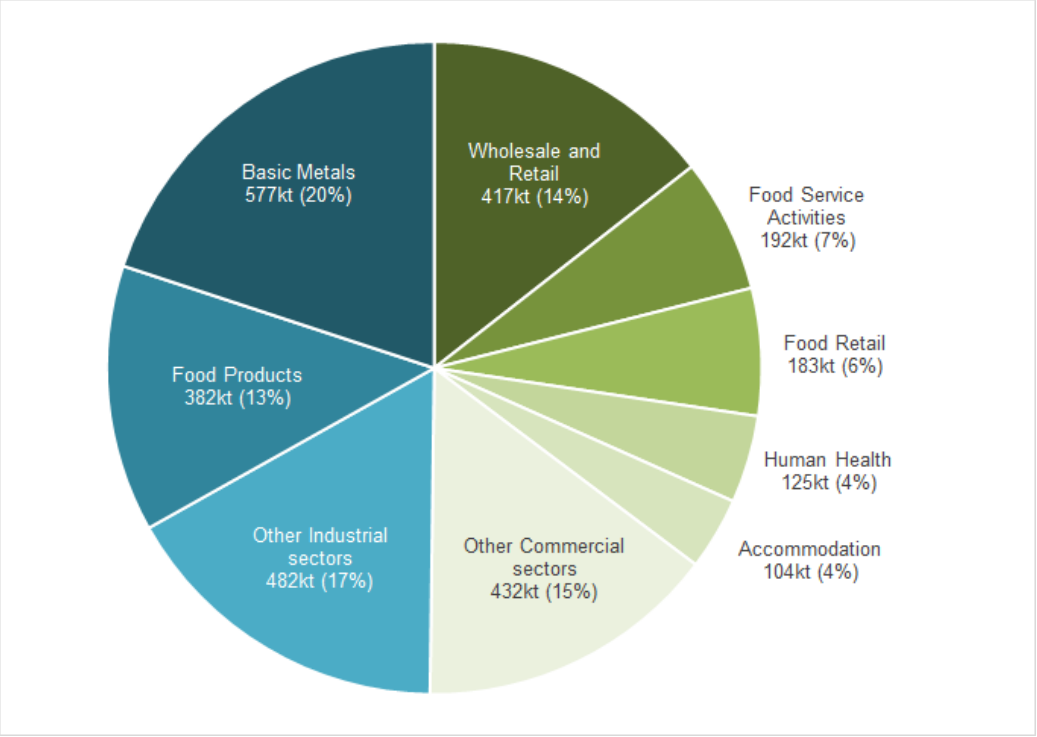
This part of the report provides the analysis on the waste data. The sections detail:

- national waste generation overall and by Industrial sector and Commercial sector[13];
- regional waste overall and by Industrial sector and by Commercial sector;
- methods of waste management at the national level
- methods of waste management at the regional level;
- a comparison of 2018 to 2012; and
- Hazardous waste arisings

## 3.1. Waste Generation - Nationally

An estimated 2.9 million tonnes of Industrial and Commercial (I&C) waste was generated in Wales in 2018. The precision for the total I&C waste generated in Wales was +/- 4.54% at 90% confidence. Industry generated 1.44 million tonnes and commerce generated 1.45 million tonnes. Figure 11 shows a breakdown by significant sectors and is detailed further in the following sections.

**Figure 11: Total waste by sector, Wales 2018**




### 3.1.1. National Generation – Industrial Sectors

The Industrial sector generated 1.44 million tonnes of waste in 2018 (Industrial waste).

[13] To allow for better spacing on tables and charts the SIC descriptions have been abbreviated. The full description has been used in the text, see Table 4.

- The Manufacture of Basic Metals, and Metal Products sector generated the most waste, accounting for 577 thousand tonnes (40%).
- The Manufacture of Food Products, Drinks and Tobacco sector was the second highest, accounting for 382 thousand tonnes (27%).

These were the third and second largest Industrial waste generating sectors respectively in 2012.

Generation of Electricity, Gas, Steam and Air Conditioning Supply was the largest Industrial waste generating sector in 2012 (613 thousand tonnes, 31%) but reduced to 31 thousand tonnes (2%) in 2018 due to significantly reduced operations at a single coal-fired power station.

**Figure 12: Industrial waste by material stream, Wales 2018**

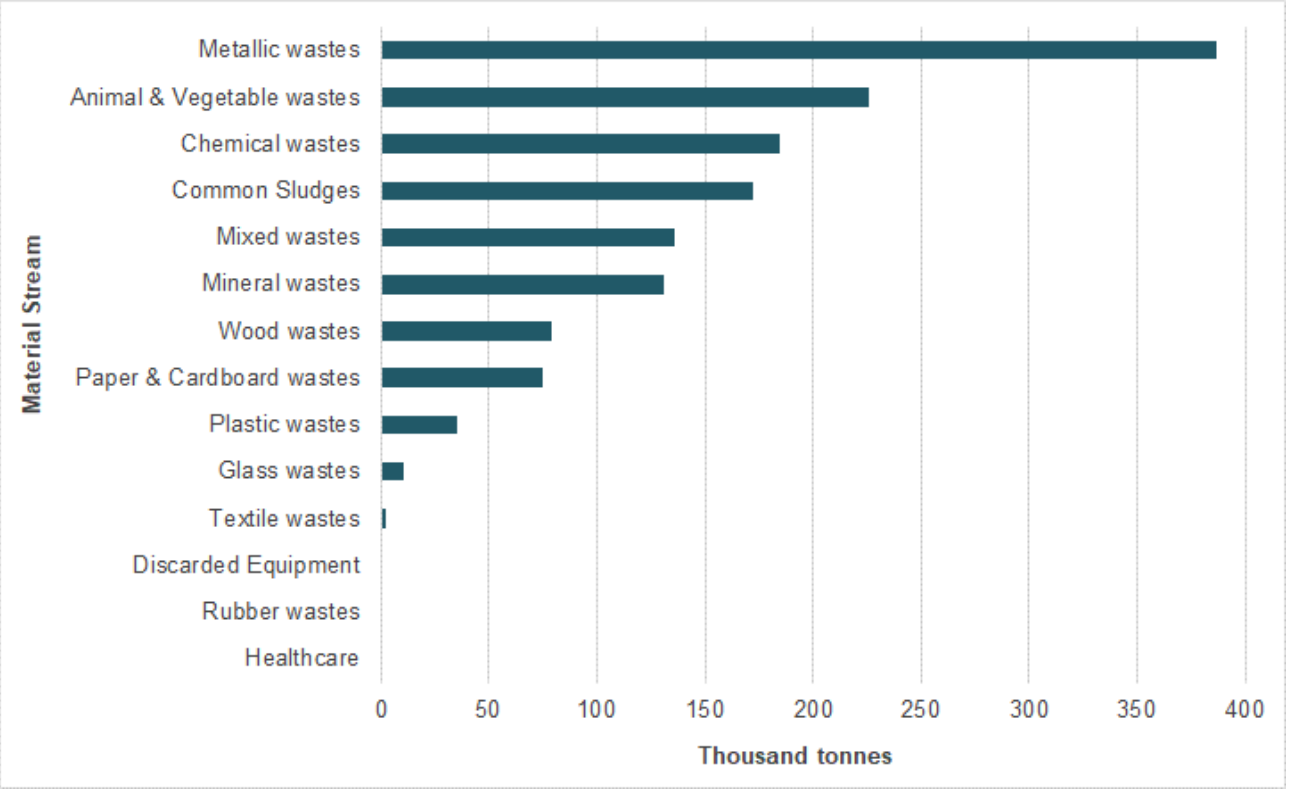


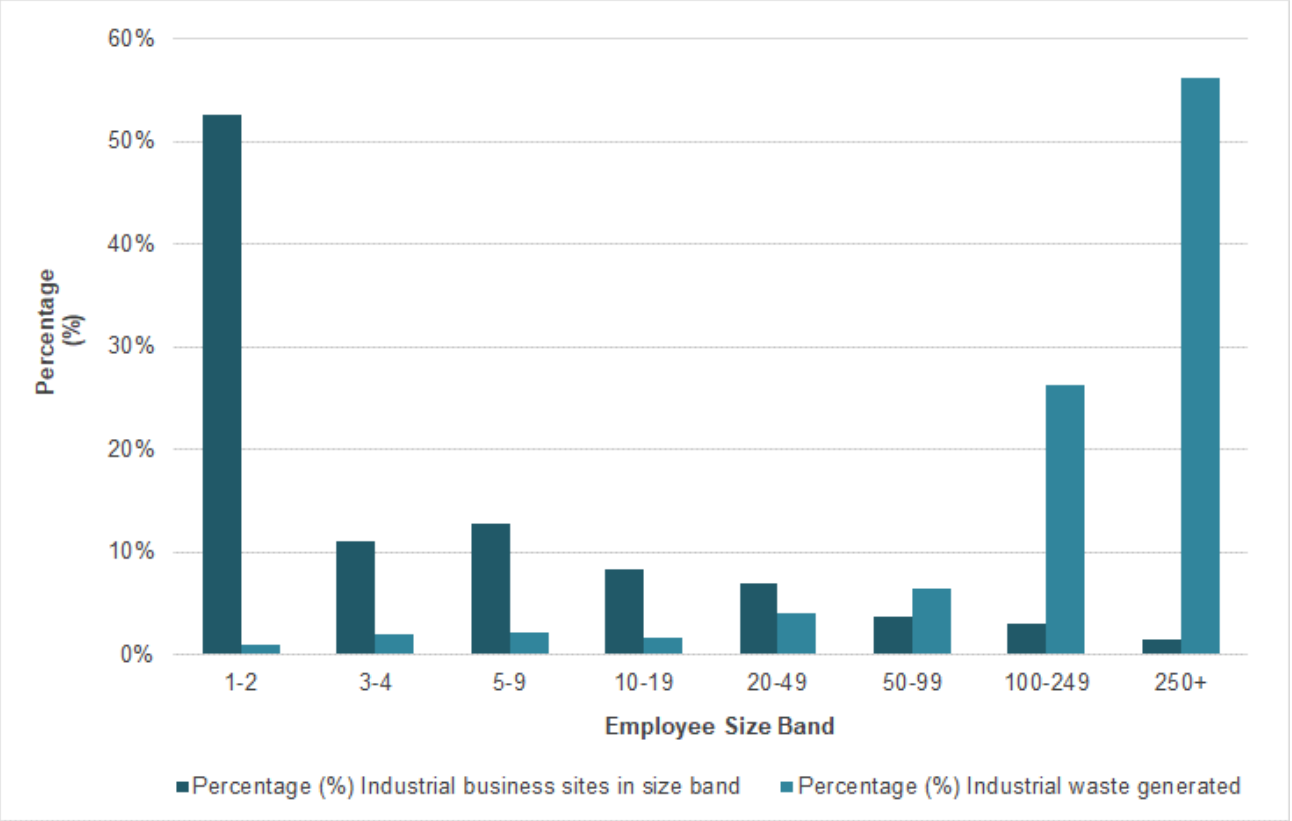

Figure 12 shows the Industrial waste generation by material streams. The three largest were:

- Metallic wastes: 387 thousand tonnes (27%)
    - with the majority (80%) generated by the Manufacture of Basic Metals, and Metal Products sector.
- Animal & Vegetable wastes: 226 thousand tonnes (16%)
    - almost all of these (97%) were generated by the Manufacture of Food Products, Drinks and Tobacco sector.

- Chemical wastes: 184 thousand tonnes (13%).

Figure 13 shows that 83% of Industrial waste was generated by the 5% of business sites with over 100 employees. Conversely, the 64% of Industrial business sites with between 1-4 employees generated 3% of the waste.

**Figure 13: Industrial waste by business site employee size band, Wales 2018**




### 3.1.2. National Generation – Commercial Sectors

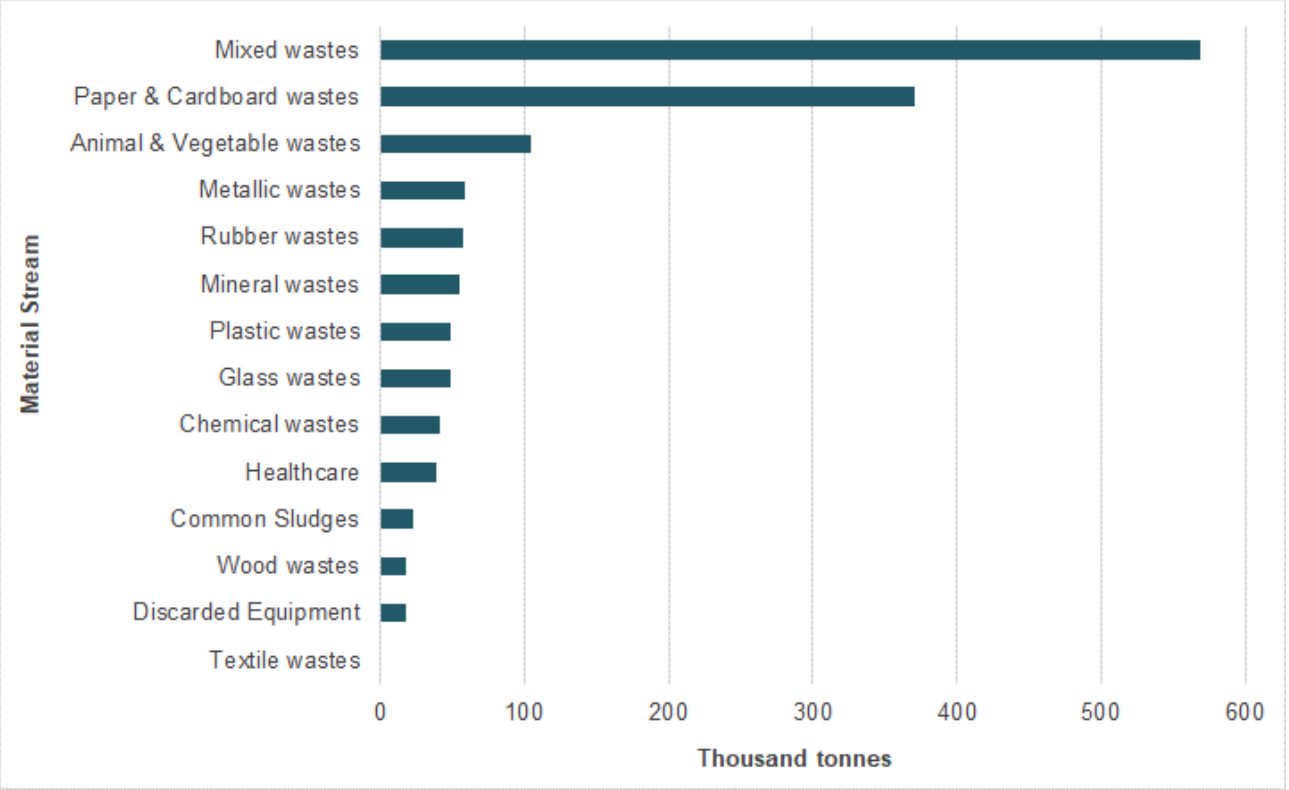
The Commercial sector generated 1.45 million tonnes of waste in 2018 (Commercial waste).

- The Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) generated the most waste accounting for 417 thousand tonnes (29%).
- Food Service Activities was the second largest, accounting for 192 thousand tonnes (13%) and 104 thousand tonnes (7%) from the Accommodation sector.
- Collectively these were also the largest Commercial waste generating sectors in 2012 and 2007[14] .

The Food Retail Only and the Human Health and Social Work Activities sectors both generated higher quantities of waste in 2018, compared independently to the newly segregated Accommodation sector.

[14] accommodation and Food service activities were combined in 2007 and 2012

**Figure 14: Commercial waste by material stream, Wales 2018**

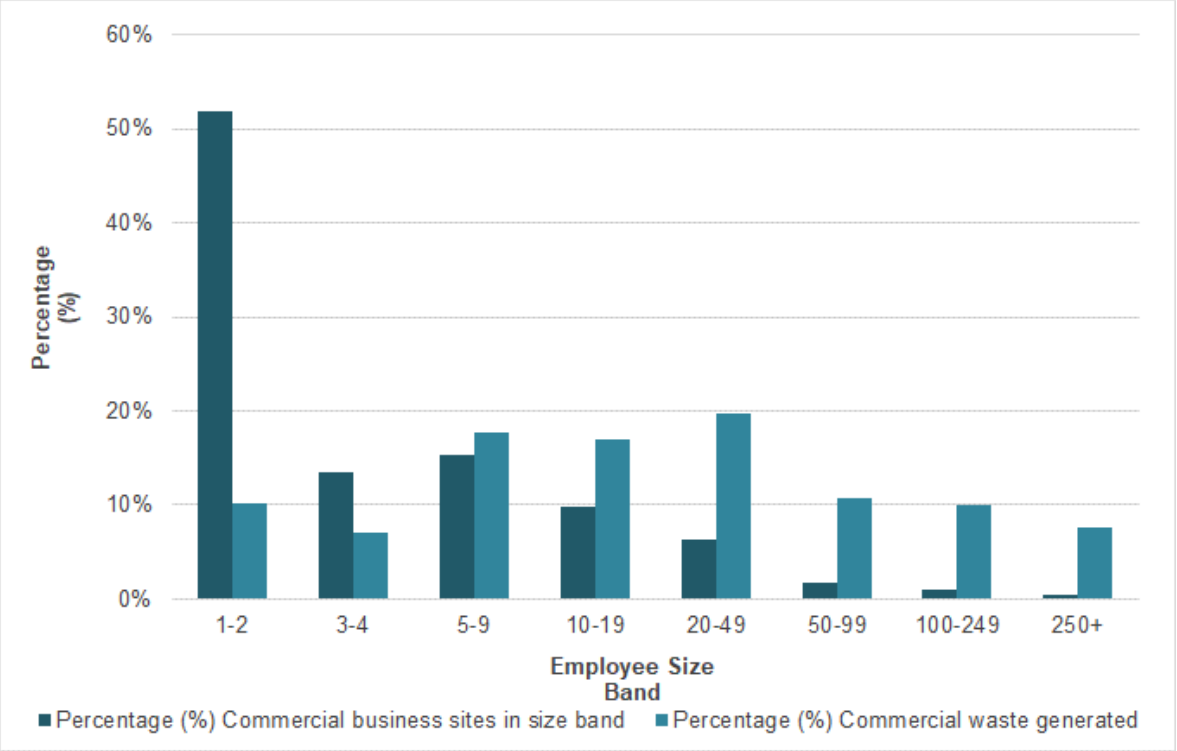



The breakdown of Commercial waste by material stream is shown in Figure 14. The three largest were:

- Mixed wastes: 569 thousand tonnes (39%)
    - of which more than half were Mixed Residual (60%) with the remaining consisting of Mixed Dry Recyclables & Packaging (38%), Sorting Residues (2%) and Bulky waste (0.4%).
- Paper & Cardboard wastes: 371 thousand tonnes (26%)
    - of which 209 thousand tonnes was estimated to be Card Packaging (56%) and 129 thousand tonnes to be Mixed Paper and Card Packaging (35%).
    - which came from the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) sector (34%), Food Retail Only (29%) and Food Service Activities sector (14%) sectors and
- Animal & Vegetable wastes: 104 thousand tonnes (7%).

