Department for Environment Food & Rural Affairs

Government Statistical Service

7th March 2019

UK Statistics on Waste

The purpose of this release is to announce UK estimates which have been calculated to comply with EU legislation. It includes data on:
Recycling rate from Waste from Households – minor revisions; latest data 2017
Biodegradable municipal waste sent to landfill – minor revisions; latest data 2017
Packaging waste – latest data 2017 (provisional)
Recovery rate from construction and demolition – revisions to 2010-14 data; latest data 2016
Waste from commercial and industrial (C&I) activities – latest data 2017 (England), 2016 (UK)
Total waste generation and final treatment of all waste – minor revisions; latest data 2016
Waste infrastructure – latest data 2016
There is a detailed separate dataset available here for all sections.

Key points

- The **UK recycling rate for Waste from Households** (WfH; including IBA metal) was 45.7% in 2017, increasing from 45.2% in 2016. There is an EU target for the UK to recycle at least 50% of household waste by 2020.

- The recycling rate for WfH increased in all UK countries in 2017. The recycling rate for England was 45.2%, compared with 46.3% in Northern Ireland, 43.5% in Scotland and 57.6% in Wales. Northern Ireland saw a 3.0 percentage point increase in the recycling rate in 2017 compared to 2016 which has been attributed to the introduction of mandatory food waste collection from April 2017.

- **UK biodegradable municipal waste (BMW) sent to landfill** has fallen from approximately 7.8 million tonnes in 2016 (22% of the baseline 1995 value) to around 7.4 million tonnes in 2017 (21% of the baseline 1995 value). The UK is therefore still on track to meet the EU target to restrict BMW landfilled to 35% of the 1995 baseline by 2020.

- Provisional figures for 2017 indicate, 70.2% of **UK packaging waste** was either recycled or recovered compared to 71.4% in 2016. This exceeds the EU target to recycle or recover at least 60% of packaging waste.

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- It is estimated that the UK generated 41.1 million tonnes of **commercial and industrial (C&I) waste** in 2016, of which 33.1 million tonnes (around 80%) was generated in England. The latest estimates for England only indicate that C&I waste generation was around 37.9 million tonnes in 2017.

- **The UK generated 222.9 million tonnes of total waste in 2016**, with England responsible for 85% of the UK total.

- 'Recycling and other recovery' was the most common **final waste treatment** type in the UK, accounting for 104.0 million tonnes (48.5%) in 2016. Landfill is the second most used waste treatment in the UK, with 24.4% (52.3 million tonnes) of waste disposed of at landfill in 2016.

- Energy recovery showed the largest percentage change in tonnage, with the 2016 figure of 7.3 million tonnes being almost four times the 1.9 million tonnes treated in 2014. Larger tonnages of waste are now treated at energy recovery facilities than at incineration without energy recovery.

Data revisions in this update:

In February 2019, revisions were made to the full time series for the recovery rate from non-hazardous construction and demolition waste. This is due to updates made to the underlying Mineral Products Association data, following revisions to the ONS construction industry growth index on which their estimates are based. The revisions resulted in increases of 10-20% in absolute tonnages for all years, in comparison to the previously published figures. However, as the scale of change was similar for both generation and recovery, this had little impact on the recovery rate, which remains around 90% throughout the time-series. Additionally, minor revisions were made to historical Waste from Households (WfH) recycling rate figures for UK, England, NI and Scotland, and to historical biodegradable municipal waste (BMW) to landfill figures for UK, Scotland and Wales. Additional minor revisions were made to historical total waste generation figures for UK, Scotland and Wales to correct for some double-counting of end of life vehicles.

In March 2019, revisions were made to the 2010 mining waste figures for all UK countries, in line with previous corrections to the slate waste factor. Additional minor revisions were made to data for 2012 and 2014, to correct some double-counting in the previously reported data for Wales.

1 Waste from Households (WfH) - updated, with new figures for 2017

WfH is the agreed harmonised UK measure used to report household recycling to comply with the Waste Framework Directive (2008/98/EC). Under this Directive the UK and other EC Member States must meet a target to recycle 50% of household waste by 2020. The UK currently defines 'household waste' using the WfH measure.

A methodological change was introduced in the February 2018 release, with metal recovered and recycled after incineration (incinerator bottom ash metal; IBAm) now included in the recycling tonnage, where it would previously have been classed as 'recovery'. This has been facilitated through the new Q100 reporting structure for waste treatment, which all local authorities have been using since April 2015. At an overall UK level this change in methodology raised the recycling rate for 2017 by around 0.7 percentage points (equivalent to 189 thousand tonnes; see table below). For more details on this change refer to the Methodology section.

Table 1. Waste from Households, UK and country split, 2010-17

thousand tonnes and % rate

Year	Measure	UK total	England	Northern Ireland	Scotland	Wales
2010	Arisings	26,954	22,131	829	2,649	1,344
	Of which recycled (excl. IBAm)	10,878	9,112	314	861	591
	Recycling rate	**40.4%**	**41.2%**	**37.8%**	**32.5%**	**44.0%**
2011	Arisings	26,792	22,170	810	2,482	1,329
	Of which recycled (excl. IBAm)	11,492	9,596	324	921	651
	Recycling rate	**42.9%**	**43.3%**	**40.0%**	**37.1%**	**49.0%**
2012	Arisings	26,428	21,956	783	2,383	1,306
	Of which recycled (excl. IBAm)	11,594	9,684	319	911	681
	Recycling rate	**43.9%**	**44.1%**	**40.7%**	**38.2%**	**52.1%**
2013	Arisings	25,929	21,564	781	2,310	1,274
	Of which recycled (excl. IBAm)	11,433	9,523	324	916	669
	Recycling rate	**44.1%**	**44.2%**	**41.5%**	**39.6%**	**52.5%**
2014	Arisings	26,795	22,355	806	2,348	1,285
	Of which recycled (excl. IBAm)	12,035	10,025	344	962	704
	Recycling rate	**44.9%**	**44.8%**	**42.6%**	**41.0%**	**54.8%**
2015	Arisings	26,675	22,225	818	2,354	1,278
	Of which recycled (excl. IBAm)	11,795	9,752	344	989	709
	Recycling rate (excl. IBAm)	**44.2%**	**43.9%**	**42.1%**	**42.0%**	**55.5%**
	Of which recycled (incl. IBAm)	11,898	9,849	z	991	713
	Recycling rate (incl. IBAm)	**44.6%**	**44.3%**	**z**	**42.1%**	**55.8%**
2016	Arisings	27,300	22,770	845	2,378	1,307
	Of which recycled (excl. IBAm)	12,198	10,074	366	1,017	741
	Recycling rate (excl. IBAm)	**44.7%**	**44.2%**	**43.3%**	**42.8%**	**56.7%**
	Of which recycled (incl. IBAm)	12,351	10,219	z	1,020	749
	Recycling rate (incl. IBAm)	**45.2%**	**44.9%**	**z**	**42.9%**	**57.3%**
2017	Arisings	26,897	22,437	843	2,345	1,271
	Of which recycled (excl. IBAm)	12,093	9,959	390	1,018	726
	Recycling rate (excl. IBAm)	**45.0%**	**44.4%**	**46.3%**	**43.4%**	**57.1%**
	Of which recycled (incl. IBAm)	12,282	10,139	z	1,019	733
	Recycling rate (incl. IBAm)	**45.7%**	**45.2%**	**z**	**43.5%**	**57.6%**

