Wheelabrator TECHNOLOGIES

Waste Hierarchy and Fuel Availability Assessment

Wheelabrator Kemsley (K3 Generating Station) and Wheelabrator Kemsley North (WKN) Waste to Energy facility Development Consent Order

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K3/WKN

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Waste Hierarchy and Fuel Availability Assessment

Executive Summary

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1. Executive Summary

1.1 Introduction

1.1.1 Wheelabrator Technologies Inc (WTI EfW Holdings Ltd, 'Wheelabrator') is submitting an application (the 'Application') for a Development Consent Order ('DCO') made to the Planning Inspectorate under section 37 of the Planning Act 2008 (the 'PA 2008').

1.1.2 The Application seeks a DCO both for: the construction and operation of the Wheelabrator Kemsley Generating Station ('K3'); and for the construction and operation of a new energy from waste (EfW) facility, Wheelabrator Kemsley North ('WKN').

1.1.3 It is recognised that the Application seeks consent for two separate EfW facilities.

1.1.4 K3 is already consented to operate using 550,000 tpa of waste. Whilst the Application seeks consent for the full construction and operation of K3, in practical terms the effect of the application would be the K3 facility with an upgraded power generation and treating an additional 107,000 tpa of waste. WKN would be a wholly new EfW facility, designed to process 390,000 tpa of waste.

1.1.5 These facilities are proposed within the same Application Site and will be considered together through the Application. There is no sensible reason to consider the waste hierarchy separately for each of K3 and WKN within this report.

1.1.6 Consequently fuel availability and the subsequent effect on the waste hierarchy will be considered once, as a cumulative total of 497,000 tpa (the additional 107,000 tpa proposed for K3 plus the 390,000 tpa proposed for WKN).

1.1.7 Overarching National Policy Statement for Energy ('NPS EN-1') together with National Policy Statement for Renewable Energy Infrastructure ('NPS EN-3') provide the primary basis for decisions on nationally significant renewable energy infrastructure. NPS EN-3 makes clear that for waste combustion generating stations, there should be an '*assessment of the conformity with the waste hierarchy and the effect on relevant waste plans should be presented in a separate document to accompany the application …* ' (NPS EN-3 Paragraph 2.5.68).

1.1.8 This Waste Hierarchy and Fuel Availability Report is that separate document, prepared to demonstrate how K3/WKN conforms both to the waste hierarchy and relevant waste plans and strategies. The report is set out to address the tests set at paragraph 2.5.70 of NPS EN-3, namely: conformity with the waste hierarchy; evidence that K3/WKN will play an important role within the waste hierarchy; and the proposed development complies with national and local policy relevant to the waste hierarchy.

1.2 Waste Hierarchy

1.2.1 The revised Waste Framework Directive[1] (the 'rWFD') which came into force on 12 December 2008, established the overarching framework for the management of waste across the EU. It required Member States to 'bring into force the laws, regulations and administrative provisions necessary to comply with this Directive' within two years of its entry into force, i.e.

[1] Directive 2008/98/EC on waste

by December 2010. The rWFD brought together existing elements of waste legislation and introduced a new approach to waste management that focused more strongly on the prevention of waste.

1.2.2 The key element relevant to this report is Article 4(1) by which the rWFD introduced a new five point waste hierarchy, based on the priority order of:

- prevention (preferred option);
- preparing for re-use;
- recycling;
- other recovery (e.g. energy recovery); and
- disposal (i.e. landfilling or incineration without energy recovery).

1.2.3 The rWFD was incorporated into national legislation, in England and Wales, by the Waste (England and Wales) Regulations 2011 (as amended) (the 'Waste Regulations 2011').

1.2.4 The Waste Regulations 2011 require, in Schedule 1, at paragraph 2(1), that the waste hierarchy, as set out in the rWFD, is applied by the appropriate authority as a 'priority order' in waste prevention and management policy.

1.2.5 With regard to the fuel being received, the responsibility for compliance with the waste hierarchy lies with each of the processors of waste producing fuel for the Proposed Development. Their compliance with the hierarchy will be regulated and monitored by the Environment Agency (or other permitting authority if located elsewhere in the UK) through their respective Environmental Permits. These measures would be controlled through the Environmental Permit and Environmental Management System to be prepared for the operation of the Proposed Development.

1.2.6 The waste hierarchy is delivered both through good intentions and market forces. Given the current combination of landfill costs (including both facility gate fees and Landfill Tax) or the lower but still appreciable costs of energy recovery (whether through home combustion or exporting) there is a clear financial imperative for wastes to be recycled where it is the practicable solution.

1.2.7 The flexibility of the design of the Proposed Development is important, in that it can accept a wide range of fuel, and so make an ongoing and appropriate contribution to delivery of the waste hierarchy.

1.2.8 Section 2 of the report demonstrates that the practice of using waste as a source of renewable/low carbon energy plays an important role within the waste hierarchy, and will continue to do so into the future.

1.3 Fuel Availability

1.3.1 Within Section 3, a substantial quantity of fuel is demonstrated to be available to K3/WKN, comprising both: residual wastes that are being disposed to landfill (which is at the bottom of the hierarchy) and from which energy can be efficiently recovered; and refuse derived fuel ('RDF') that is being exported overseas, meaning a missed opportunity for renewable/low carbon energy supply in the UK.

1.3.2 The fuel availability assessment presented in Section 3 has focused on wastes that are currently landfilled within or exported overseas (as RDF) from the Study Area. The significant decline in landfill availability, both nationally and locally, is recognised.

1.3.3 In considering the wastes currently disposed to landfill the assessment focuses on Household/Industrial/Commercial ('HIC') wastes but to avoid the potential for over-estimating available fuel, there is a further refinement to consider only a shortlist of HIC waste types that are most likely to suitable for combustion at the Proposed Development. This is summarised in Table ES1.

Table ES1 The range of fuel availability across the Study Area, 2015, 2016, 2017

Fuel Source	2015 (tonnes)	2016 (tonnes)	2017 (tonnes)
Shortlisted waste types (see Table 3.4, row t)	2,058,801	1,693,940	1,508,860
Exported RDF (see Table 3.6, row h)	595,413	1,000,617	1,018,592
Total	**2,654,214**	**2,694,557**	**2,527,452**

1.3.4 Table ES1 shows that there is, consistently, somewhere in the region of 2.5 million tonnes of fuel available to the Proposed Development (Table ES1). Even if local authority collected waste ('LACW') was discounted, there would still remain c.2 million tonnes of residual wastes and RDF available to K3/WKN as a renewable/low carbon fuel source.

1.3.5 The fuel availability assessment subsequently applies additional sensitivities to incorporate consideration of: additional recycling to meet the Circular Economy Package target of 65%; and potential new treatment capacity that is not currently operational. It is considered unlikely that all of these variables would occur to the extent considered within this fuel availability assessment and consequently this outcome is considered to be very conservative.

1.3.6 As demonstrated in Table ES2, there is somewhere in the region of 992,500 (row h) to 1.98 million (row a) tonnes of fuel available to the Proposed Development.

1.3.7 The fuel availability assessment demonstrates that there is substantial fuel availability, to be sourced from wastes that would otherwise be disposed to landfill or exported overseas. It is clear that K3/WKN will not prejudice delivery of either the waste hierarchy, or the future circular economy.

Table ES2 Summary of Fuel Availability Assessment and sensitivities

Assessment	**Reference** (within Report)	**Calculated range using 2017 data** (tonnes)		row
		Upper	Lower	
HIC waste disposed to landfill within Study Area	Table 3.2 (row h)	1,981,358		a
Shortlisted waste types disposed to landfill within Study Area	Table 3.4 (row t)		1,508,860	b
RDF removed from facilities in the Study Area and exported	Table 3.6 (row h)	1,018,592	1,018,592	c
Total fuel		**2,999,950**	**2,527,452**	d
Additional 27% recycling to achieve CEP 2035 target	paragraph 3.4.21	809,986	682,412	e
Remaining fuel		**2,189,963**	**1,845,040**	f
Comparable future capacity likely to be delivered	Table 3.9 (row h)	852,500	852,500	g
Remaining fuel		**1,337,463**	**992,540**	h
Proposed capacity of K3/WKN	paragraph 1.7.7	497,000	497,000	i
Remaining level of need		**840,463**	**495,540**	j

1.4 National and local policy and strategy

1.4.1 The report also considers relevant national policy and strategy documents and policy from the adopted and emerging development plan within Kent.

1.4.2 It is notable that the most recent expression of Government's intentions for waste management (the Resources and Waste Strategy[2]) expands the concept to fully recognise waste as a resource; something that should be valued and not simply treated or disposed of.

'*Our Strategy is framed by natural capital thinking and guided by two overarching objectives:*

1 To maximise the value of resource use; and

2 To minimise waste and its impact on the environment.' (page 17)

[2] Our Waste, Our Resources: A Strategy for England, Defra, December 2018. See page 137, section 8.1.6. https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england

1.4.3 Valuing resources to gain these benefits is achieved through a lifecycle approach and delivery of the circular economy. The Strategy confirms (at page 26) that reusing and recycling materials helps to reduce the need for virgin raw materials and prevent the impacts of its manufacture.

'*But it's not just in material reuse that the circular economy delivers benefits. It's also relevant to energy generation and savings. Incineration of non-recyclable or contaminated waste (such as food packaging) can generate energy. Bio-waste can also be used to make bio-gas, a renewable energy source*' (page 26).

1.4.4 K3/WKN is demonstrated to deliver key objectives of national policy and strategy through:

- delivering the waste hierarchy;
- contributing to self-sufficiency (in terms of both energy recovery and sustainable waste management) at the national level; and
- being part of a network of facilities from which value would be recovered from appropriate residual wastes.

1.4.5 Locally, K3/WKN will deliver the waste hierarchy within Kent, using residual wastes and RDF to produce a renewable/low carbon energy, with a defined steam user located adjacent to the Application Site.

1.4.6 The Proposed Development is appropriately located at the Application Site, making optimal use of a site already in use for waste management. The supply of steam to the Kemsley Paper Mill means there is a clear and particular advantage in locating K3/WKN at the Application Site and in bringing waste to it.

1.4.7 The K3/WKN Carbon Assessment Reports demonstrate that the Proposed Development will bring substantial benefit in terms of net avoided carbon. There is recognised to be a carbon burden associated with the transport of fuel to the facilities, however, as demonstrated by proxy through consideration of the transport of residues off-site, transport burdens are small compared to the overall carbon benefits of diverting waste from landfill. There is no reasonable objection to the import of fuel to K3/WKN from outside of Kent.

1.4.8 The assessment concludes that the Proposed Development, sustainably treating wastes and RDF from (within and) outside of Kent will help the county continue to meet net self-sufficiency policy and enable the county to bring to gain from the economic, environmental and social benefits of the Proposed Development.

1.4.9 The Proposed Development is wholly compliant with both the adopted and the proposed modifications to Kent waste policy.

1.5 Conclusion

1.5.1 The Proposed Development is situated at a preferred location that optimises existing infrastructure assets. K3/WKN is demonstrated to be at the right level of the waste hierarchy, taking waste out of landfill, and optimising the use of RDF.

1.5.2 K3/WKN will complement re-use and recycling, not prejudice them. Increased recycling is an important policy drive and the market responds positively to this, not least it is a cheaper waste management method than either energy recovery or disposal. Landfill capacity is fast

running out and our continued reliance on energy recovery facilities overseas is not guaranteed and is a lost opportunity for UK energy supply.

1.5.3 The Proposed Development provides a policy compliant solution through: avoiding non-recyclable wastes being disposed to landfill; optimising the use of RDF; recovering renewable/low carbon energy; providing steam to an adjacent industry; and recovering secondary materials including aggregates, glass, and metal.

1.5.4 K3/WKN is located within Kent, but proposed as a regional facility and not to be constrained to only accepting waste from within Kent. By treating wastes and RDF from (within and) outside of Kent will help the county continue to meet net self-sufficiency policy and enable the county to bring to gain from the economic, environmental and social benefits of the Proposed Development.

1.5.5 K3/WKN is demonstrated to be wholly in accordance with the waste hierarchy and not prejudicial to either national or local policy or strategy. The Proposed Development will deliver both the aspirations of the NPS and the adopted and emerging development plan for waste management and renewable/low carbon energy supply.

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Waste Hierarchy and Fuel Availability Assessment

Report

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1. Introduction

1.1 The Development Consent Order

1.1.1 Wheelabrator Technologies Inc (WTI EfW Holdings Ltd, 'Wheelabrator') is submitting an application (the 'Application') for a Development Consent Order ('DCO') made to the Planning Inspectorate under section 37 of the Planning Act 2008 (the 'PA 2008').

1.1.2 The Application seeks a DCO both for: the construction and operation of the Wheelabrator Kemsley Generating Station ('K3'); and for the construction and operation of a new energy from waste (EfW) facility, Wheelabrator Kemsley North ('WKN').

1.1.3 K3 gained planning permission (reference SW/10/444) under the Town and Country Planning Act 1990, from Kent County Council in 2012. Construction began in July 2016 and is expected to be completed, with the plant operational by the end of 2019. As currently consented, K3 will have a generating output of 49.9MW and be permitted to process up to 550,000 tonnes per annum ('tpa') of waste. The Applicant has identified that K3 has the ability to operate to an upgraded power generation level of 75MW aswell as processing an additional 107,000 tpa of waste.

1.1.4 In order for K3 to be properly categorised and consented under the Planning Act 2008, consent is being sought for the construction of K3 at its total generating capacity of 75MW (49.9 MW consented plus 25.1MW upgrade) together with the separate proposed total tonnage throughput of 657,000 tpa (550,000 tpa consented plus 107,000 tpa increase).

1.1.5 K3 is a nationally significant infrastructure project, under section 14(1)(a) of the PA2008, by virtue of it being the construction of an onshore generating station in England, with a generating capacity of over 50MW.

1.1.6 Incorporated into the Application, consent is also sought for WKN, which would be a single line EfW facility, with a generating capacity of 42MW processing 390,000 tpa of waste.

1.1.7 WKN is not a nationally significant infrastructure project as its generating capacity is below 50MW. However, by Direction (dated 27 June 2018) under section 35 of the PA 2008, the Secretary of State for Business, Energy and Industrial Strategy has confirmed that WKN is to be treated as development for which development consent is required.

1.1.8 K3 and WKN are the subject of this single Application and the DCO, if granted, would be known as the Wheelabrator Kemsley Generation Station and Wheelabrator Kemsley North Power Station Order.

1.1.9 In this report, the project is referred to as either the 'Proposed Development' or 'K3/WKN'.

1.2 The Applicant

1.2.1 Wheelabrator Technologies is the second largest US waste-to-energy business, and is an industry leader in the conversion of everyday residential and business waste into clean energy. Wheelabrator currently has a platform of 25 strategically located assets across the US and UK: 19 waste-to-energy facilities (three under construction), two waste fuel facilities as well as four ash monofills. We also recover metals for recycling at two advanced metals recovery systems and one central upgrade facility.

1.2.2 Wheelabrator currently has an annual waste processing capacity of over 7.2 million tonnes (8 million tons), and a total combined electric generating capacity of 732 megawatts, enough energy to power more than 671,100 US homes. Wheelabrator also recovers metals for recycling into commercial products. The company's vision to develop, deliver and realize the potential of clean energy speaks to Wheelabrator's ongoing commitment to the development of clean energy solutions for its customers and local communities. Wheelabrator is owned by Macquarie Infrastructure and Real Assets, a business within the Macquarie Asset Management division of Macquarie Group and a global alternative asset manager focused on real estate, infrastructure, and agriculture and energy assets.

1.2.3 For more on Wheelabrator, please visit https://www.wtienergy.com.

1.3 The Application Site

1.3.1 The Application Site is located on land directly east of the Kemsley Paper Mill, and situated east of Kemsley, a residential suburb of Sittingbourne in Kent. The Site is accessed via the A249, which links to both the M2 and M20 motorways.

1.3.2 Immediately north of the Site lie the Kemsley Marshes, beyond which lie the Kemsley Paper Mill effluent treatment works and a jetty operated by Knauf for the import of gypsum by barge. The Swale Estuary is adjacent the Site, to the east, with the Isle of Sheppey beyond. To the south of the Application Site lies a former (capped) landfill site, which lies adjacent to the confluence between Milton Creek and the Swale Estuary.

1.3.3 K3 occupies the southern two-thirds of the Application Site, with WKN located immediately north. The proposed site for WKN is currently being used as a laydown and parking area for the construction of K3. The site has been cleared of vegetation and laid to concrete or hardcore with a perimeter fence.

1.3.4 A full site description can be found at Chapter 2 of the Environmental Statement (Document 3.1).

1.4 Background to K3/WKN

1.4.1 K3/WKN will be capable of producing renewable/low carbon energy through the use of waste derived fuels from various sources of processed municipal waste, commercial and industrial ('C&I') waste and waste wood. It will therefore make a positive contribution towards the UK Government's climate change commitments, including reducing the amount of waste disposed to landfill, in addition to increasing the diversity and security of national electricity supply.

1.4.2 The planning consent for K3 permits the construction and operation of a sustainable energy plant to serve Kemsley Paper Mill with steam. K3, currently under construction, is capable of processing 550,000 tpa of wastes under its extant consents. The subsequent level of interest that Wheelabrator has received from potential fuel suppliers in relation to that facility has demonstrated, commercially, that there is a market demand for expanded EfW capacity at Kemsley.

1.4.3 The site proposed to be occupied by WKN was formerly consented for development as a processing plant for the incinerator bottom ash produced by K3. Wheelabrator has since

concluded that it is more efficient and effective for this processing to be undertaken off-site by a third party.

1.4.4 Not only does WKN provide the opportunity to maximise the waste management potential of a site already in that use, responding to a recognised market need, it also provides the opportunity to act as contingency steam supply to the Kemsley Paper Mill when K3 is under maintenance.

1.5 The Proposed Development

1.5.1 The Proposed Development comprises the two EfW facilities (K3 and WKN) and all the elements that are integral to them, including the fuel reception and storage facilities, combustion systems, steam turbines and emissions stacks, as well as associated and supporting buildings, structures, plant and areas.

1.5.2 In addition, it includes some Associated Development connected with the generating station as defined by section 115(2) of the PA 2008. The Proposed Development will also involve temporary works connected with the construction phase, such as contractors' compounds and laydown areas.

1.5.3 A detailed description of the Proposed Development is provided at Chapter 2 of the Environmental Statement (Document 3.1).

1.6 The purpose, approach and structure of this report

Purpose

1.6.1 Overarching National Policy Statement for Energy ('NPS EN-1') together with National Policy Statement for Renewable Energy Infrastructure ('NPS EN-3') provide the primary basis for decisions on nationally significant renewable energy infrastructure. At section 2.5, NPS-EN-3 sets out the policy principles in relation to biomass and waste combustion.

1.6.2 At paragraph 2.5.64, NPS EN-3 makes clear that waste combustion generating stations '*need not disadvantage reuse or recycling initiatives where the proposed development accords with the waste hierarchy.*'

1.6.3 Having established that principle, NPS EN-3 sets out what is expected in an applicant's assessment (paragraphs 2.5.66 to 2.5.68):

'*An assessment of the proposed waste combustion generating station should be undertaken that examines the conformity of the scheme with the waste hierarchy and the effect of the scheme on the relevant waste plan or plans where a proposal is likely to involve more than one local authority.*

The application should set out the extent to which the generating station and capacity proposed contributes to the recovery targets set out in relevant strategies and plans, taking into account existing capacity.

The results of the assessment of the conformity with the waste hierarchy and the effect on relevant waste plans should be presented in a separate document to accompany the application … '

1.6.4 This Waste Hierarchy and Fuel Availability Report is that separate document, prepared to demonstrate how K3/WKN conforms both to the waste hierarchy and relevant waste plans and strategies.

Approach

1.6.5 It is recognised that the Application seeks consent for two separate EfW facilities.

1.6.6 K3 is already consented to operate using 550,000 tpa of waste. Whilst the Application seeks consent for the full construction and operation of K3 (in order to properly consent the facility under the Planning Act 2008) in practical terms the effect of the application would be the K3 facility with an upgraded power generation and treating an additional 107,000 tpa of waste. WKN would be a wholly new EfW facility, designed to process 390,000 tpa of waste.

1.6.7 These facilities are proposed within the same Application Site and will be considered together through the Application. There is no sensible reason to consider the waste hierarchy separately for each of K3 and WKN within this report.

1.6.8 Consequently fuel availability and the subsequent effect on the waste hierarchy will be considered once, as a cumulative total of 497,000 tpa (the additional 107,000 tpa proposed for K3 plus the 390,000 tpa proposed for WKN).

Structure

1.6.9 The structure of the remainder of this report is set out to address the tests set at paragraph 2.5.70 of NPS EN-3, and is as follows:

- **Section 2: Waste Hierarchy**

  Introduces the waste hierarchy and how it is delivered by the market

- **Section 3: Fuel Availability Assessment**

  Provides the evidence that K3/WKN will play an important role within the waste hierarchy

- **Section 4: Waste Plans and Strategies**

  Demonstrates that K3/WKN complies with national and local policy relevant to the waste hierarchy

- **Section 5: Conclusions**

2. Waste Hierarchy

2.1 Origin of the waste hierarchy

2.1.1 The revised Waste Framework Directive[1] (the 'rWFD') which came into force on 12 December 2008, established the overarching framework for the management of waste across the EU. It required Member States to '*bring into force the laws, regulations and administrative provisions necessary to comply with this Directive*' within two years of its entry into force, i.e. by December 2010. The rWFD brought together existing elements of waste legislation and introduced a new approach to waste management that focused more strongly on the prevention of waste.

2.1.2 The key element relevant to this report is Article 4(1) by which the rWFD introduced a new five point waste hierarchy, based on the priority order of:

- prevention (preferred option);
- preparing for re-use;
- recycling;
- other recovery (e.g. energy recovery); and
- disposal (i.e. landfilling or incineration without energy recovery).

2.1.3 The changes in emphasis in the revised hierarchy were: the preference for waste prevention; and the confirmation that waste treatment involving energy generation is a recovery operation (subject to it achieving energy recovery efficiency expressed as R1 of 0.65 or more[2]).

2.1.4 Member States of the EU are required by Article 4(1) of the rWFD to apply the hierarchy as a priority order *'in waste prevention and management legislation and policy'*. This requirement remains following EU-wide agreement on the Circular Economy Package ('CEP', considered further at section 3.4).

2.1.5 However, the need to observe the principles of the hierarchy is devolved further in that guidance[3] on the interpretation of the rWFD confirms that EU case law has established that the '*waste hierarchy is to be observed and applied by all the relevant administrative levels within a given Member State that are concerned with waste policies and legislation*.'

2.1.6 Ratification of the Circular Economy Package across the Member States means that a revised legislative framework on waste has now been agreed, which came into force on 4 July 2018. This revised legislative framework includes changes to the rWFD, as set out in Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (the '2018 Revised WFD').[4]

[1] Directive 2008/98/EC on waste

[2] The way in which the R1 criterion is calculated is set out in the rWFD. The Proposed Development is designed to achieve an R1 of >0.65 such that it would be regarded as a waste recovery activity.

[3] Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste, European Commission, June 2012

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.150.01.0109.01.ENG

2.1.7 Member States have two years in which to transpose the agreed amendments, which the UK Government has indicated it will implement in full. The key changes in relation to this report are:

- incorporation of the measures required to achieve the CEP (considered at section 3.4);
- amendments to Article 3, in relation to the definition of 'municipal waste' (incorporated into the assessment in the choice of wastes assessed); and
- amendments to Article 4, adding a requirement for Member States to make use of economic instruments and other measures to provide incentives for the application of the waste hierarchy.

2.2 The legislative background in England and Wales

2.2.1 The rWFD was incorporated into national legislation, in England and Wales, by the Waste (England and Wales) Regulations 2011 (as amended) (the 'Waste Regulations 2011').

2.2.2 The Waste Regulations 2011 require, in Schedule 1, at paragraph 2(1), that the waste hierarchy, as set out in the rWFD, is applied by the appropriate authority as a '*priority order*' in waste prevention and management policy.

2.2.3 Schedule 1, at paragraph 2(2) requires that when applying the waste hierarchy, the appropriate authority must ensure that it:

'(a) encourages the options that deliver the best overall environmental outcome, which may require specific waste streams to depart from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste;

(b) takes into account—

(i) the general environmental protection principles of precaution and sustainability,

(ii) technical feasibility and economic viability,

(iii) protection of resources, and

(iv) the overall environmental, human health, economic and social impacts.'

2.2.4 The 'appropriate authority' in England is defined in Regulation 3, as the Secretary of State for the Environment, Food and Rural Affairs.

2.3 Application of the waste hierarchy

2.3.1 The hierarchy of waste management methods and the requirements as to how it should be applied dictate that the feedstock for energy recovery projects should (primarily) only be drawn from residual waste that would otherwise be disposed to landfill and which is not capable, either technically or from the standpoint of economic feasibility (paragraph 2(2)(b)(ii) of Schedule 2 to the Waste Regulations 2011) of being recycled.

2.3.2 With regard to the fuel being received, the responsibility for compliance with the waste hierarchy lies with each of the processors of waste producing fuel for the Proposed Development. Their compliance with the hierarchy will be regulated and monitored by the Environment Agency (or other permitting authority if located elsewhere in the UK) through their respective Environmental Permits.

2.3.3 The above measures will be implemented and controlled through the Environmental Permit and Environmental Management System to be prepared for the operation of the Proposed Development.

2.4 Compliance with the waste hierarchy

2.4.1 The propensity of a waste recovery scheme to comply with the waste hierarchy, based on market forces and practical factors alone, will be affected by a combination of:

- the availability of waste that is being treated by methods lower in the hierarchy than the recovery proposal; and
- the financial disincentive to use waste that is already being managed higher in the hierarchy as feedstock in the recovery facility.