Figure 15 shows the proportion of Commercial waste generated across all employee size bands is more evenly spread. Business sites with 1-4 employees generated 17% of the waste and accounted for 65% of all Commercial business sites in Wales. The highest proportion of waste (20%) was generated in the 20-49 employee size band which accounted for 6% of all Commercial business sites in Wales.

**Figure 15: Commercial waste by business site employee size band, Wales 2018**




## 3.2. Waste Generation - Regionally

The geographical distribution of business sites in Wales is:

- 47% in South East Wales, 29% in Mid & South West Wales and 24% in North Wales.

The geographic distribution of waste generation in Wales is:

- 43% South East Wales, 32% in Mid & South West Wales and 25% in North Wales.

Estimated regional waste generation was as follows:

- South East Wales 1,243 thousand tonnes (+/- 4.84% at 90% confidence)
- Mid & South West Wales 938 thousand tonnes (+/- 4.17% at 90% confidence)
- North Wales 710 thousand tonnes (+/- 5.05% at 90% confidence)

Table 14 provides estimates of the waste generated in the three regions in Wales by the Industrial and Commercial sectors combined.

The Industrial sector generated the majority of the waste in Mid & South West Wales (55%) and North Wales (51%). In contrast, the majority of the waste generated in South East Wales was from the Commercial sector (54%).

South East Wales generated the greatest quantity of Industrial waste accounting for approximately 39% of all Industrial waste generated in Wales. South East Wales generated the greatest quantity of Commercial waste accounted for approximately 47% of all Commercial waste generated in Wales.

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**Table 14: Regional waste, Wales 2018**

| Sector | Quantity of waste generated by region in Wales 2018 (thousand tonnes per annum and % of sector) | | | | | | |
|---|---|---|---|---|---|---|---|
| | South East Wales | | Mid & South West Wales | | North Wales | | All Wales |
| Industrial | 566 | 39% | 512 | 36% | 364 | 25% | 1,441 |
| Commercial | 679 | 47% | 427 | 29% | 347 | 24% | 1,453 |
| **Total** | **1,245** | **43%** | **938** | **32%** | **710** | **25%** | **2,894** |
| | | | | | | | |
| **Distribution of business sites** | | **47%** | | **29%** | | **24%** | |

**Figure 16: Industrial waste by material stream and region, Wales 2018**

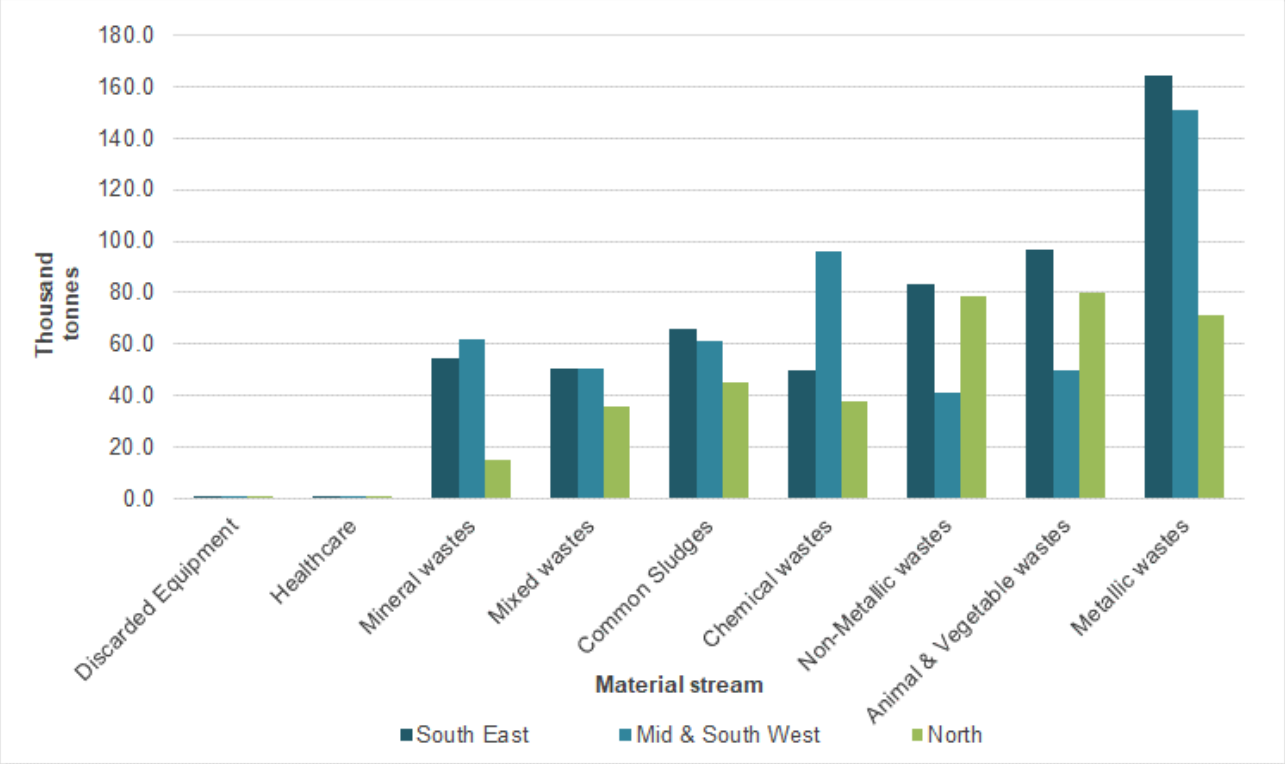



Figure 16 shows that, regionally, the largest material stream generated by the Industrial sector was Metallic wastes in the South East and Mid & South West Region. The majority of this Metallic wastes was generated by the Manufacture of Basic Metals and Metal Products sector (93% in Mid & South West, 74% in South East). There is no breakdown within the Metallic wastes material stream. There were fewer extreme differences in material steams generated in the North region.

**Figure 17: Commercial waste by material stream and region, Wales 2018**

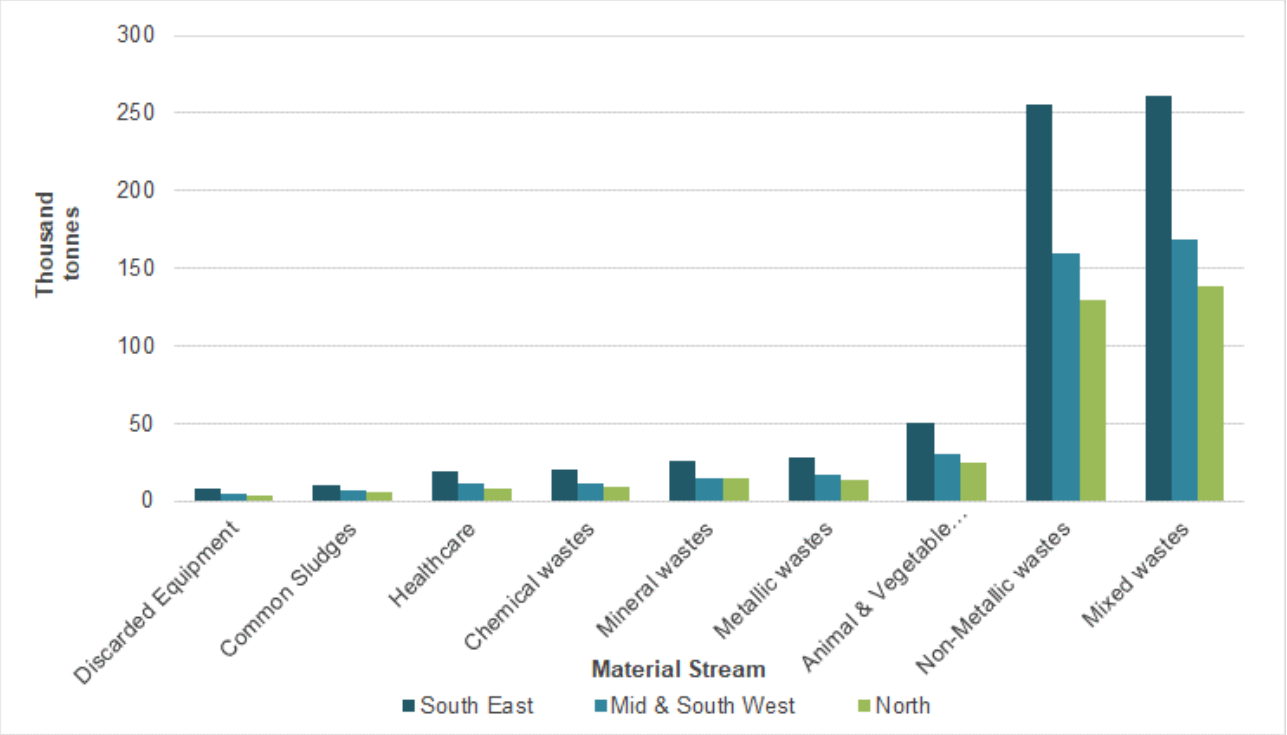



Figure 17 shows that Mixed wastes and Non-Metallic wastes were the largest Commercial waste stream in all regions. Overall the proportion of material streams generated by the Commercial sector in all three regions was similar, other than for Mixed wastes and Non-Metallic wastes in the South East which is much higher.

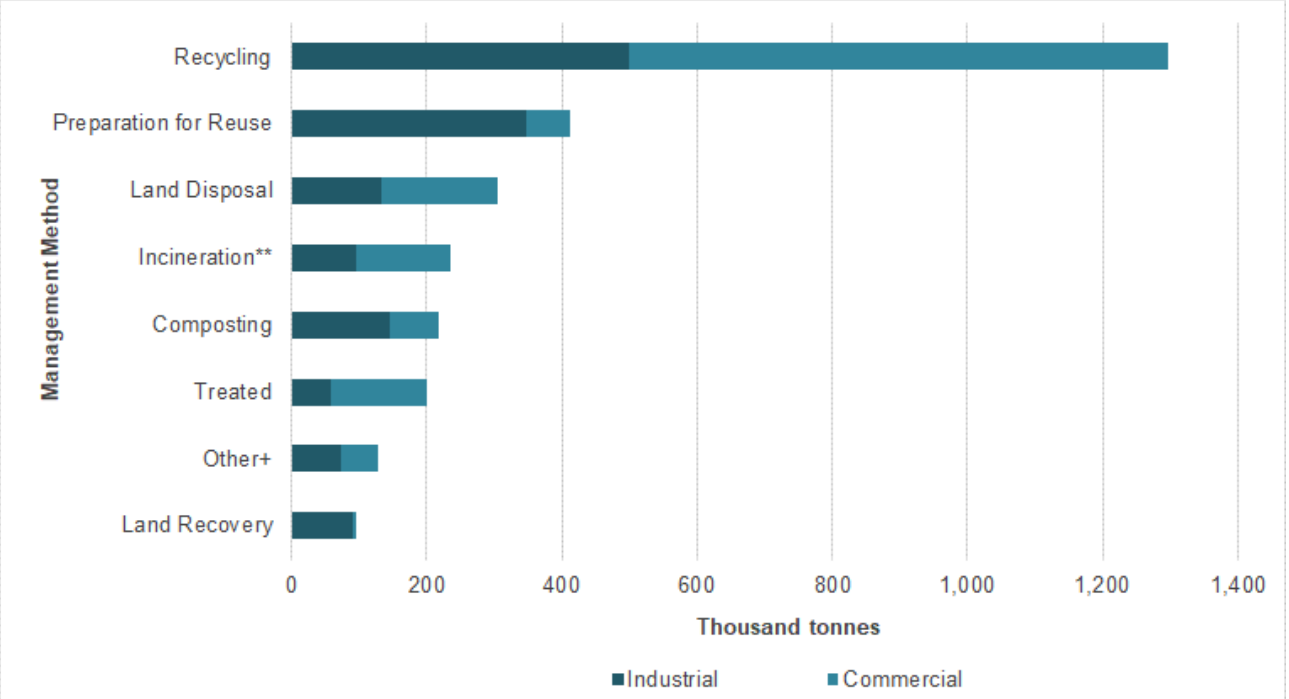
The majority of Non-Metallic wastes consisted of Paper & Cardboard (68%) across all three regions. Household and Similar waste accounted for the highest quantities of Mixed wastes across all three regions (South East 56%, Mid & South West 58%, and North 58%).

## 3.3. Waste Management - Nationally

Preparation for Reuse, Recycling and Composting (including Anaerobic Digestion) contribute towards the Recycling rate. The Preparation for Reuse, Recycling and Composting rate for the combined total of all Industrial and Commercial sectors was 67%.

As shown in Figure 18 and Table 15, almost 1.3 million tonnes of Industrial and Commercial wastes were recycled (45%) with a further 413 thousand tonnes (14%) prepared for Reuse and 306 thousand tonnes disposed via Landfill (11%). Of the 236 thousand tonnes managed by Incineration, 225 thousand included Energy Recovery and 11 thousand was Incineration Without Energy Recovery.

**Figure 18: Industrial and Commercial waste by waste management method, Wales 2018**




+Other includes wastes managed through a Transfer Station and management method was Don't Know
** Incineration includes With and Without Energy Recovery.

**Table 15: Industrial and Commercial waste by waste management method, Wales 2018**

| Waste Management Method | Industrial waste | Commercial waste | Total waste |
|---|---|---|---|
| Recycling | 500 | 798 | 1,298 |
| Preparation for Reuse | 347 | 65 | 413 |
| Land Disposal | 133 | 173 | 306 |
| Incineration | 95 | 142 | 236 |
| Composting | 145 | 73 | 218 |
| Treated | 59 | 141 | 200 |
| Other | 73 | 54 | 127 |
| Land Recovery | 90 | 7 | 97 |
| **Total** | **1,441** | **1,453** | **2,894** |

The largest waste by material stream was Mixed wastes and as Table 16 shows, it was represented in all waste management routes and was the largest in all other than Preparation for Reuse, Recycling and Composting. Paper and Cardboard wastes and Metallic wastes were the largest in Preparation for Reuse, Recycling and Composting.

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**Table 16: Industrial and Commercial waste by waste stream split by waste management method, Wales 2018**

| Material Stream | Preparation for Reuse, Recycling and Composting | Landfill | Recovery** | Other* | Total |
|---|---|---|---|---|---|
| Mixed wastes | 217 | 210 | 122 | 157 | 705 |
| Paper & Cardboard wastes | 434 | 2 | 8 | 2 | 446 |
| Metallic wastes | 432 | 13 | 0 | 0 | 445 |
| Animal & Vegetable wastes | 189 | 8 | 64 | 70 | 331 |
| Chemical wastes | 128 | 0 | 36 | 61 | 225 |
| Common sludges | 92 | 21 | 58 | 24 | 195 |
| Mineral wastes | 141 | 39 | 4 | 3 | 186 |
| Wood wastes | 84 | 0 | 12 | 1 | 97 |
| Plastic wastes | 80 | 2 | 2 | 0 | 85 |
| Glass wastes | 59 | 0 | 0 | 0 | 59 |
| Rubber wastes | 56 | 0 | 1 | 0 | 58 |
| Healthcare | 0 | 8 | 23 | 9 | 40 |
| Discarded Equipment | 16 | 1 | 0 | 1 | 19 |
| Textiles wastes | 1 | 0 | 2 | 0 | 3 |
| **Total** | **1,928** | **306** | **333** | **327** | **2,894** |

*Other includes wastes managed through treatment, a Transfer Station and those where the management method was Don't Know.
** Recovery includes Land Recovery & Incineration with Energy Recovery

### 3.3.1. Waste Management – Industrial Sectors

The rate of Preparation for Reuse, Recycling and Composting for Industrial waste was 69% in 2018 (992 thousand tonnes). The largest proportion, 38% of these tonnages, consisted of Metallic wastes (373 thousand tonnes).