Source: WasteDataFlow, Defra Statistics

z = Not applicable (In N. Ireland no local authority collected municipal waste went directly to incinerators)

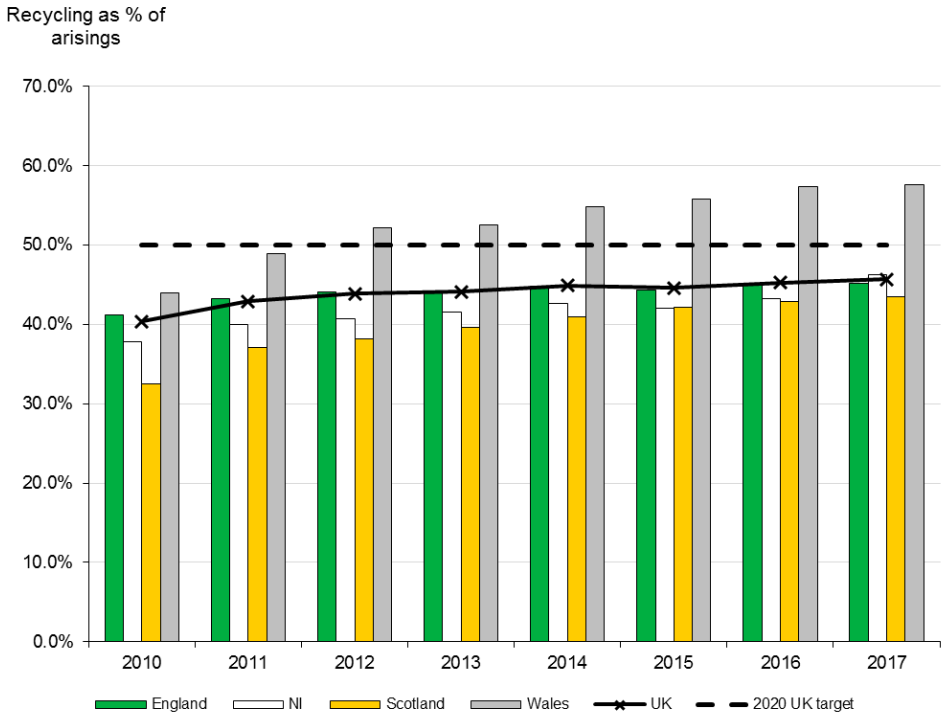
England and Scotland have included IBA metals for data from 2015 onwards, when Q100 was introduced. For England this is from April 2015, when Q100 came into full use by all local authorities.

For Wales, Q100 was introduced in 2012; IBA metals have been included for 2015 and 2016 in line with the other UK countries.

Minor revisions made to historical figures for UK, England, NI and Scotland.

Percentages calculated from unrounded figures; Breakdowns for individual countries may not exactly sum to UK totals due to rounding

Figure 1. Recycling rate from Waste from Households, UK and country split, 2010-17



Source : WasteDataFlow, Defra Statistics

The UK waste from households recycling rate (including IBA metal) was 45.7% in 2017, increasing from 45.2% in 2016. **An increase was seen in all UK countries.** There is an EU target for the UK to recycle at least 50% of waste from households (WfH) by 2020.

The recycling rate for waste from households increased in all UK countries in 2017. The recycling rate for England was 45.2%, compared with 46.3% in Northern Ireland, 43.5% in Scotland and 57.6% in Wales.

In 2017, the recycling rate for Northern Ireland was higher than that for England for the first time, increasing by 3.0 percentage points, from 43.3% in 2016 to 46.3% in 2017. Northern Ireland attribute this increase to the introduction of mandatory food waste collection from households from April 2017.

England is responsible for the vast proportion of UK WfH, generating 22.4 million tonnes (83% of the UK total) in 2017. WfH generation decreased in all UK countries in 2017, following increases for all UK countries in 2016.

The inclusion of incineration bottom ash (IBA) metal in the WfH recycling data causes a small increase in WfH recycling rates. For example, for 2017, the UK WfH recycling rate including IBA metals is 45.7%, a 0.7 percentage point increase from 45.0% if IBA metals are excluded.

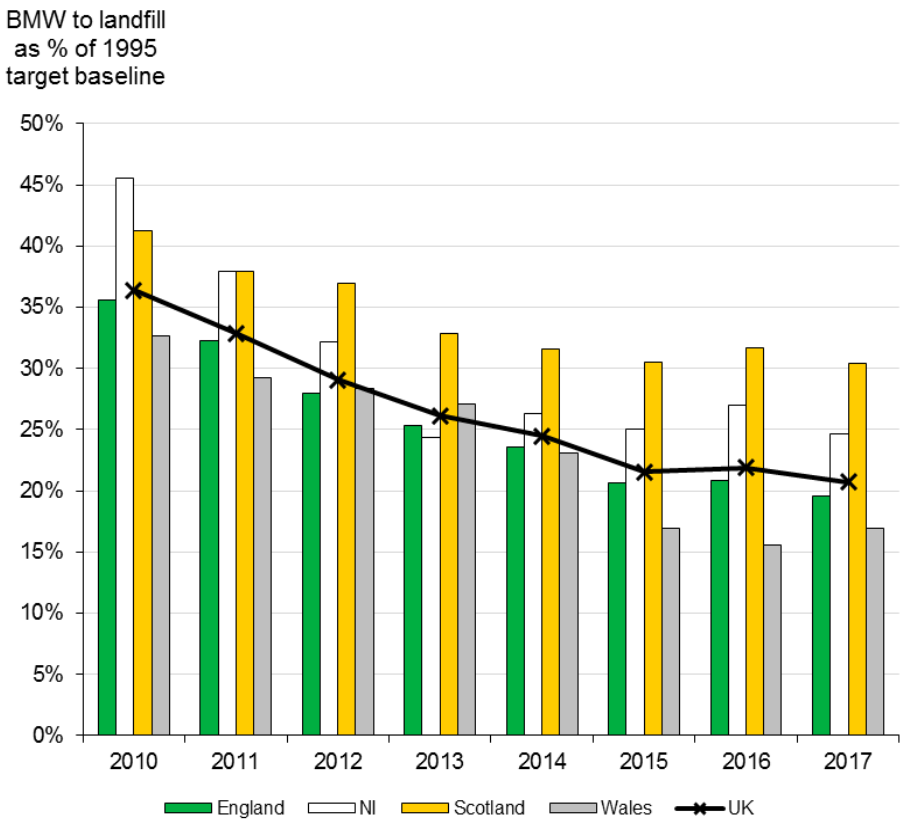
2 Biodegradable municipal waste (BMW) sent to landfill - updated, with new figures for 2017

UK estimates for biodegradable municipal waste (BMW) to landfill have been calculated in accordance with the Landfill Directive (1999/31/EC), which aims to prevent or reduce as far as possible negative effects of landfilling waste. BMW is the fraction of municipal waste that will decompose within a landfill to produce methane, a potent greenhouse gas. Amongst other materials it will include food waste, green waste, cardboard and paper. Within the Landfill Directive the UK has three targets to meet, measured as a percentage of the tonnage of BMW generated in 1995 ('the 1995 baseline'). These require the tonnage of BMW to landfill to be:

- No greater than **75%** of the 1995 baseline by 2010
- No greater than **50%** of the 1995 baseline by 2013
- No greater than **35%** of the 1995 baseline by 2020

For this reporting obligation, the UK countries have agreed a set of European Waste Catalogue (EWC) classification codes to represent 'municipal waste'. Countries use broadly similar, but non-identical sets of factors, for the proportion of each EWC code that is biodegradable, based upon composition studies of landfill waste. See Methodology section for more details.