2.4.2 These inter-related issues are explored below.

Availability of waste lower than recovery in the waste hierarchy

2.4.3 The availability of wastes that are below recovery in the hierarchy at present and as such may be available in the future should CEP targets be achieved and potential future plant become fully operational, has been assessed in Section 3.

2.4.4 The use of this residual waste at the Proposed Development would be in accordance with the requirements of the waste hierarchy, providing that such recovery activity did not prevent those wastes that are currently being landfilled from being recycled. This prospect has been tested (section 3.4).

2.4.5 The potential for this to happen, in the context of a hierarchy which has to take account of, inter alia, '*technical feasibility and economic viability*', can be further explored having regard to the respective costs of recycling, landfilling and treatment by energy recovery, as described below.

Financial incentive for recycling

2.4.6 The potential for there to be a financial incentive to deviate from the waste hierarchy, to divert waste from landfill to recovery, rather than to recycling, in order to provide fuel for an energy recovery facility, such as the Proposed Development, is the reason that some have cited as necessitating commitments on a planning permission. However, this is not substantiated by relevant data.

2.4.7 The waste hierarchy is delivered both through good intentions and market forces. Data gathered by WRAP[5] and published in its Gate Fee Report 2018[6] clearly shows that gate fees at material recycling facilities and organic waste treatment facilities (eg anaerobic digestion facilities) which are preferred in the waste hierarchy, are significantly lower than gate fees at energy from waste plant and landfill facilities. This price differential across the waste management methods has been seen repeatedly in WRAP's annual reporting, as demonstrated in Table 2.1.

[5] The Waste and Resources Action Programme. Originally set up by government (2000) and registered as a Charity in 2014, to promote sustainable waste management.

[6] http://www.wrap.org.uk/collections-and-reprocessing/recovered-materials-markets/reports/gate-fee-reports

2.4.8 It is clear that it makes sound commercial sense for waste producers to seek the most cost-effective waste management solution, favouring reuse and recycling.

2.4.9 Further, the design of the Proposed Development is flexible in that it can accept a wide range of composition within the fuel received.[7] Consequently, the Proposed Development will be able to accommodate changes in the fuel it receives, as the composition of residual wastes changes over time (reflecting new recycling initiatives for example).

2.4.10 K3/WKN will be able to continue to take those wastes that remain to be diverted from landfill.

[7] Demonstrated through the sensitivity analysis undertaken within the Carbon Assessments (Appendices 6.1 and 6.2 of the Environmental Statement, Document 3.1)

Table 2.1 Summary of median gate fees for waste management options, WRAP reporting, 2011 to 2018 (£ per tonne)

Facility type	2011	2012	2013	2014	2015	2016	2017	2018	Row
Materials Recovery Facility	15	9	9	n/a	6	25	15	22	a
Open Air Windrow Compost	24	25	24	n/a	24	24	n/r	n/r	b
In-Vessel Compost	43	44	46	n/a	46	47	46	49	c
Anaerobic Digestion	43	41	41	n/a	40	40	29	26	d
Mechanical Biological Treatment	84	79	76	n/a	88	85	88	n/r	e
Energy from Waste (pre-2000)	54	64	58	n/a	73	58	56	57	f
Energy from Waste (post-2000)	73	82	90	n/a	99	95	91	89	g
Landfill (gate fee only)	20	21	21	n/a	20	19	22	20	h
Landfill (gate fee and Landfill Tax)	76	85	93	n/a	100	102	107	107	i

Source: WRAP, http://www.wrap.org.uk/collections-and-reprocessing/recovered-materials-markets/reports/gate-fee-reports

2.5 Conclusions

2.5.1 The treatment practice of using waste as a source of renewable/low carbon energy plays an important role within the waste hierarchy, and will continue to do so into the future.

2.5.2 Section 3 demonstrates that a substantial quantity of fuel is available to K3/WKN, comprising both: residual wastes that are being disposed to landfill (which is at the bottom of the hierarchy) and from which energy can be efficiently recovered; and refuse derived fuel that is being exported overseas, meaning a missed opportunity for renewable/low carbon energy supply in the UK.

2.5.3 Given the current combination of landfill costs (including both facility gate fees and Landfill Tax) or the lower but still appreciable costs of energy recovery (whether through home combustion or exporting) there is a clear financial imperative for wastes to be recycled where it is the practicable solution.

2.5.4 The flexibility of the design of the Proposed Development is important, in that it can accept a wide range of fuel, and so make an ongoing and appropriate contribution to delivery of the waste hierarchy.

3. Fuel Availability Assessment

3.1 Introduction

3.1.1 This section of the Waste Hierarchy and Fuel Availability Report considers the amount of residual waste that is available to the Proposed Development.

3.1.2 Prior to presenting the assessment, it is necessary to be clear on both: the type of waste being considered; and the area being considered (the 'Study Area').

3.1.3 This assessment does not seek to specify an exact level of need for the Proposed Development. This is not required by policy and would be a level of spurious precision that cannot be achieved, not least as the data (except for local authority collected waste, or 'LACW') is very uncertain and is dependent on the accuracy of waste generators, carriers, operators and the regulator when completing relevant forms recording the amount of waste and its end destination.

3.1.4 However, it does use publicly available data to identify a reasonable conclusion on the availability of fuels appropriate for combustion in the Proposed Development, considering both those wastes disposed to landfill and those exported from the UK.

Residual waste

3.1.5 The fuel proposed to be processed at the Proposed Development is appropriately described as 'residual waste', which may be defined as the elements of the waste stream that remain after practicable recyclable or compostable materials have been separated and removed. This type of waste is principally suitable only for combustion with energy recovery or disposal to landfill.

3.1.6 This description aligns with the recently published Resources and Waste Strategy,[8] which defines residual waste as '*the mixed material that is typically incinerated for energy recovery or landfilled.*'

3.1.7 This fuel availability assessment has considered both residual wastes that are disposed to landfill and those that are sent overseas after treatment (principally to mainland Europe) for energy recovery.

3.1.8 It is recognised that not all residual wastes disposed to landfill will be appropriate for combustion; this element is also considered within the assessment.

3.1.9 In order to meet the regulations that govern the export of waste to facilities outside of England, waste is generally subjected to some form of treatment (for example shredding, separation, biostabilisation, and/or baling) prior to its export overseas.

3.1.10 There are several different terms that can be used to describe these wastes, with the most common being solid recovered fuel ('SRF') and refuse derived fuel ('RDF'). This report uses refuse derived fuel or RDF.

[8] Our Waste, Our Resources: A Strategy for England, Defra, December 2018. See page 137, section 8.1.6. https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england

3.1.12 This fuel availability assessment has focussed on these materials because:

- the wastes disposed to landfill should be moved up the waste hierarchy;
- the waste exported overseas means the UK loses out on the opportunity to generate energy in domestic facilities; and
- this approach incorporates existing EfW capacity, as these are the materials that remain on the market for beneficial use.

3.1.13 Each of these matters are considered further within this report.

The Study Area

3.1.14 As a nationally significant infrastructure project, and one that is not predicated solely on the waste management demands of Kent, the Proposed Development is appropriately described as a regional facility.

3.1.15 Across the country, residual wastes can move long distances to find treatment, from very local facilities to those located overseas. However, it is not unreasonable to assume a travel time of approximately two hours before transport becomes too great an element of the overall management costs.[9] This has been approximately applied to the Proposed Development to identify a Study Area comprising the following authority areas:[10]

- **East London**, comprising Barking and Dagenham, Havering, Newham and Redbridge;
- **East Sussex**, including Brighton and Hove;
- **Essex**, including Southend-on-Sea and Thurrock;
- **Kent**, including Medway;
- **South East London**, comprising Bexley, Greenwich, Lewisham and Southwark; and
- **South London**, comprising Bromley, Croydon, Merton, Kingston-upon-Thames and Sutton.
- **West Sussex**.

3.1.16 These areas within the Study Area are hereafter only referred to by the authority name shown in bold, unless explicitly stated otherwise.

3.2 Disposal of waste to landfill

Total waste disposed

3.2.1 In 2017, the year for which (at the time of writing) the most recent statistics are available, a total of 45.4 million tonnes of waste were landfilled in England.[11] Soils and mineral wastes make up the majority of all wastes received at landfill (c. 61%) with the remainder comprising

[9] A two hour drive time has been selected and used approximately to identify a Study Area for this assessment. It should not be relied upon beyond that purpose.

[10] The selection of London boroughs is considered to be conservative, as a 2 hour drive time from the Application Site also encompasses boroughs located in west London.

[11] Waste Management 2017: England. Environment Agency, published September 2019, updated 5 March 2019. See table titled: 'Waste managed'. https://www.gov.uk/government/publications/waste-management-data-for-england Also provided at Annex A.

municipal waste and '*other wastes', which typically includes 'mixed wastes following processing to remove recyclates*.'[12]

3.2.2 Consequently, over 15 million tonnes of waste (that could be recovered for energy) were instead disposed to landfill across England, in 2017.[13]

3.2.3 Whilst not all of this waste would be appropriate for combustion, and much lies beyond the Study Area, this simple statistic demonstrates the overall scale of recovery capacity that is required, at a national level, in order to move non-hazardous waste up the hierarchy away from landfill, which is at the bottom of the waste hierarchy.

3.2.4 To identify the amount of residual waste that is being landfilled within the Study Area a detailed review of landfill data for years 2015 to 2017 has been undertaken. The data source used for this review is the Waste Data Interrogator ('WDI') the national dataset prepared by the Environment Agency that details the inputs to permitted waste management facilities in England.

3.2.5 Within the Study Area, **between 7.3 and 8.2 million tonnes** of waste was disposed to landfill each year between 2015 and 2017; with up to 80% of that waste also reported as originating within the Study Area. Table 3.1 shows the total landfill deposits across the Study Area for 2017, and for the previous two years.

3.2.6 Table 3.1 (and others within this report) refers to 'Not Codeable' wastes. Operators of permitted waste facilities are asked to provide information on the 'origins' of the waste accepted at their sites, such that this information can be recorded in the WDI. Where data is supplied, the entry is normally completed showing the local authority or county where the waste came from. Where operators do not provide accurate information on the origin of waste, the WDI reports the origin as 'Not Codeable'. If possible, within this report, 'Not Codeable' wastes are assigned to the region of origin. '

[12] UK Statistics on Waste. Defra and Government Statistical Service, 7 March 2019. See section 6.2, page 13. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784263/UK_Statistics_on_Waste_statistical_notice_March_2019_rev_FINAL.pdf Also provided at Annex B.

[13] Total landfilled in England in 2017 was 45.4 million tonnes, 61% of which was soils and minerals waste (27.7 million tonnes). Subtracting soils and minerals from total waste, leaves 17.7 million tonnes of household and similar waste and other wastes.

Table 3.1 Disposal to landfill within the Study Area, all wastes, 2015, 2016, 2017

Area	2015 (tonnes)	2016 (tonnes)	2017 (tonnes)	row
East London	1,164,279	1,629,647	966,976	a
East Sussex	202,032	173,934	71,450	b
Essex	4,191,770	3,893,572	3,390,890	c
Kent	1,532,673	1,456,120	1,414,843	d
South East London	No tonnage reported to landfill			e
South London	302,137	297,674	308,661	f
West Sussex	819,075	761,454	1,142,875	g
Total	**8,211,967**	**8,212,402**	**7,295,695**	h
Tonnage and percentage with reported origin within the Study Area and deposited in landfills in Study Area (including WPA not codeable (South London) and WPA not codeable (South East)	6,065,852	6,384,017	5,843,111	i
	73.9%	77.7%	80.1%	j

Source: Environment Agency, WDI: 2015, 2016, 2017

3.2.7 As highlighted in paragraph 3.2.3, not all this waste may be suitable for combustion. Consequently, Table 3.2 focusses on the Household/Industrial/Commercial ('HIC') wastes deposited at non-hazardous landfill sites across the Study Area between 2015 and 2017. These are the most suitable for combustion in the Proposed Development

Table 3.2 Disposal to landfill within the Study Area, HIC, 2015, 2016, 2017

Area	2015 (tonnes)	2016 (tonnes)	2017 (tonnes)	row
East London	376,680	239,093	426,120	a
East Sussex	162	No HIC tonnage reported to landfill		b
Essex	1,170,959	987,925	988,817	c
Kent	240,657	199,430	147,707	d
South East London	No HIC tonnage reported to landfill			e
South London	233,097	216,757	229,455	f
West Sussex	249,765	224,728	189,259	g
Total	**2,271,320**	**1,867,934**	**1,981,358**	h
Tonnage and percentage with reported origin within the Study Area and deposited in landfills in Study Area (including WPA not codeable (South London) and WPA not codeable (South East)	2,162,732	1,770,405	1,848,176	i
	95.2%	94.8%	93.3%	j

Source: Environment Agency, WDI: 2015, 2016, 2017

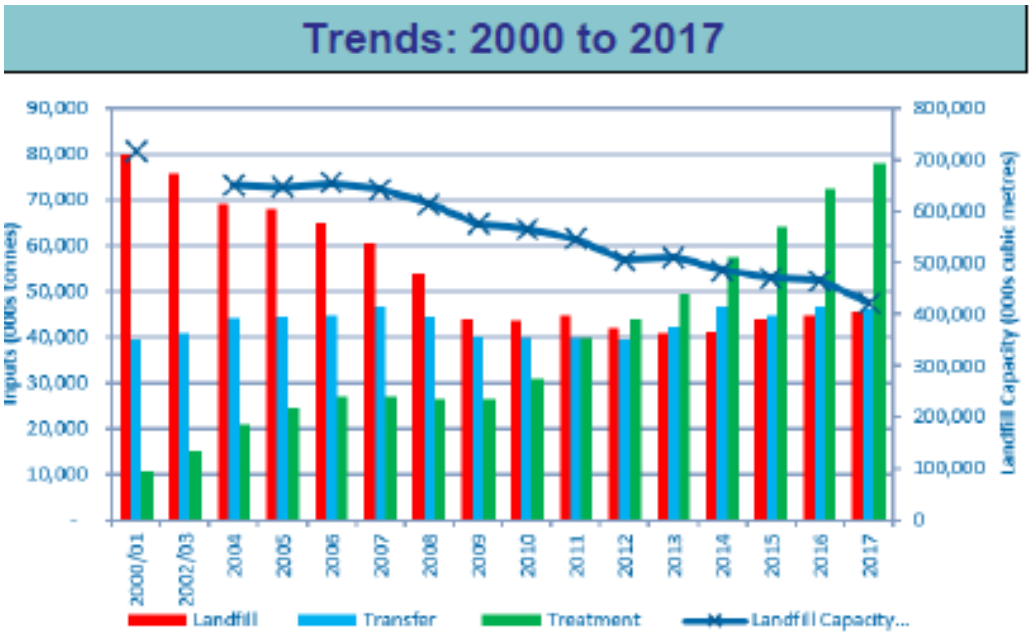
3.2.9 Table 3.2 shows that the total amount of HIC waste disposed of has fluctuated over this period, with less waste landfilled in 2017 than 2015, but more than in 2016. Nevertheless, it is clear that a substantial amount of residual waste, **nearly 2 million tonnes**, is still being disposed to landfill in the Study Area (Table 3.2, row h).

3.2.10 Table 3.2 also shows that most (greater than 90%) of the waste disposed to landfill in the Study Area has its origin identified as within the Study Area. This can be explained through two factors: a proportion of the waste being deposited will be LACW, and potentially more likely to use an in-area facility; and that the market is making the balance between transport cost and gate fee. Disposal to landfill is consistently one of the most expensive forms of waste management (not least as it incurs the Landfill Tax) (Table 2.1 of this report) and so the market will be looking to reduce the transport cost element within total waste management costs incurred for every tonne of waste generated.

3.2.11 However, the ability to rely on landfill facilities located within the Study Area is a practice that may not be able to continue into the long term.

3.2.12 There is a national trend of diminishing landfill capacity, as shown in Waste Management 2017: England, an info graphic of waste management data produced by the Environment Agency in March 2017 (Annex A). The bar chart titled 'Trends: 2000 to 2017' (reproduced in Figure 3.1) clearly demonstrates a consistent reduction in landfill capacity across England.

Figure 3.1 Trends: 2000 to 2017



3.2.13 Looking at the 'Regional picture 2017' (on the last page of Waste Management 2017: England) shows that less than 2 years of landfill capacity remains in London, and just 6.5 years in the former planning region of the South East of England (within which much of the Study Area lies).

3.2.14 Only the former region of Yorkshire and the Humber has landfill capacity estimated to last more than 10 years. Whilst it is recognised that new policy measures are being introduced to deliver the circular economy, keeping resources at their highest level for as long as possible

and seeking to reduce the amount of waste produced, the future shortage of landfill capacity is a clear indicator of the need for new residual waste treatment infrastructure within England.

3.2.15 Table 3.3 provides a summary of active, non-hazardous landfill facilities within the Study Area active over the relevant period (between years 2015 and 2017). The summary information presents:

- the permitted annual capacity;
- the total input in each year;
- the HIC input in each year;
- the remaining capacity (m^3) at the end of each year as reported to the Environment Agency by the operator;
- the current status / potential life.

3.2.16 Table 3.3 shows that of the 11 non-hazardous waste landfill facilities accepting HIC wastes in 2015:

- a significant number have since closed or have limited remaining capacity; and
- only 4 remain with potential capacity of over 500,000m^3 by the end of 2017 (Bellhouse Landfill, Ockendon Area II & III Landfill, Rainham Landfill, and Shelford Landfill Site).

3.2.17 The data presented in Table 3.3 presents the local decline in landfill facility capacity, which is reflecting the national decline.

Table 3.3 Active non-hazardous waste landfill facilities in the Study Area, 2015, 2016, 2017

Site Name	Operator	WPA	Annual Capacity	2015			2016			2017			Comment
				Total Input (tonnes)	HIC Input (tonnes)	Remaining Capacity (m^3)	Total Input (tonnes)	HIC Input (tonnes)	Remaining Capacity (m^3)	Total Input (tonnes)	HIC Input (tonnes)	Remaining Capacity (m^3)	
Barling Marsh Landfill	Enovert South	Essex	145,000	152,625	45,776	236,905	155,408	14,523	202,316	205,553	21,762	170,775	Operator changed from Cory in 2017
Beddington Farmlands Landfill Site	Viridor Waste Management	Sutton	990,000	302,137	233,097	498,801	297,674	216,757	228,950	308,661	229,455	291,513	Now closed and being restored
Bellhouse Landfill	Enovert South	Essex	900,000	183,385	108,218	4,714,363	227,808	115,540	4,555,140	294,580	119,840	4,485,896	Operator changed from Cory in 2017
Brookhurst Wood Landfill Site	Biffa Waste Services	West Sussex	500,000	388,462	161,537	319,674	478,207	224,728	145,188	401,256	189,259	112,170	
Greatness Quarry Integrated Waste Management Facility	Enovert South	Kent	235,000	114,025	59,347	218,345	133,300	53,910	136,788	81,502	47,866	80,548	Operator changed from Cory in 2017
Lidsey Landfill Site	Lidsey Landfill	West Sussex	400,000	430,614	88,228	0	212,345	n/r	0	205,385	n/r	0	Only accepted CD&E wastes in 2016 & 2017
Martells Quarry Landfill	Recycled In Ardleigh	Essex	60,000	76,551	50,292	398,000	120,926	92,941	138,676	90,376	84,184	15,015	Permit issued for new sites at same location in 2018 does not allows the deposit of mixed municipal waste (LoW 20 03 01)

Site Name	Operator	WPA	Annual Capacity	2015			2016			2017			Comment
				Total Input (tonnes)	HIC Input (tonnes)	Remaining Capacity (m^3)	Total Input (tonnes)	HIC Input (tonnes)	Remaining Capacity (m^3)	Total Input (tonnes)	HIC Input (tonnes)	Remaining Capacity (m^3)	
Mucking Landfill	Enovert South	Thurrock	750,000	644,005	10,897	0	350,848	11,302	0	248,968	167,742	0	Operator changed from Cory in 2017. Only accepting inert soils for reuse in the restoration of the landfill site
Ockendon Area II & III Landfill	Veolia ES Landfill	Thurrock	1,573,000	n/r	n/r	4,505,680	18,514	8,609	4,266,362	239,218	96,898	4,102,969	
Pebsham Landfill - Northern Quandrant	Biffa Waste Services	East Sussex	150,000	202,032	162	0	173,934	n/r	0	71,450	n/r	0	Only accepted CD&E wastes in 2016 & 2017
Pitsea Landfill	Veolia ES Landfill	Essex	1,659,000	1,650,447	955,777	1,677,855	1,689,062	745,010	869,144	907,332	498,391	246,816	
Rainham Landfill	Veolia ES Landfill	Havering	1,700,000	868,689	376,680	3,126,521	1,216,139	239,093	2,702,549	939,544	426,120	2,244,172	
Shelford Landfill Site	Viridor Waste Management	Kent	595,000	217,622	181,310	2,400,000	185,621	145,520	2,441,731	185,393	99,841	2,091,712	

Notes

n/r: none reported

Shortlisted waste types

3.2.18 The rWFD sets out what waste is and how it should be managed. Wastes are categorised in a List of Wastes ('LoW') which is split into 20 separate chapters, each of which contains further subdivisions.[14]

3.2.19 Chapters 01 to 12, and 17 to 20 refer specifically to sectors producing the waste (eg Chapter 09, wastes from the photographic industry) with Chapter 20 referring to municipal waste. Chapters 13, 14 and 15 contain oil wastes, solvent wastes and waste packaging, absorbents, filter materials, wiping cloths and protective clothing. Chapter 16 contains a lot of general wastes such as vehicles, electronic equipment and batteries, and chemical wastes.

3.2.20 This fuel availability assessment focusses on the HIC wastes sent to non-hazardous landfill facilities, i.e. those wastes listed under Chapters 01, 02, 03, 08, 10, 11, 12, 15, 16, 18, 19 and 20 of the LoW. Whilst the HIC category in the WDI does contain waste that would be appropriate for combustion in the Proposed Development, they also contain some wastes that are not, for example Chapter 01 Mine and Quarry Wastes will contain soils and rock.

3.2.21 To avoid any potential for relying on an over-estimation of available fuel, the next step in this fuel availability assessment considers a more focused range of wastes within those identified as HIC wastes in the WDI.

3.2.22 Within the LoW, Chapter 19 contains Waste and Water Treatment Wastes, whilst Chapter 20 contains Municipal Wastes. Each of these Chapters are subdivided again, with this assessment focussing on two sub-chapters from each, and looking at just two specific waste types in each sub-chapter:

- 19 Waste and Water Treatment Wastes
  - 19 12 wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
    - **19 12 10 combustible waste (refuse derived fuel)**
    - **19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes**
- 20 Municipal Wastes
  - 20 03 other municipal wastes
    - **20 03 01 mixed municipal waste**
    - **20 03 07 bulky waste**

3.2.23 These specific waste types were selected because they predominantly comprise wastes suitable for combustion at the Proposed Development. Table 3.4 presents the proportions of each Chapter, and the specified waste types identified above, as disposed to landfill within the Study Area.

[14] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02000D0532-20150601

Table 3.4 LoW Chapters disposed to landfill within the Study Area, highlighting the shortlisted waste types, 2015, 2016, 2017

Percentages reported to first decimal place that shows more than 0.0

LoW Code	2015		2016		2017		Row
	tonnes	%	tonnes	%	tonnes	%	
01 Mine and Quarry Wastes	348	<0.1%	161	<0.1%	n/d	0.0%	a
02 Agriculture and Food Processing Wastes	1,570	0.1%	4,162	0.2%	1,232	0.1%	b
03 Furniture, Paper and Cardboard Manufacturing Wastes	42,633	1.9%	44,300	2.4%	71,633	3.6%	c
06 Inorganic Chemical Process Waste	n/d	<0.1%	38	<0.1%	203	<0.1%	d
07 Organic Chemical Process Waste	n/d	<0.1%	5	<0.1%	141	<0.1%	e
08 Paint, Adhesive, Sealant and Ink Manufacturing Waste	56	<0.1%	402	<0.1%	743	<0.1%	f
10 Thermal Processes Waste	9,573	0.4%	6,049	0.3%	4,956	0.3%	g
11 Chemical Surface Treatment and Metal Coating Wastes	981	<0.1%	24	<0.1%	472	<0.1%	h
12 Shaping and Physical Treatment of Metals and Plastics	382	<0.1%	6	<0.1%	12	<0.1%	i
15 Packaging, Absorbents, Wiping Cloths Etc N.O.S.	110	<0.1%	8	<0.1%	5	<0.1%	j
16 Wastes Not Otherwise Specified in the List	286	<0.1%	283	<0.1%	97	<0.1%	k
18 Human and Animal Health Care Waste	27,347	1.2%	21,174	1.1%	33,367	1.7%	l
19 Waste and Water Treatment Wastes (other than those listed below)	112,316	4.9%	77,203	4.1%	311,770	15.7%	m
19 12 10 combustible waste (refuse derived fuel)	**60,682**	**2.7%**	**107,294**	**5.7%**	**98,882**	**5.0%**	n
19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes	**1,113,516**	**49.0%**	**1,000,645**	**53.6%**	**906,111**	**45.7%**	o
20 Municipal Wastes (other than those listed below)	16,917	0.7%	20,162	1.1%	47,870	2.4%	p
20 03 01 mixed municipal waste	**777,184**	**34.2%**	**560,849**	**30.0%**	**479,643**	**24.2%**	q
20 03 07 bulky waste	**107,419**	**4.7%**	**25,153**	**1.3%**	**24,223**	**1.2%**	r
Overall Total	2,271,320	100.0%	1,867,918	100.0%	1,981,358	100.0%	s
Shortlisted Wastes Types	**2,058,801**	**90.6%**	**1,693,940**	**90.7%**	**1,508,860**	**76.2%**	t

Source: Environment Agency, WDI, 2015, 2016, 2017

n/d = no deposits recorded

3.2.24 Table 3.4 (row t) shows that the vast majority of all wastes considered that were disposed to landfill were appropriate for combustion in the Proposed Development. There is a sharp decrease from 2016 to 2017, with the most significant and sustained reduction in waste type 20 03 01 mixed municipal wastes. This is most likely to be due to the change in waste management practices, moving from disposal to landfill to exporting RDF (Figure 3.3).