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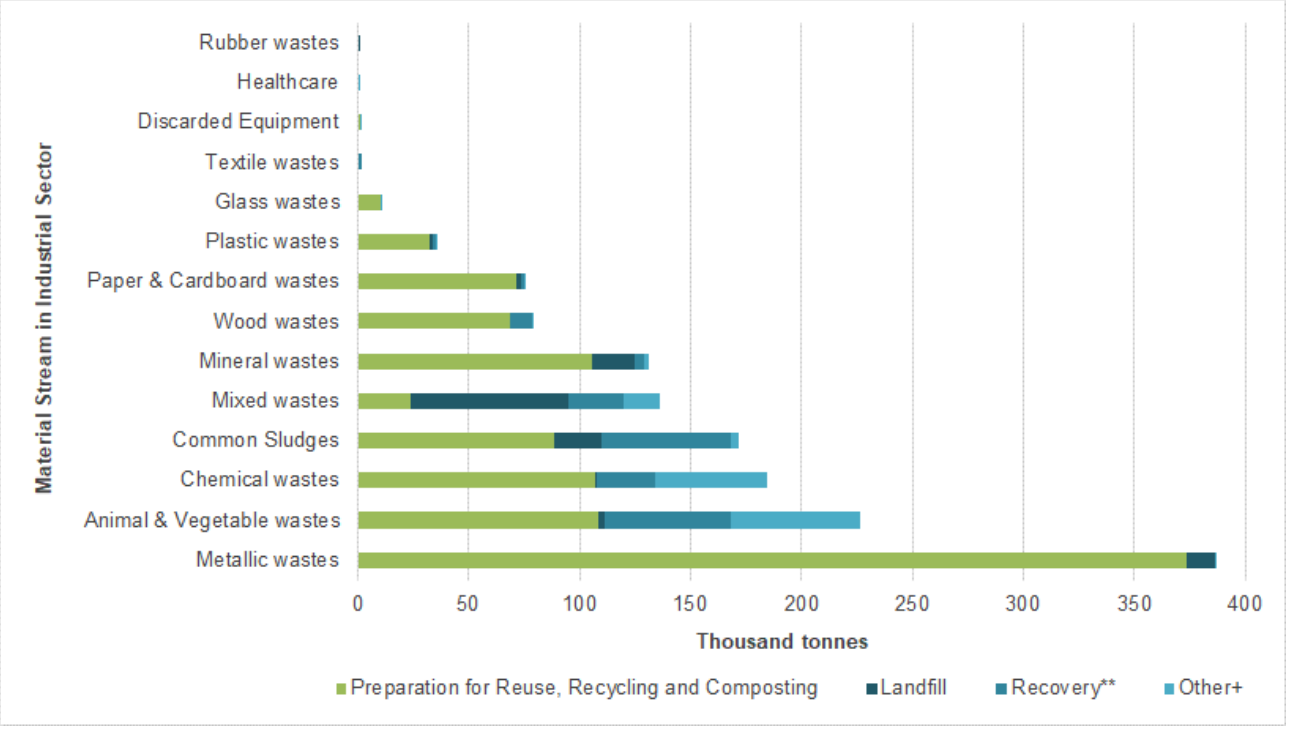
**Table 17: Industrial waste by sector split by waste management method, Wales 2018**

| Industrial Sector | Preparation for Reuse, Recycling and Composting | Landfill | Recovery ** | Other+ |
|---|---|---|---|---|
| Basic Metals | 88% | 9% | 1% | 2% |
| Water | 87% | 4% | 3% | 6% |
| Paper Products | 85% | 6% | 7% | 2% |
| Non-Metallic Mineral Products | 81% | 3% | 11% | 6% |
| Computer Equipment | 75% | 4% | 10% | 11% |
| Furniture | 72% | 3% | 10% | 15% |
| Wood Products | 66% | 14% | 19% | 2% |
| Chemical Products | 60% | 10% | 16% | 14% |
| Textiles | 59% | 23% | 5% | 12% |
| Energy Supply | 50% | 45% | 2% | 3% |
| Food Products | 37% | 9% | 33% | 21% |
| Coke Products | 31% | 0% | 8% | 61% |
| **Total Industrial waste** | **69%** | **9%** | **13%** | **9%** |

+ Other includes Incineration Without Energy Recovery, treatment, transfer, Don't Know and Other
** Recovery includes Land Recovery & Incineration with Energy Recovery

Within the Industrial sector, Preparation for Reuse, Recycling and Composting rates were higher than Landfill rates for all sectors as shown in Table 17. The Manufacturing of Basic Metals and Metal Products sector had the highest Preparation for Reuse, Recycling and Composting rate (88%) followed by the Water Collection & Treatment sector (87%) and Manufacture of Paper Products' sector (85%).

**Figure 19: Industrial waste by material stream and management, Wales 2018**




** Recovery includes Incineration with Energy Recovery and Land Recovery
+ Other includes Incineration Without Energy Recovery, Treatment, Transfer, Don't Know and Other

Approximately 133 thousand tonnes (9%) of Industrial waste was disposed of to Landfill. Figure 19 shows that Mixed wastes (approximately 71 thousand tonnes) were the dominant fractions of waste sent to Landfill. Conversely, the majority of Metallic wastes and separately collected Non-Metallic wastes (e.g. Paper & Card, Plastic and Wood) were sent for Preparation for Reuse, Recycling or Composting.

### 3.3.1. Waste Management – Commercial Sectors

Table 18 shows that the combined Preparation for Reuse, Recycling and Composting rate for Commercial waste was 64% in 2018 (936 thousand tonnes). Of the 0.9 million tonnes prepared for Reuse, recycled and composted, Paper and Cardboard accounted for over a third (39%).

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**Table 18: Commercial waste by sector split by waste management method, Wales 2018**

| Commercial Sector | Preparation for Reuse, Recycling and Composting | Landfill | Recovery** | Other* |
|---|---|---|---|---|
| Other Services | 86% | 7% | 2% | 5% |
| Food Retail | 82% | 5% | 8% | 4% |
| Wholesale and Retail | 73% | 11% | 6% | 10% |
| Professional | 72% | 6% | 11% | 11% |
| Food Service Activities | 63% | 14% | 8% | 15% |
| Public Admin | 61% | 21% | 11% | 6% |
| Education | 57% | 14% | 14% | 15% |
| Information | 53% | 24% | 7% | 16% |
| Financial | 55% | 10% | 10% | 24% |
| Arts | 52% | 20% | 17% | 12% |
| Administrative | 51% | 12% | 14% | 24% |
| Accommodation | 48% | 16% | 14% | 22% |
| Human Health | 47% | 16% | 23% | 14% |
| Transportation | 42% | 5% | 10% | 44% |
| Real Estate | 19% | 25% | 55% | 2% |
| **Total Commercial waste** | **64%** | **12%** | **10%** | **13%** |

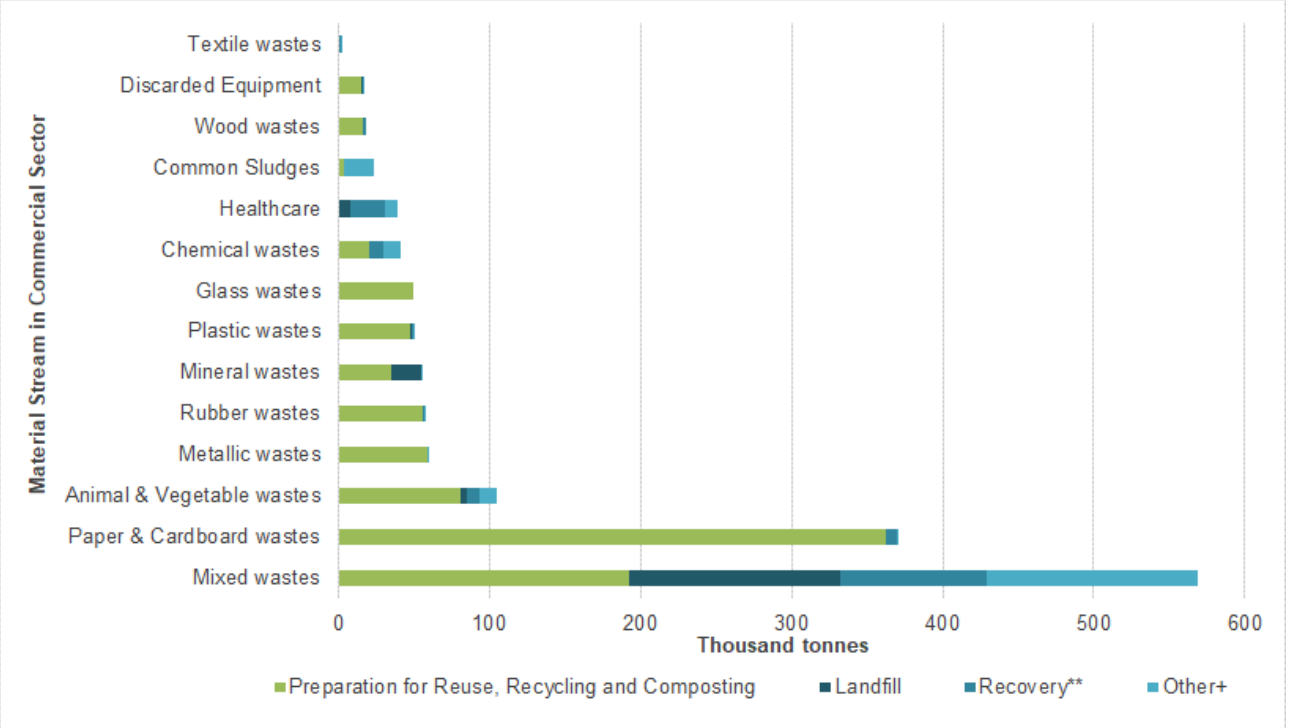
⁺ Other includes Incineration Without Energy Recovery, treatment, transfer, Don't Know and Other
** Recovery includes Land Recovery & Incineration with Energy Recovery

The sectors with the highest Preparation for Reuse, Recycling and Composting rates were the Other Services sector (86%), Food Retail sector (82%) and the Wholesale & Retail sector (73%).

The Wholesale & Retail sector alone accounts for 29% of the Commercial waste, excluding this gives a rate of 61% across the remainder of the Commercial sectors.

Approximately 12% of Commercial waste generated (173 thousand tonnes) was disposed of by Landfill. The majority (80%) of Commercial waste disposed of by Landfill was classified as Mixed wastes (approximately 139 thousand tonnes). This Mixed wastes mostly consisted of Mixed Residual (90%) and Dry Mixed Recyclables (6%).

**Figure 20: Commercial waste by material stream and management, Wales 2018**




** Recovery includes Incineration with Energy Recovery and Land Recovery
+ Other includes Incineration Without Energy Recovery, Treatment, Transfer, Don't Know and Other

Figure 14 illustrates that Mixed wastes – primarily Mixed Residual waste – constituted the greatest proportion of waste managed by Landfill (Land Disposal). Wastes collected separately are rarely Landfilled as they are managed by more sustainable waste management methods higher up the waste hierarchy.

## 3.4. Waste Management - Regionally

Table 19 and Table 20 outline the differences in the management methods used to treat Industrial and Commercial wastes in each of the regions.

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**Table 19: Industrial waste by management method split by region, Wales 2018**

| Waste Management Method | By Region in thousand tonnes and percentage of region | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | South East Wales | | Mid & South West Wales | | North Wales | | All Wales | |
| Preparation for Reuse, Recycling and Composting | 365 | 64% | 401 | 78% | 226 | 62% | 992 | 69% |
| Land Recovery | 35 | 6% | 17 | 3% | 37 | 10% | 90 | 6% |
| Incineration** | 41 | 7% | 21 | 4% | 32 | 9% | 94 | 7% |
| Land Disposal | 60 | 11% | 44 | 9% | 28 | 8% | 133 | 9% |
| Treated | 28 | 5% | 15 | 3% | 17 | 5% | 59 | 4% |
| Other* | 36 | 6% | 13 | 3% | 23 | 6% | 73 | 5% |
| **Total** | **566** | | **512** | | **364** | | **1,441** | |

* Other methods of waste management include Transfer Stations and Don't Know.
** Incineration includes With and Without Energy Recovery

The predominant waste management method in the Industrial sector was Preparation for Reuse, Recycling and Composting with 78% in Mid & South West, 64% in the South East and 62% in North Wales. Landfill disposal was highest in the South East region accounting for 11% of waste generated by the region. Land Recovery (10%) exceeded Land Disposal (9%) as the second largest waste management method in North Wales.

**Table 20: Commercial waste by management method split by region, Wales 2018**

| Waste Management Method | By Region in thousand tonnes and percentage of region | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | South East Wales | | Mid & South West Wales | | North Wales | | All Wales | |
| Preparation for Reuse, Recycling and Composting | 443 | *65%* | 271 | *63%* | 222 | *64%* | 936 | 64% |
| Land Recovery | 4 | *1%* | 2 | *0%* | 2 | *0%* | 7 | *0%* |
| Incineration** | 66 | *10%* | 43 | *10%* | 33 | *10%* | 142 | *10%* |
| Land Disposal | 80 | *12%* | 51 | *12%* | 42 | *12%* | 173 | *12%* |
| Treated | 63 | *9%* | 43 | *10%* | 34 | *10%* | 141 | *10%* |
| Other* | 24 | *4%* | 17 | *4%* | 13 | *4%* | 54 | *4%* |
| **Total** | **679** | | **427** | | **347** | | **1,453** | |

* Other methods of waste management include Transfer Stations and Don't Know.
** Incineration includes With and Without Energy Recovery

For the Commercial sector waste, as with the Industrial sector, the Preparation for Reuse, Recycling and Composting was the predominant waste management method across the regions (65% in South East, 64% in Mid & South East and North Wales). Land Disposal was the second most common management method (12%).

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Further details on the generation and management of all these wastes can be found in the technical appendices.

## 3.5. Comparison with Previous Surveys and Targets in 'Towards Zero Waste' National Waste Strategy

Comparing data with previous survey results is the only way that trends can be identified because surveys are the only way of gathering this information at present. The ability to compare the 2012 and 2018 I&C results is constrained by the precision achieved by the two surveys. Both surveys have a certain margin of error, so differences between the 2012 and 2018 survey will sometimes be due to sampling error rather than a genuine change in waste generation or management. This must be taken into consideration when reading this section.

### 3.5.1. Comparison of Results for Industrial Waste

**Table 21: Comparison of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Target Industrial waste generation | Estimated Industrial waste generation | There is a 90% likelihood that the true value falls between these two values | | |
|---|---|---|---|---|---|
| | | | Range | Lowest | Highest |
| | (thousands of tonnes) | | | (thousands of tonnes) | |
| 2018 | 1,604 | 1,441 | +/- 6.76% | 1,344 | 1,538 |
| 2012 | 1,763 | 2,001 | +/- 11.7% | 1,767 | 2,235 |
| 2007 | Base year | 1,896 | +/- 11.4% | 1,680 | 2,122 |

The waste prevention target for Industrial waste is a reduction of 1.4% every year until 2050 (using 2007 as baseline). The data should therefore be reducing every year by 26,544 tonnes towards a total tonnage of 1,604 thousand tonnes in 2018, and 1,418 thousand tonnes in 2025.

The data (see Table 21) suggests that there has been progress towards this target. There is a statistically significant decrease in the quantity of Industrial waste generated in Wales.

**Table 22: Comparison of Recycling rate of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Industrial waste Recycled | | There is a 90% likelihood that the true value falls between these two values | |
|---|---|---|---|---|
| | | | Lowest | Highest |
| | Quantity (thousands of tonnes) | Recycling Rate | (thousands of tonnes) | |
| 2018 | 992 | 69% | 860 | 1,125 |
| 2012 | 1,002 | 50% | 812 | 1,192 |
| 2007 | 1,128 | 59% | 957 | 1,298 |

Towards Zero Waste sets a Preparation for Reuse, Recycling and Composting target of 67% by 2019/20, and 70% by 2024/25, for the Industrial sector.

The data in Table 22 suggests that there has been progress towards this target. There is a statistically significant increase in the Preparation for Reuse, Recycling and Composting rate for Industrial waste; the rate was 50% in 2012 and 69% in 2018. This rate was heavily influenced by the management of Combustion wastes from the Energy Supply sector in 2012.

**Table 23: Comparison of the Energy Recovery rate of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Industrial waste sent to Energy Recovery | |
|---|---|---|
| | Quantity (thousands of tonnes) | Energy Recovery Rate |
| 2018 | 90 | 6.2% |
| 2012 | 43 | 2.1% |
| 2007 | 8 | 0.4% |

There is a target for no more than 30% of Industrial waste to be sent to Energy Recovery by 2024/25. Table 23 shows that there is a statistically significant increase in Energy Recovery rate since 2012 but the ceiling for 2024/25 has not been exceeded.

**Table 24: Comparison of Landfill rate of Industrial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Industrial waste Landfilled | | There is a 90% likelihood that the true value falls between these two values | |
|---|---|---|---|---|
| | | | Lowest | Highest |
| | Quantity (thousands of tonnes) | Landfill Rate | (thousands of tonnes) | |
| 2018 | 133 | 9% | 98 | 168 |
| 2012 | 534 | 27% | 521 | 548 |
| 2007 | 550 | 29% | 484 | 616 |

There is a target for no more than 10% of Industrial waste to be Landfilled by 2019/20, and no more than 5% by 2024/25. As shown in Table 24 there is a statistically significant decrease in the waste to Landfill to 9% in 2018 compared to 27% in 2012.

The 2012 landfill rate was previously heavily influenced by the management of combustion wastes from the energy sector which is significantly reduced in 2018. By removing the data for the energy supply sector from the 2012 data the total Landfill rate for the remaining Industrial sectors was 7% in 2012.

### 3.5.2. Comparison of Results for Commercial Waste

**Table 25: Comparison of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Target Commercial waste generation | Estimated Commercial waste generation | There is a 90% likelihood that the true value falls between these two values | | |
|---|---|---|---|---|---|
| | | | Range | Lowest | Highest |
| | (thousands of tonnes) | | | (thousands of tonnes) | |
| 2018 | 1,456 | 1,453 | +/- 6.05% | 1,365 | 1,541 |
| 2012 | 1,576 | 1,665 | +/- 10.4% | 1,492 | 1,839 |
| 2007 | Base year | 1,677 | +/- 7.4% | 1,553 | 1,801 |

The waste prevention target for Commercial waste is a reduction of 1.2% every year until 2050 (using 2007 as baseline). The data should therefore be reducing every year by 20,124 tonnes towards a total tonnage of 1,456 thousand tonnes in 2018 and 1,315 thousand tonnes in 2025.

The data (see Table 25) suggests that there has been progress towards this target with a reduction in the estimated amount which can be considered a marginally statistically significant difference in the quantity of Commercial waste generated in Wales.

**Table 26: Comparison of Recycling rate of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Commercial waste Recycled | | There is a 90% likelihood that the true value falls between these two values | |
|---|---|---|---|---|
| | | | Lowest | Highest |
| | Quantity (thousands of tonnes) | Recycling Rate | (thousands of tonnes) | |
| 2018 | 936 | 64% | 861 | 1,011 |
| 2012 | 1,131 | 68% | 980 | 1,281 |
| 2007 | 628 | 37% | 560 | 696 |

Towards Zero Waste sets a Preparation for Reuse, Recycling and Composting target of 67% by 2019/20, and 70% by 2024/25, for the Commercial sector.

The data in Table 26 suggests that the Commercial sectors' performance has receded slightly to below the 2019/20 target, from a previous marginal exceedance of the target in the 2012 survey. However, this is not a statistically significant difference in the Preparation for Reuse, Recycling and Composting rate for Commercial waste; the rate was 68% in 2012 and 64% in 2018.

In 2012 the rate for the Commercial sector was heavily influenced by the management of wastes from the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) sector. In 2018 this sector still accounted for 29% of Commercial waste, which is more than any other Commercial sector and recycled 73% of its waste. By

removing the data for the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) sector, the total Preparation for Reuse, Recycling and Composting rate for the remaining Commercial sectors was 61% in 2018 compared with 55% in 2012.

**Table 27: Comparison of Energy Recovery rate of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated total Commercial waste sent to Energy Recovery | |
|---|---|---|
| | Quantity (thousands of tonnes) | Energy Recovery rate |
| 2018 | 135 | 9.3% |
| 2012 | 20 | 1.2% |
| 2007 | 15 | 0.9% |

There is a target for no more than 30% of Commercial waste to be sent to Energy Recovery by 2024/25. Table 27 shows that there is a statistically significant increase in the Energy Recovery rate since 2012, but the ceiling for 2024/25 has not been exceeded.