Figure 2. Biodegradable municipal waste (BMW) to landfill as a percentage of 1995 baseline, UK and country split, 2010-17



Source: Waste Data Interrogator, Defra Statistics

UK BMW sent to landfill in 2017 was 7.4 million tonnes, representing 21% of the 1995 baseline value. There is an EU target to restrict BMW landfilled to no greater than 35% of the 1995 baseline by 2020. UK comfortably met the interim targets for 2010 (75%) and 2013 (50%).

There was a slight decrease in the UK percentage of BMW to landfill between 2016 and 2017, with the figure falling from 22% to 21% of the target baseline. Prior to this, UK tonnages of BMW to landfill reduced each year between 2010 and 2015, with a small increase in 2016.

England is responsible for over three quarters (77%) of UK BMW to landfill, generating 5.7 million tonnes of the 7.4 million tonne UK total in 2017.

Table 2. BMW to landfill, UK and country split, 2010-17

thousand tonnes

Year	Measure	UK	England	NI	Scotland	Wales
1995	BMW generated (baseline)	35,688	29,030	1,225	3,595	1,837
2010	Municipal Waste to Landfill	25,019	20,298	893	2,508	1,319
	of which BMW to Landfill	12,982	10,339	558	1,484	600
2011	Municipal Waste to Landfill	22,879	18,421	734	2,560	1,164
	of which BMW to Landfill	11,725	9,360	464	1,364	538
2012	Municipal Waste to Landfill	20,260	16,187	622	2,429	1,023
	of which BMW to Landfill	10,372	8,129	394	1,327	522
2013	Municipal Waste to Landfill	18,450	14,780	472	2,244	954
	of which BMW to Landfill	9,325	7,347	299	1,182	497
2014	Municipal Waste to Landfill	17,281	13,714	511	2,194	862
	of which BMW to Landfill	8,726	6,843	322	1,137	424
2015	Municipal Waste to Landfill	15,605	12,215	484	2,264	642
	of which BMW to Landfill	7,693	5,980	307	1,095	311
2016	Municipal Waste to Landfill	16,111	12,381	524	2,306	900
	of which BMW to Landfill	7,807	6,049	331	1,140	286
2017	Municipal Waste to Landfill	15,263	11,784	539	2,262	678
	of which BMW to Landfill	7,388	5,684	302	1,092	311

Source: Waste Data Interrogator, Defra Statistics
The 1995 target baseline was modelled and agreed in 2010
Individual countries may not exactly sum to UK total due to rounding
Minor revisions made to historical figures for the UK and Scotland (2011-2016) and Wales (2016)

Table 3. Municipal waste to landfill, by main waste types, UK and country split, 2017

thousand tonnes

Waste Type (EWC code)	UK total	England	Northern Ireland	Scotland	Wales
Wastes from mechanical treatment of waste (19 12 12)	8,887	7,533	216	746	392
Mixed municipal waste (20 03 01)	4,505	2,888	244	1,200	173
Other (all other EWC codes)	1,872	1,363	79	316	113
Total	**15,263**	**11,784**	**539**	**2,262**	**678**

Source: Waste Data Interrogator, Defra Statistics
Individual countries may not exactly sum to UK total due to rounding

The vast majority of municipal waste received at landfill is classified as "mixed" waste categories, from which it is not possible to identify individual material streams, e.g. food waste. The two main waste categories are 'wastes from mechanical treatment of waste' (EWC code 19 12 12) and 'mixed municipal waste' (EWC code 20 03 01), which together make up around 90% of municipal waste received at landfill).

In 2017, 8.9 million tonnes of municipal waste sent to landfill in the UK was categorised as 'wastes from mechanical treatment of waste', and 4.5 million tonnes was categorised as 'mixed municipal waste'. This equates to 58% and 30% of the total municipal sent to landfill in 2017, respectively. Data on the biodegradable portions of these waste codes can be found in the underlying dataset.

3 Packaging waste - updated, with new provisional figures for 2017

UK estimates of recovery/recycling rates for packaging materials have been calculated for reporting against material specific targets set by the EC Directive 94/62/EC on packaging and packaging waste. The Packaging and Packaging Waste Directive (as amended) set minimum recovery targets (60%) and recycling targets (55%) for packaging waste, to be met by 31 December 2008, as well as material-specific recycling targets. These are 60% for glass, 60% for paper and cardboard, 50% for metals, 22.5% for plastics, and 15% for wood. Since 2008, Member States must continue to meet these minimum targets, but they have the freedom to set higher domestic targets if they so choose.

Table 4. Packaging waste and recycling / recovery, split by material, UK 2017 (provisional)

	Packaging waste arising (thousand tonnes)	Total recovered / recycled (thousand tonnes)	Achieved recovery / recycling rate (%)	EU target recovery / recycling rate (%)
Metal	736	525	71.3%	50.0%
of which: Aluminium	177	94	53.1%	z
of which: Steel	559	431	77.1%	z
Paper and cardboard	4,749	3,754	79.0%	60.0%
Glass	2,399	1,623	67.6%	60.0%
Plastic	2,260	1,044	46.2%	22.5%
Wood	1,310	411	31.4%	15.0%
Other materials	23	0	0.0%	z
Total (for recycling)	**11,476**	**7,357**	**64.1%**	**55.0%**
Energy from Waste	**z**	700	6.1%	z
Total (for recycling and recovery)	**11,476**	**8,057**	**70.2%**	**60.0%**

Source: Defra Statistics
z = Not applicable
Arisings estimates made at point of manufacture. For further details see Methodology section

In 2017, provisional figures indicate that 70.2% of UK packaging waste was either recycled or recovered. This was above the EU target of 60% but slightly lower than the 71.4% achieved in 2016. Equivalent figures for 2012-2016 can be seen in the accompanying dataset.

Recycling accounted for 7.4 million tonnes of the 11.5 million tonnes of packaging waste arisings in 2017, with a further 0.7 million tonnes recovered by use in 'energy from waste' incineration. Paper and cardboard had the highest waste arisings, at 4.7 million tonnes.

The highest recycling rate achieved in 2017 was 79.0% for paper and cardboard, followed by 71.3% for metal and 67.6% for glass. Tonnes of paper and cardboard packaging recovered or

recycled fell by 3.5% from 3.9 million tonnes in 2016 to 3.8 million tonnes in 2017. For the other materials, the amount recycled or recovered has increased slightly over the same period. The packaging arisings estimates have remained unchanged since 2014 because in the absence of reliable total packaging waste arisings figures, they are based on estimates of packaging placed on the market. Since 2014, our research suggested that there would 0% growth in sales, or if there were any growth it would be off-set by minimisation/prevention activity, and so the arisings figures have been held flat.