3.2.25 Table 3.4 (row t) shows that in 2017, **just over 1.5 million tonnes of the shortlisted waste types** were disposed to landfill within the Study Area. These wastes are recognised to be a renewable/low carbon fuel.

Local authority collected waste

3.2.26 Some of the waste disposed to landfill will be LACW and likely (currently) to be subject to long-term contracts.

3.2.27 Table 3.5 presents the amount of LACW disposed of, to landfill, by the local authorities within the Study Area; this represents approximately around 40% of the total shortlisted waste types disposed to landfill. However, it should be noted that LACW data is gained from a different reference source to the WDI, so it is not directly comparable. In particular:

- a proportion of the LACW landfill will not be shortlisted waste types;
- some of the LACW disposed to landfill could be landfilled outside the Study Area (but is reported in Table 3.5); and
- LACW is recorded by financial year, whereas the data collected in the WDI is recorded by calendar year, such that Table 3.5 refers to the percentage of LACW 'managed' each year rather than as 'arising'. Consequently, there is a bit of a disconnect between comparing total waste disposed data with LACW disposal data.

Table 3.5 Tonnes of LACW disposed to landfill and the percentage of LACW managed, 2015,2016, 2017 (tonnes)

Sub region	2015/16		2016/17		2017/18		row
	tonnes landfilled	% of managed	tonnes landfilled	% of managed	tonnes landfilled	% of managed	
East London	94,125	21%	47,247	10%	32,117	7%	a
East Sussex	18,320	5%	17,958	5%	18,514	5%	b
Essex	259,620	29%	179,280	20%	105,129	12%	c
Kent	60,818	7%	34,563	4%	19,985	2%	d
South East London	8,286	2%	18,036	4%	3,618	1%	e
South London	255,526	47%	231,194	42%	210,144	39%	f
West Sussex	163,755	37%	199,673	45%	170,605	39%	g
Total	**860,449**	**21%**	**727,951**	**18%**	**560,113**	**14%**	h
Shortlisted Wastes	2,058,801 (WDI 2015)		1,693,940 (WDI 2016)		1,508,860 (WDI 2017)		i
LACW as % of shortlisted wastes	42%		43%		37%		j

Source: Department for Environment, Food & Rural Affairs. LACW Statistics (LA_and_Regional_Spreadsheet_201718).
Table 2: Management of Local Authority Collected Waste, England, 2014/15 to 2017/18

3.2.29 Table 3.5 (row h) shows a decrease of 300,336 tonnes in the amount of LACW disposed to landfill between 2015 and 2017. This correlates with the change in LoW Code 20 03 01 mixed municipal wastes landfilled over the same period (297,541 tonnes, see Table 3.4, row q). This reduction in LACW waste disposed to landfill is likely to be a result of the increased amount of LACW exported from the Study Area as RDF (section 3.3).

3.2.30 If LACW is deducted from the shortlisted combustible wastes, in 2017/18 this leaves 950,000 tonnes of residual wastes that were landfilled in 2017. However, for all the reasons explained at paragraph 3.2.27 this figure is provided for context only.

Range of fuel availability from wastes disposed to landfill

3.2.31 This fuel availability assessment has shown that between 950,000 (paragraph 3.2.30) and nearly 2 million (Table 3.2) tonnes of residual waste would be available as fuel (diverted from landfill) for the Proposed Development.

3.2.32 It would almost certainly be an overestimation to rely upon the total wastes landfilled, not least due to the fact that some waste will not be appropriate for combustion in the Proposed Development. However, reliance upon the lower end of the range equally could be an underestimation.

3.2.33 There are two key reasons for the potential to underestimate the available fuel using this method:

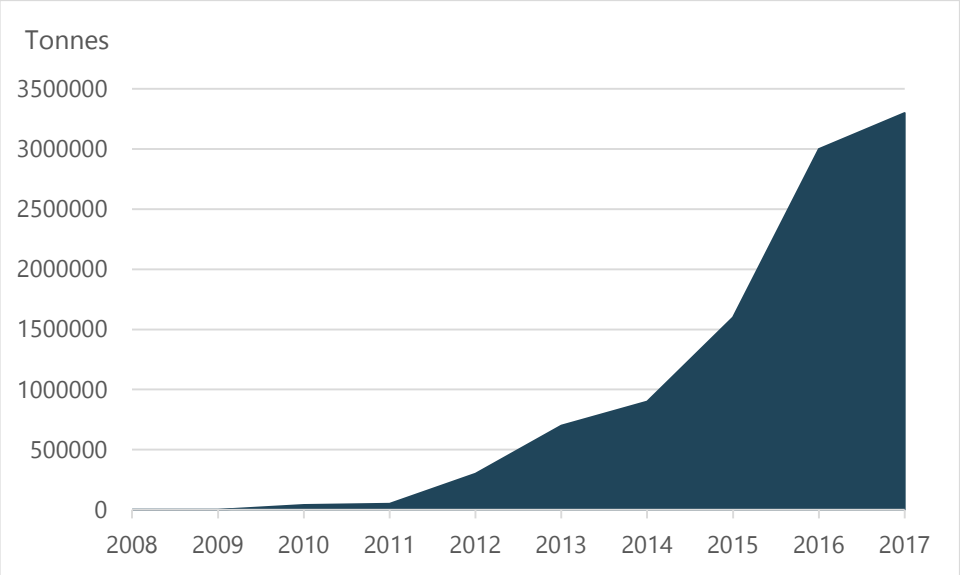
- There will be combustible wastes in those Chapters not shortlisted in Table 3.4. For example, in 2017, a total of 71,633 tonnes of waste from Chapter 03 Furniture, Paper and Cardboard Manufacturing Waste was disposed to landfill. In Table 3.4, the totality of these wastes have been discounted; however 63,500 tonnes of that waste deposited was mechanically separated rejects from pulping of waste paper and cardboard (LoW 03 03 07). These wastes may be entirely appropriate to use a fuel in the Proposed Development.
- Whilst LACW is currently subject to long term contracts, these contracts will come up for renewal throughout the lifetime of the Proposed Development. In addition, whilst historically LACW contracts have been long term, they are already beginning to change to shorter term contracts, favouring the ability to gain more cost effective waste management options.

3.2.34 Table 3.4 (row t) shows a total of **1.5 million tonnes of shortlisted residual wastes** remaining to be diverted from landfill within the Study Area.

3.3 Export of refuse derived fuel

3.3.1 The UK has been exporting RDF to mainland Europe for energy recovery since about 2009. As Figure 3.2 below shows, this practice was limited for the first few years, and then increased rapidly from 2014, reaching 3.35 million tonnes in 2017.

Figure 3.2 Export of RDF overseas



Source: hendeca, from a combination of industry news reports and Environment Agency data

3.3.2 In its report, 'Residual Waste in London and the South East' (published October 2018) Tolvik Consulting estimated that 1.72 million tonnes of RDF was exported from London and the South East, around 54% of the total exported from England.

3.3.3 Clearly, the export of RDF to energy recovery facilities located in mainland Europe is a key element of the waste management infrastructure relied upon nationally. However, it is a practice that fails to optimise the UK's use of a recognised renewable/low carbon fuel.

3.3.4 Table 3.6 presents the amount of RDF identified in the WDI as being removed from facilities within the Study Area and having an end destination as 'Outside UK'. Again, this data was sourced from the WDI, this time selecting waste types 19 12 10 combustible waste (refuse derived fuel) and 19 12 12 other wastes (including mixtures of materials) from mechanical treatment of waste not containing dangerous substances.

Table 3.6 RDF removed from facilities within the Study Area and exported, 2015, 2016, 2017

Area	**2015** (tonnes)	**2016** (tonnes)	**2017** (tonnes)	row
East London	307,935	412,435	360,679	a
East Sussex	218	6,177	4,627	b
Essex	54,757	211,650	149,020	c
Kent	153,617	321,582	369,730	d
South East London	n/r	1,901	25,536	e
South London	78,886	46,871	99,843	f
West Sussex	n/r	n/r	9,156	g
Total	**595,413**	**1,000,617**	**1,018,592**	h

Source: Environment Agency, WDI, 2015, 2016, 2017
n/r = none reported

3.3.5 Table 3.6 shows that there was a sharp increase in the amount of RDF being removed from facilities within the Study Area, to be exported overseas between 2015 and 2016, and that a more steady increase has been maintained into 2017, with **over 1 million tonnes exported**.

3.4 Fuel availability and considered sensitivities

The shift from disposal to landfill to export

3.4.1 This fuel availability assessment has demonstrated that there is, consistently, in the region of **2.5 million tonnes of fuel available to the Proposed Development within the Study Area**.

3.4.2 All of these wastes are suitable for combustion in an energy generating station such as K3/WKN. By utilising the RDF within K3/WKN, this resource, recognised as a renewable/low carbon fuel, contributes to the new supply of renewable/low carbon energy sought throughout national policy.

3.4.3 This level of availability is identified by considering the shortlisted waste types that are disposed to landfill within the Study Area (over 1.5 million tonnes) and adding to it all the RDF removed from facilities in the Study Area that is exported overseas (over 1 million tonnes), as shown in Table 3.7. Even if the LACW was also discounted, there would still remain c.2 million tonnes.

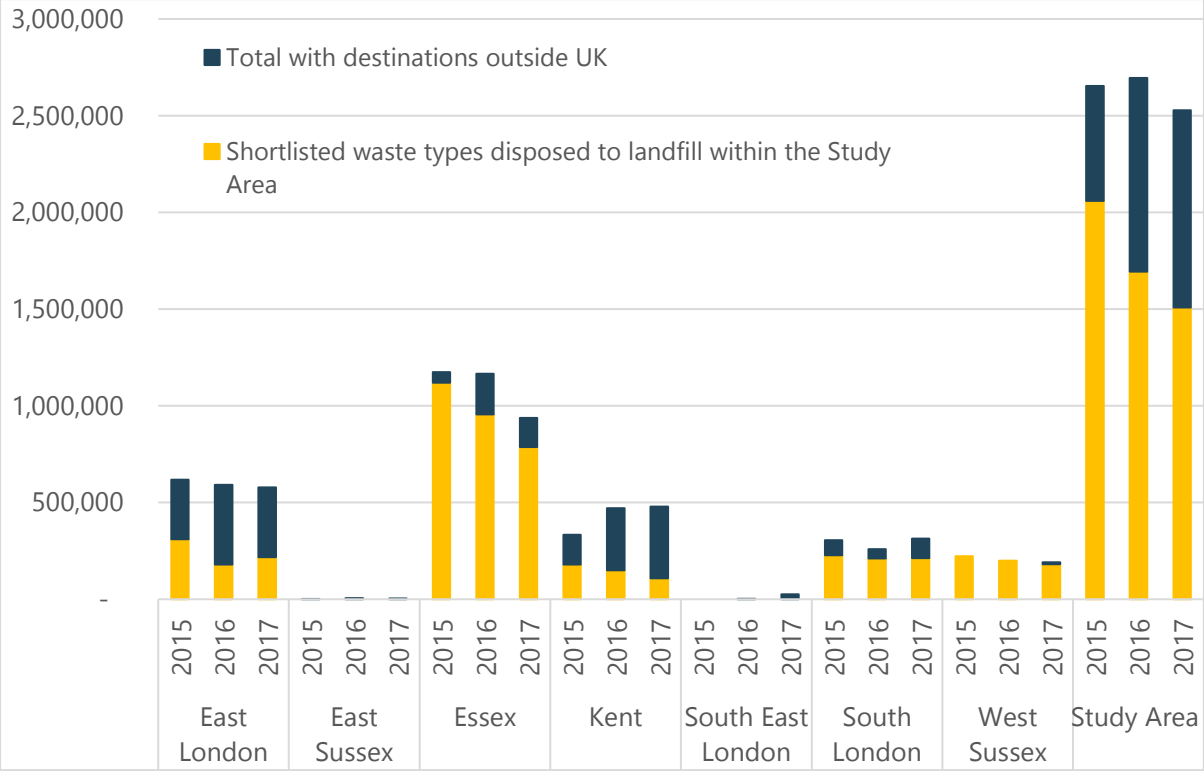
Table 3.7 The range of fuel availability across the Study Area, 2015, 2016, 2017 (tonnes)

Fuel Source	2015 (tonnes)	2016 (tonnes)	2017 (tonnes)
Shortlisted waste types (Table 3.4, row t)	2,058,801	1,693,940	1,508,860
Exported RDF (Table 3.6, row h)	595,413	1,000,617	1,018,592
Total	**2,654,214**	**2,694,557**	**2,527,452**

3.4.4 Table 3.7 does not account for all wastes disposed of within the Study Area; however it very clearly demonstrates the extent of the level of availability of fuel for K3/WKN and other EfW energy facilities like it.

3.4.5 Table 3.7 also clearly shows a shift from residual wastes being disposed to landfill, to their being exported overseas as RDF. This is graphically presented across the Study Area (cumulatively and for each sub region in Figure 3.3).

Figure 3.3 The shift from disposal to export



3.4.6 The substantial amount of fuel both disposed to landfill and exported overseas highlights the significant deficiency in residual waste management infrastructure. Both methods (landfill disposal and RDF export) pose risks to long term sustainable waste management through uncertain future available capacity and environmental disadvantages.

3.4.7 Disposal to landfill is the least preferred management method in the waste hierarchy. Further, the future capacity, and consequent availability, of landfill facilities cannot be relied upon beyond the next ten years.

3.4.8 Export of RDF overseas is a missed opportunity. The large amount of RDF exported overseas from the south east has developed as a short term solution to the UK's residual waste treatment infrastructure gap. It is not a sustainable long term solution, not least with the uncertainties continuing around the UK's potential exit from the European Union.

3.4.9 Further, the continued export of RDF fails to support the construction of essential new infrastructure in the UK. Energy generation facilities, such as K3/WKN, provide both a sustainable destination for residual wastes, and a supply of renewable/low carbon energy, bringing consequent environmental, economic and societal benefits.

Future impact of the circular economy?

3.4.10 The Resources and Waste Strategy opens with a candid recognition of the interconnectedness between natural and material resources, and the consequent connectivity between resource and waste management, and the benefits to be achieved through addressing both, together.

3.4.11 Consequently, The Resources and Waste Strategy is clear that Government wants to deliver the circular economy in England; in short, this is a concept of properly valuing resources, keeping them at their highest value for as long as possible.

3.4.12 Delivery of the circular economy is intended to be achieved through a range of different programmes and policies: starting with the design, material and manufacture of products; through transport and packaging options; re-use and recycling initiatives; to choices about end destination. At page 26, the Resources and Waste Strategy states:

'*But it's not just in material reuse that the circular economy delivers benefits. It's also relevant to energy generation and savings. Incinerating non-recyclable or contaminated waste (such as food packaging) can generate energy. Bio-waste can also be used to make bio-gas, a renewable energy source. Reusing products preserves the energy and materials embedded in them during their production.*'

3.4.13 A key element of the CEP, a suite of defined measures agreed across European member states, and to which the UK has committed even if we leave the European Union, are new municipal waste recycling targets up to 2030. These seek to achieve:

- 55% by 2025;
- 60% by 2030; and
- 65% by 2035.

3.4.14 In December 2018, Defra published 'Statistics on waste managed by local authorities in England in 2017/18'[15] (the'2017/18 Statistics'). On page 2 (at the first bullet) the 2017/18 Statistics confirm the '*official England waste from household recycling rate for 2017 was 45.2 per cent, up 0.3 percentage points from 44.9 percent in 2016.*' On page 9, the 2017/18 Statistics confirm (at the third bullet) that the '*amount of all local authority waste sent for recycling in 2017/18 was 10.9 million tonnes, 392 thousand tonnes down on 2016/17. Overall 42.4 per cent of all local authority waste was sent for recycling in 2017/18 compared to 42.8 per cent in 2016/17.*'

3.4.15 Recycling rates across the Study Area have been identified for household waste recycling (this data is collected through WasteDataFlow[16] and reported by Defra on an annual basis[17]). Household waste recycling is a performance indicator for local authorities and makes up the greatest proportion of LACW; it generally achieves a higher recycling rate than the other wastes in LACW (street sweepings, parks and garden wastes, business waste).

3.4.16 Table 3.8 shows household waste recycling data over the past seven years. This reveals a wide range of recycling achieved across the Study Area, but within all the authorities significant improvement would need to be made to reach 65% recycling by 2035. The average across the Study Area is less than that reported for England as a whole.

[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/763191/LACW_mgt_annual_Stats_Notice_Dec_2018.pdf Also provided at Annex C

[16] WasteDataFlow is the web based system for municipal waste data reporting used by UK local authorities to government. The system went live over 10 years ago on 30 April 2004 and validated information held on the system can be downloaded by the general public.

[17] https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables

3.4.17 Perhaps the most striking observation is the lack of change in recycling achieved over that period; recycling has generally remained fairly constant across all the authorities. Albeit, there are some notable exceptions: Southwark achieved a 10% increase over the period; Sutton achieved a 12% increase; whilst Barking and Dagenham's recycling fell to 19% in 2015/16 (from 28% in 201/11) but has subsequently sustained a level of 25%.

3.4.18 This level of consistency across the Study Area and over an extended period reflects that the 'easy wins' have generally been achieved, with the potential for expanding waste management services likely to have been curtailed over the recent period of financial austerity. This indicates that to significantly increase household waste recycling will require collection of the more difficult to recycle materials and will probably also require the separate collection of food and green wastes (an initiative explored in the Resources and Waste Strategy).

3.4.19 Whilst the ability of local authorities to achieve a 65% recycling rate is uncertain, it is clear that to enable a significant increase in recycling of LACW will require both defined performance targets and substantial funding from central government.

3.4.20 Whilst the government's detailed strategy for achieving CEP targets remains to be seen, it is likely that a recycling rate of 65% will not be expected to be achieved by all authorities, instead a blended rate across the country would be used in reporting. However, to apply a conservative sensitivity test, this assessment assumes that the current recycling rate achieved for municipal waste in the Study Area is 38% (the commonest household recycling rate achieved within the Study Area). To reach 65% would require an additional 27% of wastes to be recycled.

3.4.21 In simple terms, the result of this level of improvement in recycling would take nearly 682,500 tonnes out of the available fuels (Table 3.7) at 2017 which would **reduce the availability of the fuels to over 1.8 million tonnes**.[18]

3.4.22 This is however considered to be a very conservative sensitivity. Not least, whilst C&I waste data is not comprehensive and cannot readily be used to identify the recycling rates across each authority in the Study Area, it is generally believed to range from 52% to 60% across England.[19] Much of the C&I waste stream would fall within the CEP description for municipal waste; consequently, the overall increase in recycling required to meet the CEP 2035 target of 65% across municipal wastes, is unlikely to be as great as 27%.

[18] 27% of 2,527,452 tonnes (Table 3.7, Total, 2017) = 682,412 tonnes, subtracted from Total leaves 1,845,040 tonnes

[19] Waste Management Plan for England, 2013 page 18 reports that the last C&I waste survey identified a 52% recycling rate within this waste stream. It is widely believed across the industry that this has increased and generally exceeds LACW recycling.

Table 3.8 Household recycling rates across the Study Area, 2010/11 to 2017/18

	Area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
E London	**Barking and Dagenham**	28%	30%	27%	25%	23%	19%	25%	25%
	Havering	31%	36%	35%	32%	32%	32%	37%	37%
	Newham	15%	23%	21%	18%	17%	15%	14%	14%
	Redbridge	28%	33%	29%	29%	29%	28%	27%	24%
E Sussex	**East Sussex**	38%	39%	39%	41%	42%	42%	44%	43%
	Brighton and Hove	28%	28%	27%	26%	25%	25%	27%	29%
Essex	**Essex**	50%	52%	52%	52%	51%	51%	53%	53%
	Southend on Sea	45%	47%	48%	52%	51%	46%	46%	47%
	Thurrock	45%	42%	43%	41%	40%	38%	37%	36%
Kent	**Kent**	39%	41%	41%	44%	46%	44%	46%	47%
	Medway	36%	38%	41%	41%	46%	43%	43%	43%
SE London	**Bexley**	51%	54%	54%	55%	54%	52%	53%	52%
	Greenwich	37%	39%	40%	39%	34%	35%	35%	35%
	Lewisham	18%	17%	20%	18%	17%	18%	18%	22%
	Southwark	25%	27%	30%	34%	35%	35%	34%	35%
S London	**Bromley**	44%	50%	49%	50%	48%	46%	47%	50%
	Croydon	34%	38%	44%	42%	40%	38%	39%	38%
	Merton	36%	37%	39%	39%	38%	35%	36%	37%
	Kingston Upon Thames	47%	47%	46%	46%	46%	46%	47%	48%
	Sutton	38%	37%	37%	37%	38%	35%	37%	50%
	West Sussex	44%	44%	43%	41%	42%	42%	44%	51%
	Average	**36%**	**38%**	**38%**	**38%**	**37%**	**36%**	**37%**	**38%**

Potential future capacity

3.4.23 This fuel availability assessment has incorporated consideration of existing treatment capacity, because the source of the fuel is looking solely at that waste which is being disposed to landfill or exported overseas. However, it is recognised that there is new treatment capacity potentially able to become operational within the Study Area that could[20] serve to reduce the availability of fuels to the Proposed Development.

3.4.24 Reference has been made to the Environment Agency's Waste Management 2017 in England_Data Tables[21] to identify new energy recovery facilities that have received an Environmental Permit, but are not yet operational. Table 3.9 presents those that are located within the Study Area, indicating a total new capacity pipeline of over 2 million tonnes.

3.4.25 It is not reasonable to give credence to capacity that is not yet operational, or at the very least, for which there is not more than reasonable prospect that it will become available. NPS EN-1 makes clear (at footnote 36 on page 22) that energy projects that have gained consent but have not as yet started to be built cannot be relied upon; '*Government considers that it would not be prudent to consider these numbers for the purposes of determining the planning policy in this NPS*.'

3.4.26 Neither the Thames Gateway Energy Facility, Rivenhall Integrated Waste Management Facility, nor Kemsley Park EfW can credibly be considered as likely to be delivered. Construction has not commenced, or (as in the case of the Thames Gateway Facility) if it has, it has subsequently stalled.

3.4.27 Phase 1 of Tilbury Green Power Ltd's project therefore has a reasonable prospect of being delivered, but not Phase 2. Phase 1 is permitted to receive 270,000 tonnes of waste wood. As demonstrated in the analysis presented in Annex D, very little waste wood is disposed to landfill, not least because it would be recognised as a biodegradable waste and consequently incur the Landfill Tax. The WDI data shows that just over 482,000 tonnes of waste wood was removed from facilities (excluding transfer stations) operating within the Study Area. This is shown in Table D.1 of Annex D.

3.4.28 Looking further into waste type 19 12 07 (the most substantial) the data held within the WDI shows that 230,000 tonnes had a destination of incineration outside the UK.

3.4.29 Annex D demonstrates that there is a substantial amount of waste wood available for Tilbury Green Power Ltd's project to be gained from sources (waste types) that have not been considered in identifying the fuel availability for K3/WKN.

3.4.30 Tilbury Green Power Ltd's project, whilst an energy from waste facility, is not a comparable project and can be discounted from further consideration.

[20] These other facilities may be accepting waste from beyond the Study Area, as well as within.

[21] https://data.gov.uk/dataset/dd8629ad-bd32-4db3-a07a-879737964f23/waste-data-interrogator-2017 under the 3rd 'Resource locator' link, 2017 Waste Summary Tables.zip

Table 3.9 Energy recovery facilities with an Environmental Permit, in construction but not operational, 2017

EP Number	Operator Name	Site Name	Study Area	Permitted Capacity (tonnes)	Comment	row
CP3737CV	Thames Gateway Waste to Energy Ltd	Thames Gateway Energy Facility	East London	120,000	Permitted 2010. Construction not started.	a
FP3335YU	Gent Fairhead & Co Ltd	Rivenhall Integrated Waste Management Facility	Essex	595,000	Permitted 2017. In pre-construction stage. Construction not started.	b
KP3936ZB	Tilbury Green Power Ltd	Former Cargill Sweetners Facility	Essex	490,000	Commissioning of waste wood plant underway. Construction on Phase 2 RDF plant not started.	c
JP3135DK	**K3 CHP Operations Ltd**	Kemsley Sustainable Energy Park	Kent	**550,000**	Permitted July 2011. Construction commenced in 2017 and hot commissioning planned to commence in 2019.	d
YP3137VY	4Evergreen Technologies Ltd	Kemsley Park EfW	Kent	48,000	Permitted October 2015. Construction not started.	e
TP3836CT	**Viridor Waste Management Ltd**	Beddington Energy Recovery Facility (ERF)	South London	**302,500**	Permitted 2013. Construction commenced 2016. Hot commissioning underway with the plant to enter full service in 2019.	f
Total	All permitted facilities			2,105,500		g
	Reasonable prospect to become operational			**852,500**	Kemsley Sustainable Energy Park (K3) and Beddington ERF.	h

Source: Environment Agency, Waste Management 2017 in England Data Tables, Pre-Operational Incinerators tab
Comment column is mix of EA and report author comment

3.4.31 This leaves just Kemsley Sustainable Energy Park (K3) and Beddington ERF, both of which have substantially completed construction and should be fully operational in 2019.

3.4.32 Consequently, if only those facilities are counted for which there is a reasonable prospect of delivery, and which would have a similar source of fuels as K3/WKN (i.e. discounting Tilbury Green Power Ltd's focus on waste wood) then the potential future capacity is 852,500 tonnes (Table 3.9, row h).