**Table 28: Comparison of Landfill rate of Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Commercial waste Landfilled | | There is a 90% likelihood that the true value falls between these two values | |
|---|---|---|---|---|
| | | | Lowest | Highest |
| | Quantity (thousands of tonnes) | Landfill Rate | (thousands of tonnes) | |
| 2018 | 173 | 12% | 118 | 229 |
| 2012 | 429 | 26% | 347 | 511 |
| 2007 | 848 | 51% | 765 | 930 |

There is a target for no more than 10% of Commercial waste to be Landfilled by 2019/20, and no more than 5% by 2024/25. As shown in Table 28, the Landfill rate for 2018 is 12%, a significant reduction since 2012 when it was 26%.

### 3.5.3. Comparison of Results for Total Industrial and Commercial Waste

**Table 29: Comparison of the total of Industrial and Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Target Industrial and Commercial waste generation | Estimated Industrial and Commercial waste generation | There is a 90% likelihood that the true value falls between these two values | | |
|---|---|---|---|---|---|
| | | | Range | Lowest | Highest |
| | (thousands of tonnes) | | | (thousands of tonnes) | |
| 2018 | 3,060 | 2,894 | +/- 4.54% | 2,762 | 3,025 |
| 2012 | 3,340 | 3,666 | +/- 7.90% | 3,377 | 3,956 |
| 2007 | Base year | 3,573 | +/- 7.00% | 3,323 | 3,823 |

The waste prevention target is a reduction of 1.4% every year for Industrial waste and 1.2% every year for Commercial waste until 2050 (using 2007 as baseline). The data should therefore be reducing every year by 46,670 tonnes towards a total tonnage of 3,060 thousand tonnes in 2018 and 2,920 thousand tonnes in 2021.

The data (see Table 29) suggests that there has been progress towards this target. There is a statistically significant reduction in the quantity of Industrial and Commercial waste generated in Wales since 2012.

**Table 30: Comparison of Recycling rate of the total Industrial and Commercial waste in Wales in 2012 and 2018**

| Survey Year | Estimated Industrial and Commercial waste Recycled | | There is a 90% likelihood that the true value falls between these two values | |
|---|---|---|---|---|
| | | | Lowest | Highest |
| | Quantity (thousands of tonnes) | Recycling Rate | (thousands of tonnes) | |
| 2018 | 1,928 | 67% | 1,776 | 2,080 |
| 2012 | 2,133 | 58% | 1,890 | 2,376 |
| 2007 | 1,756 | 49% | 1,573 | 1,938 |

Overall, as shown in Table 30, the data suggests that there has been no statistically significant difference in the combined amount of Industrial and Commercial waste sent for Preparation for Reuse, Recycling and Composting since 2012. The rate has improved; it was 58% in 2012 and 67% in 2018.

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**Table 31: Comparison of Energy Recovery rate of Industrial and Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Industrial and Commercial waste sent to Energy Recovery | |
|---|---|---|
| | Quantity (thousands of tonnes) | Energy Recovery rate |
| 2018 | 225 | 7.8% |
| 2012 | 63 | 1.7% |
| 2007 | 23 | 0.6% |

There is a target for no more than 30% of Industrial and Commercial waste to be sent to Energy Recovery by 2024/25. Table 31 shows that there is a statistically significant increase in the Energy Recovery rate since 2012, but the ceiling for 2024/25 has not been exceeded.

**Table 32: Comparison of Landfill rate of the total Industrial and Commercial waste in Wales in 2007, 2012 and 2018**

| Survey Year | Estimated Industrial and Commercial waste Landfilled | | There is a 90% likelihood that the true value falls between these two values | |
|---|---|---|---|---|
| | | | Lowest | Highest |
| | Quantity (thousands of tonnes) | Landfill Rate | (thousands of tonnes) | |
| 2018 | 306 | 11% | 241 | 371 |
| 2012 | 963 | 26% | 877 | 1,050 |
| 2007 | 1,398 | 39% | 1,293 | 1,503 |

The Welsh Government has set a cap for limiting the amount of Landfill of Industrial and Commercial waste to 10% by 2019/20 and no more than 5% by 2024/25.

As shown in Table 32 there is a statistically significant decrease in Industrial and Commercial sectors sending waste to Landfill to 11% in 2018 compared to 26% in 2012.

The 2018 results indicate that in the last 6 years the proportion of waste generated that was Landfilled has reduced by approximately 15 percentage points. Therefore, a further reduction of 6 percentage points is required in the next 5-6 years by the Industrial and Commercial sectors combined to achieve the landfill cap target.

The project team compared the grossed-up survey data against permitted site returns for Landfills. The inferred Industrial and Commercial proportion from Landfill site 2018 returns, after taking into account Leachate, and an allowance for Household waste Landfilled, was 328 thousand tonnes, which is very similar to the survey result of 306 thousand tonnes This supports the accuracy of the Landfill figure from this survey.

## 3.6. Hazardous Waste

The Hazardous waste nature of individual waste streams was recorded, based upon a definition of Hazardous waste from the Hazardous waste regulations and on a list of typical Hazardous waste (including household items such as Fluorescent Tubes). Table 33 shows the waste generated by each sector split between Hazardous and Non-Hazardous.

An estimated 225 thousand tonnes of Hazardous waste was generated by industry and commerce in 2018 out of a total waste generation of 2.9 million tonnes (8%). The estimated split of this was 137 thousand tonnes Industrial (61%) and 88 thousand tonnes Commercial (39%).

Figure 21 shows that the Industrial sectors generating the largest quantity of Industrial Hazardous waste were the Manufacture of Basic Metals, and Metal Products sector (46%) followed by the Manufacture of Furniture, Other Manufacturing, Repair and Installation sector (19%). This differs to 2012, whereby the Manufacture of Chemical, Pharmaceutical, Rubber & Plastic Products sector generated the most Industrial Hazardous waste.

The Industrial sectors that generated the largest proportion of Hazardous waste compared to total waste generated by their sector were the Manufacture of Furniture, Other Manufacturing, Repair and Installation sector (37%) and Manufacture of Chemical, Pharmaceutical, Rubber & Plastic Products sector (16%).

The Commercial sectors that generated the largest quantity of Hazardous waste were the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) sector (45%) followed by the Human Health and Social Work Activities sector (34%). This differs to 2012, when the Human Health and Social Work Activities sector generated the most Commercial Hazardous waste followed by the Professional, Scientific and Technical Activities sector.

The Commercial sectors that generated the largest proportion of Hazardous waste compared to total waste generated by their sector were Human Health and Social Work Activities (24%) and Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) (9%) sectors.

**Figure 21: Hazardous waste by Industrial and Commercial sector, Wales 2018**

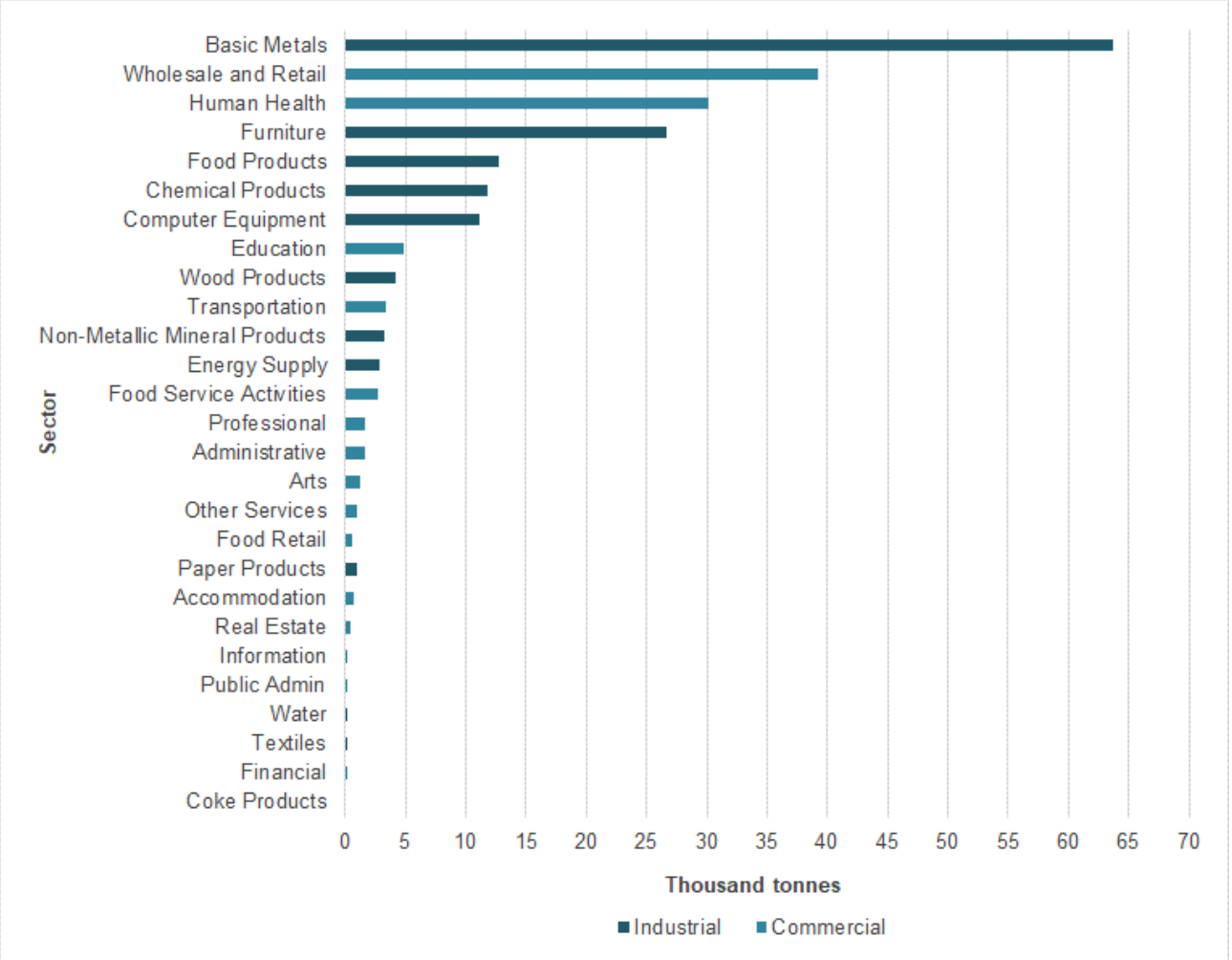


Figure 22 shows that by material stream Chemical wastes accounted for 119 thousand tonnes (53%) of the total Hazardous waste generated by Industry and Commerce. The second largest proportion of Hazardous waste type generated was Healthcare and Biological wastes with 35 thousand tonnes (15%) generated.

In terms of Hazardous waste generated by the Industrial sector, Chemical wastes accounted for the greatest proportion (68%) followed by Mineral wastes (19%). Conversely, in terms of Hazardous waste generated by the Commercial sectors, the majority were Healthcare and Biological wastes (30%) followed by Chemical wastes (30%).

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**Figure 22: Industrial and Commercial Hazardous waste by material stream, Wales 2018**

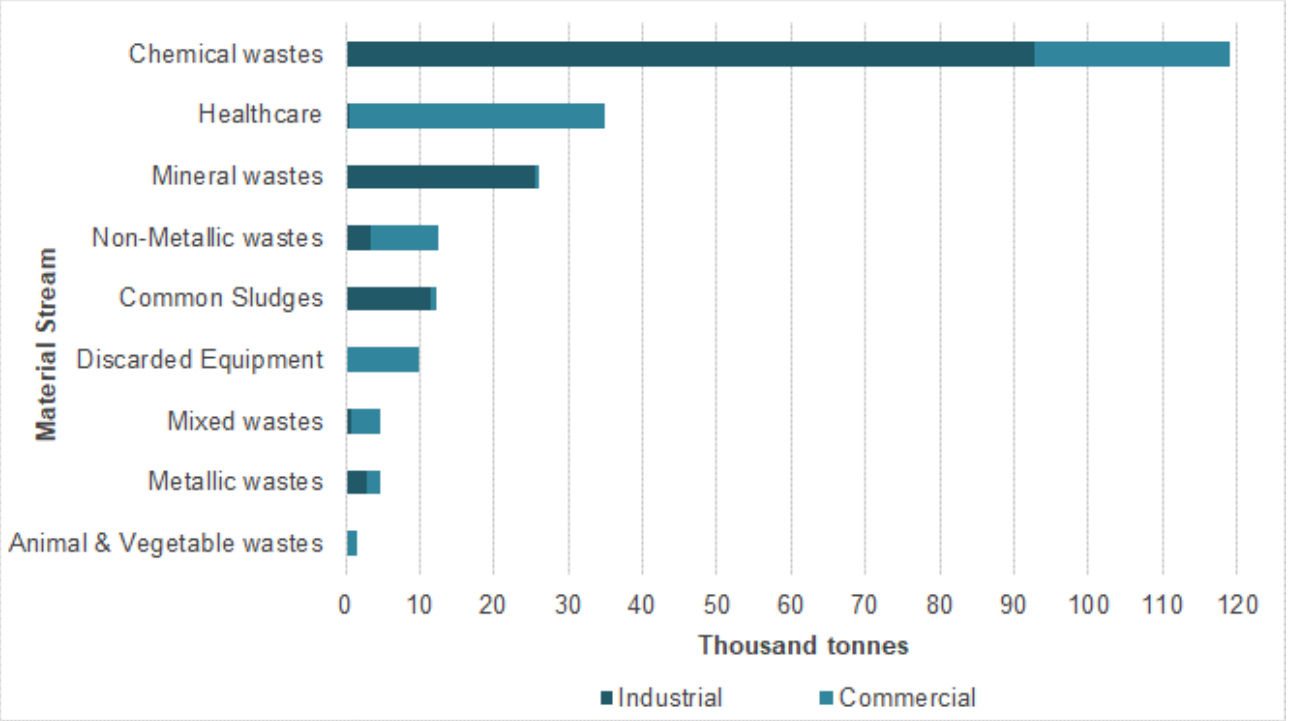

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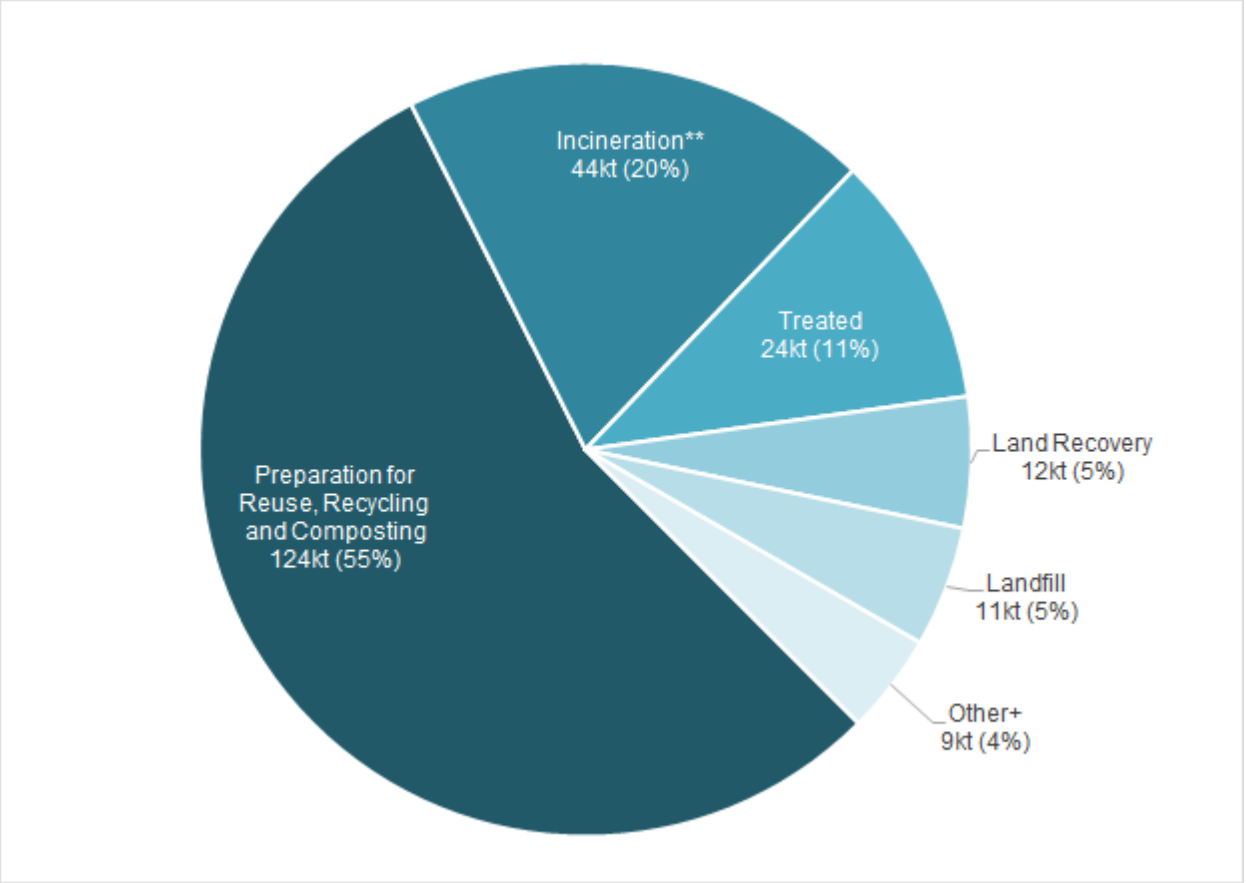
**Table 33: Industrial and Commercial waste by sector split by Hazardous and Non- Hazardous waste, Wales 2018**

| Sector | Sector | Hazardous Tonnes (thousand) | % | Non-Hazardous Tonnes (thousand) | % | Total Tonnes (thousand) |
|---|---|---|---|---|---|---|
| Industrial | Basic Metals | 64 | 11% | 513 | 89% | 577 |
| Industrial | Furniture | 27 | 37% | 46 | 63% | 72 |
| Industrial | Food Products | 13 | 3% | 370 | 97% | 382 |
| Industrial | Chemical Products | 12 | 16% | 60 | 84% | 72 |
| Industrial | Computer Equipment | 11 | 12% | 78 | 88% | 89 |
| Industrial | Wood Products | 4 | 6% | 71 | 94% | 75 |
| Industrial | Non-Metallic Mineral Products | 3 | 8% | 39 | 92% | 42 |
| Industrial | Energy Supply | 3 | 9% | 28 | 91% | 31 |
| Industrial | Paper Products | 0.97 | 1% | 93 | 99% | 94 |
| Industrial | Water | 0.04 | 1% | 3 | 99% | 3 |
| Industrial | Textiles | 0.03 | 1% | 3 | 99% | 3 |
| Industrial | Coke Products | 0 | 0% | 0.1 | 100% | 0 |
| **Industrial sub total** | | **137** | **10%** | **1,304** | **90%** | **1,441** |
| Commercial | Wholesale and Retail | 39 | 9% | 378 | 91% | 417 |
| Commercial | Human Health | 30 | 24% | 95 | 76% | 125 |
| Commercial | Education | 5 | 6% | 82 | 94% | 87 |
| Commercial | Transportation | 3 | 5% | 59 | 95% | 63 |
| Commercial | Food Service Activities | 3 | 1% | 189 | 99% | 192 |
| Commercial | Professional | 2 | 4% | 44 | 96% | 46 |
| Commercial | Administrative | 2 | 3% | 60 | 97% | 62 |
| Commercial | Arts | 1.19 | 3% | 43 | 97% | 44 |
| Commercial | Other Services | 1.03 | 2% | 57 | 98% | 58 |
| Commercial | Food Retail | 0.61 | 0% | 182 | 100% | 183 |
| Commercial | Accommodation | 0.74 | 1% | 103 | 99% | 104 |
| Commercial | Real Estate | 0.38 | 5% | 8 | 95% | 8 |
| Commercial | Information | 0.23 | 1% | 21 | 99% | 21 |
| Commercial | Public Admin | 0.11 | 0% | 28 | 100% | 28 |
| Commercial | Financial | 0.02 | 0% | 15 | 100% | 15 |
| **Commercial sub total** | | **88** | **6%** | **1,365** | **94%** | **1,453** |
| **Total** | | **225** | **8%** | **2,669** | **92%** | **2,894** |

**Figure 23: Industrial and Commercial Hazardous waste by waste management method, Wales 2018**




* Other includes Transfer Station and Don't Know

Figure 23 shows the range of options used to manage Hazardous waste generated in Wales in 2018. The majority of all Industrial and Commercial Hazardous waste generated was reported as being prepared for Reuse and Recycling (124 thousand tonnes), sent for Incineration (44 thousand tonnes) or sent for Treatment (24 thousand tonnes).