4 Recovery rate from non-hazardous construction and demolition (C&D) waste – updated, with new figures for 2015 and 2016

UK estimates of recovery rates from non-hazardous C&D waste have been calculated for reporting against the EC Waste Framework Directive. Accurately quantifying C&D waste is challenging and whilst the absolute tonnage figures are subject to a relatively high level of uncertainty, there is not a significant impact on the final recovery rate. Under this Directive there is a target for the UK to recover at least 70% of non-hazardous C&D waste by 2020, which it is currently meeting.

Table 5. Recovery rate from non-hazardous construction and demolition waste, UK and England, 2010-16

million tonnes and % rate

	UK			England		
	Generation	**Recovery**	**Recovery rate**	**Generation**	**Recovery**	**Recovery rate**
	M tonnes	**M tonnes**	**%**	**M tonnes**	**M tonnes**	**%**
2010	59.2	53.1	89.7%	53.6	49.4	92.2%
2011	60.2	55.0	91.4%	54.9	50.8	92.5%
2012	55.8	50.8	91.1%	50.5	46.4	92.0%
2013	57.1	52.0	91.2%	51.7	47.6	92.0%
2014	61.5	56.3	91.5%	55.9	51.7	92.4%
2015	63.8	58.1	91.1%	57.7	53.3	92.3%
2016	66.2	60.2	91.0%	59.6	55.0	92.1%

Source: Defra Statistics

Revisions made to all figures, in line with updates made to underlying Mineral Products Association data.
This has increased absolute tonnages for both generation and recovery by 10-20% each year in comparison to previously published figures, but had little impact on the recovery rate, which has remained around 90% throughout the timeseries.
Excludes excavation waste because this is outside the scope of the target.
Percentages calculated using unrounded figures.

In 2016 the UK generated 66.2 million tonnes of non-hazardous C&D waste, of which 60.2 million tonnes was recovered. This represents a recovery rate of 91.0%.

The recovery rate from non-hazardous C&D waste has remained at similar levels from 2010 to 2016 and has been comfortably above the minimum target of 70%, which the UK must meet in 2020.

5 Waste from commercial and industrial (C&I) activities - updated, with new figures for 2017

UK and England estimates for waste generation by the C&I sectors have been calculated as part of the Waste Statistics Regulation returns for 2010, 2012, 2014 and 2016. The term 'commercial and industrial' spans a range of economic activities (based on the European NACE statistical classification of economic activities in the European Community) including manufacturing, industrial processes and service based enterprises, but excluding sewage sludge.

Note: Defra has worked closely with industry experts to improve the C&I methodology for England (for details see here). Nonetheless, C&I waste generation remains extremely difficult to estimate owing to data limitations and data gaps. As a result, C&I estimates for England have a much higher level of uncertainty than Waste from Households (or other Local Authority Collected Waste) and users should exercise caution in application of the figures and interpreting trends over time.

Estimates presented below are "as received" tonnages and do not include an additional adjustment from wet weight to dry weight for sludges, which is a Eurostat requirement for the figures submitted as part of the Waste Statistics Regulation return.

Table 6. Total waste generated by the commercial and industrial sectors, UK and England, 2010-17

million tonnes

	UK			England		
	Commercial	**Industrial**	**Total C&I**	**Commercial**	**Industrial**	**Total C&I**
2010	28.7	15.0	43.7	21.6	10.4	32.0
2011	UK 2011 Estimates not available			21.4	12.0	33.4
2012	25.0	17.6	42.6	21.0	12.9	33.9
2013	UK 2013 Estimates not available			20.8	12.0	32.8
2014	25.4	14.6	40.0	21.3	10.4	31.7
2015	UK 2015 Estimates not available			22.5	9.4	31.9
2016	27.5	13.6	41.1	23.6	9.5	33.1
2017	UK 2017 Estimates not available			27.1	10.8	37.9

Source: Defra Statistics

Methodology relies on known tonnages of waste processed at permitted sites and recycling facilities. It makes no attempt to estimate waste that may be processed at exempt sites and does not overlap with recycling data. For more details see here

The UK C&I sectors generated 41.1 million tonnes of waste in 2016, of which 33.1 million tonnes (around 80%) was produced in England. By comparison, the 2014 UK C&I waste arisings figure was 40.0 million tonnes, of which 31.7 million tonnes was generated by England. Over two thirds of C&I waste is generated by the commercial sector, in both the UK and England.

The latest estimates for England only indicate that waste generation was around 37.9 million tonnes in 2017 and 33.1 million tonnes in 2016. Around a third of this increase is driven by increases in the underlying Environment Agency (EA) data at incineration, as well as in RDF exported. Another third is accounted for by some treatment categories where EA have made improvements to capture additional installations in the 2017 data that were omitted for previous years; therefore, 2017 figures are not completely directly comparable with earlier years. Caution should generally be exercised in interpreting apparent year-on-year changes in the C&I data, owing to inherent uncertainties in the underlying data and methodology.

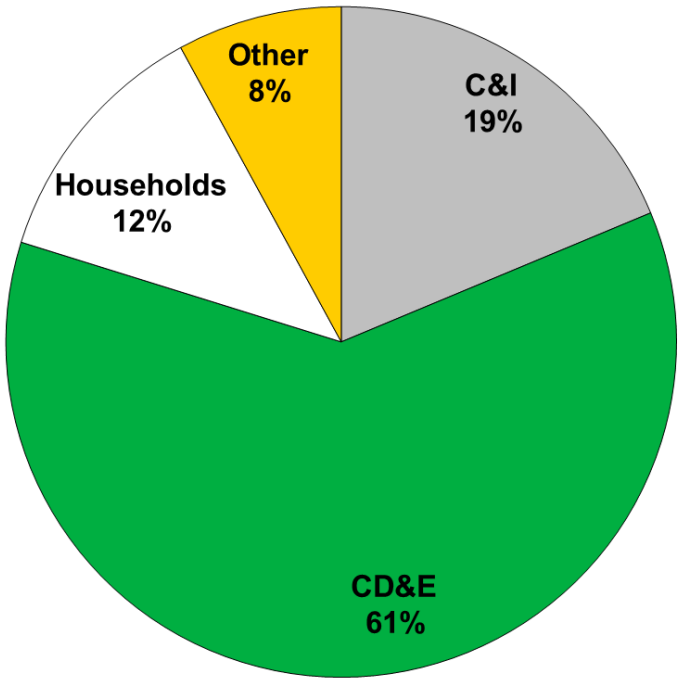
6 Total Waste Generation and Final Treatment of All Waste – updated, with new figures for 2016

Note: These figures have now been back-revised to reflect revisions made to the England C&I methodology and estimates. There are some differences between the C&I figures presented here, and those shown in the C&I section of this release (Section 4). For the purposes of the Waste Statistics Regulation return (WStatR), for which the total waste figures are compiled, sewage sludge is included in the C&I estimates. However, as WStatR also requires that figures for sludges are converted from wet to dry weight for reporting, the UK 2016 figure for C&I that is incorporated below (41.7 million tonnes) does not differ greatly from that published in Section 5 on an as 'received basis' excluding sewage sludge (41.1 million tonnes). **Minor additional revisions are detailed in the Methodology section.**

UK and England tonnage estimates for generation and final treatment of all waste have been calculated in order to report against the EC Waste Statistics Regulation return for 2016. In line with the Regulation requirements, total waste generation is split by material and NACE economic activity responsible for generating it. In line with the Regulation requirements, total waste generation is split by material and NACE economic activity responsible for generating it. Users should be aware that 'total waste' includes all waste produced by the economy and is therefore much broader than frequently analysed subsets such as 'municipal waste' or 'Waste from Households'. Users should also consider the varying natures and impacts of different waste materials included within total waste.