3.4.33 Assuming this new capacity takes wastes from within the Study Area would reduce the availability of the fuels to **nearly 1 million tonnes**.[22]

3.5 Conclusions on fuel availability

3.5.1 NPS EN-3 paragraph 2.5.70:

'*The IPC should be satisfied, with reference to the relevant waste strategies and plans, that the proposed waste combustion generating station is in accordance with the waste hierarchy and of an appropriate type and scale so as not to prejudice the achievement of local or national waste management targets in England and local, regional or national waste management targets in Wales. Where there are concerns in terms of a possible conflict, evidence should be provided to the IPC by the applicant as to why this is not the case or why a deviation from the relevant waste strategy or plan is nonetheless appropriate and in accordance with the waste hierarchy.*'

3.5.2 Section 4 of this report addresses national and local policy. However, this fuel availability assessment has demonstrated that the Proposed Development is in accordance with the waste hierarchy on a practical level. It demonstrates both:

- The substantial amount of fuel that is currently available to the Proposed Development. This fuel would be sourced from either those residual wastes being disposed to landfill or exported (as RDF) overseas.
- That, even in the event that the Government's latest resource and waste management aspirations are met, there remains a substantial amount of residual waste that would be either disposed to landfill or exported overseas. There remains a substantial availability of fuel for the Proposed Development.

3.5.3 A summary of the assessment undertaken, the sensitivities applied, and the remaining amount of fuel available for energy recovery is shown in Table 3.10.

[22] Paragraph 3.4.21 leaves 1,845,040 tonnes in 2017 after applying the CEP sensitivity. Subtracting 852,500 tonnes would leave 992,540 tonnes.

Table 3.10 Summary of Fuel Availability Assessment and sensitivities

Assessment	Reference	Calculated range using 2017 data (tonnes)		row
		Upper	Lower	
HIC waste disposed to landfill within Study Area	Table 3.2 (row h)	1,981,358		a
Shortlisted waste types disposed to landfill within Study Area	Table 3.4 (row t)		1,508,860	b
RDF removed from facilities in the Study Area and exported	Table 3.6 (row h)	1,018,592	1,018,592	c
Total fuel		**2,999,950**	**2,527,452**	d
Additional 27% recycling to achieve CEP 2035 target	paragraph 3.4.21	809,986	682,412	e
Remaining fuel		**2,189,963**	**1,845,040**	f
Comparable future capacity likely to be delivered	Table 3.9 (row h)	852,500	852,500	g
Remaining fuel		**1,337,463**	**992,540**	h
Proposed capacity of K3/WKN	paragraph 1.6.7	497,000	497,000	i
Remaining level of need		**840,463**	**495,540**	j

3.5.4 With somewhere in the region of **992,500 (row h) to 1.98 million (row a) tonnes of fuel available to the Proposed Development**, K3/WKN will not prejudice delivery of either the waste hierarchy, or the future circular economy.

3.5.5 Applying all the sensitivities (focussing on specific waste types, assuming very high additional recycling, and relying on non-operational facilities) there would still remain at least 495,500 tonnes of fuel available beyond that sought for the Proposed Development (row j above). It is considered unlikely that all of these variables would occur to the extent considered within this fuel availability assessment and consequently this outcome is considered to be very conservative.

3.5.6 However, it serves to demonstrate that there is substantial fuel availability, to be sourced from wastes that would otherwise be disposed to landfill within or exported overseas from the Study Area. K3/WKN is demonstrated not to prejudice options preferred in the waste hierarchy, and is confirmed to be playing an important and appropriate role in delivering sustainable waste management.

4. Effect on Waste Plans and Strategies

4.1 Introduction

4.1.1 NPS EN-3 paragraph 2.5.66 states that:

'*An assessment of the proposed waste combustion generating station should be undertaken that examines the conformity of the scheme with the waste hierarchy and the effect of the scheme on the relevant waste plan or plans where a proposal is likely to involve more than one local authority.*'

4.1.2 Sections 2 and 3 of this report have demonstrated how, on a practical level, considering the availability of fuel and the technical and financial drivers for waste management, the Proposed Development plays an important role within the waste hierarchy. They provide the evidence as to why K3/WKN will not prejudice national and local policy waste management targets.

4.1.3 This section considers the policy of relevant national and local waste plans and strategies in more detail.

Identifying the relevant policy objectives

4.1.4 In that the national strategy has to be, at a minimum, compliant with the requirement that the rWFD places on EU Member States, it is relevant to consider how the relevant rWFD requirements have been implemented. In England and Wales, the Waste Regulations 2011 require, at Regulation 18, that planning authorities must have regard to the provisions of Article 13 (regarding general environmental protection) and to the majority of Article 16 of the rWFD. Neither Articles 13 nor 16 are affected by the 2018 amendments to the rWFD.

4.1.5 Those parts of paragraph 1 of Article 16 which are given effect by the Waste Regulations 2011 Regulation, and which are relevant to the Proposed Development, require that:

'*Member States shall take appropriate measures to establish an integrated and adequate network of waste disposal installations and of installations for the recovery of mixed municipal waste collected from private households, including where such collection also covers such waste from other producers.*'

4.1.6 Paragraph 2 of Article 16 of the rWFD also requires that the network of disposal and recovery installations referred to in paragraph 1 shall be designed to enable the Community as a whole to become self-sufficient in waste disposal as well as in the recovery of the types of waste referred to in paragraph 1. Paragraph 2 indicates that the network of facilities to be established should '*enable Member States to move towards that aim (i.e. self sufficiency) individually, taking into account geographical circumstances or the need for specialised installations for certain types of waste.*'

4.1.7 Paragraph 3 of Article 16 requires that Member States ensure that the network of facilities shall enable waste to be disposed of or waste referred to in paragraph 1 to be '*recovered in one of the nearest appropriate installations, by means of the most appropriate methods and technologies, in order to ensure a high level of protection for the environment and public health.*'

4.1.8 This is an important principle and avoids wastes being disposed of outside of the European Union where appropriate facilities may not operate sufficiently to ensure waste management occurs without endangering human health or harming the environment.

4.1.9 However, the wording '*recovered in one of the nearest appropriate installations*' is important. The concept involves elements other than just distance: the installation chosen for any tonne of waste may be one of several; and it cannot be any installation, it needs to be an appropriate installation.

4.1.10 Energy recovery facilities, such as K3/WKN, are not required to be the, only, closest, installation to the waste; they are required to be '*one of the nearest appropriate installations*'.

4.1.11 Consequently, this section focusses on the relevant objectives, as set out in the Waste Regulations of 2011, to:

- deliver the waste hierarchy;
- obtain self-sufficiency at the national level; and
- establish a network of facilities from which value can be recovered from municipal waste or waste collected together with municipal waste.

4.2 National policy and strategy

Resources and Waste Strategy

4.2.1 It is notable that the most recent expression of Government's intentions for waste management expands the concept to fully recognise waste as a resource; something that should be valued and not simply treated or disposed of.

'*Our Strategy is framed by natural capital thinking and guided by two overarching objectives:*

1 To maximise the value of resource use; and

2 To minimise waste and its impact on the environment. ' (page 17)

4.2.2 This approach is focussed upon the delivery of five strategic ambitions (page 17):

'1 To work towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025;

2 To work toward eliminating food waste to landfill by 2030;

3 To eliminate avoidable plastic waste over the lifetime of the 25 Year Environmental Plan;

4 To double resource productivity by 2050; and

5 To eliminate avoidable waste of all kinds by 2050.'

4.2.3 On page 18, the Resources and Waste Strategy introduces a new monitoring framework to be established, with an initial focus on greenhouse gas emissions and natural capital. Policies within the Strategy are expected '*to contribute to a wide range of economic and social goals.*' At the same time, the Resources and Waste Strategy seeks to minimise the damage caused to the natural environment by reducing and managing waste safely and carefully and by tackling waste crime. It combines actions to take now with firm commitments for the coming years and gives a clear longer-term policy direction in line with the 25 Year Environment Plan.

4.2.4 '*The environment will benefit as we reduce landfill and carbon emissions, and use fewer finite natural resources. … '* Alongside environmental benefits, the Resources and Waste Strategy identifies economic benefits, including turning waste into wealth, improved resilience to raw materials supply and less vulnerability to price volatility; and societal benefits. (page 25)

4.2.5 Valuing resources to gain these benefits is achieved through a lifecycle approach and delivery of the circular economy. The Strategy confirms (at page 26) that reusing and recycling materials helps to reduce the need for virgin raw materials and prevent the impacts of its manufacture.

'*But it's not just in material reuse that the circular economy delivers benefits. It's also relevant to energy generation and savings. Incineration of non-recyclable or contaminated waste (such as food packaging) can generate energy. Bio-waste can also be used to make bio-gas, a renewable energy source*' (page 26).

4.2.6 The Proposed Development will recover renewable/low carbon energy from residual wastes and RDF, achieving the environmental, economic and societal benefits sought in both the NPS and in the Strategy.

4.2.7 Following combustion, the resultant incinerator bottom ash (IBA) will be transported off site to be treated to recover glass, metals and a secondary aggregate. '*Constructing, maintaining and repairing our built environment … represents a major material resources flow in the economy.*' (page 45) The materials recovered from K3/WKN will enable the construction industry to further reduce its reliance on raw materials and increase its resource efficiency. The Proposed Development contributes to delivery of the circular economy through both energy and materials recovery.

4.2.8 Alongside the CEP recycling targets, the Resources and Waste Strategy supports growth in residual waste treatment infrastructure, including through energy recovery to divert waste from landfill.

4.2.9 '*No matter what we do, we will generate waste … Even those materials that can be given a new lease of life by reuse or reprocessing will eventually reach a point of such little value that they need to be disposed of...*' (page 67) The fuels for K3/WKN are just this type of waste, the residual wastes that remain following practicable reuse or recycling. The Resources and Waste Strategy explicitly recognises (not least at page 20) the role to be played by growth in energy from waste and alternative residual waste treatment infrastructure to divert further waste from landfill.

4.2.10 The Carbon Assessment Reports (Appendices 6.1 and 6.2 of the Environmental Statement, Document 3.1) each completed for K3 and WKN (the 'K3/WKN Carbon Assessment Reports') directly address how the Proposed Development contributes to carbon emissions reduction, primarily through the diversion of residual waste from landfill. This is important, as the Resources and Waste Strategy advises (pages 19 & 20) that methane is '*25 times more potent than CO2, and … accounted for 11% of the UK National Inventory of greenhouse gases in 2016*' and confirms (page 76) that '*landfill is the least preferred option given its environmental impact*'.

4.2.11 The Proposed Development will divert residual waste that would otherwise be disposed to landfill, and use RDF that would otherwise be exported overseas, to recover energy and so deliver both the Strategy's ambitions to remove waste from the least preferred option, landfill and the NPS ambitions for greater supply of a diverse, secure, affordable, renewable/low carbon energy supply.

4.2.12 However, the Strategy also seeks to drive greater efficiency of EfW facilities, not least by encouraging use of the heat. As part of the review of the Waste Management Plan for

England[23] (programmed for 2019) Defra will work with the Ministry of Housing, Communities and Local Government to ensure that both it, and National Planning Policy for Waste and its supporting planning practice guidance, reflects the policies set out in the Resources and Waste Strategy. This will consider how to ensure, where appropriate, future plants are situated near potential heat customers. In addition, Government will work closely with industry to secure a substantial increase in the number of EfW facilities that are formally recognised as achieving recovery status and will ensure that all future EfW plants achieve recovery status.[24]

4.2.13 Both K3 and WKN are wholly modern, efficient, facilities. The K3/WKN Carbon Assessment Reports demonstrate that, in 2020, the Proposed Development will result in the net avoided burden of c.59.5 to 63.3 ktCO2e[25] and c.63.8 to 98.3 ktCO2e[26] respectively.

4.2.14 Further, there is a demonstrated heat demand located adjacent to the Application Site. K3 will provide steam to the Kemsley Paper Mill, and WKN could provide back up and contingency energy as required, for example during maintenance. Further heat demands are being explored to expand WKN's role in the future.

4.2.15 The Carbon Assessments consequently also confirm that the Proposed Development will achieve the R1 status, and so can be confirmed as a 'recovery facility'.

4.2.16 At page 78, the Resources and Waste Strategy presents an overview of domestic residual waste infrastructure. The policy set out within the Strategy is clear:

'*Given our projections we continue to welcome further market investment in residual waste treatment infrastructure*.'

4.2.17 Through footnote 112, the Strategy directs the reader to the evidence annex, where its own internal analysis and that undertaken by Tolvik Consulting Ltd ('Tolvik's 2030 Market Review') are presented. At page 78, the evidence annex advises that the internal analysis appears to provide a contrary view, indicating that significant additional residual waste energy recovery capacity '*would not necessarily be needed*' and that the report prepared by Tolvik '*concluded that there would not be a gap in incineration capacity by 2030*.'

4.2.18 However, the evidence annex needs to be read in its totality. Not least, it is clear that the internal analysis is predicated upon a number of assumptions incorporating: reduced arisings, increased recycling, continuing to export RDF, and landfilling of no more than 10%.

4.2.19 Tolvik's 2030 Market Review presents two key conclusions:

- the wide range of residual waste predicted at 2030, demonstrates the level of uncertainty in relation to forecasting future events; and
- that a potential surplus of capacity is only achieved with very high recycling rates, when all potential future capacity is included (even when it is not yet operational) and RDF continues to be exported.

[23] https://www.gov.uk/government/publications/waste-management-plan-for-england

[24] 'R1' Recovery status acts as a proxy for the energy-generating efficiency of facilities. Facilities which achieve the status are classed as a recovery operation for the purposes of the waste hierarchy and so are a level up from the bottom rung of 'disposal'.

[25] Carbon Assessment for Kemsley K3 CHP WtE Plant, November 2018, Section 5.0 Conclusions

[26] Carbon Assessment for Wheelabrator Kemsley North WtE Plant, November 2018, Section 5.0, Conclusions

4.2.20 This is reflected in the conclusions of the evidence annex (page 78) stating:

'*The risk of a gap in capacity is, however, still relevant as projections on future capacity, exports and arisings are subject to uncertainty*.'

4.2.21 This position is entirely consistent with that of the NPS. NPS EN-1 (at footnote 36 on page 22) makes clear that energy projects that have gained consent but not yet started construction cannot be relied upon, Government policy consequently seeks to deliver a minimum level (of 59 GW) of new electricity capacity.

4.2.22 Further, not least as set out at paragraphs 2.2.4, 3.3.21 and 4.1.9, NPS EN-1 is clear that it is not the role of the planning system to dictate capacity amounts. Instead, the '*role of the planning system is to provide a framework which permits the construction of whatever Government – and players in the market responding to rules, incentives or signals from Government – have identified as the type of infrastructure we need in the places where it is acceptable in planning terms*.'

4.2.23 The NPS, both EN-1 and EN-3 identify energy from waste as a type of infrastructure that is needed. So too does the Resources and Waste Strategy, which is wholly supportive of new residual waste treatment capacity, particularly encouraging *'developments that increase plant efficiency, minimise environmental impacts whilst upholding our existing high standards of emissions control* …' (page 79).

4.2.24 K3/WKN is a wholly modern development that will deliver all of these aims.

National Waste Management Plan

4.2.25 The Waste Management Plan for England[27] ('WMPE') was published in December 2013 and sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management.

4.2.26 The WMPE provides an analysis of the current waste management situation in England, and evaluates how it will support implementation of the objectives and provisions of the rWFD. It is a high level document that is not site specific.

4.2.27 At page 6, the WMPE recognises that the objectives of the rWFD cannot be delivered by Government alone. It requires action by businesses, consumers, householders and local authorities.

4.2.28 It also makes clear (at page 13) that, alongside increased recycling, the '*Government supports efficient energy recovery from residual waste – of materials which cannot be reused or recycled - to deliver environmental benefits, reduce carbon impact and provide economic opportunities. Our aim is to get the most energy out of waste, not to get the most waste into energy recovery.* …'

4.2.29 On page 32, the WMPE confirms that Government does not express a preference for any one technology, whilst acknowledging that any given technology for residual waste management is more beneficial if both heat and electricity can be recovered. '*Particular attention should therefore be given to the location of the plant to maximise opportunities for heat use*.'

[27] https://www.gov.uk/government/publications/waste-management-plan-for-england

4.2.30 Page 14 of the WMPE advises that '*landfill or incineration without energy recovery should usually be the last resort for waste, particularly biodegradable waste.*'

4.2.31 K3/WKN is an example of the industry delivering key objectives of the rWFD and meeting the priorities of the WMPE.

Energy from waste – A guide to the debate

4.2.32 In February 2013, the Government published 'Energy from Waste – A Guide to the Debate'[28] to highlight key environmental, technical and economic issues to raise the level of understanding and debate around energy from waste. This was subsequently revised in February 2014.

4.2.33 In the Guide, it is readily acknowledged that many waste materials that could theoretically be recycled are not currently, and go to energy recovery or landfill. It is important that the presence of energy recovery as an option does not diminish efforts to overcome the range of barriers to capturing and recycling these. However, it is equally important that while those barriers do exist, energy from waste is used effectively to ensure those materials do not go to a worse environmental fate in landfill. In the long term, all waste should be treated at its optimal level in the hierarchy in environmental and economic terms.

4.2.34 In this context, energy from waste needs to support, not compete with, both increased diversion from landfill and increased recycling whilst also ensuring waste reduction and reuse are not compromised. This is demonstrated to be achieved by the Proposed Development.

National Planning Policy for Waste

4.2.35 An integrated approach is also present in the National Planning Policy for Waste[29] published in October 2014. The opening paragraph confirms that waste management makes a positive contribution to sustainable communities, sustainable development and resource efficiency.

4.2.36 Further (continued on page 1) it states that positive planning plays a pivotal role in delivering this country's waste ambitions through delivery of sustainable development and resource efficiency, including provision of modern infrastructure, local employment opportunities and wider climate change benefits, by driving waste management up the waste hierarchy.

4.2.37 In identifying suitable sites and areas for development (page 5) consideration should be given to a broad range of locations, '*looking for opportunities to co-locate waste management facilities together'* and to enabling *'the utilisation of the heat produced as an energy source in close proximity to suitable potential heat customers.*'

4.2.38 K3/WKN are two EfW facilities proposed to be co-located and are situated adjacent to a steam demand (the Kemsley Paper Mill). The National Planning Policy for Waste objectives are achieved by the Proposed Development.

[28] https://www.gov.uk/government/publications/energy-from-waste-a-guide-to-the-debate
[29] https://www.gov.uk/government/publications/national-planning-policy-for-waste

Planning Practice Guidance on Waste

4.2.39 Published in October 2015, the Planning Practice Guidance on Waste[30] provides further information in support of the implementation of waste planning policy.

4.2.40 All local planning authorities, to the extent appropriate to their responsibilities, should look to drive waste management up the hierarchy, this is an integral part of national waste planning policy.

4.2.41 The principles of self-sufficiency and proximity are set out in Article 16 of the rWFD. Local planning authorities are required, under regulation 18 of the 2011 Regulations which transposed the Directive, to have regard to these requirements when exercising their planning functions relating to waste management.

4.2.42 Though the aim is for each waste planning authority to manage its own waste, there is no expectation that each local planning authority should deal solely with its own waste to meet the requirements of the self-sufficiency and proximity principles. The guidance notes that the ability to source waste from a range of locations/organisations helps ensure existing capacity is used effectively and efficiently, and importantly helps maintain local flexibility to increase recycling without resulting in local overcapacity.

4.2.43 K3/WKN is proposed both to serve a regional need for new waste management infrastructure and the national need for new renewable/low carbon energy. Section 3 of this report demonstrates the substantial amount of fuel availability for the Proposed Development, and that it is appropriately located adjacent to a steam demand and with satisfactory connection to the highway network.

Conclusions on national policy and strategy

4.2.44 As demonstrated in section 3, there is substantial fuel available within the Study Area. This fuel comprises residual waste from which energy could be recovered but which instead continues to be disposed to landfill and RDF exported overseas. The Proposed Development will take those wastes out of landfill and up the hierarchy, and optimise the use of RDF to deliver renewable/low carbon energy to the UK.

4.2.45 K3/WKN is demonstrated to deliver key objectives of national policy and strategy through:

- delivering the waste hierarchy;
- contributing to self-sufficiency (in terms of both energy recovery and sustainable waste management) at the national level; and
- being part of a network of facilities from which value would be recovered from appropriate residual wastes.

[30] https://www.gov.uk/guidance/waste

4.3 Local policy and strategy

Kent Minerals and Waste Local Plan

4.3.1 The Kent Minerals and Waste Local Plan 2013-30 ('KMWLP') was adopted in July 2016 and sets out the vision and strategy for waste management and mineral provision up until the year 2030. It also contains a number of development management policies for evaluating minerals and waste planning applications.

4.3.2 The following policies are relevant to this report:

- **Policy CSW 2** requires that to deliver sustainable waste management solutions for Kent, proposals for waste management must demonstrate how the proposal will help drive waste to ascend the waste hierarchy whenever possible.
- **Policy CSW 4** presents the strategy for providing waste management capacity within Kent, with an objective to manage at least the equivalent of the waste arising in Kent plus some residual non-hazardous waste from London. As a minimum it is to achieve the targets for recycling and composting, reuse and landfill diversion identified in the Kent Joint Municipal Waste Management Strategy (as amended).

  The Kent Joint Municipal Waste Management strategy contains the following targets:

  - By 2015/16, the Kent Resource Partnership will reduce household waste arisings by at least 5% (based on 2010/11 levels); recycle/compost at least 45%; and send no more than 10% to landfill.
  - By 2020/21, the Kent Resource Partnership will reduce household waste arisings by at least 10% (based on 2010/11 levels); recycle/compost at least 50%; and send no more than 5% to landfill. The Partnership's ambition is to get as close to zero untreated waste to landfill as possible.
- **Policy CSW 7** states that sufficient sites will be found for the management of non-hazardous wastes, to meet identified needs as a minimum, including for the provision of 562,500 tonnes of new recovery capacity, by 2026. The policy further requires that:
  - pre-sorting of the waste is carried out unless proven not to be technically practicable for that particular waste stream;
  - recovery of by-products and residues is maximised;
  - energy recovery is maximised (utilising both heat and power); and
  - any residues produced can be managed or disposed of in accordance with the objectives of Policy CSW 2.
- **Policy CSW 8** is specific to the development of recovery facilities for non-hazardous waste. It requires that facilities using waste as a fuel will only be permitted if they qualify as recovery operations as defined by the Revised Waste Framework Directive. When an application for a combined heat and power facility has no proposals for use of the heat when electricity production is commenced, the development will only be granted planning permission if the applicant and landowner enter into a planning agreement to market the heat and to produce an annual public report on the progress being made toward finding users for the heat.

4.3.3 K3/WKN is demonstrated to be delivering a sustainable waste management solution for Kent, taking waste out of landfill and optimising the use of RDF. It will not prejudice the recycling targets set out in the Municipal Waste Management Strategy and will provide for at least the residual wastes (and RDF) available within Kent, and those from London and elsewhere. The Proposed Development fully achieves the requirements of policy CSW7.

4.3.4 K3/WKN is demonstrated to be modern, efficient plant delivering CHP and exploring further opportunities to optimise this benefit, thereby delivering policy CSW 8.

Early Partial Review of the Kent Minerals and Waste Local Plan

4.3.5 Kent County Council is currently progressing an Early Partial Review of the KMWLP (the 'Early Partial Review') through Examination. This is separately identifying sites for minerals development (none of which is relevant to the Proposed Development) and making changes to waste policy. Relevant to waste management, and to this report, are the modifications proposed to be made to policies CSW 4, CSW 7 and CSW 8.

4.3.6 **Policy CSW4** is proposed to be updated to incorporate revised recycling targets.[31] The proposed revised policy states:

'*The strategy for waste management capacity in Kent is to provide sufficient waste management capacity to manage at least the equivalent of the waste arising in Kent plus some residual non-hazardous waste from London. As a minimum it is to achieve the targets set out below for recycling and composting and other forms of recovery.*'

	Milestone Year			
	2015/16	**2020/21**	**2025/26**	**2030/31**
Local Authority Collected Waste				
Recycling /Composting	n/a	50%	55%	60%
Other Recovery	n/a	48%	43%	38%
Remainder to landfill	n/a	2%	2%	2%
Commercial and Industrial Waste				
Recycling /Composting	n/a	50%	55%	60%
Other Recovery	n/a	35%	32.5%	30%
Remainder to landfill	n/a	15%	12.5%	10%

4.3.7 Paragraph 6.3.1 of the Early Partial Review is proposed to be redrafted to state:

'*Kent currently achieves net self-sufficiency in waste management capacity. I.e. the annual capacity of the waste management facilities (excluding transfer) in Kent is sufficient to manage the equivalent quantity of waste to that predicted to arise in Kent. The continued*

[31] Recycling/composting in the table is described as including organic waste (including green and kitchen waste) treatment by anaerobic digestion. The table also includes recycling targets for construction and demolition wastes, which have not been represented in this report.

achievement of net self-sufficiency and the management of waste close to its source are key Strategic Objectives of the Kent MWLP, because it shows that Kent is not placing any unnecessary burden on other WPAs to manage its waste. Net self-sufficiency recognises that existing (and future) waste management capacity within Kent may not necessarily be for the exclusive management of Kent's waste. Proposals that would result in more waste being managed in Kent than is produced may be acceptable if it is demonstrated that these would result in waste produced in Kent being managed at a higher level of the waste hierarchy. Achievement of net self-sufficiency can be monitored on an annual basis and will provide an indicator as to whether the policies in the Plan need to be reviewed.'

4.3.8 The Early Partial Review no longer proposes to allocate sites for new waste development, because it considers that this is no longer necessary.