Table 34 gives a breakdown by material stream of the 124 thousand tonnes of Hazardous waste prepared for Reuse and Recycling.

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**Table 34: Hazardous waste Prepared for Reuse and Recycling by material stream, Wales 2018**

| Material stream and sub-category | | Tonnes (thousand) | |
|---|---|---|---|
| | Chemical Deposits and Residues | 41.2 | |
| | Used Oils (mineral) | 15.2 | |
| | Spent Solvents | 12.8 | |
| | Industrial Effluent Sludges (Chemical) | 5.4 | |
| | Chemical Preparation wastes | 1.6 | |
| | Acid, Alkaline or Saline wastes | 0.7 | |
| | Spent Chemical Catalysts | 0.6 | |
| **Chemical wastes** | | | **77.4** |
| | Combustion waste | 18.2 | |
| | Construction and Demolition waste | 2.9 | |
| | Contaminated Soils and Polluted Dredging Spoils | 0.4 | |
| | Waste of Naturally Occurring Minerals | 0.2 | |
| **Mineral wastes** | | | **21.7** |
| | Rubber wastes | 7.8 | |
| | Paper & Cardboard wastes | 1.1 | |
| | Plastic wastes | 1.1 | |
| | Glass wastes | 0.1 | |
| | Textile wastes | 0.02 | |
| | Wood wastes | 0.04 | |
| **Non-Metallic wastes** | | | **10.2** |
| | Batteries and Accumulators wastes | 5.3 | |
| | WEEE and Other Discarded Equipment | 3.1 | |
| | Discarded Vehicles (ELVs) | 0.8 | |
| **DisCarded equipment** | | | **9.2** |
| | Metallic wastes | 4.3 | |
| **Metallic wastes** | | | **4.3** |
| | Other Animal &Vegetable wastes | 0.9 | |
| **Animal & vegetable wastes** | | | **0.9** |
| | Household and Similar wastes | 0.2 | |
| **Mixed wastes** | | | **0.2** |

# 4. Priority Materials

For the 2018 study a focus was made on waste streams of priority to Welsh Government. The priority materials considered within this study were:

- Chemical wastes;
- Food wastes;
- Paper & Cardboard wastes; and
- Plastic wastes.

This analysis of priority materials is based on the material streams identified earlier in this report, therefore focussing on waste that is already segregated and not inclusive of further potential quantities that may reside within Mixed wastes such as Mixed Residual wastes.

It should be noted that the sample frame for this survey was designed to provide overall waste generation figures and so the precision limits (the plus or minus from the stated value) widen substantially at this level of reporting.

Note that subsection 4.2 (focussing on Food wastes), within this priority materials analysis, is the only component of this report to consider Non-wastes within the analysis.

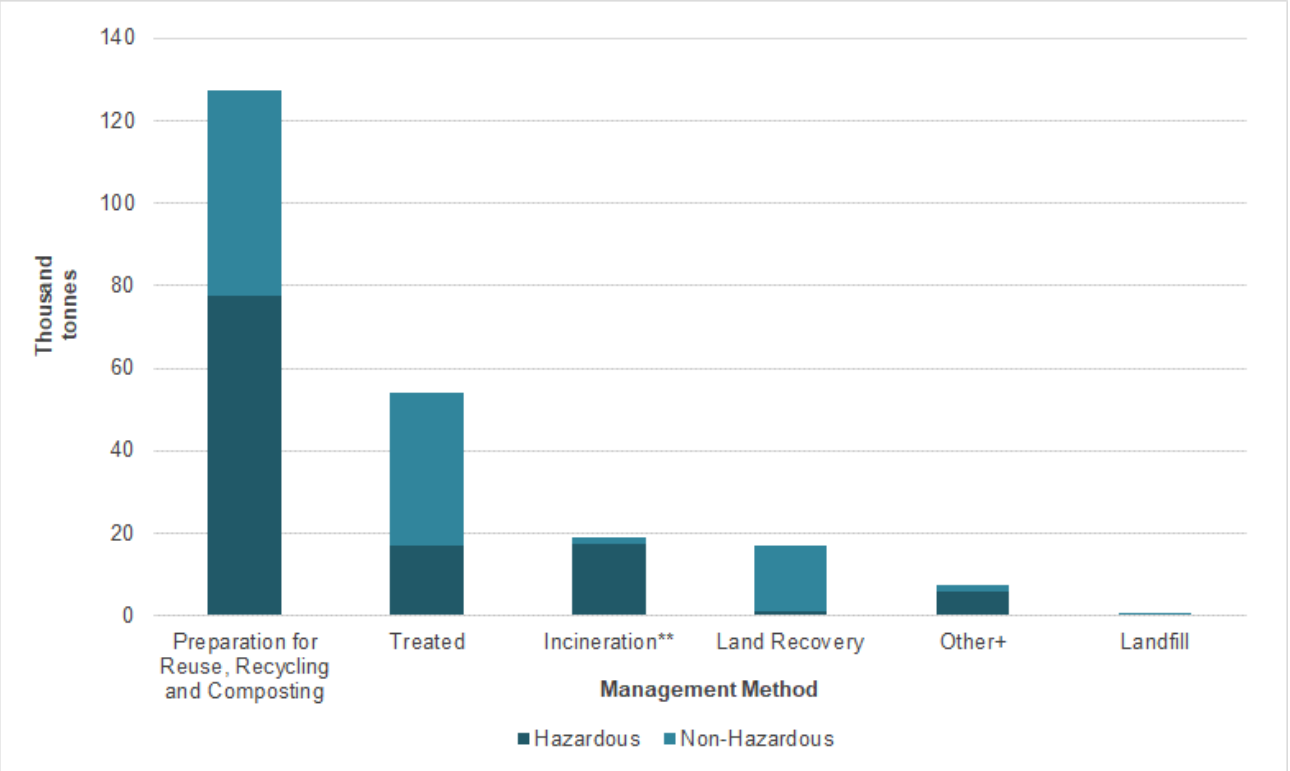
## 4.1. Chemical Wastes

An estimated 225 thousand tonnes of Chemical wastes was generated as a separate material stream by the Industrial and Commercial sectors in Wales during 2018. Industry generated 184 thousand tonnes and commerce generated 41 thousand tonnes. 53% of Chemical wastes (119 thousand tonnes) was categorised as Hazardous, and 47% (106 thousand tonnes) Non-Hazardous (Figure 30).

The Industrial sector that generated the most Chemical wastes was the Manufacture of Basic Metals, and Metal Products accounting for 94 thousand tonnes (51%). The Manufacture of Furniture, Other Manufacturing, Repair and Installation sector was the second highest accounting for 26 thousand tonnes (14%) and the Manufacture of Food Products, Drinks and Tobacco sector was the third highest accounting for 23 thousand tonnes (12%).

The Commercial sector that generated the most Chemical wastes was Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) accounting for 29 thousand tonnes (72%). The Transport and Storage sector was the second highest accounting for 6 thousand tonnes (14%).

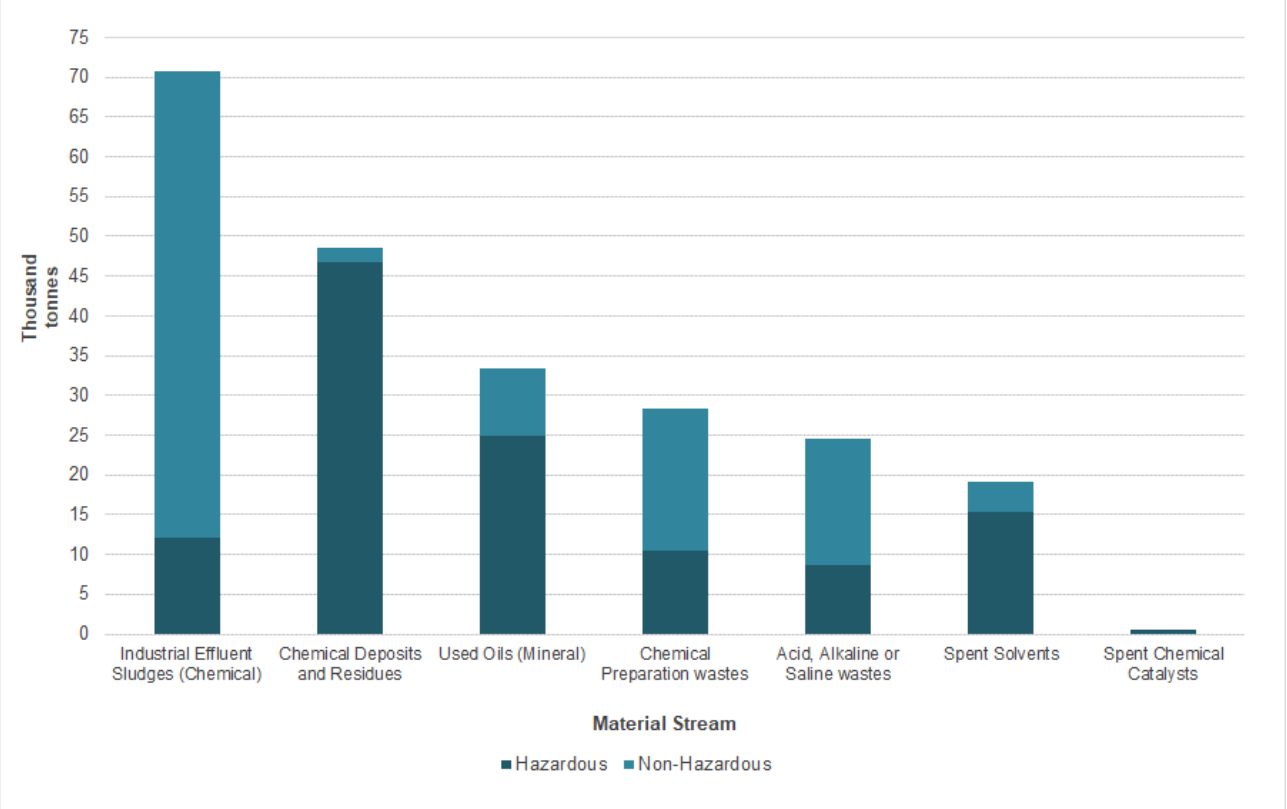
**Figure 24: Chemical waste by waste management method split by Hazardous and Non-Hazardous, Wales 2018**




+ Other includes Other methods of waste management, Transfer Stations and Don't Know.
** Incineration includes With and Without Energy Recovery

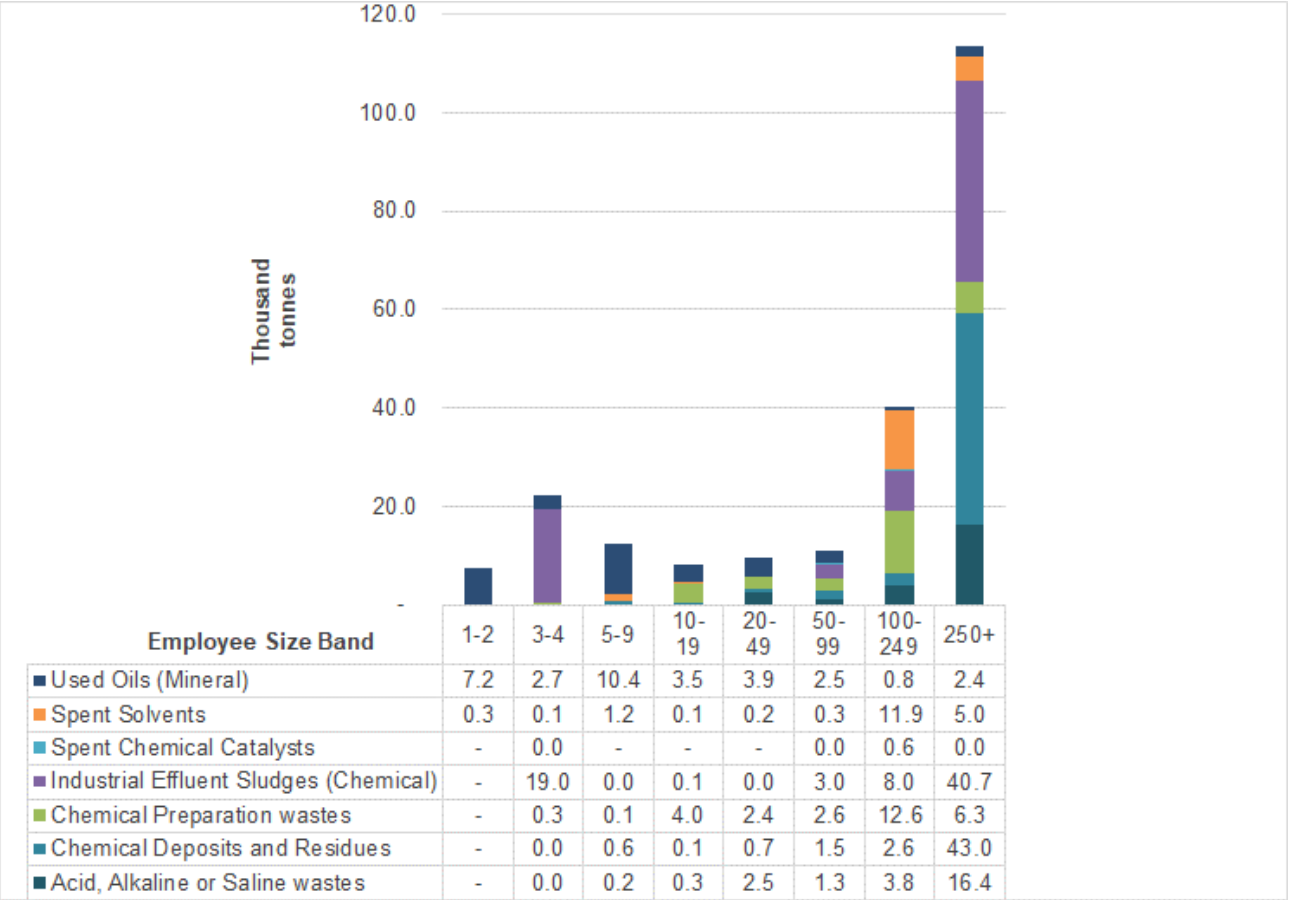
The rate of Preparation for Reuse, Recycling and Composting for Chemical wastes was 57% in 2018 (128 thousand tonnes). 32% of these tonnages consisted of Hazardous Chemical Deposits and Residues (41 thousand tonnes) and 28% of these tonnages consisted of Non-Hazardous Industrial Effluent Sludges (35 thousand tonnes). The rate of Preparation for Reuse and Recycling for Hazardous Chemical wastes was 65% (77 thousand tonnes) and 47% (50 thousand tonnes) for Non-Hazardous Chemical wastes.

**Figure 25: Chemical wastes by material stream split by Hazardous and Non-Hazardous waste, Wales 2018**




Sludges from Industrial Processes & Effluent Treatment accounted for 30% (68 thousand tonnes) of Chemical wastes material stream, of which 84% (57 thousand tonnes) was categorised as Non-Hazardous. Tars and Carbonaceous wastes accounted for 13% (30 thousand tonnes) of Chemical wastes material stream, this was exclusively categorised as Hazardous. Used Motor Oils accounted for 11% (24 thousand tonnes) of Chemical wastes material stream, of which 77% (18 thousand tonnes) was categorised as Hazardous.

**Figure 26: Chemical wastes by business site employee size band split by material stream, Wales 2018**




| Employee Size Band | 1-2 | 3-4 | 5-9 | 10-19 | 20-49 | 50-99 | 100-249 | 250+ |
|---|---|---|---|---|---|---|---|---|
| Used Oils (Mineral) | 7.2 | 2.7 | 10.4 | 3.5 | 3.9 | 2.5 | 0.8 | 2.4 |
| Spent Solvents | 0.3 | 0.1 | 1.2 | 0.1 | 0.2 | 0.3 | 11.9 | 5.0 |
| Spent Chemical Catalysts | - | 0.0 | - | - | - | 0.0 | 0.6 | 0.0 |
| Industrial Effluent Sludges (Chemical) | - | 19.0 | 0.0 | 0.1 | 0.0 | 3.0 | 8.0 | 40.7 |
| Chemical Preparation wastes | - | 0.3 | 0.1 | 4.0 | 2.4 | 2.6 | 12.6 | 6.3 |
| Chemical Deposits and Residues | - | 0.0 | 0.6 | 0.1 | 0.7 | 1.5 | 2.6 | 43.0 |
| Acid, Alkaline or Saline wastes | - | 0.0 | 0.2 | 0.3 | 2.5 | 1.3 | 3.8 | 16.4 |

Businesses with greater than 250 employees generate the highest proportion of Chemical wastes (50%, 114 thousand tonnes). The largest two chemical material streams in that employee band were Chemical Deposits and Residues (43 thousand tonnes) and Industrial Effluent Sludges (41 thousand tonnes). Chemcial wastes generated by businesses with between 1-4 employees consisted almost exclusively of Industrial Effluent Sludges (64%, 19 thousand tonnes) and Used Oils (33%, 10 thousand tonnes).