6.1 Waste Generation

Figure 3. Waste generation split by source, UK, 2016



Source: Defra Statistics

Percentages may not sum to exactly 100% due to rounding
C&I figures presented here differ from those in the C&I section in that they include sewage sludge. However, as these figures are from the WStatR return, which requires sludges to be converted to dry weight for reporting, the C&I figures do not differ greatly from those presented in the C&I section.
C,D&E figures include excavation waste and dredging.
Household figures are based on the WfH measure.

Construction, demolition and excavation (CD&E; including dredging) generated around three fifths (61%) of total UK waste in 2016. Commercial and Industrial (C&I) waste accounted for almost a fifth (19%) of total waste generation and the remaining fifth was split between 'Households' (12%) and 'Other' activities (8%). In England, the share of CD&E was higher at 64% of the total, 'Households' was similar to the UK and the C&I and 'Other' contributions were slightly lower than the UK at 18% and 6% respectively.

Note: The 'Households' measure quoted here is the WfH measure (used for household recycling reporting against the Waste Framework Directive) with slight adjustments made in order to map to the EWC-STAT material categories.

Table 7. Waste generation split by responsible economic activity, UK and England, 2014-16

million tonnes and % change

		Commercial & industrial	Construction, demolition & excavation (includes dredging)	Households	Other	Total
UK	**2014**	38.7	130.3	26.8	18.2	214.0
	2016	41.7	136.2	27.3	17.7	222.9
	Change	7.8%	4.5%	1.9%	-2.8%	4.2%
England	**2014**	30.7	116.8	22.4	11.9	181.8
	2016	34.0	120.3	22.8	11.8	188.8
	Change	10.8%	3.0%	1.9%	-1.3%	3.9%

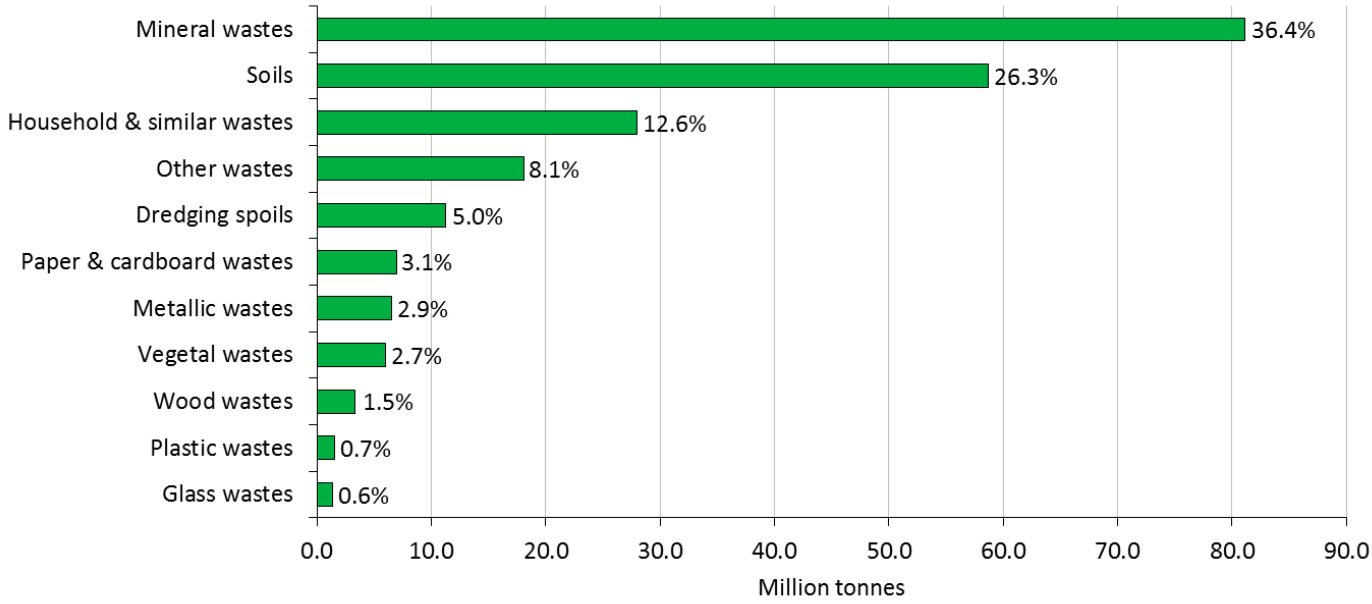
Source: Defra Statistics
Includes waste that may go for export.
'Other' consists of waste from mining, agriculture, forestry and fishing.
Percentages calculated from unrounded figures; Breakdowns may not exactly sum to totals due to rounding.

The UK generated 222.9 million tonnes of total waste in 2016, an increase of 4.2% from the 214.0 million tonnes generated in 2014. England generated 181.8 million tonnes of total waste in 2016, an increase of 3.9% from 2014 and 85% of the UK total.

In 2016, the largest tonnages of waste (81.1 million) were 'Mineral Wastes', followed by 'Soils' (58.7) million tonnes. These two categories represent 36% and 26% respectively of all waste generated in the UK and together make up almost two thirds (63%) of the total.

Note: Figure 4 below splits all waste generated in the UK by waste materials, which are categorised by European Waste Catalogue (EWC) codes. Care should be taken when interpreting this information as some categories, e.g. 'Household & similar wastes' will include mixtures of waste. As a result, an individual material stream such as 'Plastic wastes' will not represent total tonnages of plastic waste, because there will also be some in mixed waste streams (e.g. black bag waste) that are categorised as 'Household and similar wastes'.

Figure 4. Waste generation by waste material, UK, 2016



Source: Defra Statistics
Includes waste that may go on to be exported.
Any type of waste can be generated by any economic activity. E.g. 'Household & similar wastes' are not solely generated by 'Households'.
Percentages may not sum to exactly 100% due to rounding.
A more detailed material split is available in the accompanying dataset.

6.2 Waste Treatment

Table 8. All waste at final treatment, split by method, UK and England, 2014-16

million tonnes and % change

		Energy recovery	Incinerat--ion	Recycling and other recovery	Backfilli--ng	Deposit onto or into land (landfill)	Land treatment and release into water bodies	Total
UK	**2014**	1.9	7.6	96.3	21.7	48.2	29.8	**205.4**
	2016	7.3	5.7	104.0	16.8	52.3	28.2	**214.3**
	Change	278.3%	-24.8%	8.0%	-22.5%	8.5%	-5.4%	**4.3%**
England	**2014**	1.3	7.3	87.0	19.1	41.3	22.1	**178.1**
	2016	6.2	5.4	92.4	13.3	44.7	20.2	**182.2**
	Change	374.9%	-25.5%	6.2%	-30.7%	8.3%	-8.5%	**2.3%**

Source: Defra Statistics

Includes waste that may have been imported.
'Energy recovery' refers to facilities where the main purpose is generation of energy, and formal R1 accreditation has been awarded.
'Recycling and other recovery' refers to the Eurostat category 'Recovery other than energy recovery - Except backfilling'. See Methodology section for more details.
Percentages calculated from unrounded figures; Breakdowns may not exactly sum to totals due to rounding.