4.3.9 **Policy CSW 7**, as proposed to be modified, states:

'Waste management capacity for non-hazardous waste that assists Kent in continuing to be net self-sufficient while providing for a reducing quantity of London's waste, will be granted planning permission provided that:

1. it moves waste up the hierarchy

2. recovery of by-products and residues is maximised

3. energy recovery is maximised (utilising both heat and power)

4. any residues produced can be managed or disposed of in accordance with Policy CSW 2'

5. and 6. are relevant to composting/anaerobic digestion and so are not repeated here.

4.3.10 Policy CSW 8 as proposed to be modified, states:

'Facilities using waste as a fuel will only be permitted if they qualify as recovery operations as defined by the Revised Waste Framework Directive. When an application for a combined heat and power facility has no proposals for use of the heat when electricity production is commenced, the development will only be granted planning permission if the applicant and landowner enter into a planning agreement to market the heat and to produce an annual public report on the progress being made toward finding users for the heat.'

4.3.11 Paragraph 6.8.1 of the Early Partial Review is proposed to be redrafted to state:

'*One of the fundamental aims of the Plan is to reduce the amount of MSW and C&I waste being sent to non-hazardous landfill. Proposals for additional recovery capacity will need to be designed to harness the maximum practicable quantity of energy produced.*'

4.3.12 The Applicant has submitted representations to Kent County Council on the proposed Early Partial Review, focussing on what are considered to be limitations within the evidence base that has led to the Authority's decision not to allocate sites for the development of new waste facilities. The remaining policy, as set out above, is not objected to.

4.3.13 Indeed, as has been demonstrated throughout this report, the policy objectives of both the adopted and the emerging development plan, are wholly met by the Proposed Development.

4.3.14 K3/WKN will not prejudice the proposed revised recycling targets for the county; instead it will reduce residual wastes sent to landfill. The Proposed Development will enable Kent to be net self-sufficient, including making optimal use of the RDF within the county and currently exported overseas (in the region of 370,000 tonnes in 2017, see Table 3.6, row d).

4.3.15 As demonstrated through the Carbon Assessments, energy recovery is maximised, with the IBA resulting from combustion of fuels taken off-site for treatment and to recover metals, glass and secondary aggregates, so further contributing to the circular economy and achieving the expectations of proposed policy CSW 7.

4.3.16 K3/WKN is demonstrated to be modern, efficient plant that will deliver CHP, exporting steam to a defined heat user and exploring further opportunities to optimise this benefit, thereby delivering policy CSW 8.

Conclusions on local policy and strategy

4.3.17 K3/WKN will deliver the waste hierarchy within Kent, using residual wastes and RDF to produce a renewable/low carbon energy, with a defined steam user located adjacent to the Application Site.

4.3.18 The Proposed Development is appropriately located at the Application Site, making optimal use of a site already in use for waste management. The supply of steam to the Kemsley Paper Mill means there is a clear and particular advantage in locating K3/WKN at the Application Site and in bringing waste to it.

4.3.19 The K3/WKN Carbon Assessment Reports demonstrate that the Proposed Development will bring substantial benefit in terms of net avoided carbon. There is recognised to be a carbon burden associated with the transport of fuel to the facilities, however, as demonstrated by proxy through consideration of the transport of residues off-site, transport burdens are small compared to the overall carbon benefits of diverting waste from landfill. In any event, transport-related carbon burdens are bound to be generated whichever final destination the fuels take.

4.3.20 As demonstrated in Chapter 4 of the Environmental Statement (Document Reference 3.1), there is no unacceptable adverse impact caused by transporting waste to the Proposed Development from further afield than the county of Kent, not least because the transport routes are wholly appropriate for the transport of fuel to the Application Site. Consequently, there is no reasonable objection to the import of fuel to K3/WKN from outside of Kent.

4.3.21 The Proposed Development is wholly compliant with both the adopted KMWLP and the proposed modifications as set out in the Early Partial Review.

5. Conclusions

5.1 Introduction

5.1.1 NPS EN-3 paragraph 2.5.70 requires that:

'*The IPC should be satisfied, with reference to the relevant waste strategies and plans, that the proposed waste combustion generating station is in accordance with the waste hierarchy and of an appropriate type and scale so as not to prejudice the achievement of local or national waste management targets in England and local, regional or national waste management targets in Wales. Where there are concerns in terms of a possible conflict, evidence should be provided to the IPC by the applicant as to why this is not the case or why a deviation from the relevant waste strategy or plan is nonetheless appropriate and in accordance with the waste hierarchy.*'

5.1.2 This Waste Hierarchy and Fuel Availability Report has considered each of these elements in turn and demonstrates that the Proposed Development is both:

- wholly in accordance with the waste hierarchy; and
- not prejudicial to the achievement of either national or local waste management targets.

5.2 Waste Hierarchy

5.2.1 Section 2 of this report introduced the legislative requirements of the waste hierarchy and considered its practicable implementation. The findings can be summarised as follows:

- the waste hierarchy, in which disposal to landfill is at the bottom, has been incorporated into national legislation by the Waste Regulations 2011 and requires that the Secretary of State, who considers the Proposed Development, should seek to move the management of waste up the waste hierarchy;
- the recovery of energy from residual waste (and RDF) is in accordance with the hierarchy where waste that would otherwise be landfilled and which cannot, for technical and economic reasons be recycled, be treated;
- information on the relative costs of recycling waste versus energy recovery or disposal to landfill suggests that the residual waste now being deposited in landfills may not be technically or economically capable of further recycling.

5.2.2 Consequently, it is concluded that the operation of the Proposed Development would accord with the waste hierarchy in that it would move the management of residual wastes, predominantly arising in the south of England, away from landfill and up to recovery in the hierarchy. Further, it would address the lost opportunity to use RDF exported from the Study Area to generate renewable/low carbon energy within the UK.

5.3 Fuel Availability Assessment

5.3.1 Section 3 of this report considered the availability of fuel across the Study Area. A number of variables were considered, resulting in a wide range of fuel availability being calculated. A range of fuel availability is entirely appropriate. To seek to define a level of need for the

Proposed Development is neither required by policy and would in any event result in a level of spurious precision that cannot be achieved with available data.

5.3.2 Table 3.7 demonstrates that there is, consistently, somewhere in the region of 2.5 million tonnes of fuel available to the Proposed Development. Even if the LACW was also discounted, there would still remain c.2 million tonnes.

5.3.3 Section 3 went on to consider sensitivity tests to fuel availability, including the potential impact of achieving CEP targets (from the assumed current rate of recycling) and of potential future capacity wholly operating across the same waste streams and Study Area.

5.3.4 With somewhere in the region of 992,500 to 1.98 million tonnes of fuel available to the Proposed Development (paragraph 3.5.4), K3/WKN will not prejudice delivery of either the waste hierarchy, or the future circular economy.

5.3.5 Applying all the sensitivities (focussing on specific waste types, assuming very high additional recycling, and relying on non-operational facilities) there would still remain 495,500 tonnes of fuel available beyond that sought for the Proposed Development (paragraph 3.5.5). It is considered unlikely that all of these variables would occur to the extent considered within this fuel availability assessment and consequently this outcome is considered to be very conservative.

5.3.6 However, it serves to demonstrate that there is substantial fuel availability, to be sourced from wastes that would otherwise be disposed to landfill or exported overseas. K3/WKN is demonstrated not to prejudice options preferred in the waste hierarchy, and is confirmed to be playing an important and appropriate role in delivering sustainable waste management.

5.4 National and local policy and strategy

5.4.1 Section 4 reviewed a wide range of relevant national policy and strategy documents and relevant policy from the adopted and emerging development plan within Kent.

5.4.2 K3/WKN is demonstrated to deliver key objectives of national and local policy through:

- delivering the waste hierarchy;
- contributing to self-sufficiency (in terms of both energy recovery and sustainable waste management) at the national level; and
- being part of a network of facilities from which value would be recovered from appropriate residual wastes.

5.4.3 Critically, section 4 also recognises the well- established policy principle (not least as set out in paragraphs 2.2.4, 3.3.21 and 4.1.9 of NPS EN-1) that it is not the role of the planning system to dictate capacity amounts or limit the capacity of appropriate development. Instead, the '*role of the planning system is to provide a framework which permits the construction of whatever Government – and players in the market responding to rules, incentives or signals from Government – have identified as the type of infrastructure we need in the places where it is acceptable in planning terms*.'

5.4.4 K3/WKN is appropriately located at the Application Site, making optimal use of a site already in use for waste management. The supply of steam to the Kemsley Paper Mill means there is a clear and particular advantage in locating K3/WKN at the Application Site and in bringing waste to it.

5.4.5 The K3/WKN Carbon Assessment Reports demonstrate that the Proposed Development will bring substantial benefit in terms of net avoided carbon. There is recognised to be a carbon burden associated with the transport of fuel to the facilities, however, as demonstrated by proxy through consideration of the transport of residues off-site, transport burdens are small compared to the overall carbon benefits of diverting waste from landfill. In any event, transport related carbon burdens are bound to be generated whichever final destination the fuels take.

5.4.6 As demonstrated in Chapter 4 of the Environmental Statement (Document Reference 3.1), there is no unacceptable adverse impact caused by transporting waste to the Proposed Development from further afield than the county of Kent, not least because the transport routes are wholly appropriate for the transport of fuel to the Application Site. Consequently, there is no reasonable objection to the import of fuel to K3/WKN from outside of Kent.

5.5 Conclusion

5.5.1 The Proposed Development is situated at a preferred location that optimises existing infrastructure assets. K3/WKN is demonstrated to be at the right level of the waste hierarchy, taking waste out of landfill, and optimising the use of RDF.

5.5.2 K3/WKN will complement re-use and recycling, not prejudice them. Increased recycling is an important policy drive and the market responds positively to this, not least it is a cheaper waste management method than either energy recovery or disposal. Landfill capacity is fast running out and our continued reliance on energy recovery facilities overseas is not guaranteed and is a lost opportunity for UK energy supply.

5.5.3 The Proposed Development provides a policy compliant solution through: avoiding non-recyclable wastes being disposed to landfill; optimising the use of RDF; recovering renewable/low carbon energy; providing steam to an adjacent industry; and recovering secondary materials including aggregates, glass, and metal.

5.5.4 K3/WKN is located within Kent, but proposed as a regional facility and not to be constrained to only accepting waste from within Kent. By treating wastes and RDF from (within and) outside of Kent will help the county continue to meet net self-sufficiency policy and enable the county to bring to gain from the economic, environmental and social benefits of the Proposed Development.

5.5.5 K£/WKN is demonstrated to be wholly in accordance with the waste hierarchy and not prejudicial to either national or local policy or strategy. It will deliver both the aspirations of the NPS and the adopted and emerging development plan for waste management and renewable/low carbon energy supply.

hendeca

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Waste Hierarchy and Fuel Availability Assessment

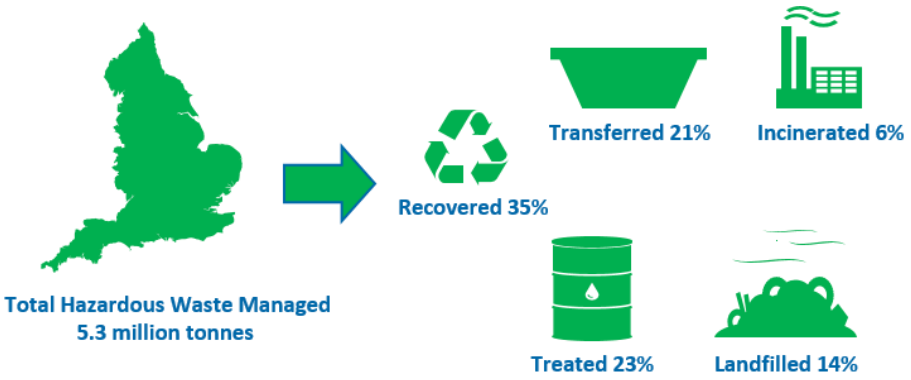
Annex A
Waste Management 2017: England

Waste management 2017: England

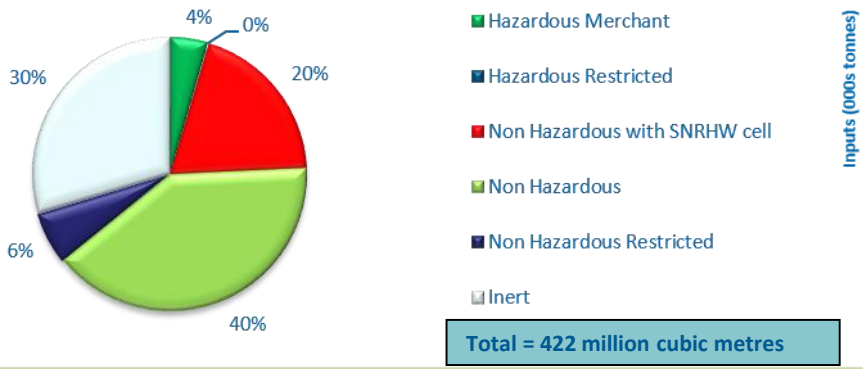
Waste managed

Waste Management Method	Sites permitted at end 2017	Sites that accepted waste in 2017	Millions tonnes managed in 2017
Landfill	516	330	45.4
Transfer	2,902	2,301	46.1
Treatment	2,839	2,164	78.1
Metal Recovery	2,373	1,251	15.7
Incineration	161	87	13.0
Use of Waste	41	15	1.6
Land Disposal	432	243	13.2
Total	**9,264**	**6,390**	**213.1**