**Figure 27: Chemical wastes by business site employee size band split by Hazardous and Non-Hazardous waste, Wales 2018**

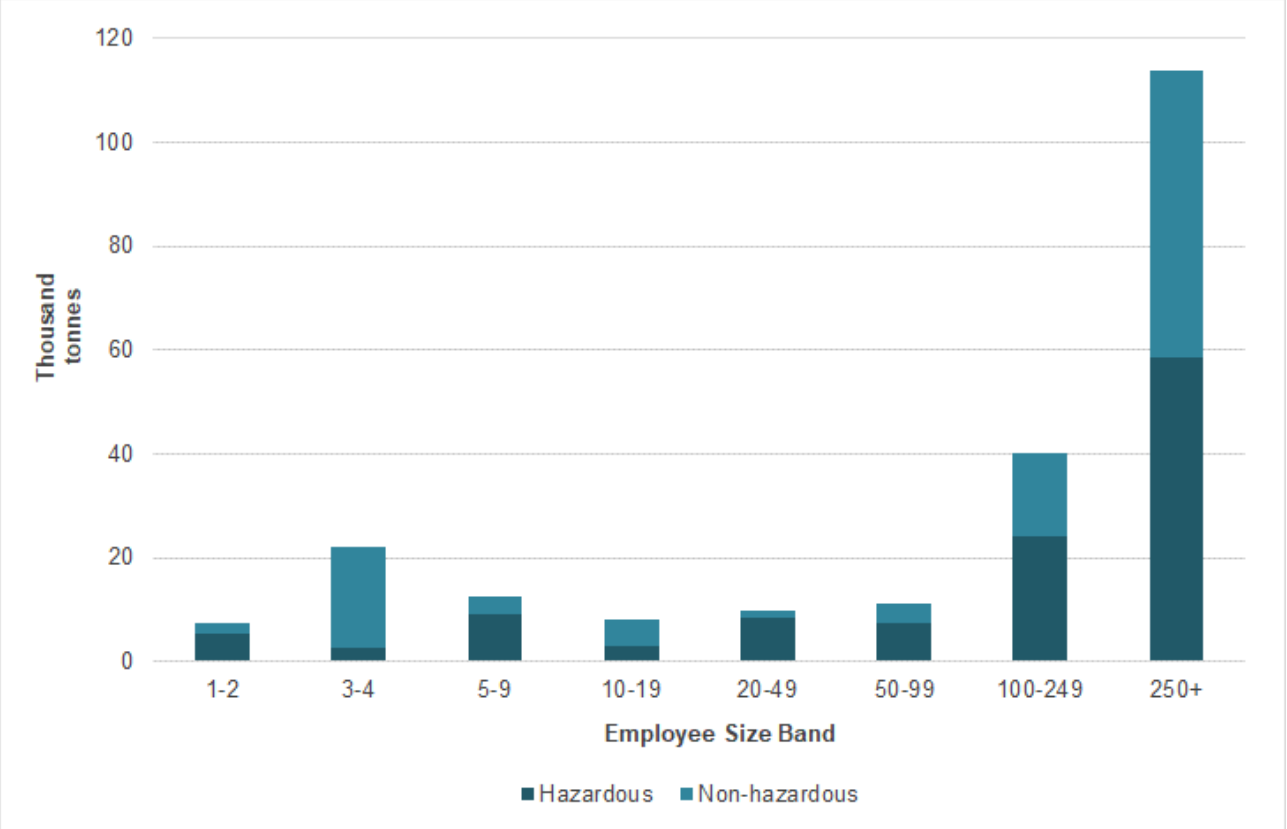



Figure 27 shows that 70% (83 thousand tonnes) of Chemical wastes categorised as Hazardous was generated by the 2% of businesses with over 100 employees. Conversely, the 65% of businesses with between 1-4 employees generated 7% (8 thousand tonnes) of Chemical wastes generated accross all Industrial and Commercial businesses in Wales.

For waste categorised as Non-Hazardous 67% (71 thousand tonnes) was generated by businesses with over 100 employees and businesses with 1-4 employees generated 20% (22 thousand tonnes) of the Non-Hazardous Chemical wastes.

## 4.2. Food Wastes

In the survey Food was categorised as either:

- Food Fit for Human Consumption
- Food By-Product (Non-waste)
- Animal waste of Food Preparation and Products
- Other Animal and Vegetable wastes

Food Fit for Human Consumption and Food By-Product were recorded as Non-wastes as they do not enter the waste stream and so do not appear in the analysis of the main report. Dealing with Food streams in this way allows this section to better overview Food wastes and is consistent with the revised Waste Framework Directive and national and European Food wastes reporting.

In total 492 thousand tonnes of Food wastes was generated as separate material streams by the Industrial and Commercial sectors in Wales during 2018 and Table 35 shows how that is broken down by waste treatment method. Of this, 314 thousand tonnes is classified as waste leaving 178 thousand tonnes as Non-wastes.

**Table 35: Food waste by material stream by treatment method, Wales 2018**

| Management Method | Food wastes stream (thousand tonnes) | | | | |
|---|---|---|---|---|---|
| | Animal waste of Food Preparation and Products | Food By-Product (Non-waste) | Other Animal and Vegetable wastes | Food Fit for Consumption | Total |
| Preparation for Reuse, Recycling and Composting | 101 | - | 88 | - | **189** |
| Treated | 1 | 178 | - | - | **179** |
| Other* | 39 | - | 28 | 0.3 | **67** |
| Incineration | 46 | - | 2 | - | **48** |
| Land Disposal | 8 | - | 0.3 | - | **8** |
| Land Recovery | 0.1 | - | 0.3 | - | **0.4** |
| **Total** | **195** | **178** | **119** | **0.3** | **492** |

* Other accounts for waste reported as Other Methods of Waste Management, Transfer Stations, Land Recovery and Don't Know.

Table 36 shows the Food streams by sub-category of the material stream. The majority of the Food by Product is Animal wastes from food processing and is sent for Rendering. The incinerated Food wastes is predominantly Other Animal waste of Food Preparation and Products. The majority of the waste under the management method Other has been used as Animal Feed.

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**Table 36: Food wastes by material stream and sub-category, Wales 2018**

| Food Material Stream | Thousand Tonnes | Percentage |
|---|---|---|
| Food Processing - Animal wastes | 92 | |
| Other Animal waste of Food Preparation and Products | 84 | |
| Domestic & Canteen Food waste - Animal | 19 | |
| **Animal waste of Food preparation and products** | **195** | **40%** |
| Food Processing - Animal wastes | 124 | |
| Other Animal & Vegetable wastes | 51 | |
| Other Animal waste of Food Preparation and Products | 2 | |
| Vegetable Oil | 1 | |
| Food Processing waste - Mixed Animal & Vegetable wastes | 1 | |
| Cooking Oil | 0.3 | |
| Food Processing - Vegetable wastes | 0.2 | |
| Domestic & Canteen Food waste - Animal | 0.002 | |
| **Food by product (not waste)** | **178** | **36%** |
| Green wastes (Garden) | 29 | |
| Food Processing - Vegetable wastes | 21 | |
| Other Animal & Vegetable wastes | 21 | |
| Food Processing waste - Mixed Animal and Vegetable wastes | 15 | |
| Domestic and Canteen Food waste - Vegetable | 13 | |
| Domestic and Canteen Food waste - Mixed Animal & Vegetable | 13 | |
| Cooking Oil | 5 | |
| Vegetable Oil | 1 | |
| **Other Animal & Vegetable wastes** | **119** | **24%** |
| Food Packaged | 0.2 | |
| Food Unpackaged | 0.1 | |
| **Food Fit for consumption** | **0.3** | **0.1%** |
| **Total** | **492** | |

Of the 314 thousand tonnes of Food wastes generated as separate material streams by the Industrial and Commercial sectors in Wales during 2018.

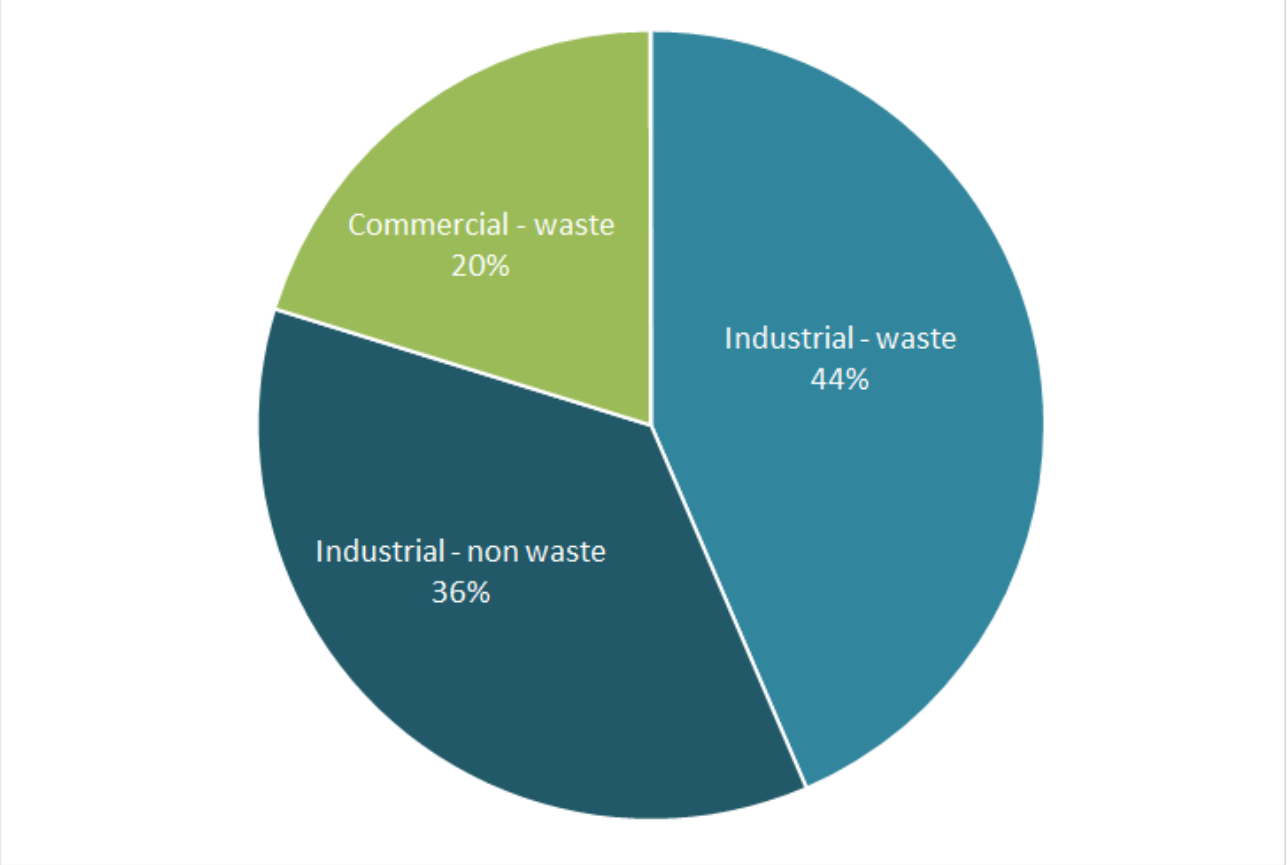
- The Industrial sector generated 214 thousand tonnes and
- The Commercial sector generated 99 thousand tonnes

Of the 178 thousand tonnes of Food Non-waste generated as separate material streams by the Industrial and Commercial sectors in Wales during 2018.

- The Industrial sector generated 178 thousand tonnes and
- The Commercial sector generated 0.2 thousand tonnes

The percentage breakdown is shown in Figure 28.

**Figure 28: Food wastes by Industrial and Commercial and classification, Wales 2018**




Industrial Food wastes was generated almost exclusively by the Manufacture of Food Products, Drinks and Tobacco sector, accounting for 209 thousand tonnes (97%) excluding Non-wastes and 387 thousand tonnes (99%) including Non-wastes.

The Commercial sector that generated the most Food wastes was Food Retail Only accounting for 28 thousand tonnes (28%). The Other Services sector was the second highest, accounting for 26 thousand tonnes (26%). The Food Service Activities sector was the third highest accounting for 20 thousand tonnes (20%).

In 2018 the rate of Preparation for Reuse, Recycling and Composting for Food wastes was 60% excluding Non-wastes and 38% of all Food wastes; 189 thousand tonnes in both calculations.

- Composting accounted for 94% (178 thousand tonnes) of this, the remaining split evenly between Preparation for Reuse and Recycling.
- Of the Preparation for Reuse, Recycling and Composting tonnages:
    - 54% was Animal waste of Food Preparation and Products (101 thousand tonnes) and
    - 46% was Other Animal and Vegetable wastes (88 thousand tonnes).

All Food Non-wastes were categorised sent for Treatment and all with a sub-category of Sent for Rendering.

**Figure 29: Food wastes by business site employee size band split by Industrial and Commercial, Wales 2018**

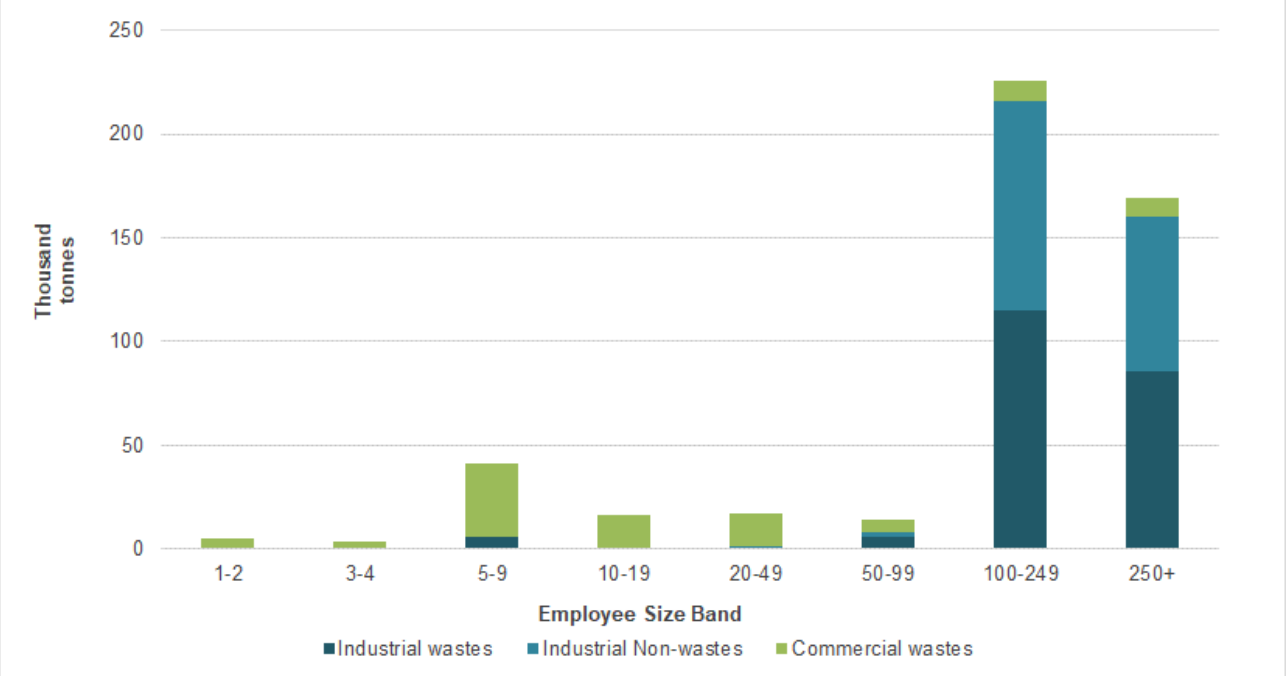


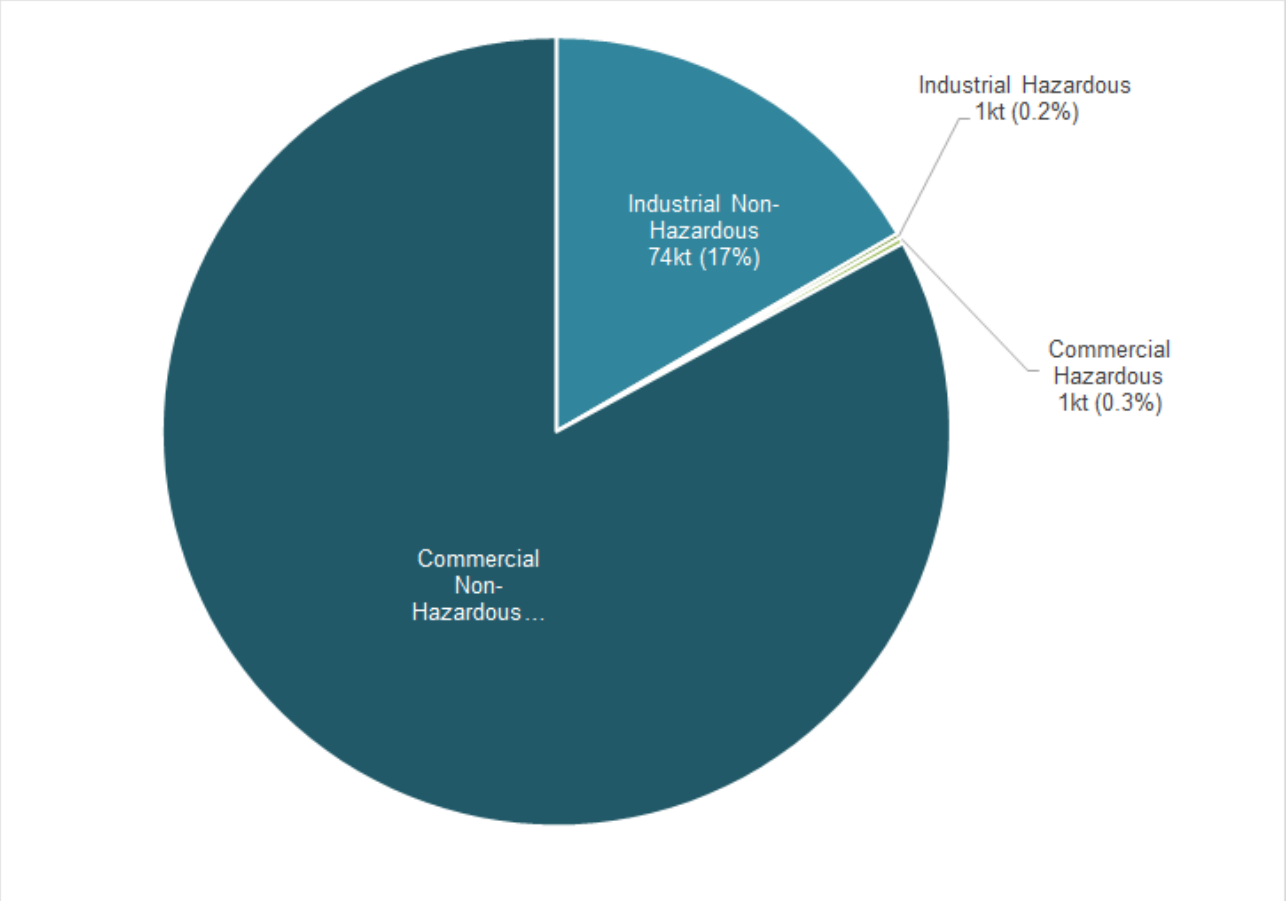

Figure 29 shows that 94% (201 thousand tonnes) excluding Non-wastes, and 96% (376 thousand tonnes) including Non-wastes, of Food wastes from Industrial sectors was generated by the 5% of business sites with over 100 employees. Conversely, the 64% of Industrial business sites with between 1-4 employees generated <0.1% of the Food wastes generation total for the Industrial sector, both excluding and including Non-wastes.