‘Recycling and other recovery’ was the most common final waste treatment type in the UK, accounting for 104.0 million tonnes (48.5%) in 2016. Landfill is the second most used waste treatment in the UK, with 24.4% (52.3 million tonnes) of waste disposed of at landfill in 2016.

Energy recovery showed the largest percentage change in tonnage, with the 2016 figure of 7.3 million tonnes being almost four times the 1.9 million tonnes treated in 2014. Larger tonnages of waste are now treated at energy recovery facilities than at incineration without energy recovery, coinciding with policies to divert waste away from landfill. While overall waste to landfill has not shown a corresponding decrease, the underlying Environment Agency (EA) data shows that increases in landfilled waste have largely come from materials such as soil and stone waste. However, local authority managed municipal waste to landfill has declined as more waste is diverted to other treatments higher up the waste hierarchy.

Table 9. Final treatment methods for waste, split by material, UK, 2016 - proportion of tonnages

% waste material, by treatment type

Waste material	Energy recovery	Incineration	Recycling and other recovery	Backfilling	Deposit onto or into land (landfill)	Land treatment and release into water bodies
Metallic wastes	0%	0%	14%	0%	0%	0%
Glass wastes	0%	0%	2%	0%	0%	0%
Paper & cardboard wastes	0%	0%	4%	0%	0%	0%
Plastic wastes	0%	0%	1%	0%	0%	0%
Wood wastes	8%	13%	2%	1%	0%	0%
Vegetal wastes	0%	1%	4%	0%	0%	0%
Household & similar wastes	76%	38%	1%	0%	11%	0%
Mineral wastes	0%	0%	55%	5%	6%	60%
Soils	0%	0%	12%	89%	55%	0%
Dredging spoils	0%	0%	0%	1%	0%	40%
Other wastes	16%	48%	6%	4%	27%	0%
All wastes	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Waste Statistics Regulation return

Includes waste that may have been imported.
'Energy recovery' refers to facilities where the main purpose is generation of energy, and formal R1 accreditation has been awarded.
'Recycling and other recovery' refers to the Eurostat category 'Recovery other than energy.recovery - Except backfilling'. See Methodology section for more details.
'Other wastes' include residues following physical treatment and incineration of waste, residues from industrial processes and sewage.
Percentages calculated from unrounded figures.

The majority (76%) of waste treated at energy recovery facilities is ‘Household & similar wastes’. Incineration without energy recovery has a different profile with only 38% of the waste accepted being ‘Household & similar’ and almost half (48%) being classed as ‘Other wastes’, which includes residues following physical treatment and incineration of waste, residues from industrial processes and sewage.

The vast majority (89%) of ‘Backfilling’ is ‘soils’, with ‘mineral wastes’ being the next biggest contributor at 5%.

‘Soils’ make up 55% and ‘mineral wastes’ 6% of the tonnage received by landfills, demonstrating that it is not just residual waste using this outlet. The two other main

components of landfilled waste are 'household & similar wastes' (11% of the total) and 'other wastes' (27%). The 'other wastes' category includes 'sorting residues' which will typically be mixed wastes following processing to remove recyclates.

More than half (55%) of waste recorded as 'recycling and other recovery' is 'mineral wastes', while a further 12% is 'soils'. The 'mineral wastes' category is typically construction wastes such as bricks, stone and road planings that are converted into usable aggregates. 'metallic wastes' is the second biggest material group at 14%, partially a reflection of their high value. The remaining tonnage going to 'recycling and other recovery' consists of a variety of material types that each make a small contribution.

A more detailed material split along with 2010, 2012 and 2014 data and England only figures are available in the accompanying dataset.

Note: Generation and final treatment are at opposite ends of what can be a complex and multiple staged treatment process. Different methodology is used to estimate generation and final treatment figures. Furthermore, final treatment excludes some treatment processes identified as predominantly intermediate, which nevertheless may effectively be the final treatment for some waste. As a result, there is no direct reconciliation between generation and final treatment of total waste. Users should also be aware that in most cases it is not possible to estimate the final treatment of waste generated by specific economic activities. Users should take care to understand the material and economic activity categories. Further information is available in the Methodology and Useful Links sections.

7 Waste Infrastructure – updated, with new figures for 2016

Defra collates summaries from the environment agencies of all four UK countries on facilities authorised by mandatory permit or license. Capacity is based on the level authorised by permit or license with the exception of some small scale incinerators where the permit did not feature capacity. In these cases, operational capacity is used. Please see the Methodology section for more detail.

Table 10. Number and capacity of permitted final treatment facilities, UK and England, 2014-16

Facility type	Measure	UK		England	
		2014	2016	2014	2016
Energy recovery	Number of facilities	29	37	13	23
	Capacity (thousand tonnes/year)	4,862	9,808	2,803	7,202
Incineration	Number of facilities	83	78	60	57
	Capacity (thousand tonnes/year)	9,859	8,474	9,040	8,193
Recovery other than energy recovery (includes backfilling)	Number of facilities	2,660	3,506	1,669	1,944
	Capacity	:	:	:	:
Deposit onto or into land (landfill)	Number of facilities (includes closed facilities)	596	604	493	510
	Rest (remaining) capacity (thousand m^3)	592,637	554,751	484,370	464,891

Source: Defra Statistics
: = Not available
Energy recovery refers to facilities where the main purpose is generation of energy and formal R1 accreditation has been awarded.
Excludes: Recovery facilities operating solely under a waste exemption; Facilities permitted only for intermediate treatment (including most anaerobic digesters); Facilities that were formally closed throughout 2016 (except landfills).

From 2014 to 2016, energy recovery facilities in the UK increased in number from 29 to 37, with capacity doubling from 4.9 million tonnes to 9.8 million tonnes per year, coinciding with policies aimed at diverting waste away from landfill. Energy from waste is generally the best management option for waste that cannot be reused or recycled in terms of environmental impact and getting value from the waste as a resource.

DATA USES, METHODOLOGY, GLOSSARY, FEEDBACK AND REFERENCES

User Statement

Data on waste generation and management is collected to monitor policy effectiveness, particularly the commitments in the Waste Review and to support policy development, including the Resource and Waste Strategy published in December 2018. The data also meet legislative reporting targets on recycling targets set out in the Waste Framework Directive (2008/98/EC), the Packaging and Packaging waste Directive (94/62 EC) and supply data for the Waste Statistics Regulation (2002/2150/EC). The data are used extensively by local and central government, the waste industry, academia and the public.

Feedback

We welcome feedback on the data from all users including how and why the data is used. This helps us to understand the value of the statistics to external users. Please use the contact details at the bottom of the first page of this notice.

Methodology

Waste from Households (WfH)

UK estimates for WfH have been calculated in accordance with the EC Waste Framework Directive. The WfH measure has been chosen as the UK interpretation of the EC term 'household waste', which they define as "waste generated by households". Waste management and recycling is a devolved matter and different countries have used their own data to adopt to the EU definition. The statistics are the best estimates that provide the conformity to the EU definition.