Hazardous waste movements

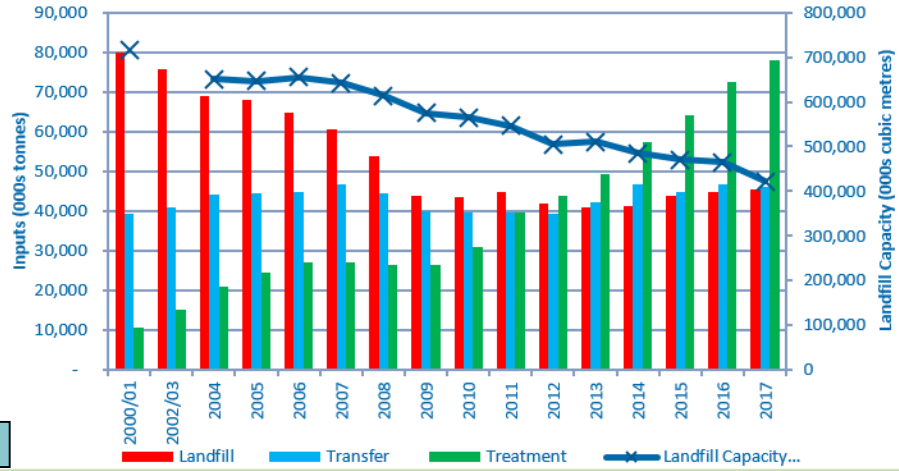


Remaining landfill capacity



Total = 422 million cubic metres

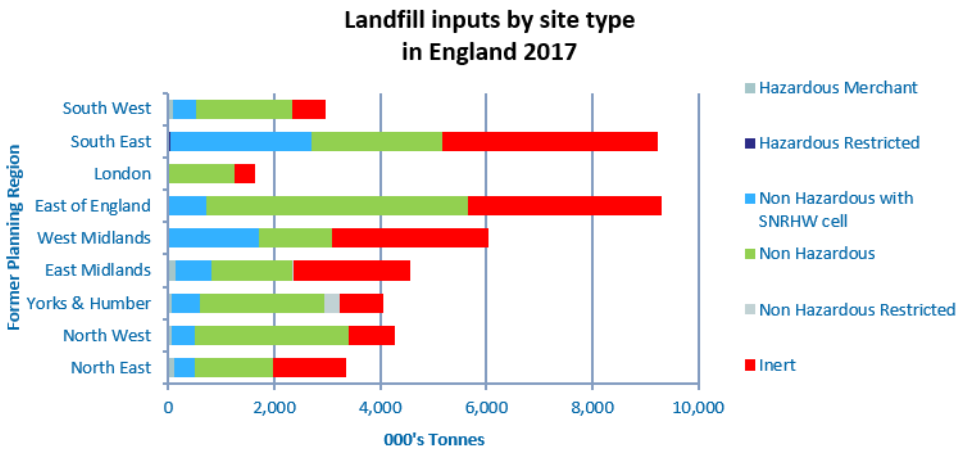
Trends: 2000 to 2017



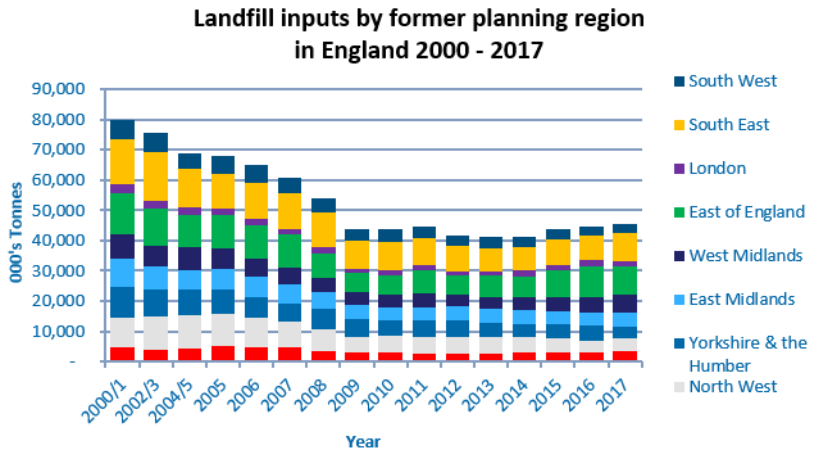
Environment Agency

Landfill inputs and capacity 2017

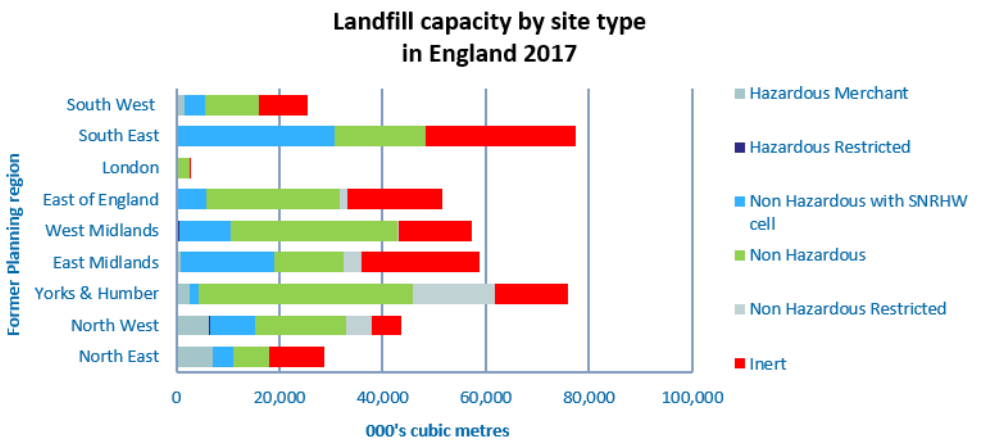
Landfill inputs

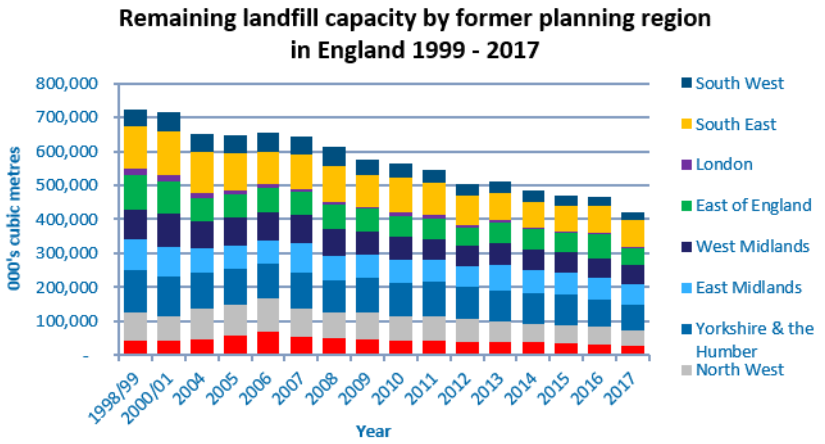


Trends: 2000 to 2017



Landfill capacity

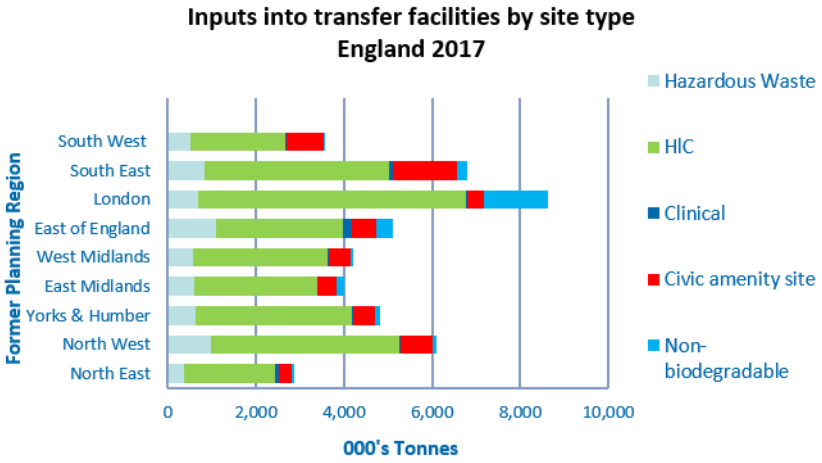




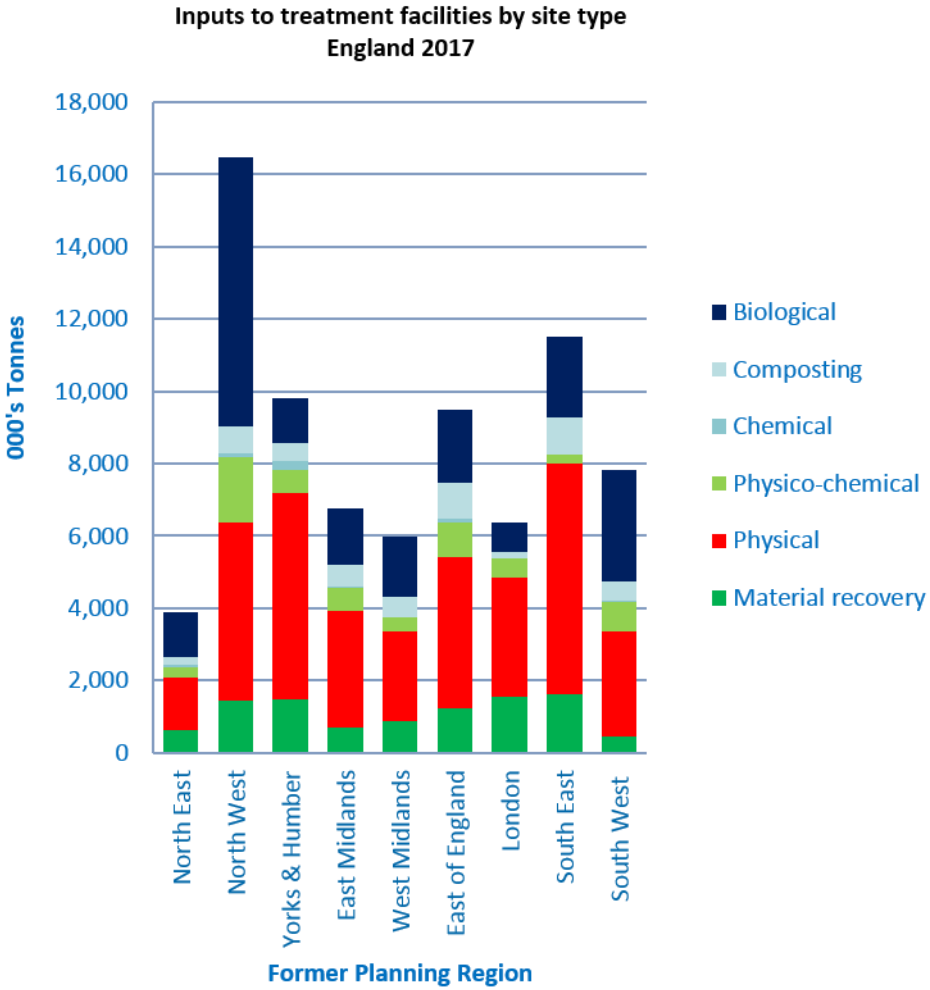
Environment Agency

Transfer and treatment inputs 2017

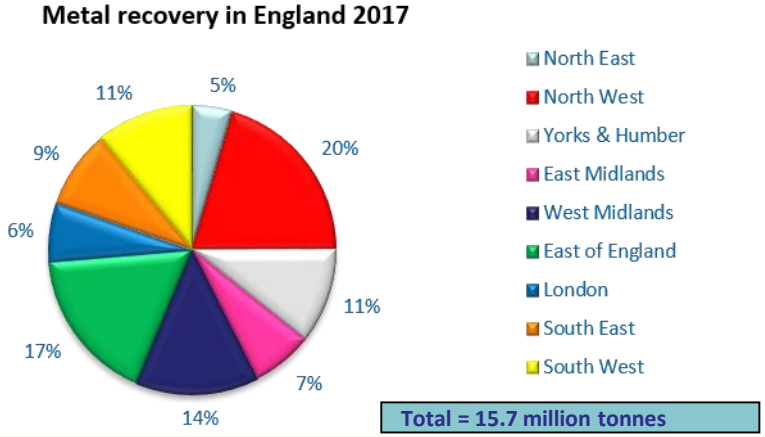
Transfer inputs



Treatment inputs



Metal recovery inputs

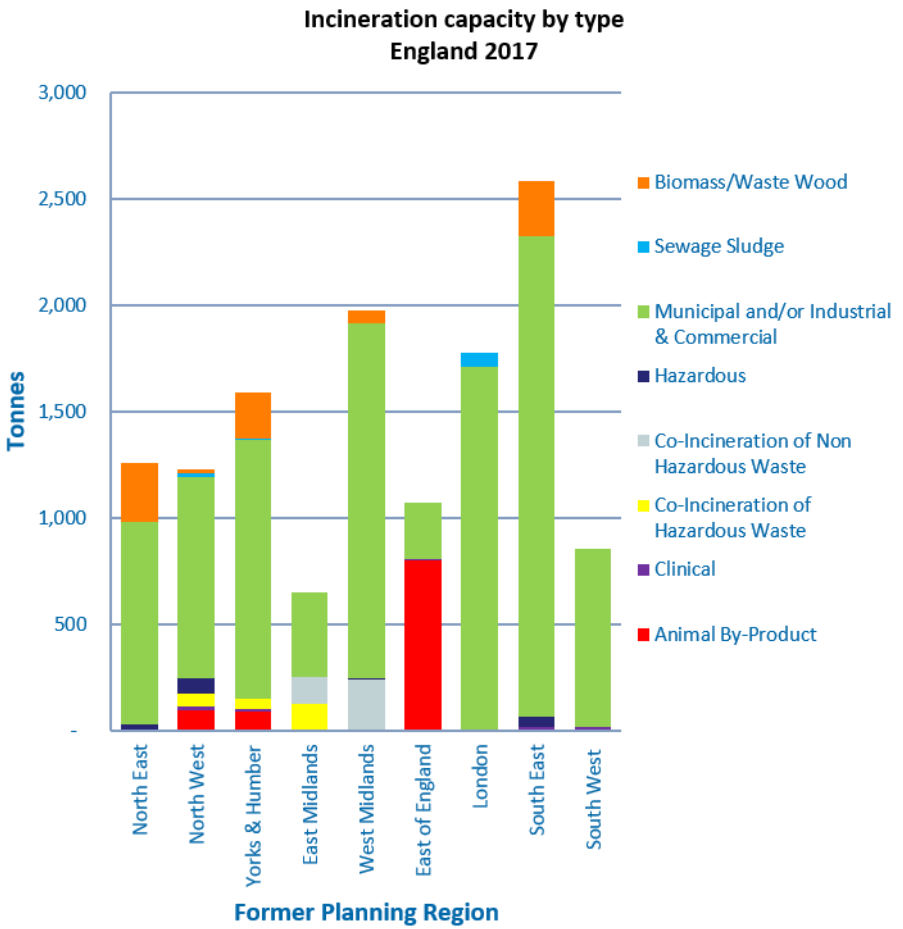


Total = 15.7 million tonnes

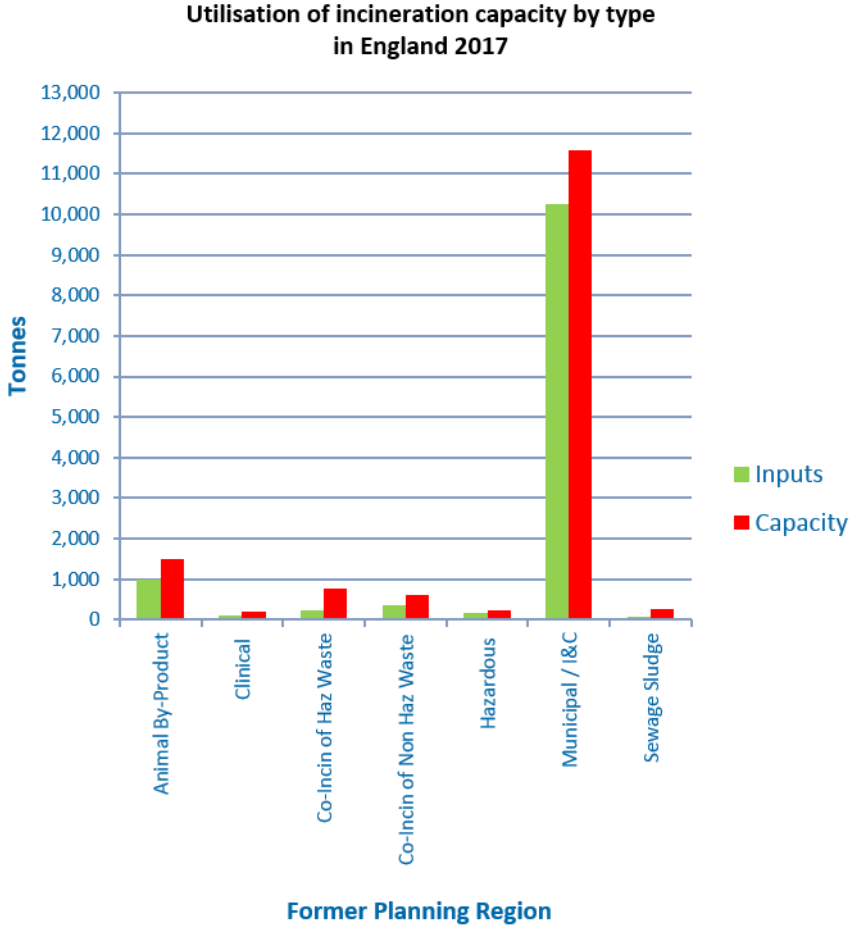
Environment Agency

Incineration inputs and capacity 2017

Incineration inputs



Incineration utilisation

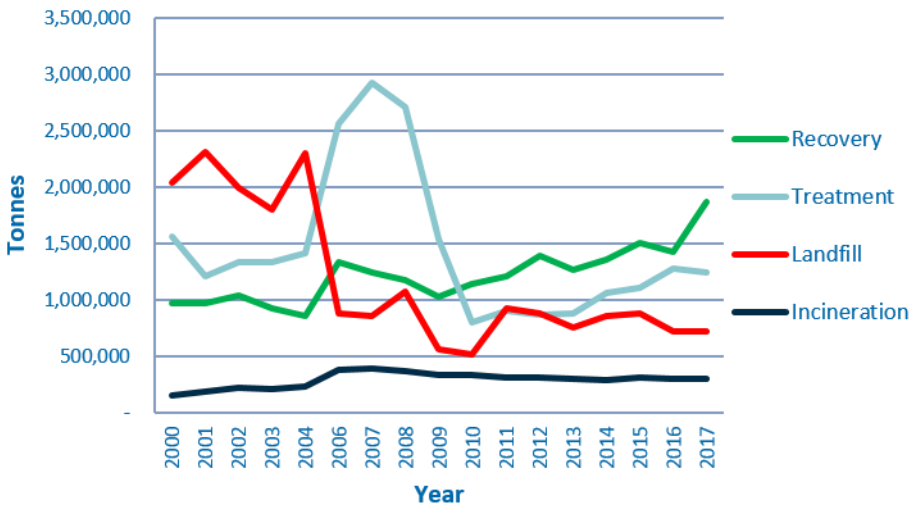


Environment Agency

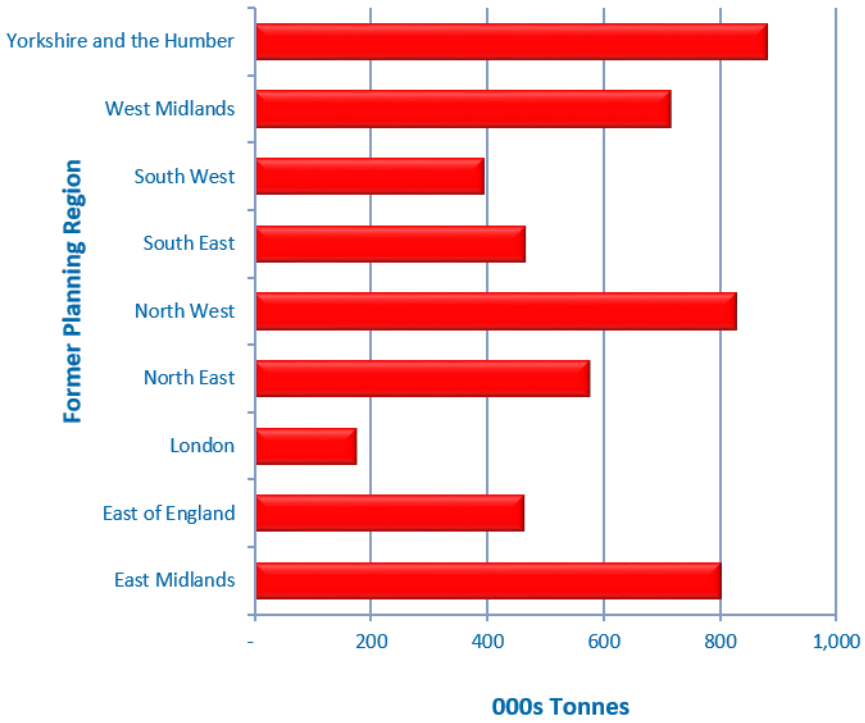
Hazardous waste 2017

Hazardous waste deposits

Hazardous waste deposit trends in England by fate 2000-2017



Hazardous Waste Deposits by Former Planning Region 2017



Notes

2005 was a transitional year with data from old and new hazardous waste systems. There were comparability issues and some data was missing so returns for 2005 have not been included in this trend analysis.

The increase in treatment between 2004 and 2007 was largely accounted for by a Single plant on Teesside, which took in more than 1.6 million tonnes of liquid wastes by pipeline from nearby chemical processing plants in 2007. This industry has now decreased substantially shown by the reduction in treatment.

Environment Agency

Regional picture 2017

Former Planning Region	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire & the Humber	ENGLAND
Landfill Inputs										
In 2017 (in 000s tonnes)	4,561	9,302	1,629	3,364	4,272	9,231	2,957	6,043	4,061	45,419
Transfer Inputs										
In 2017 (in 000s tonnes)	4,005	5,101	8,640	2,870	6,102	6,806	3,565	4,210	4,830	46,129
Treatment Inputs (excluding metal recycling sector)										
In 2017 (in 000s tonnes)	6,765	9,482	6,377	3,886	16,467	11,520	7,840	5,997	9,813	78,147
Incineration										
Inputs in 2017 (in 000s tonnes)	653	1,071	1,774	1,257	1,230	2,582	856	1,978	1,591	12,992
Permitted capacity at end of 2017 at operational incinerators (in 000s tonnes)	1,203	1,330	2,175	1,739	1,693	3,203	1,004	2,468	1,974	16,660
Number of operational incinerators in 2017	7	6	7	5	9	17	10	15	11	87
Landfill Capacity & Life										
Remaining capacity for non haz merchant sites at end 2017 (000s cubic metres)	31,527	31,702	2,536	10,951	26,371	48,160	14,544	42,370	43,291	251,451
Remaining capacity for merchant haz sites at end 2017 (000s cubic metres)	948	-	-	7,059	6,409	196	1,480	-	2,666	18,759
Remaining capacity at inert sites at end 2017 (000s cubic metres)	22,795	18,459	344	10,737	5,827	29,121	9,386	14,377	14,136	125,183
Landfill Life 2017 for non haz wastes only based on 2017 inputs (years)	9.8	3.9	1.4	4.2	5.5	6.5	4.4	9.3	10.1	6.3
Hazardous Waste										
Managed in 2017 (tonnes)	505,104	339,059	439,697	517,918	771,707	647,302	390,934	512,524	831,378	4,955,623
Deposited in 2017 (tonnes)	800,123	463,366	177,912	576,217	827,535	464,938	394,539	715,305	880,833	5,300,768
No. of hazardous waste only landfills in 2017	2	-	1	2	6	3	4	3	2	23

hendeca

Waste Hierarchy and Fuel Availability Assessment

Annex B
UK Statistics on Waste, March 2019

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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Media enquiries: 03459 33 55 77, or refer to: https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about/media-enquiries

- 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)

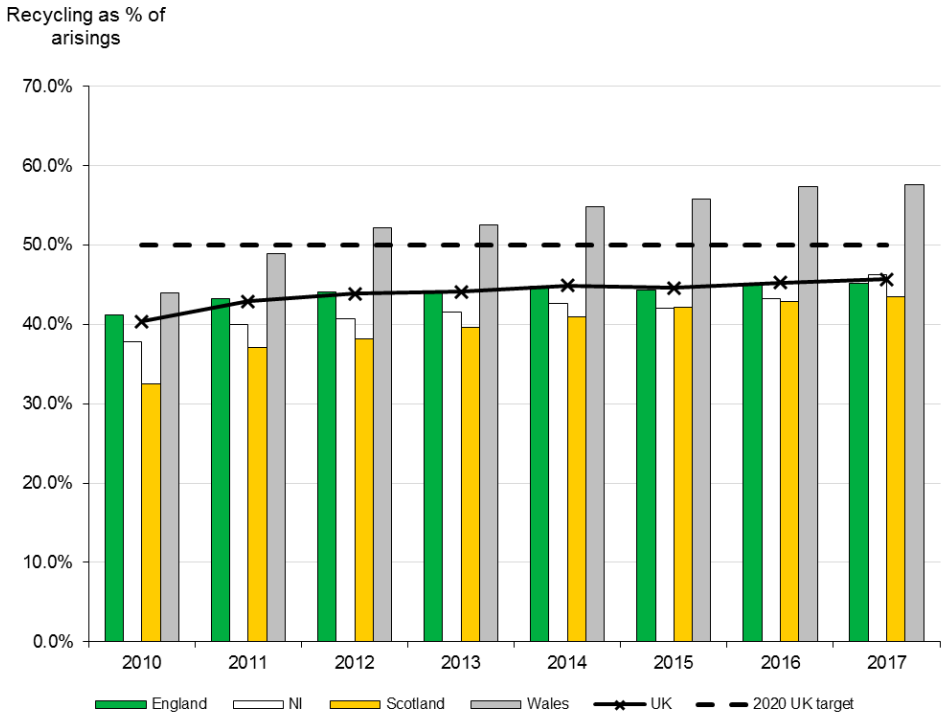
England and Scotland have included IBA metals for data from 2015 onwards, when Q100 was introduced. For England this is from April 2015, when Q100 came into full use by all local authorities.

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.

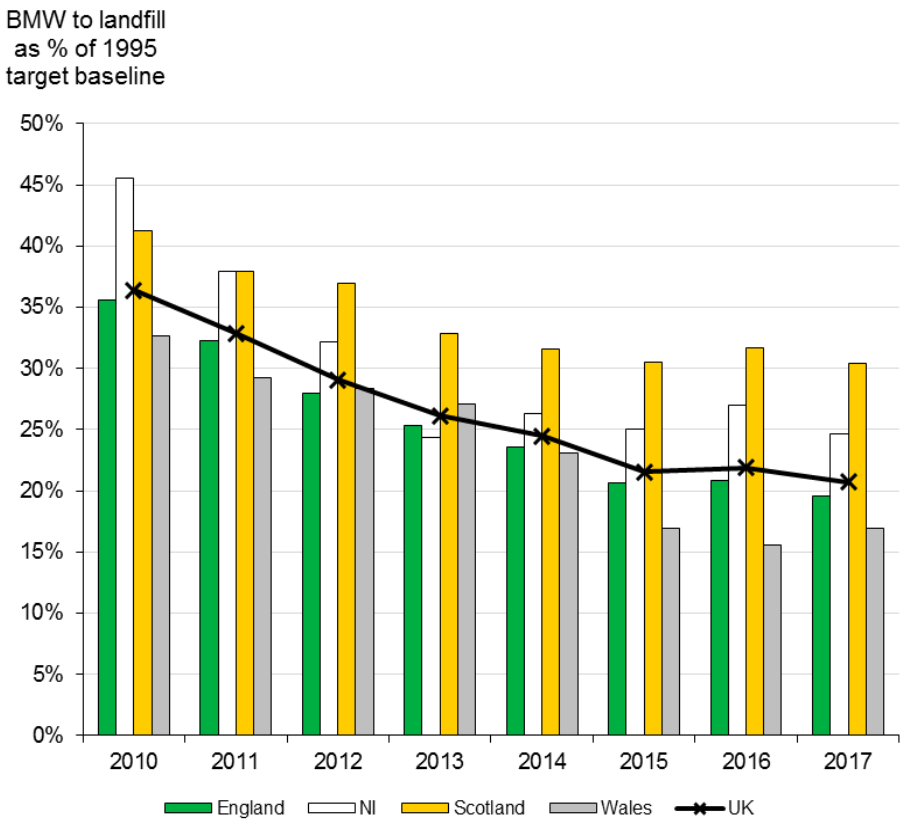
2 Biodegradable municipal waste (BMW) sent to landfill - updated, with new figures for 2017

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.

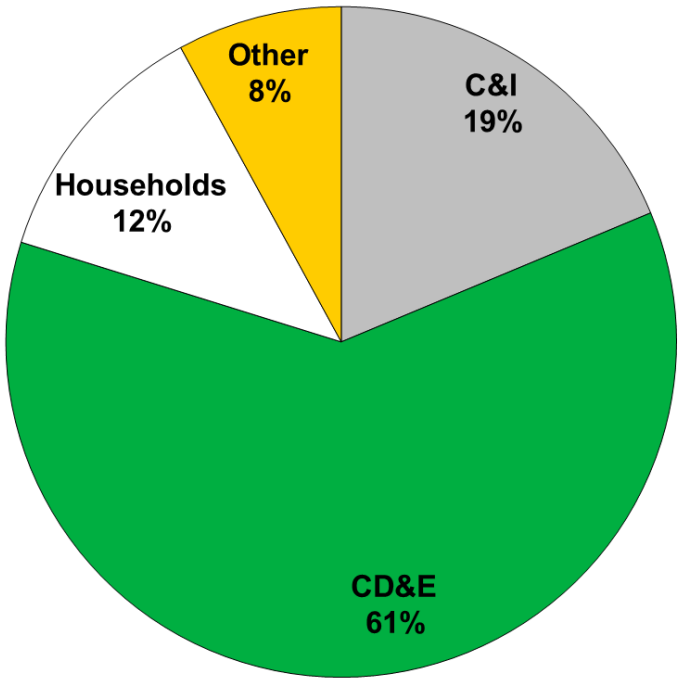
6 Total Waste Generation and Final Treatment of All Waste – updated, with new figures for 2016

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%

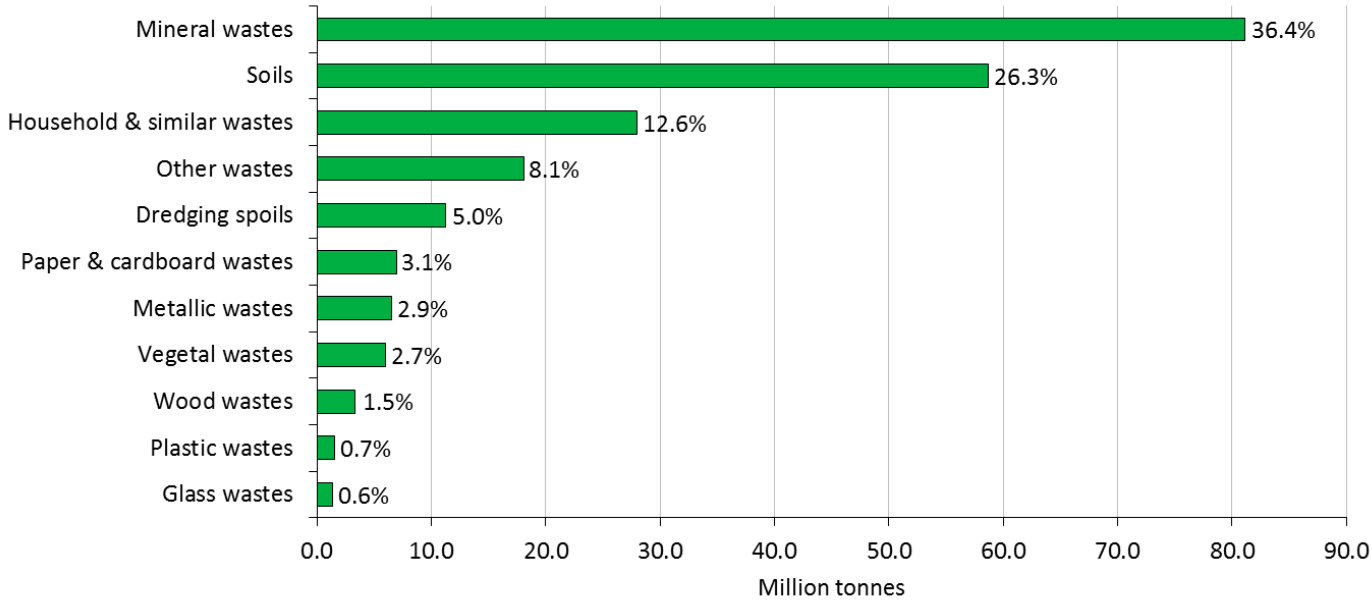
Source: Defra Statistics
Includes waste that may go for export.
'Other' consists of waste from mining, agriculture, forestry and fishing.
Percentages calculated from unrounded figures; Breakdowns may not exactly sum to totals due to rounding.

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/*

hendeca

Waste Hierarchy and Fuel Availability Assessment

Annex C
Statistics on waste managed by local authorities in England in 2017/18, December 2018

Department for Environment Food & Rural Affairs

11th December 2018

Statistics on waste managed by local authorities in England in 2017/18

This release relates to the collection and management of waste under the possession or control of Local Authorities in England. It covers three principal measures as summarised in the table below.

The next update to this notice and datasets will be in November/December 2019.

What data are confirmed in this release?

Measure	Time period
Waste from households This is the official recycling measure which is used as the basis for reporting at a harmonised UK level against the waste Framework Directive.	First publication of figures for the 2017 calendar year and for 2017/18 financial year.
Local authority collected waste This is all waste within the remit of local authorities. It includes household waste plus other non-household waste collected by local authorities.	First publication of figures for the 2017/18 financial year.
Household waste This is broader than "waste from households", including waste from street bins, street sweepings, parks and grounds.	First publication of the data for the financial year 2017/18.

Data revisions:

There are some minor revisions to data from April 2015/16 onwards. These are a result of small refinement to complex calculations and factors applied in the 'waste from households' calculation to fully capture for variations in data reporting and also were there were some data reporting errors/oversights by local authorities. None of the changes affect the overall 'waste from household' or household recycling rates for England.

For more information about what data is included in the three measures listed in the table above, please see the section on 'Glossary of terms and measures' and the separate methodology document.

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Key points

England Waste from Households: 2017 and 2017/18 (Table 1 and Figure 1)

- The official England waste from households recycling rate for 2017 was 45.2 per cent, up 0.3 percentage points from 44.9 per cent in 2016. Metal recovered and recycled from waste which has been through incineration (IBA metal) now included in this measure, added around 0.8 percentage points to the recycling rate in 2017.
- Total 'waste from households' in England decreased by 1.5 per cent in 2017 to 22.4 million tonnes from 22.8 million tonnes in 2016. This is equivalent to 403 kg per person, down from 412 kg per person in 2016 a decrease of 2.2 per cent.
- Residual waste treated decreased by 2.1 per cent to 12.3 million tonnes in 2017 from 12.5 million tonnes in 2016.
- Total recycled waste in England decreased by 0.8 percent to 10.1 million tonnes in 2017 from 10.2 million tonnes in 2016.
- Dry recycling volumes fell by 2.1 per cent to 5.9 million tonnes in 2017 from 6.0 million tonnes in 2016. Other organic waste remained stable at 3.8 million tonnes in both years. Separate food waste collected for recycling increased by 8.7 per cent in 2017 to 386 thousand tonnes from 355 thousand tonnes in 2016.
- There is an EU target for the UK to recycle at least 50 per cent of waste generated by households by 2020. The England 'waste from households' figures seen here make a significant contribution to the UK estimates, which are published in UK Statistics on Waste.
- The rolling 12 month 'waste from households' recycling rate to end March 2018 was 44.8 per cent. This is a decrease of 0.3 percentage points compared with the previous 12 month period to March 2017. These figures include IBA metal.

England Local Authority and Household Waste: 2016/17 financial year (Table 2)

- Total local authority managed waste in 2017/18 was 25.6 million tonnes, a decrease of 2.6 per cent from 26.3 million tonnes in 2016/17.
- Just 12.5 per cent of all local authority waste was disposed to landfill in 2017/18, down by 0.9 million tonnes or 22 per cent to 3.2 million tonnes.
- Waste sent for incineration has continued to increase, up 0.7 million tonnes in 2017/18 to 10.8 million tonnes. In 2017/18, 42 per cent of all local authority waste was sent to incineration.
- Existing definitions and methodology have been retained for all local authority and household waste recycling figures; IBA metal is not included.
- The amount of all local authority waste sent for recycling in 2017/18 was 10.9 million tonnes, a 3.5 per cent decrease on the 11.3 million tonnes in 2016/17.
- There is a wide variation in household waste recycling rates amongst individual local authorities, ranging from 14 to 64 per cent per cent in 2017/18.

Datasets for the national and regional data, as well as data at Local Authority level, including the ex-National Indicator measures are available at the www.gov.uk website.

1.1 **Waste from Households** (Table 1 and Figure 1)

This is the measure that the UK introduced in 2014 for statistical purposes to provide a harmonised UK indicator to report recycling rates at UK level on a calendar year basis under the Waste Framework Directive (2008/98/EC). 'Waste from households' excludes local authority collected waste types not considered to have come directly from households, such as street bins, street sweepings, parks and grounds waste and compost like output.

Some revisions have been made to historic data as a result of enhanced data quality assurance checks. Overall changes are minor and do not affect the national Waste from household recycling rate published here. For more on these changes refer to the Data and Methodology section.