The pattern is different within the Commercial sector. The proportion of Food wastes generated across all employee size bands is more evenly spread, and there was no Non-waste. The highest proportion of Food wastes (35%, 35 thousand tonnes) was generated in the 5-9 employee size band which accounted for 6% of all Commercial business sites in Wales. Businesses with 1-4 employees generated 8% (8 thousand tonnes) of the Food wastes and accounted for 65% of all Commercial business sites in Wales. Business sites with over 100 employees generated 19% (19 thousand tonnes) of the Food wastes

## 4.3. Paper and Cardboard Wastes

An estimated 446 thousand tonnes of Paper & Cardboard wastes was generated as a separate material stream by the Industrial and Commercial sectors in Wales during 2018. The Industrial sector generated 75 thousand tonnes and the Commercial sector generated 371 thousand tonnes, of which each sector generated a very small amount (approximately one thousand tonnes) that was classified by the businesses as Hazardous. This is shown in Figure 30.

**Figure 30: Paper & Cardboard wastes by Industrial and Commercial and waste nature, Wales 2018**

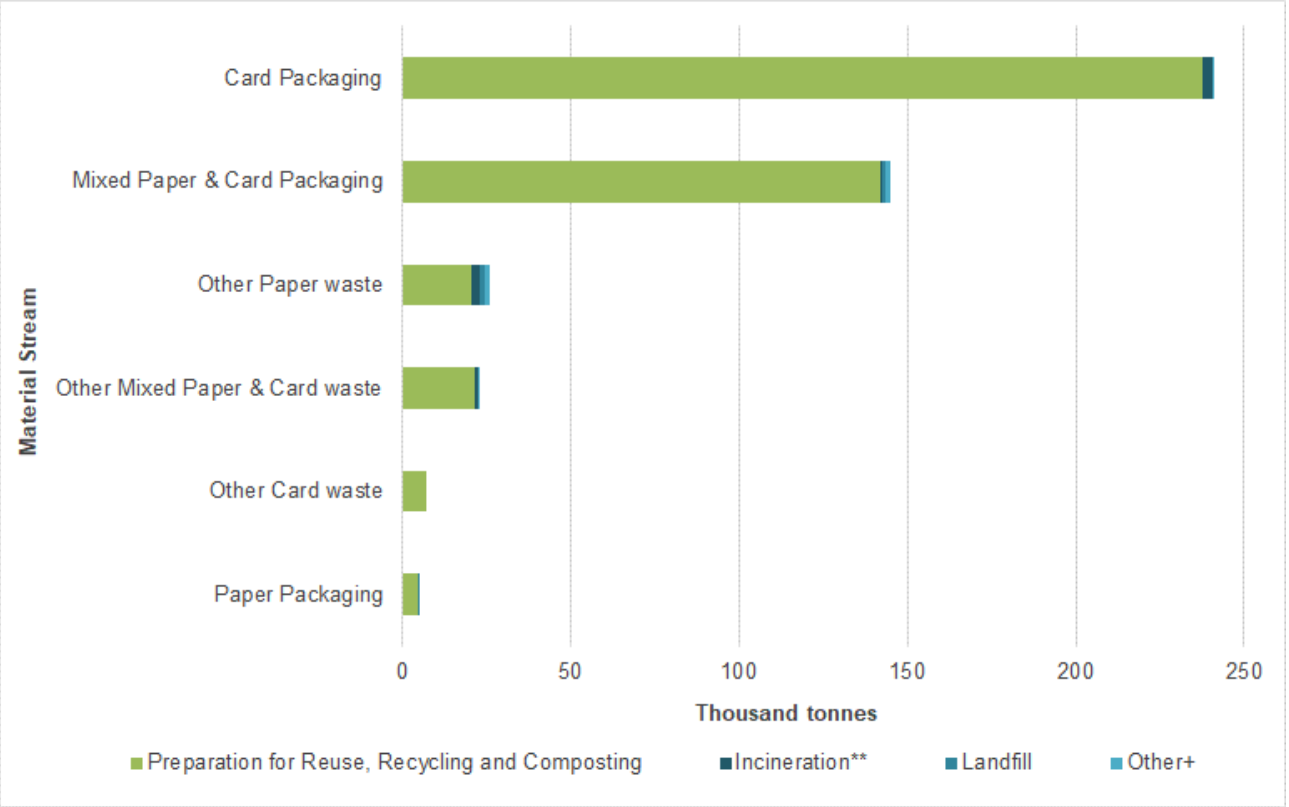



The Industrial sector that generated the most Paper & Cardboard wastes was Manufacture of Paper and Paper Products accounting for 32 thousand tonnes (42%). The Manufacture of Food and Drink sector was the second highest, accounting for 13 thousand tonnes (18%).

The Commercial sector that generated the most waste was Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) accounting for 125 thousand tonnes (34%). The Food Retail Only sector was the second highest accounting for 106 thousand tonnes (29%) and the Food Service Activities sector was the third highest accounting for 51 thousand tonnes (14%).

The rate of Preparation for Reuse, Recycling and Composting for Paper & Cardboard wastes was 97% in 2018 (434 thousand tonnes). 55% of these tonnages consisted of Card Packaging (238 thousand tonnes) and 33% of these tonnages consisted of Mixed Paper & Card Packaging (142 thousand tonnes).

**Figure 31: Paper & Cardboard wastes by material stream split by waste management method, Wales 2018**




+ Other includes Other Methods of waste management and Transfer Stations, Land Recovery, Treatment and Don't Know.
** Incineration includes With and Without Energy Recovery

Other Paper wastes generated the lowest rate of Preparation for Reuse, Recycling and Composting at 79% (20 thousand tonnes), the only sub waste category within Paper & Cardboard wastes to generate a rate of Preparation for Reuse and Recycling lower than 96%.

**Figure 32: Paper & Cardboard wastes by business site employee size band split by Industrial and Commercial, Wales 2018**

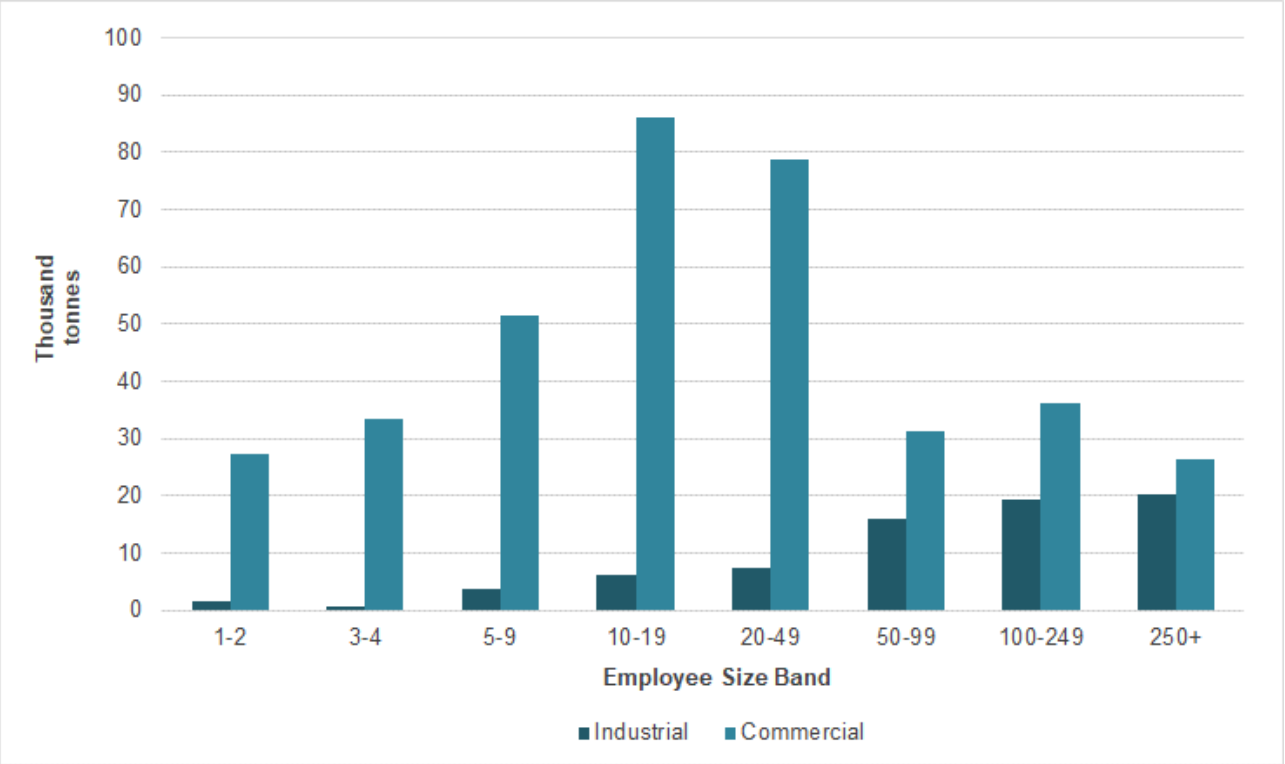



Figure 32 shows that 53% (40 thousand tonnes) of Paper & Card wastes from Industrial sectors was generated by the 5% of business sites with over 100 employees. Conversely, the 64% of Industrial business sites with between 1-4 employees generated 3% (2 thousand tonnes) of the Paper & Card wastes generation total for the Industrial sector.

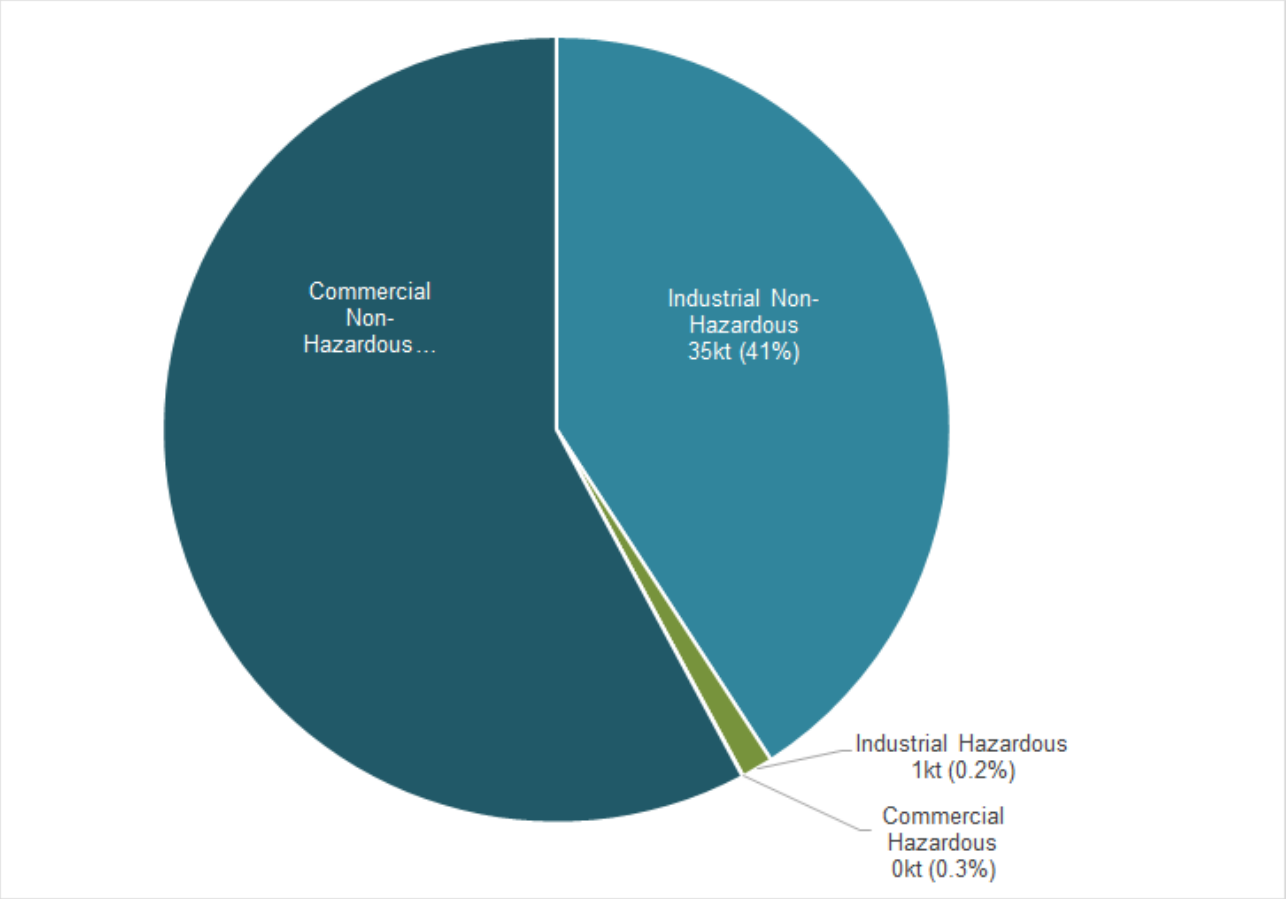
The pattern is different within the Commercial sector. The proportion of Paper & Cardboard wastes generated across all employee size bands is more evenly spread. Business sites with 1-4 employees generated 16% (61 thousand tonnes) of the Paper & Cardboard wastes and accounted for 65% of all Commercial businesses in Wales. And business sites with more than100 employees generated 17% (62 thousand tonnes).

The highest proportion of waste (23%, 86 thousand tonnes) was generated in the 10-19 employee size band which accounted for 10% of all Commercial business sites in Wales.

### 4.4. Plastic Wastes

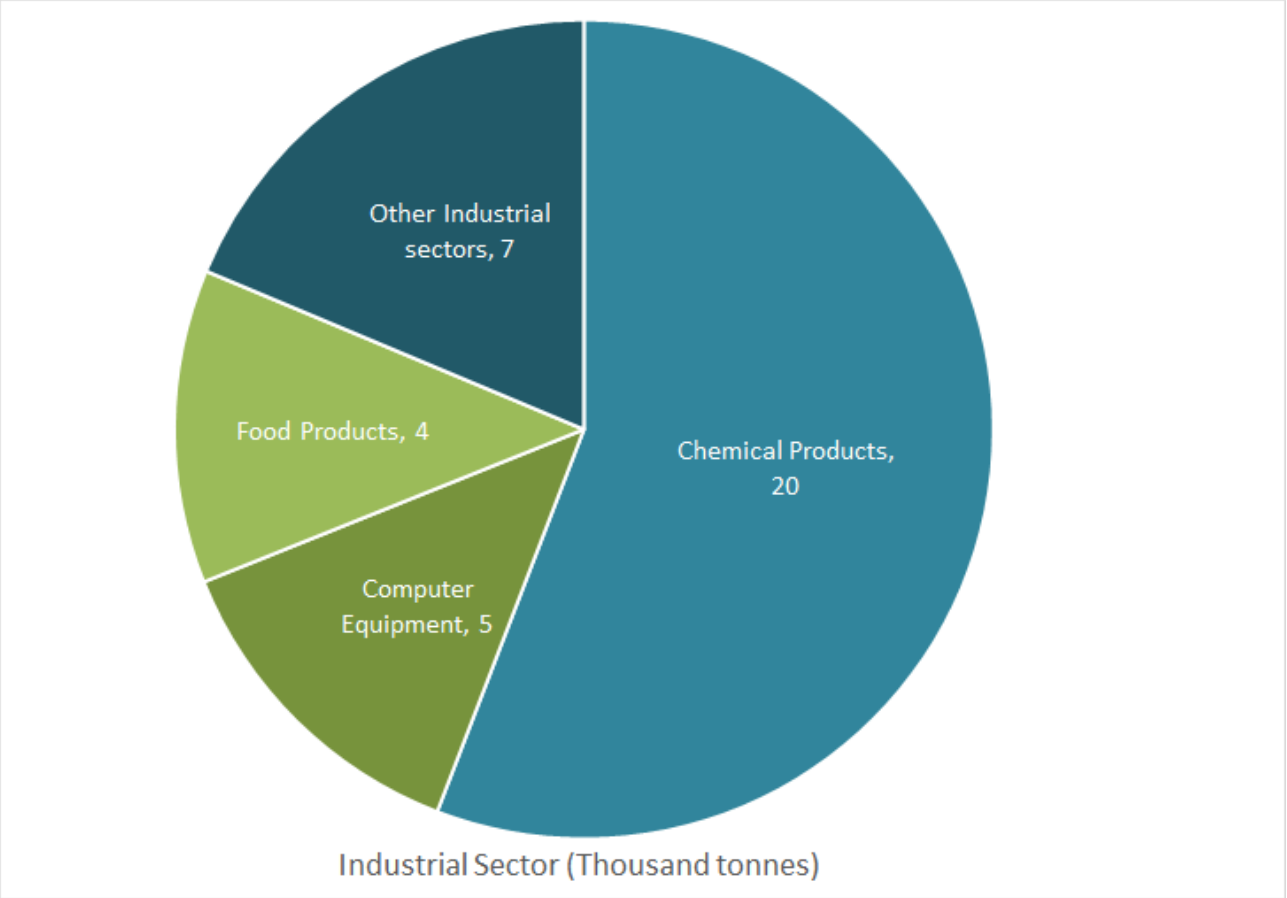
An estimated 85 thousand tonnes of Plastic wastes was generated as a separate material stream by the Industrial and Commercial sectors in Wales during 2018. Industry generated 36 thousand tonnes and Commerce generated 49 thousand tonnes (Figure 33). The one thousand tonnes of Plastic wastes that business reported as Hazardous was generated almost exclusively by the Industrial sector (98%).