WfH includes waste from:

- Regular household collection
- Civic amenity sites
- 'Bulky waste'
- 'Other household waste'.
-

WfH excludes waste from:

- Street cleaning/sweeping
- Gully emptying
- Separately collected healthcare waste
- Soil, Rubble, Plasterboard & Asbestos waste

All UK countries base the WfH measure on output from the WasteDataFlow database, which records Local Authority Collected Waste. Whilst the general approach and principles of the calculation is consistent across UK countries, there may be some differences in the specifics of the calculations as there are some differences in the structure and wording of some of the questions.

Users should be aware that individual UK countries other than England publish their own independent national household recycling estimates other than WfH recycling. Local Authorities in England may also use an alternative measure.

A change was introduced from the February 2018 release to include **metal recovered and recycled after incineration** as recycling, instead of being reported as 'recovery. The amount this contributes to recycling depends on the amount of the residual waste being incinerated and the metal content of the residual waste.

Inclusion of IBA metal has been facilitated through the new Q100 reporting structure for waste treatment which all local authorities have been using since April 2015. This has provided the opportunity for more complete recording of waste treatment, including outputs from incineration. The majority of local authorities are reporting more fully, but not in all cases. While reporting and associated quality assurance are developing and being refined, the figures need to be regarded as more indicative until it becomes fully established and embedded.

This methodological change for IBA metal has been applied to all UK countries from 2015. England data only includes IBA metal from April 2015, when Q100 came into full use by all local authorities. For Wales, Q100 was introduced in 2012 and IBA metals have been included from 2015 in line with the other UK countries. Northern Ireland did not have any incinerators that burnt local authority collected municipal waste in these years and so their figures are unaffected by the change.

At an overall UK level this change in methodology raised the recycling rate for 2017 by around 0.7 percentage points (equivalent to 189 thousand tonnes).

Biodegradable municipal waste (BMW) to landfill

UK estimates for BMW to landfill have been calculated in accordance with the Landfill Directive and a consistent approach is used by all UK countries. BMW is the fraction of municipal waste that will degrade within a landfill site. Amongst other materials it will include food waste, green waste, cardboard and paper. Tonnage data is collated from mandatory returns made for landfills to the Environment Agencies of each of the four UK countries. Tonnages are split by European Waste Catalogue (EWC) categorisation codes, as determined by landfill operators. For this reporting obligation, the UK countries have agreed a set of EWC codes to represent 'municipal waste'. Scotland applies a factor to EWC code 19 12 12 on the basis that only a proportion is 'municipal', however other countries do not do this. Scotland also includes one additional EWC code. Factors on the proportion of waste that is biodegradable are applied to each code. Countries use broadly similar, but non-identical sets of factors. The factors are multiplied by the tonnages and then summed to give final country level estimates for BMW to landfill. New factors were adopted by England in 2014 for the two EWC codes that dominate Municipal Waste, based upon a commissioned study of landfill waste composition (available here). All England figures published here have been produced using these new factors. Wales adopted these new factors from 2013 and have now backdated their estimates for 2010-2012.

Packaging waste

UK estimates for recovery/recycling from packaging have been compiled in accordance with the packaging and packaging waste directive reporting requirements. All estimates are made at a UK level and cannot be broken down into individual UK countries. Estimates of packaging waste arisings ('placed on the market') have been updated based on research done since 2014. The arisings figures exclude exports, but include filled and unfilled imports. Because these estimates are recorded at point of manufacture, materials are all separately identifiable and therefore may appear large in comparison to material type estimates based on collected waste (such as those in the Waste Statistics Regulation return), where a substantial proportion of packaging waste will be captured under mixed waste categories.

Estimates of tonnages recycled are based on Packaging Recovery Notes (PRNs) and Packaging Export Recovery Notes (PERNs) reported to the Environment Agency and held in the National Packaging Waste Database (NPWD). PRNs and PERNs are sold by accredited reprocessors and exporters to packaging producers. All packaging producers that have a turnover of at least £2m and handle at least 50 tonnes of packaging per year are obligated to obtain sufficient PRNs/PERNs to evidence that they meet an individual target. The targets are set by Defra to ensure that the aggregated obligation for all producers is sufficient to ensure the UK meets the

Directive targets. The tonnage recorded against 'Total (for recovery)' is incinerated in facilities that have either been granted formal R1 accreditation (an EC standard on efficiency factors) by the relevant Environment Agency, or meet the Directive description of 'Energy from Waste': "the use of combustible packaging waste as a means to generate energy through direct incineration with or without other waste but with recovery of the heat".

Recovery rate from non-hazardous construction and demolition (C&D) waste

UK estimates for recovery rate from non-hazardous C&D waste have been calculated in accordance with the EC Waste Framework Directive. Accurately quantifying C&D waste is challenging and whilst the absolute tonnage figures are subject to a relatively high level of uncertainty, sensitivity analysis suggests there is not a significant impact on the final recovery rate. Whilst efforts were made to synchronise approaches across UK countries, methodologies are not identical. The England methodology was originally devised in conjunction with industry. Estimates are dependent on several key assumptions relating to the role of permitted sites, simple registrations and the volume of aggregate production. Within the UK, some C&D waste is transferred across borders for treatment, primarily into England. This may slightly inflate the England recovery rate and deflate rates for Devolved Administrations.

In the February 2019 release, revisions were made to the full time series for the recovery rate from non-hazardous C&D waste. This is due to updates made to the underlying Mineral Products Association data, following revisions to the ONS construction industry growth index on which their estimates are based. The revisions resulted in increases of 10-20% in absolute tonnages for all years, in comparison to the previously published figures. However, as the scale of change was similar for both generation and recovery, this had little impact on the recovery rate, which remains around 90% throughout the time-series.

Waste from commercial and industrial (C&I) activities

UK estimates for waste generation from C&I sectors have been compiled in accordance with the Waste Statistics Regulation reporting requirements. Data sources and detailed approaches may differ slightly between UK countries, but overarching principles will be consistent.
For the purpose of this statistics release, C&I is defined as a specific collection of economic activities described by NACE ("statistical classification of economic activities in the European Community"). Those considered to be C&I here are: C, D, E36, 37& 39 (excluding sewage sludge) and G-U (excluding G46.7.7).
(For details see http://ec.europa.eu/competition/mergers/cases/index/nace_all.html).

While considerable effort has been spent reviewing the methodology for England, this remains a very challenging area. Data revisions published in December 2016 identified outstanding issues with the original 'Reconcile' methodology. Defra took this opportunity to develop a further modified version alongside industry experts, which was felt to improve the transparency of the methodology and better reflect current waste management processes. Previously published estimates for 2010 and 2012-2014 for England have been substantially revised and England estimates for 2011 and 2015-2017 have been produced using the same methodology. The latest methodology has been developed with considerable input from industry experts and sense-checked against alternative data sources. As the historical data has been revised using the same methodology, some conclusions can be drawn from changes between years; however caution should still be exercised. Full details of the current methodology are available here.

Note: The historical waste generation and waste treatment figures produced in line with WStatR reporting requirements, and which use these C&I estimates, have been revised in line with the new C&I methodology.