Table 1 Composition breakdown and recycling rate of 'waste from households' in England 2010 to 2017 (thousand tonnes)

Waste type	2013	2014	2015	2016	2017	% change 2017 over 2016
Total Recycling *of which:*	**9,523**	**10,025**	**9,849**	**10,217**	**10,139**	-0.8%
Dry recycling *of which:*	5,675	5,807	5,834	6,042	5,917	-2.1%
IBA Metal	:	:	97	143	181	26.4%
Separately collected food waste	273	290	307	355	386	8.7%
Other organics recycling	3,575	3,928	3,708	3,820	3,836	0.4%
Total Residual	**12,038**	**12,327**	**12,363**	**12,535**	**12,266**	-2.1%
Total waste from Households	**21,564**	**22,355**	**22,225**	**22,770**	**22,437**	-1.5%
Waste from households recycling rate (including IBA metal)	:	:	**44.3%**	**44.9%**	**45.2%**	**0.3 percentage points**
Waste from households recycling rate (excluding IBA metal)	**44.2%**	**44.8%**	**43.9%**	**44.2%**	**44.4%**	**0.2 percentage points**

Note: Total waste from households includes dry recycling/ preparing for reuse and organics. It also includes residual waste (or 'black bag' waste) and rejects from recycling. IBA metal is included in the recycling figures from April 2015.

- The total weight of "waste from households" in England decreased by 1.5 per cent between 2016 and 2017 to 22.4 million tonnes.

- Recycled waste in England fell slightly to 10.1 million tonnes in 2017 from 10.2 million tonnes in 2016, a decrease of 0.8 per cent. Residual waste decreased by 2.1 per cent to 12.3 million tonnes in 2017 compared to 2016. However as a proportion of total 'waste from households' it has remained at 55 percent of the total. See figure 1 below.

- The England 'waste from households' recycling rate was 45.2 per cent in 2017, an increase of 0.3 percentage points from the 2016 rate of 44.9 per cent. Metal

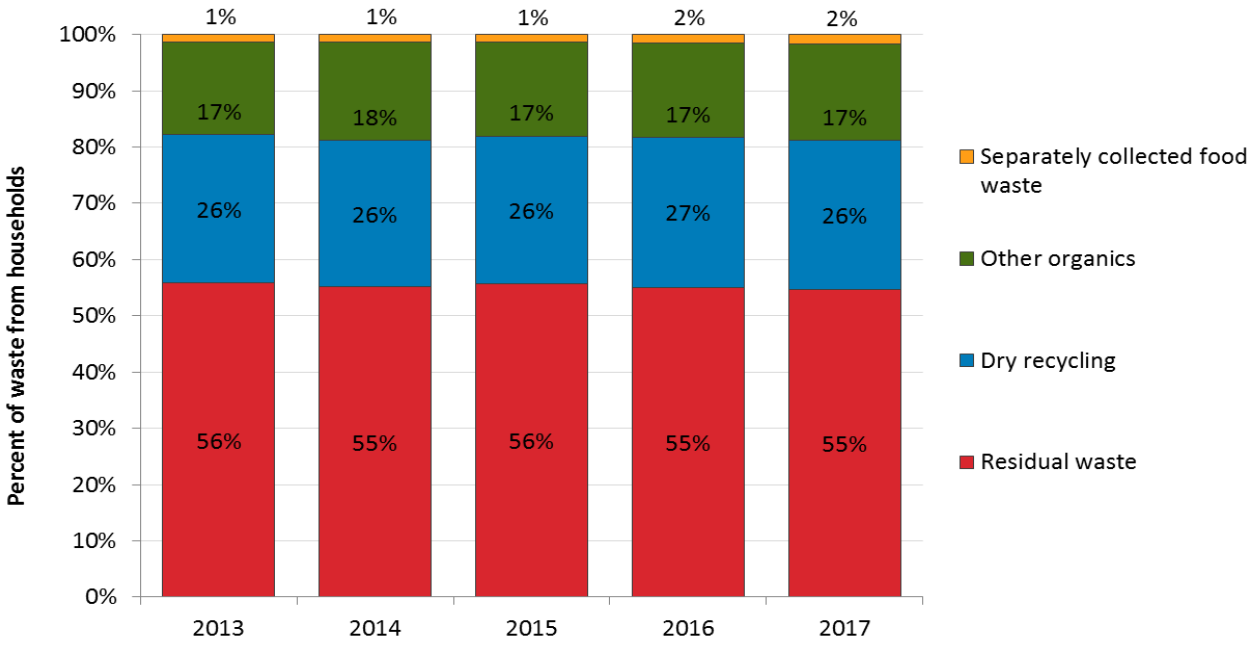
recovered and recycled from waste which has been through incineration Incinerator bottom ash (IBA metal) contributed 143 and 181 thousand tonnes in 2016 and 2017 respectively.

- When IBA metal is excluded, the waste from households recycling rate is 44.4 per cent in 2017, an increase of 0.2 percentage points from 44.2 per cent in 2016.

- There is an EU target for the UK to recycle at least 50 per cent of waste generated by households by 2020 – this is shown as the red line at the top of the chart.

1.2 Waste from Households: Waste streams (Figures 1 to 4)

Figure 1: Waste composition: waste stream proportions as a percent of total 'waste from households' 2013-2017, England



Notes
Residual waste includes residual waste from households' regular collections (black bags), bulky waste, residual from civic amenity centres and rejects from recycling. It excludes waste diverted for recycling from residual waste.
Dry recycling includes paper and card, glass, plastic, waste electrical and electronic equipment (WEEE), scrap metals including those reclaimed from incinerator bottom ash as well as other materials.
Other organics includes green garden waste, mixed garden and food waste, wood for composting and other compostable waste.

- Dry recycling volumes declined by 125 thousand tonnes or 2.1 per cent to 5.9 million tonnes in 2017.

- Dry recycling formed 58.4 per cent of the overall 2017 recycled waste total, this was down slightly from 59.1 per cent in 2016. Other organics and food waste formed 41.6 per cent of the total.

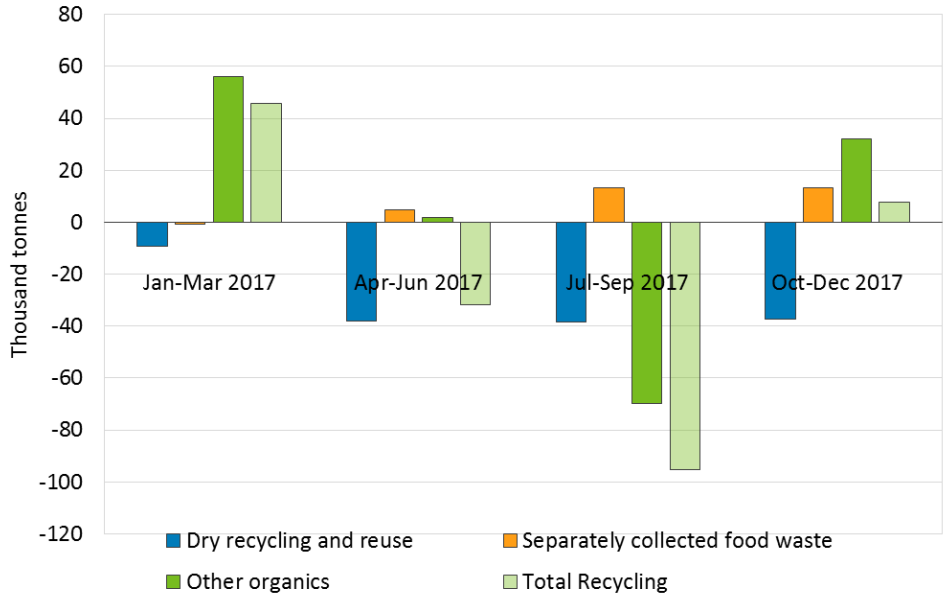
- The amount of food waste sent for composting (including anaerobic digestion) has increased by 8.7 per cent in 2017 to 386 thousand tonnes from 355 in 2016 but remains a very small proportion of total waste collected (2 per cent).

- Other organic wastes which include garden waste increased slightly by 0.4 per cent in 2017, and remained at 3.8 million tonnes.

- Other organic waste tonnages are directly linked to the season and weather or growing conditions and this is reflected in the quarterly figures. As shown in Figure 2, higher volumes of garden waste between January to March and October to December 2017 compared to the same period in 2016, offset a sharp decrease in July to September 2017, which was wetter, cooler and with less hours of sunshine than July to September 2016.

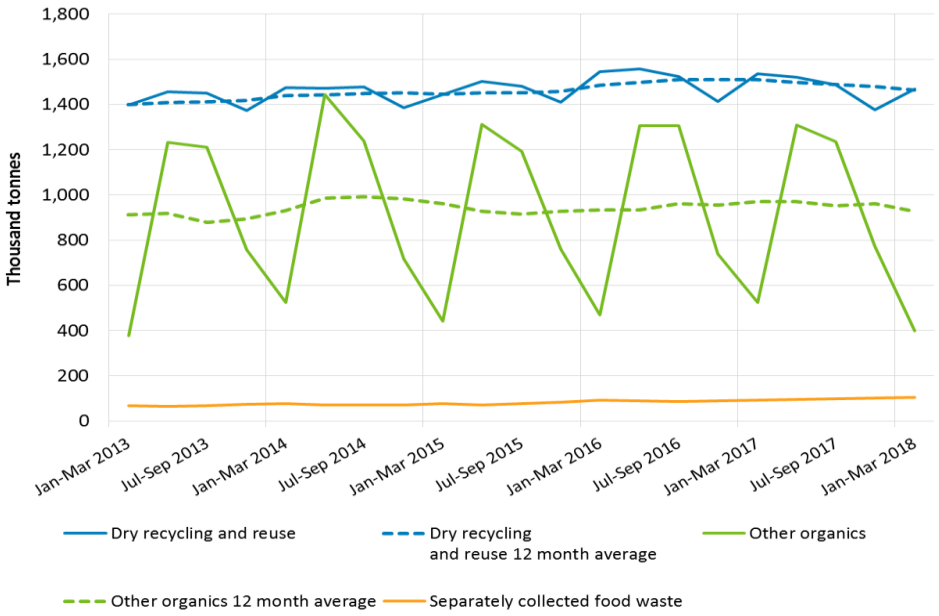
- Dry recycling was down each quarter. This has been driven mainly by the reduction in paper and card sent for recycling but there were also decrease for WEEE and other scrap metal. Further information on the composition of dry recyclate is given in Section 1.3 and Figure 5.

Figure 2: Quarterly year on year change in volume of recycled waste from households 2017 compared to 2016 England (thousand tonnes)



Quarterly trends over a longer time period are shown in Figures 3 and 4 and incorporate the data for the latest quarter, January to March 2018. Figure 4 shows quarterly dry and organic recycling as a proportion of total waste from households, and a smoothed 12 month rolling average for the overall recycling rate.

Figure 3: Waste from households – quarterly recycling volumes by waste type in England with 12 month moving averages (thousand tonnes)

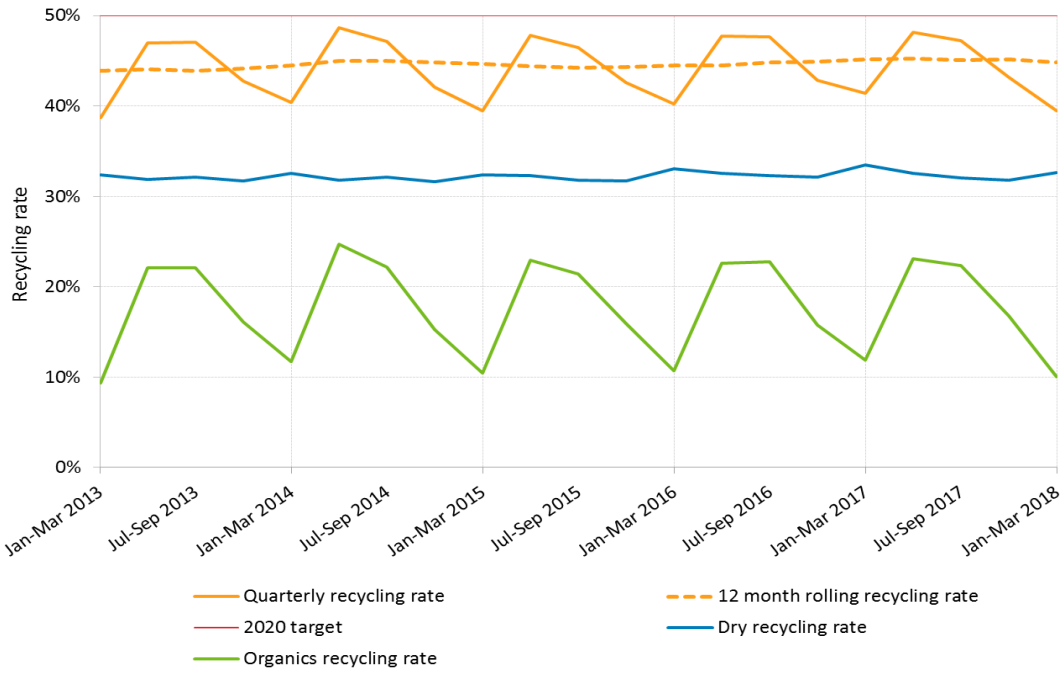


Notes

Dry recycling includes paper and card, glass, plastic, waste electrical and electronic equipment (WEEE), scrap metals including those reclaimed from incinerator bottom ash as well as other materials.

Other organics includes green garden waste, mixed garden and food waste, wood for composting and other compostable waste.

Figure 4: The 'waste from households' quarterly recycling rate in England, Jan-Mar 2013 to Jan-Mar 2018



Notes:

Recycling is 'recycling, composting and preparing for reuse'.

1.3 Waste from Households: Recycling composition (Figure 5)

- Dry recycling including metals from incinerator bottom ash decreased by 125 thousand tonnes or 2.1 per cent to 5.9 million tonnes in 2017; despite this fall it is 4 per cent higher than 5 years ago. Dry recycling constitutes 26.4 per cent of total waste from households.

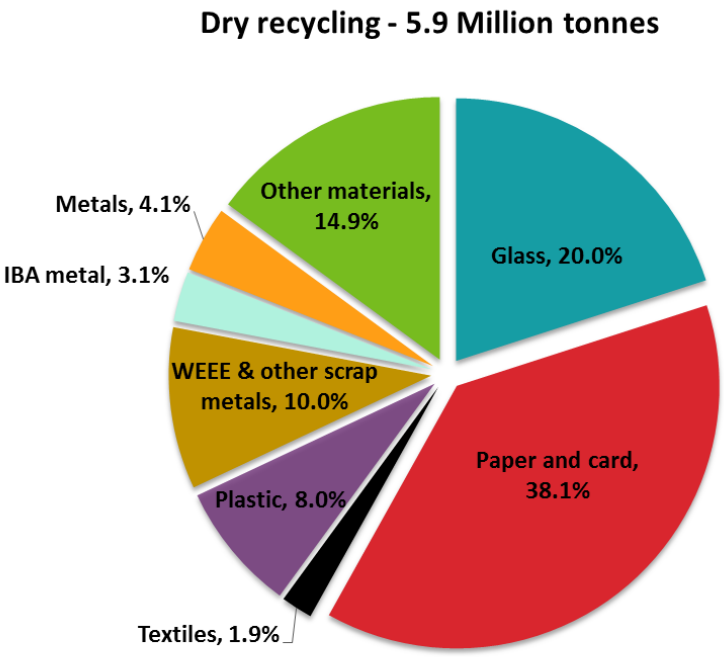
- The relative proportions of the materials are shown in Figure 5. In 2017, there were decreases across all dry recycling material groups, with the exception of IBA metal which saw a modest 38 thousand tonne increase. The largest decreases were in the tonnage of 'paper and card', down 90 thousand tonnes or 4 per cent, 'WEEE & other scrap metal' down 36 thousand tonnes or 6 per cent and 'other materials' down 25 thousand tonnes or 3 per cent.

- Plastics decreased by 5 thousand tonnes or 1 per cent, textiles by 4 thousand tonnes or 4 per cent, while mixed glass decreased only very slightly by just over 500 tonnes.

- Generally the proportions of materials have not changed substantially over the last five years between 2013 and 2017. Notable exceptions are paper and card which has seen a gradual decrease over that time and in 2017 accounts for 4.1 percentage points less of the total than in 2013, whilst the proportions of plastics and WEEE have each increased by 1.1 and 1.8 percentage points respectively in the last couple of years.

- The proportion of IBA metal has increased from 1.7 per cent in 2015 (the first year data is available for) to 3.1 per cent in 2017.

Figure 5 England 'waste from households' dry recycling composition, 2017



2 Waste from households – Financial year figures

- The total volume of 'waste from households' in England decreased by 2.3 per cent between 2016/17 and 2017/18 to 22.2 million tonnes.

- Recycled waste in England decreased slightly to 10.0 million tonnes in 2017/18 from 10.3 million tonnes in 2016/17, a decrease of 3.0 per cent.

- In 2017/18 the recycling rate for 'waste from households' was 44.8 per cent, down 0.3 percentage points on 2016/17. This fall is largely due to a sharp decrease in the recycling rate for January to March 2018, which at 39.4 per cent, is 2.0 percentage points down on the same period the previous year.

- The volume of dry recycling in 2017/18 decreased by 3.1 per cent to 5.8 million tonnes. Organic recycling decreased by 2.9 per cent to 4.1 million tonnes due to a fall in 'other organics' mainly a result of a large 24 per cent decrease in the tonnage of 'other organics' recycled, seen across most authorities in January to March 2018. While plant growth is very limited at this time of year, January to March 2018 was wetter, colder and had fewer hours of sunshine than in January to March 2017 and this may have contributed to the large decreases.

- Residual waste decreased slightly to 12.2 million tonnes in 2017/18. However as a proportion of total 'waste from households' it increased slightly by 0.3 percentage points to 55.1 per cent of the total.

3 Management of all Local Authority collected waste - financial year figures (Table 2 and Figure 5)

Local authority collected waste consists of all waste from households', street sweepings, municipal parks and gardens waste, beach cleansing waste and waste resulting from the clearance of fly-tipped materials plus some commercial or industrial waste. For further information see definition of terms on gov.uk website.

As a result of extra granularity of data reported through Q100, it is not appropriate when referring to the management of waste for landfill, incineration or recovery to compare too closely the data for April 2015 onwards with any of the previous annual data. In particular there is further reporting of refuse derived fuel (RDF) and incineration and outputs from incineration under Q100.

- Total local authority managed waste in 2017/18 was 25.6 million tonnes, a reduction of 2.6 per cent on 26.3 million tonnes in 2016/17.

- Around 12.5 per cent of all local authority managed waste was sent to landfill in 2017/18. This was equivalent to a total 3.2 million tonnes of waste, and 924 thousand tonnes lower than in 2016/17, a fall of 22.3 per cent. There was 2.5 million tonnes of waste sent direct to landfill in 2017/18, this was 77.1 per cent of the landfill total compared to 78.2 per cent some 3.2 million tonnes in 2016/17.

- Around 42 per cent of all local authority waste was incinerated[1]. This amounted to 10.8 million tonnes of local authority managed waste, an increase of 665 thousand tonnes on 2016/17 and off-setting reductions in waste going to landfill. There was 7.6 million tonnes of waste sent direct to incineration in 2017/18, at 70 per cent of the total, this proportion was unchanged from 2016/17.

- Landfill tax continues to be the main driver for diverting waste from landfill. Increasing numbers of EfW incineration plants have come on line in recent years and this has provided local authorities with a cheaper alternative to landfill gate fees.

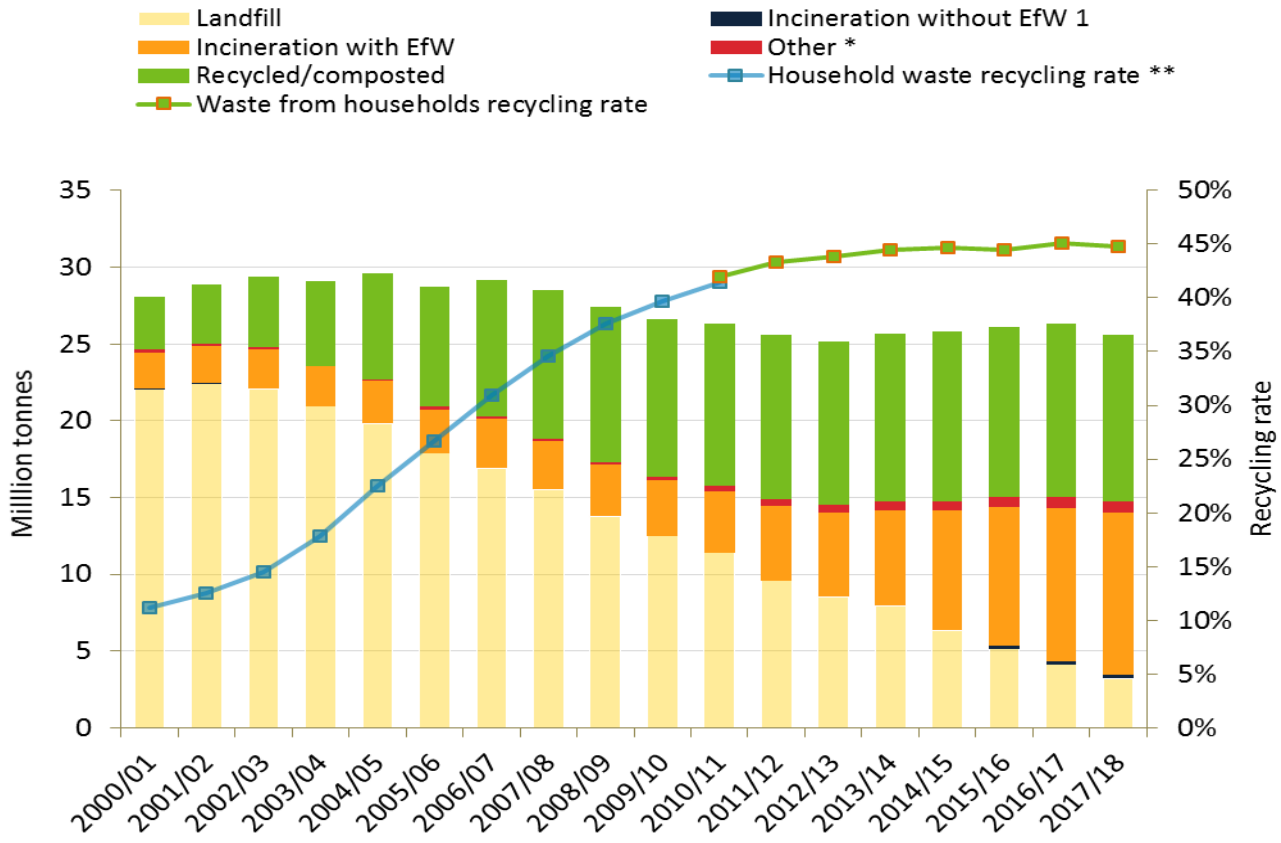
- The amount of all local authority waste sent for recycling in 2017/18 was 10.9 million tonnes, 392 thousand tonnes down on 2016/17. Overall 42.4 per cent of all local authority waste was sent for recycling in 2017/18 compared to 42.8 per cent in 2016/17.

Table 2 Management of all Local Authority collected waste financial year figures in England 2013/14 to 2017/18 (thousand tonnes)

Waste disposal method	2013/14	2014/15	2015/16	2016/17	2017/18	2017/18 % change over 2016/17
Landfill	7,933	6,361	5,133	4,136	3,213	-22.3%
Recycled / composted *of which:-*	10,931	11,067	11,065	11,252	10,860	-3.5%
Household waste	9,980	10,117	10,075	10,329	9,980	-3.4%
Non household waste	950	950	990	923	880	-4.7%
Total Incineration *of which:-*	6,245	7,798	9,259	10,169	10,834	6.5%
Incineration with EfW	6,204	7,773	9,067	9,946	10,620	6.8%
Incineration without EfW [1]	41	25	192	224	214	-4.1%
Other	537	589	668	761	719	-5.5%
Total local authority waste managed	**25,645**	**25,816**	**26,124**	**26,319**	**25,626**	**-2.6%**
Recycled / composted waste as a percent of total	**42.6%**	**42.9%**	**42.4%**	**42.8%**	**42.4%**	**-0.4 percentage points**

[1] Incineration with energy recovery/without energy recovery includes incineration bottom ash (IBA) and metals from IBA.

Figure 5: Management of all Local Authority collected waste and recycling rates in England, 2000/01- 2017/18



Notes:
Incineration with energy recovery/without energy recovery includes incineration bottom ash (IBA) and metals from IBA. This is not impacted by the change in waste from households recycling definition.
* Other includes waste treated/disposed through other unspecified methods, process and moisture loss.
** The Household waste recycling rate is based on a broader measure of waste and is not directly comparable to the 'waste from households' recycling rate. For further information on definitions refer to the glossary.
*** From April 2015/16 IBA metal is now included within the Waste from households recycling rate shown on this chart.

4. Household Waste Recycling Rates for England and the regions

(Tables 3 to 4, Figures 6 to 8; Table 3a of the dataset "Selected waste indicators")

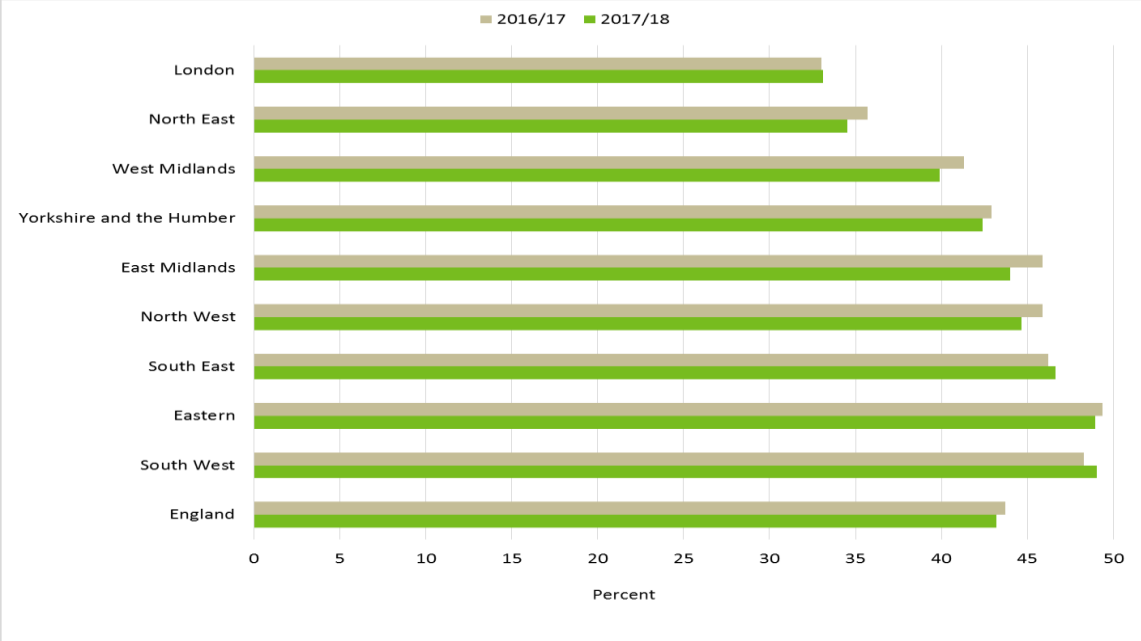
The 'household waste' (ex-NI 192) measure is a broader definition of waste than the 'waste from households' measure. The 'household waste' measure includes street bins, street sweepings, gully emptying, parks and grounds waste, soil, and compost like output, separately collected healthcare waste and asbestos.