**Figure 33: Plastic wastes by Industrial and Commercial and waste nature, Wales 2018**




The Industrial sector that generated the most Plastics wastes was the Manufacture of Chemical, Pharmaceutical, Rubber & Plastic Products accounting for 20 thousand tonnes (56%). The Manufacture of Computer, Electrical Equipment, Machinery and Motors sector was the second highest accounting for 5 thousand tonnes (13%). This is shown in Figure 34.

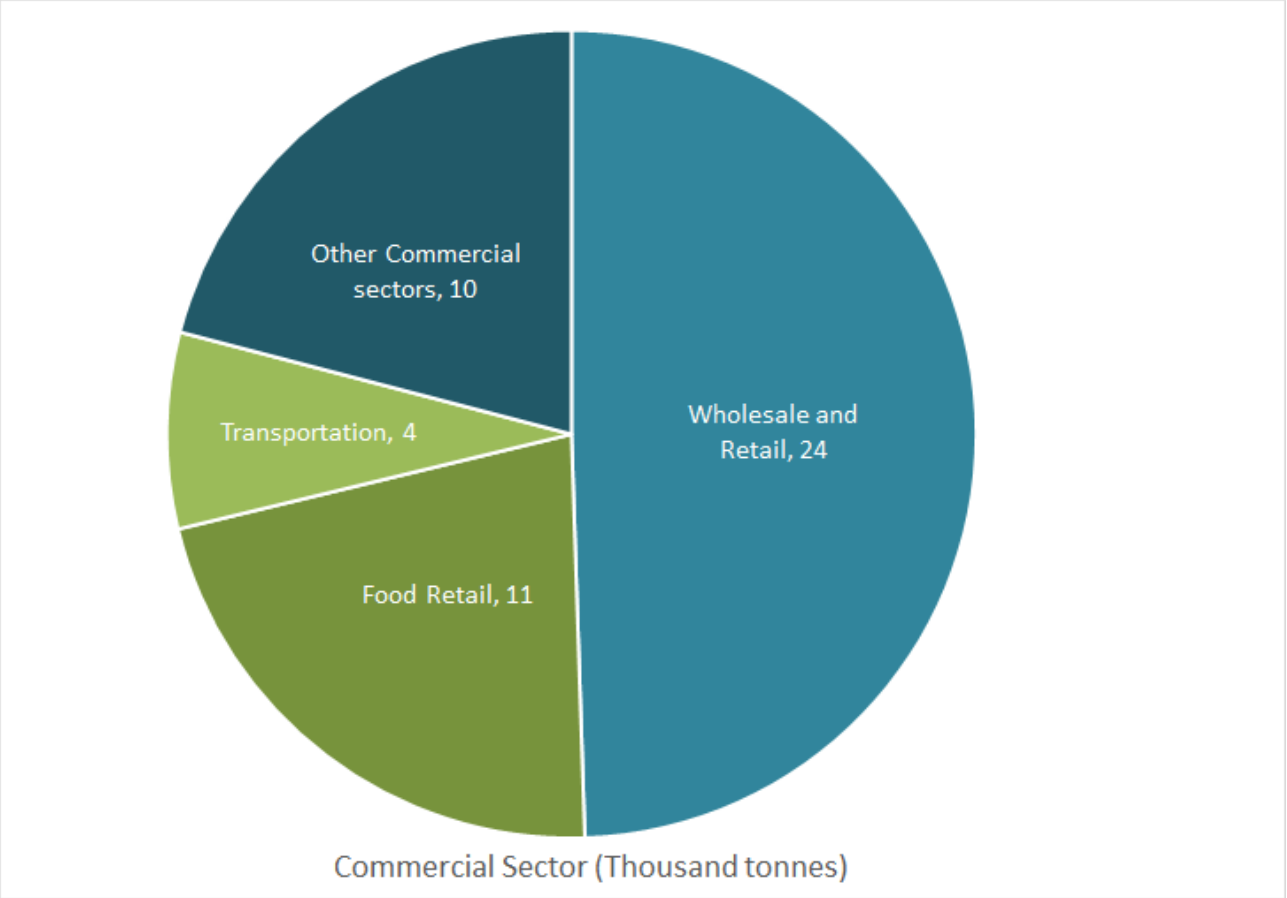
**Figure 34: Plastic wastes by Industrial sectors, Wales 2018**




[+] Other Industrial includes Coke Products, Water, Textiles, Energy Supply, Non-Metallic Mineral Products, Furniture, Wood Products, Paper Products, Basic Metals.

The Commercial sector that generated the most Plastic wastes was Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (excl. Food Retail) accounting for 24 thousand tonnes (49%). The Food Retail Only sector was the second highest accounting for 11 thousand tonnes (22%) and the Transport and Storage sector was the third highest accounting for 4 thousand tonnes (8%). This is shown in Figure 35

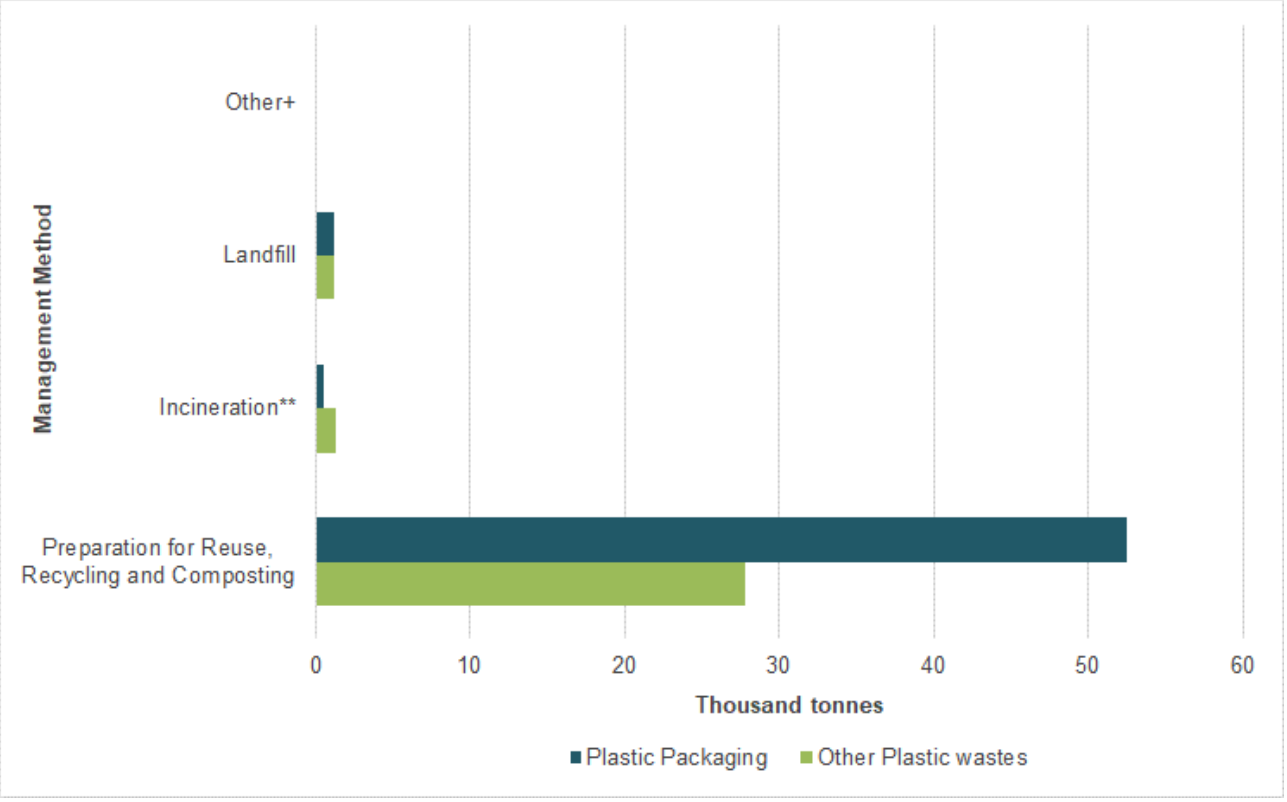
**Figure 35: Plastic wastes by Commercial sectors, Wales 2018**




[+] Other Commercial includes Accommodation, Food Service Activities, Information, Financial, Real Estate, Professional, Administrative, Public Admin, Education, Human Health, Arts, Other Services.

The rate of Preparation for Reuse, Recycling and Composting for Plastic wastes was 95% in 2018 (80 thousand tonnes). 65% of these tonnages consisted of Plastic Packaging (53 thousand tonnes) and the remaining 35% Other Plastic wastes (28 thousand tonnes).

**Figure 36: Plastic wastes by waste management method split by material stream, Wales 2018**




+ Other includes Other Methods of waste management and Transfer Stations, Land Recovery, Treatment and Don't Know.
** Incineration includes With and Without Energy Recovery

Other Plastic wastes generated the lowest rate of Preparation for Reuse, Recycling and Composting at 92% (28 thousand tonnes), Plastic Packaging generated a rate of Preparation for Reuse and Recycling of 97% (53 thousand tonnes).

**Figure 37: Plastic wastes by business site employee size band split by Industrial and Commercial, Wales 2018**

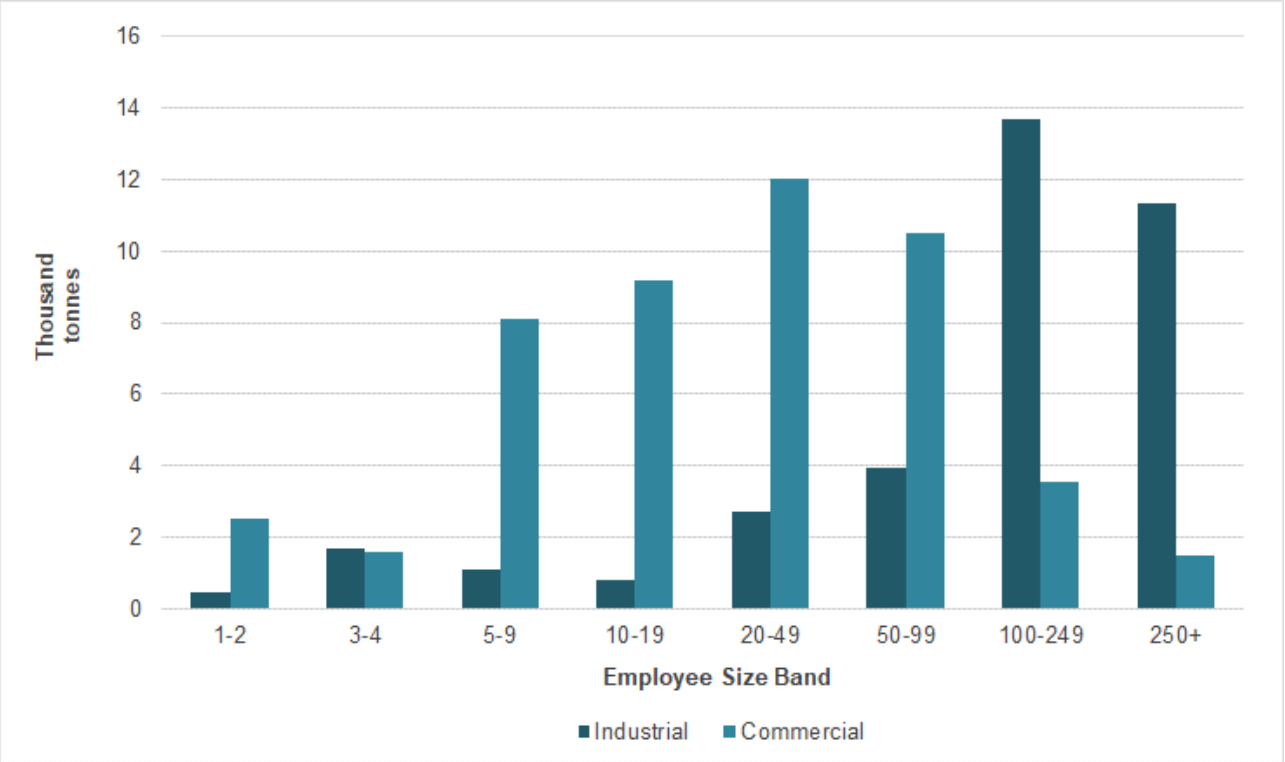



Figure 37 shows that 70% (25 thousand tonnes) of Plastic wastes from the Industrial sector was generated by the 5% of businesses with over 100 employees. Conversely, the 64% of Industrial businesses with between 1-4 employees generated 6% (two thousand tonnes) of the Plastic wastes generation total for the Industrial sector.

The pattern is different within the Commercial sector. There is less dominance of two employee size bands, with four having a significant contribution. The highest proportion of Plastic wastes (25%, 12 thousand tonnes) was generated in the 20- 49 employee size band which accounted for 6% of all Commercial businesses in Wales. Businesses with 1-4 employees generated 8% (5 thousand tonnes) of the Plastic wastes and accounted for 65% of all Commercial businesses in Wales.

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# 5. Conclusions and Recommendations

The survey of Industrial and Commercial waste generated in Wales 2018 collected data from 1,755 businesses, of differing sector and size, in a statistically valid manner. From this data, a grossed total of 2.9 million tonnes of waste was estimated as generated in Wales as a whole in 2018.

Brief comparison with data from the previous survey in 2012 indicated that there was a statistically significant change in the total Industrial and Commercial waste generated in Wales when factoring in the precision limits between both surveys. It was inconclusive as to whether the increase in the quantity of waste prepared for reuse, recycled and composted by the Industrial and Commercial sectors combined in 2018 was statistically significant compared to 2012 when factoring in the precision limits between both surveys. However, the survey results indicated that the reduction in the quantity of waste sent to Landfill by the Industrial and Commercial sectors combined was statistically significant compared to 2012 and therefore a reduction had occurred.

## 5.1. Data Confidence

The survey results show that for 95% of the waste quantities recorded, entries were based on business recorded data from written sources, which included invoices (10% of weight recorded), weighbridge notices (4%), waste transfer notices (13%) or other written sources (69%). Some waste quantities were based on estimates provided by the business being interviewed (5%) where this was not possible. 0.02% of the recorded quantities were reliant on surveyor estimates.

Further data checks were completed at the grossing up stage with the surveyors and directly with the businesses concerned. This further checked outlying data when compared to other NRW data sources, data from the previous 2012 survey and, generated sensitivity analyses.

The inferred Industrial and Commercial proportion from 2018 NRW landfill site returns was estimated to be 338 thousand tonnes, which is similar to the survey result of 305 thousand tonnes landfilled. This difference could be explained because the survey does not take into account waste indirectly landfilled from other waste management facilities.

NRW Hazardous waste data estimated that 275 thousand tonnes of Hazardous waste was generated in Wales in 2018. This compares to 333 thousand tonnes from the survey, again showing a reasonable consistency between the survey results and other data sources.

The procedures used created an effective and consistent data collection process by the surveyors. In addition, the steps to screen and check the collected and grossed data has confirmed the data collected is sufficiently accurate and robust. Details of the precision of the data are published in the Technical Appendices document.

However, it must also be acknowledged that the results from all surveys are subject to limitations with respect to the quality of estimates produced. Whilst these limitations do not alter the results or the statistical data presented in this report, they should be borne in mind by users of the data.

Additionally, there may be some discrepancies in the data tables found within this document, specifically where summations do not reflect the summary components. These discrepancies are due to rounding.

### 5.2. Lessons Learned and Recommendations

1. This survey has demonstrated a robust survey delivery and data methodology which can be used for future surveys both within Wales and the rest of the UK. The 2018 results of this survey represent the most reliable and comprehensive set of national data on Industrial and Commercial waste since 2012. Through investment in such surveys Welsh Government has the benefit of a series of robust waste generation data allowing for comparisons between different years and building a picture of trends and developments over time. However a comprehensive electronic waste tracking system would provide more real-time and regular data without the inherent delay and error of a sampled survey.
2. The project design and management process, and the software packages on which the survey delivery depended, proved themselves effective by efficiently delivering over 1,450 face to face surveys. Using software to cluster survey visits allowed the efficient use of the surveyors' time and reduced the carbon footprint of the project.
3. As with previous surveys, this 2018 survey highlighted issues of working with the ONS VAT and PAYE dataset and the need to reassign business positions in the sample matrix due to changes in either employee number size band or sector identified during the visit. The lack of detail in the supplied data in terms of business contact information was also effectively addressed by allowing sufficient time and resource to research the data gaps.
4. This report and its associated technical appendices contain sufficient detail to allow reproduction of this methodology in future surveys, to allow data consistency and comparability, and flag up issues which could be addressed in future surveys to further improve delivery such as allowing more time to quality check and gross up data prior to reporting deadlines.
5. For some businesses, such as supermarkets, Wholesalers or multi-outlet operations such as post offices or water utility sites, because of back hauling of waste to distribution centres or central management of waste contracts, data on generation is not held by individual locations. The need to access such data was more prevalent for this survey than in 2012, with fewer local managers in some sectors holding the data required for a site visit. In such cases, data can often be collected centrally from regional or national business managers. However, caution must be employed when using this data. The source or robustness of this data is not always clear, it has the potential to dominate generation in individual cells in the sample frame and will have a negative impact on the random sampling methodology upon which the sampling methodology relies. This requires close monitoring and is augmented significantly by data from other businesses and sources so that the potential negative aspects of corporate data are minimised.
6. We recommend further interpretation and analysis of the data generated by this survey to help inform and develop policy, develop planning strategy and secure opportunities in improving sustainable waste management in Wales.

7. Planning authorities can use the data at both a national and regional level to inform waste planning.
8. The results of the survey highlight areas where further initiatives and support could be focused to improve progress with achieving targets set in the National waste strategy ‘Towards Zero Waste’. For example, the majority (80%) of Commercial waste Landfilled in 2018 was Mixed wastes consisting of (90%) Mixed Residual wastes, indicating that there are further opportunities to improve segregation of recyclable materials in the Commercial sectors.
9. Information on waste management in this report is generally reliable but the accuracy of the results is limited to information available to surveyed producers on the final destinations of their waste. The accuracy is limited owing to the complexities of waste management routes and difficulties linking final fate back to source (e.g. the use of Don’t Know, Treatment and Transfer). Improvements in the electronic tracking of waste from cradle to grave are required to improve the reliability of Industrial and Commercial sector waste statistics in the future.

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