Waste Statistics Regulation (WStatR) – Total waste generation, final treatment of total waste and waste infrastructure

In the October 2018 release, various revisions were made to the historical WStatR data, as a result of minor issues identified while compiling the 2016 data for submission to Eurostat:

- Revisions were made both the generation and treatment templates, to reflect the changes that have been made to the England C&I estimates.
- In line with Eurostat guidance, End of Life Vehicles estimates are now being reported entirely against the 'Services' sector, rather than being incorporated in the 'Households' measure. This means that the 'Household' figures are now directly comparable with the Waste from Households measure shown in Section 1. Additionally, all tonnages of ELVs reported against 'discarded vehicles' in the treatment template have now been removed, on the assumption that this would double-count final treatment of the constituent parts.
- Revisions were made to the C,D&E estimates, in line with back-revisions made to the data series provided to us by the Mineral Products Association. Some minor errors were also corrected.
- For the Mining waste estimates, our methodology relies on applying waste factors to production estimates for a range of minerals. Following guidance from experts at the British Geological Survey, we revised our factor for slate production waste from 20:1 to 10:1 from 2010 onwards. As an example, this reduced the NACE B generation estimate for 2014 by around 9 million tonnes, but this was offset by increases to the mineral waste estimates attributed to the C,D&E sector.
- It was noticed that Scotland figures for dredging spoils (around 1 million tonnes) had been omitted from the 2014 generation estimate in error – this has now been corrected.

In the February 2019 release, some double-counting of end-of-life vehicles was corrected in historical figures for Scotland and Wales. In this March 2019 update, revisions were made to the 2010 mining waste figures for all UK countries, in line with previous corrections to the slate waste factor. Additional minor revisions were made to data for 2012 and 2014, to correct some double-counting in the previously reported data for Wales.

UK estimates for generation and final treatment of total waste and waste infrastructure have been calculated in accordance with the EC Waste Statistics Regulation. The final datasets are built up from a large number of estimation processes and draw upon data from WasteDataFlow, Environment Agency (EA) permitted site returns and many other sources. Whilst efforts are made to synchronise approaches across UK countries, methodological differences do exist for construction, demolition & excavation (CD&E) and C&I waste. All sludges and dredging spoils have been reported dry weight (requiring conversion in some cases). The estimates are primarily designed for reporting at a UK level rather than comparison between UK countries.

The CD&E figures include excavation waste and dredging spoils that are out of scope for the recovery rate shown in Section 3 of this release. 'Household' figures are based on the same WfH measure shown in Section 1, with slight adjustments made in order to map to the EWC-STAT material categories. Where specific materials (such as glass and plastic) are reported, they represent separately identifiable materials. Residual waste categories will also include some of these materials in a less usable form. Estimates for tonnages received by landfill here are based on EA permitted site returns and differ from estimates published in HMRC Landfill Tax Bulletins which are sourced from landfill tax receipts.

Treatment categories are specified in the Eurostat Manual on Waste Statistics.

Recovery means 'any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function.' **Recycling** is a subset of recovery and means 'any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material (e.g. composting, anaerobic digestion etc.) but excludes the use as fuels and the use for backfilling operations.'

Energy recovery refers to facilities where the main purpose is generation of energy, and formal R1 accreditation has been awarded. Only a subset of these are dedicated to the processing of 'municipal waste'. Facilities without formal R1 accreditation are reported as 'Incineration' rather than 'Energy Recovery'.

Backfilling means 'a recovery operation where waste is used in excavated areas (such as underground mines, gravel pits) for the purpose of slope reclamation or safety or for engineering purposes in landscaping and where the waste is substituting other non-waste materials which would have had to be used for the purpose.'

Disposal means 'any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy' (e.g. landfill, incineration).

Waste generation and treatment are estimated by separate processes and use multiple different data sources based largely administrative data sources. Elements of the calculations will use assumptions where there are data gaps so the figures for generation and treatment will not exactly correlate.

Both generation and final treatment of waste can also be split into hazardous and non-hazardous wastes. The full datasets for 2010-2016, for England and UK, can be found in the accompanying dataset.

Information on **infrastructure** is based on mandatory reporting of permitted and licensed sites for waste treatment which is collated by the environment agencies in each of the countries in the UK. Categories are defined according to EC guidance. The 'Energy Recovery' category only includes facilities where the primary function is generating energy (e.g. cement kilns) and Municipal Waste Incinerators that have applied for and been granted formal R1 accreditation (an EC standard on efficiency factors) by the relevant Environment Agency. Small scale 'LAPPC' (Local Authority Pollution Prevention and Control) incinerators in England have not been included as sufficiently detailed data is not available.

The data excludes facilities that were formally *closed* throughout 2016 (except landfills) but may include facilities which despite being permitted were non-*operational* in 2016. Facilities permitted only for treatment operations that are identified as intermediate (which includes most anaerobic digesters) are excluded.

Recovery operations covered by simple exemptions or simple registrations are not included. These operations are classed as low risk or low volume and operators do not have to report activity to Environment Agencies. The permitted capacity of Energy Recovery and Incineration facilities includes municipal and C&I waste, and will be higher than the actual volume of waste treated (shown in Section 6 of this release).

Revisions Policy

Defra will provide information about any revisions made to published information in this statistics release and the associated datasets. Revisions could occur for various reasons, including when data from third parties is unavailable or provisional at the time of publishing or if there are subsequent methodological improvements or refinements.

Useful links

Scottish Government environment statistics	*http://www.scotland.gov.uk/Topics/Statistics/Browse/Environment*
Welsh Government statistics	*http://wales.gov.uk/statistics-and-research/?lang=en*
Northern Ireland Department of Agriculture, Environment and Rural Affairs	*https://www.daera-ni.gov.uk/articles/northern-ireland-local-authority-collected-municipal-waste-management-statistics*
Eurostat	http://ec.europa.eu/eurostat
Environment Agency	*https://www.gov.uk/government/organisations/environment-agency*
Waste Data Interrogator	https://data.gov.uk/dataset/waste-data-interrogator-2016
Wastedataflow portal	*http://www.wastedataflow.org/login.aspx?ReturnUrl=%2fnews%2fwelcome.aspx*
Estimates of Commercial and Industrial Waste Generation in England ('Reconcile' project)	*http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=19118&FromSearch=Y&Publisher=1&SearchText=ev0804&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description*
Feb 2018 England C&I Methodology revisions paper	*https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/683007/England_CommercialandIndustrial_WasteArisings_Methodology_Revisions_Feb2018_FINAL.pdf*
Analysis of biodegradability of residual waste project	*http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=1&ProjectID=19389*
Manual on Waste Statistics	*http://ec.europa.eu/eurostat/documents/3859598/5915865/KS-RA-10-011-EN.PDF/39cda22f-3449-4cf6-98a6-280193bf770c*
EWC-STAT (used for Waste Statistics Regulation waste types)	*https://ec.europa.eu/eurostat/documents/342366/351806/Guidance-on-EWCStat-categories-2010.pdf/0e7cd3fc-c05c-47a7-818f-1c2421e55604*
List of NACE codes (used for Waste Statistics Regulation economic activities)	*http://ec.europa.eu/competition/mergers/cases/index/nace_all.html*
List of Waste (European Waste Catalogue codes)	*http://ec.europa.eu/environment/waste/framework/list.htm*
National Packaging Waste Database	*http://npwd.environment-agency.gov.uk/*