At a regional level there is considerable variation across authorities, influenced heavily by how heavily populated an area is, and the kind of housing and the level of other organic or garden waste collected. For example in built up areas with a high proportion of flats residents may find it difficult or be unwilling to store waste for recycling. Also the same properties will not be producing other organic or garden waste which will significantly reduce recycling levels for those authorities. Regions

with higher rates are likely to be influenced by good householder response to recycling schemes and are also areas where garden waste makes a significant contribution to overall recycling levels.

The regional differences are illustrated in Figure 6.

Figure 6: Household waste recycling rates 2016/17 and 2017/18 for England and regions



- The London area has the lowest household waste recycling rate, at 33.1 percent in 2017/18 while the Eastern region and South West regions are the highest at 49.0 per cent each

- The South West region had the largest increase in household waste recycling rate up by 0.7 percentage points to 49.0 per cent, while the South East and London had increases in their recycling rate of 0.5 and 0.1 percentage points respectively. There were decreases in the recycling rates of all of the other regions.

5. Household Waste Recycling Rates for Individual Local Authorities - (Table 3 below and Table 3 of the dataset "Selected waste indicators", and Figures 7 and 8 below)

- At an individual Local Authority level, 'household waste' recycling rates ranged from 14 per cent to 64 per cent. The average figure for England is 43.2 per cent in 2017/18. This is 0.5 percentage points lower than in 2016/17.

- 'Household waste' recycling is often similar in adjacent authorities, however there is a wide range between the highest and lowest recycling rates in all regions of England and even within a region. Figure 7 shows the geographic distribution of recycling rates in 2017/18.

- Table 3 below shows the highest and lowest recycling rates in each region together with the proportion of total recycling that is made up of organic waste for each authority shown. Generally an authority with a small proportion of their total recycling accounted for by organic wastes will have a lower recycling rate, although as can be seen below, this is not always the case.

Table 3: Local authorities with the highest and lowest household recycling rates in each region in 2017/18

Region	Position	Authority	Recycling Rate	Percent of Total recycling that is organic
London	lowest	Newham LB	14%	17%
	highest	Bexley LB	52%	42%
North East	lowest	Stockton-on-Tees Borough Council	25%	34%
	highest	Darlington Borough Council	41%	21%
West Midlands	lowest	Birmingham City Council	21%	38%
	highest	Stratford-on-Avon District Council	60%	58%
South West	lowest	Council of the Isles of Scilly	21%	21%
	highest	Stroud District Council	61%	41%
Yorkshire and the Humber	lowest	Kirklees MBC	27%	38%
	highest	East Riding of Yorkshire Council	64%	50%
East Midlands	lowest	Bassetlaw District Council	25%	25%
	highest	South Northamptonshire District Council	60%	59%
North West	lowest	Barrow-in-Furness Borough Council	20%	38%
	highest	Trafford MBC	59%	58%
South East	lowest	Gosport Borough Council	23%	9%
	highest	South Oxfordshire District Council	63%	53%
Eastern	lowest	Tendring District Council	27%	33%
	highest	Rochford District Council	63%	61%

- There are 3 regions in 2017/8 where the range between the highest and lowest recycling rates (see Table 3) is around 40 percentage points. These are the South West, the South East and West Midlands. Of these Birmingham City Council and the Council of the Isles of Scilly had the lowest recycling rates. Birmingham's recycling was down by 3.7 percentage points in 2017/18 due to a period of industrial action by waste collection services in the summer. Waste volumes on the Isles of Scilly are very small and this very low recycling rate has little impact on the overall rate for the region.

- There are similar but slightly narrower ranges across most other regions except for the North East. Stockton on Tees Borough Council has the lowest rate at 25 per cent and Darlington Borough Council the highest at 41 per cent, a difference of just 16 percentage points. However only 21 per cent of Darlington's recycling is organic materials compared to some 34 per cent for Stockton on Tees.

- In all 10 authorities had recycling rates in excess of 60 per cent. In total there were 82 authorities with a recycling rate of 50 per cent or higher.

- East Riding of Yorkshire Council had the highest 'household waste' recycling rate in England in 2017/18 at 64 per cent, with 50 per cent of their recycling being organic waste. South Oxfordshire District Council and Rochford District Council both achieved 63 per cent 'household waste' recycling rates. The proportion of organic/green waste within the household recycling total in 2017/18 for these authorities was 53 per cent for South Oxfordshire, 50 per cent for East Riding and 61 per cent for Rochford.

- These same three local authorities have been the top 3 performing local authorities in terms of household waste recycling in the 3 years 2015/16 to 2017/18. Over the last 5 years, South Oxfordshire District Council and Rochford District Council have both had an average recycling rate of 65 per cent, while East Riding of Yorkshire, the top performing council this year has averaged 62 per cent over the 5 years.

- Tonbridge and Malling Borough Council had the highest proportion of organic/green waste at 73 per cent of their total household recycled waste with an overall household recycling waste in 2017/18 of 42 per cent.

- Newham London Borough Council has the lowest 'household waste' recycling rate in England in 2017/18 at 14 per cent, only 17 per cent of Newham's recycling is organic materials. The next lowest recycling rates for London are Westminster City Council at 19 per cent, and Lewisham Borough Council at 22 per cent. However only 3 per cent of Westminster's recycling is made up of organic materials while for Lewisham the proportion is 33 per cent.

Table 4: Number of authorities in each region showing an increase in their recycling rate of 0.1 percentage point or more in 2017/18 compared to 2016/17

Region	Total number of authorities in region	Number of authorities with an increase of 0.1 percentage point or more in recycling rate in 2017/18	Percent of authorities in region with an increase
West Midlands	33	3	9%
North East	12	4	33%
East Midlands	45	8	18%
Yorkshire and Humber	22	8	36%
North West	43	13	30%
Eastern	50	18	36%
London	37	18	49%
South West	30	22	73%
South East	73	44	60%
Total	345	138	40%

Note:- There is a decrease of 5 in the number of local authorities in 2017/18. This is due to the formation on the "Somerset Waste Partnership Unitary Authority" which manages and reports the waste formerly reported by Mendip DC, Sedgemoor DC, Somerset CC, South Somerset DC, Taunton Dean BC, and West Somerset DC.

- Table 4 above shows the number of authorities in each region in which had an increase in their recycling rate of 0.1 of a percentage point or more in 2017/18 compared to 2016/17. Figure 8 below shows the shows the geographic distribution of increases and decreases in recycling rates for each local authority by bands according to the size of the change.

- Overall 138 or 40 per cent of the 345 local authorities in England an increase of 0.1 percentage points or more in their household recycling rate in 2017/18.

- In the South West region 73 per cent of local authorities increased their recycling rate. In the South East region 60 per cent of all local authorities increased their household recycling rate.

- In London 49 per cent of authorities achieved some level of increase in their household recycling rate.

- In the North West 30 per cent of authorities had an increase in their recycling rate and in North East region 33 per cent of authorities had an increase. In the Yorkshire and Humber region 36 per cent of all local authorities had an increase in their household recycling rate in 2017/18.

- In 2017/18 the local authorities with the largest increase in 'household waste' recycling rates over the last 12 months were Stroud District Council (61 per cent), Sutton LB (50 per cent) and Colchester Borough Council (55 per cent) where rates increased by between 9 to 16 percentage points.

Figure 7: Map of Household Waste recycling rates for individual local Authorities in England 2017/18

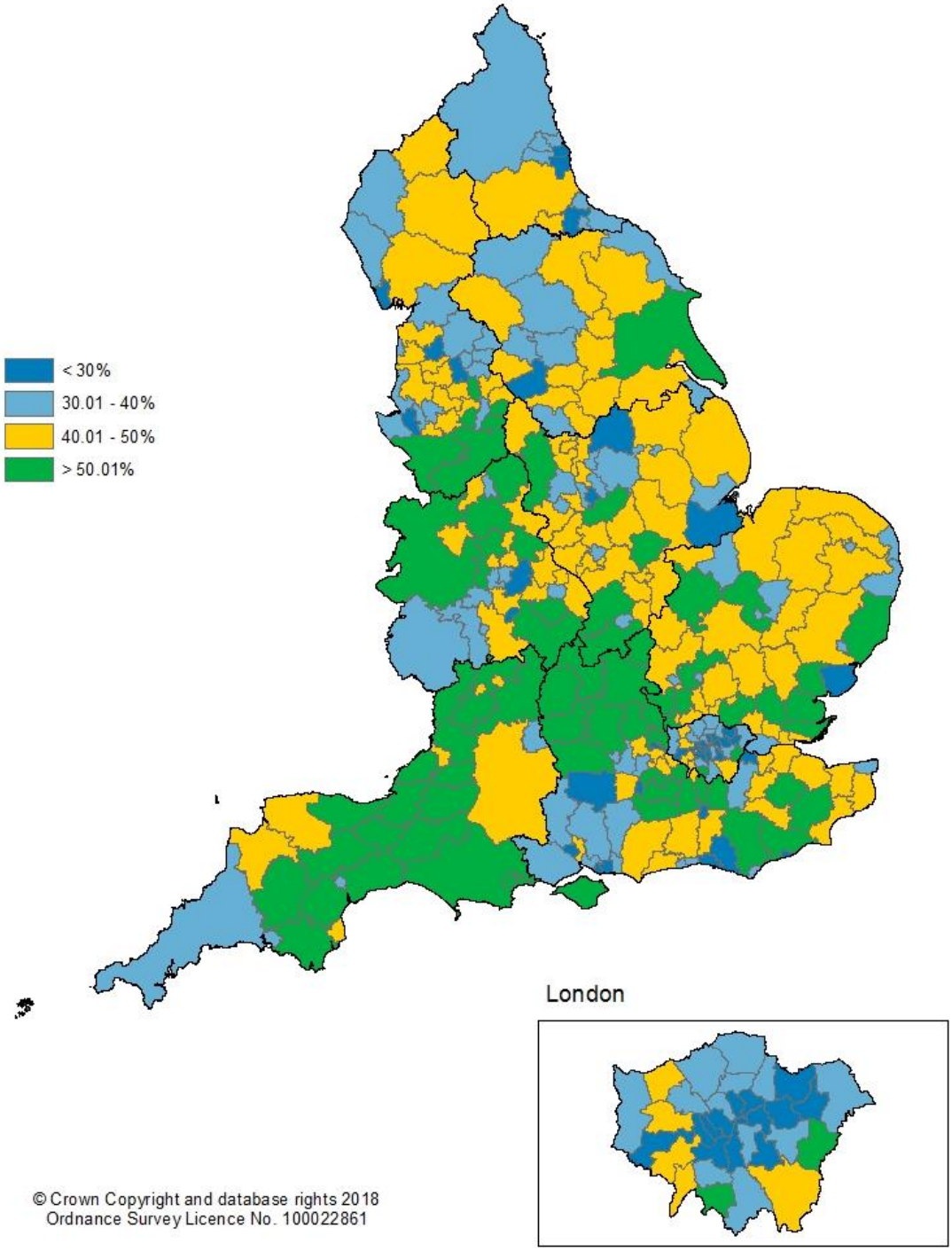
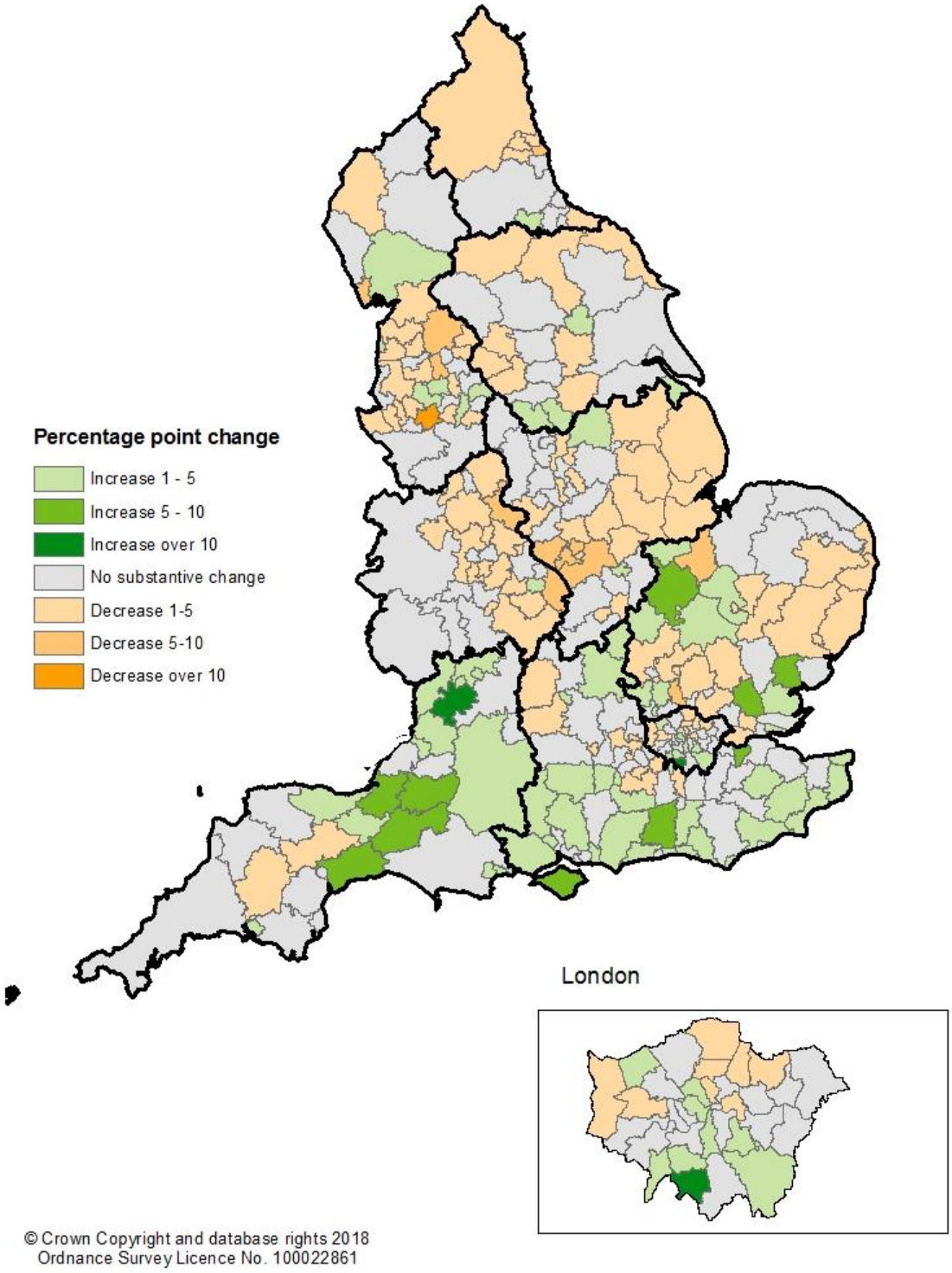


Figure 8: Map of change in Household Waste recycling rates for individual local Authorities in England for 2017/18 compared to 2016/17



Note: Grey areas in this map indicate a local authority where there was little change or the increase or decrease in the recycling rate was less than 1 percentage point.

6. DATA USES, FEEDBACK, REVISIONS POLICY, METHODOLOGY, GLOSSARY OF TERMS AND MEASURES, AND REFERENCES

6.1 Data uses

Data on waste management are used to monitor policy effectiveness and to support policy development in the context of the recycling target set out in the Waste Framework Directive (2008/98/EC). The underlying data held in WasteDataFlow are also used extensively by local and central government, the waste industry and the public. Data are reported by all local authorities, often from management information supplied by their waste management contractor.

Factors affecting household waste recycling range from individual household behaviours, the advice and collection services provided by local authorities, the cost of waste treatment and disposal and to some extent wider issues such as the state of the economy. Some quarterly waste data shows a clear seasonal fluctuation. For example, the generation of garden waste is highly seasonal, increasing sharply and pushing up recycling rates in the spring and summer months. For this reason comparisons should be made with the same quarter in previous years or using full 12 month periods.

About 86 per cent of all waste managed by local authorities is 'waste from households' with the remainder coming from street cleaning, parks and grounds, business and construction. Only a small proportion of the total waste from businesses and construction are covered in these statistics, with most being managed privately.

6.2 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 see our contact details at the bottom of the first page of this notice or e-mail: WasteStatistics@defra.gsi.gov.uk.

6.3 Revisions Policy

Defra will provide information about any significant revisions made to information published in this statistics release and the associated datasets. Revisions could occur for a variety of reasons, including backdating to reflect methodological improvements or the finalisation of data from third parties which was unavailable or provisional at the time of publishing. The figures in this statistical release are taken from data reported by local authorities at a fixed time in October. Occasionally local authorities notify revisions after this point where it is generally not possible to take into account the changes without risking delaying publication. These typically do not have a significant impact on the headline figures, particularly at an England level.

6.4 Methodology

Data for this release came from a snapshot of the WasteDataFlow database taken in October 2018. WasteDataFlow is a UK wide system managed by Defra in collaboration with Devolved Administration partners that is used to record the collection, treatment and disposal of local authority waste. First results using this database were produced for 2004/05 with earlier estimates of waste available from the Municipal Waste Management Surveys.

The tonnage of waste 'sent for reuse, recycling and composting' is that which is accepted by the re-processor. As such it excludes any recycling rejects that occur during collection, sorting or further treatment. Waste diverted for recycling from the residual (or 'black bag waste') stream by further processing is included in the recycling tonnages.

For the 2017 release a change in the methodology was made for the 'waste from households' recycling for 2016 to also include metal recovered and subsequently recycled after incineration of waste. Estimates were produced for 2015 but it was not possible to backdate figures in a consistent manner prior to 2015 due to changes in the question structure and reporting which were introduced from April 2015. See 'Data notes and developments' section below for more information.

6.5 Introduction of change to include metal recovered and recycled from Incinerator bottom ash

In December 2017, a change in how metal recovered and recycled after incineration of waste (IBA metal) is treated and reported for the 'waste from households' dataset only was introduced. The tonnage of IBA metal is now included within the recycling instead of being reported as 'recovery. The amount varies depending upon 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 for fully established and embedded. As such the figures need to be taken as indicative estimates and why this has only been applied to England rather than individual local authorities.

This methodological change for IBA metal has been applied to the waste from household measures only. It has been applied to data from April 2015 - it is not possible to apply the change to data before then as the question structure was different so reporting of IBA metal was not as complete. At an overall England level this change in methodology raised the recycling rate for 2016 by around 0.7 percentage points (equivalent to 152 thousand tonnes). For 2015 the waste from households recycling rate would be increased by around 0.4 percentage points (equivalent to around 97 thousand tonnes). This is a slight underestimate for the impact for 2015 as data for January to March 2015 use the old question structure so

don’t fully capture IBA metal for this quarter; estimated to be around 23 thousand tonnes.

Overall this change results in waste from household recycling rates being slightly higher where it would previously have been reported as ‘recovery’.

There are no such methodological changes to the dataset for all local authority waste or household waste recycling so there are no changes to the household (NI 192) household recycling figures which are reported for England and also at a regional and individual local authority level where existing methodology and definitions have been retained.

6.6 December 2018 – Revision to ‘Waste from household’ calculations and data. (Table 5)

Following detailed analysis of Q100 data it became apparent that due to the way the data had been reported, there were a few significant tonnages of recyclate being omitted from calculations. These were mainly where:-

i) Comingled recyclates going through a materials recovery facility were later described as being for reuse rather than recycling. Although both reuse and recycling count towards the recycling rate this data was outside the scope of the calculations due to rules within an algorithm and so tonnages did not count towards the Waste from household recycling total.

ii) Through the online reporting, ‘Other scrap metal’ following incineration is selected from the material list rather than the strictly correct ‘IBA metal’ by some local authorities. The change to calculations in 2017 see above to include metals from incinerator bottom ash (IBA metal) had been precisely set to exclude any material not having that precise description. It was found that this was excluding some tonnages of metals described as ‘other scrap metal’ rather than IBA metals from recycling totals.

Both these scenarios have now been accommodated within waste from household recycling calculations. Obviously it is not possible or desirable to fix all reporting issues through revision to calculations and local authorities are encouraged though updated guidance and newsletters to report materials in specific ways.

In addition to the work above to refine calculations a number of data reporting errors were found. Some of these were where recyclate material types were misreported at final destination e.g. mixed plastics instead of mixed paper & card or where Incinerator bottom ash final destination was reported incorrectly. These mistakes are likely to be a result of the complexity of the Q100 reporting structure.

Overall the revisions resulting from calculation improvements and data revisions at a National level are small. Table 5 below shows the figures published last year in Table 1 of this notice against the current figures for 2015 and 2016. The overall ‘Waste from household’ recycling rate was not affected by the revisions.

Table 5: Impact of Calculation and data revisions to Waste from Households Headline figures

Stats notice published:-	December 2017		December 2018		Change	
Waste type	**2015**	**2016**	**2015**	**2016**	**2015**	**2016**
Total Recycling of which:	9,843	10,219	9,849	10,217	6	-2
Dry recycling of which:	5,830	6,046	5,834	6,042	5	-4
IBA Metal	97	152	97	143	0	-9
Separately collected food waste	307	353	307	355	0	2
Other organics recycling	3,706	3,820	3,708	3,820	1	0
Total Residual	12,365	12,529	12,363	12,535	-2	6
Total waste from Households	22,225	22,770	22,225	22,770	0	0
Waste from households recycling rate (including IBA metal)	44.3%	44.9%	44.3%	44.9%	0.0%	0.0%
Waste from households recycling rate (excluding IBA metal)	43.9%	44.2%	43.9%	44.2%	0.0%	0.0%

6.7 Question structure for treatment and disposal questions (Q100)

"Question 100" (Q100) has replaced the previous treatment questions. It was introduced on a voluntary basis from April 2014 with and was used by all local authorities in England from April 2015.

Q100 provides a more flexible structure that has enabled local authorities to report a more complete and transparent representation of the more complex waste treatment practices that occur which could not be accurately captured under the old question structure. It also provides the opportunity for local authorities to report in more detail the further treatment and disposal of certain waste types such as refuse derived fuel (RDF), which would have been a final output previously. This is highly specific to the Local Authority and the facilities and the practices used for treatment and disposal.

Q100 also allows for more accurate and transparent reporting of recycling recovered from the residual stream which is back-allocated by the waste disposal authority to its constituent waste collection authorities, where there is arrangement to do this. This is done in a slightly different way with some subtle changes to the calculation and apportionment. It also provides material specific information to be recorded which results in lower figures against 'other materials' for recycling as this is now recorded against specific materials such as glass, plastic, paper etc.

There are some subtle differences in the way the recycling calculations work in relation to the apportionment of waste as household/non-household or waste from household/non-waste from household depending on whether the local authority has provided the specific split at treatment; in the absence of this, the default factor based on the split at collection is applied. In many cases local authorities have provided specific splits for household waste but not the waste from household splits.

This can lead to some small differences in apportionment and trends when comparing data for household and waste from household level.

We are monitoring and assessing the impact of the introduction of Q100 on data recording and subsequent reporting so that this is clear and consistent.

6.8 Data quality assurance

All local authorities provide data into WasteDataFlow. Several stages of data validation are carried out by the local authority submitting the data, the WasteDataFlow contractor and Defra with input from the Environment Agency.

The WasteDataFlow contractors check each return for completeness and data consistency against key standardised validation checks. Data are checked against appropriate threshold values specified which take into account the expected level of variance. There is an on-line validation process which compares the data for the current quarter against the data for the equivalent quarter for the previous year.

Once the data have been validated by the contractor, further validation checks are carried out by Defra who may also refer some to the Environment Agency on any specific data queries raised, particularly related to appropriate recording of treatment and facility sites. The Defra checks include trend and outlier analysis on key measures at an aggregate and individual local authority level are undertaken. Details of the validation process are available on the WasteDataFlow website.

With the introduction of Q100, this provides scope for local authorities to report more fully on treatment and end destination. This is particularly the case for incineration of waste and subsequent outputs and their final treatment and disposal. Gathering such information can be challenging, especially where waste is goes through multiple different sorting and treatment processes at different facilities. In most cases local authorities are able to supply this information but in some cases full end destination treatment is not given or is stated as ‘unknown’. This may have a small impact on the final figures. Defra will continue to monitor this and working with local authorities to enhance data quality assurance and consistency and completeness of reporting.

6.9 EU recycling target

Commission Decision 2011/753/EU allows a choice of four options and calculation methods for the calculation of the target to recycle at least 50% of household waste and similar by 2020. Each Member State must use the calculation method that corresponds to the re-use and recycling option that it has chosen to apply the target to. The UK currently applies the target to the third option: “the preparation for reuse and the recycling of household waste”. This means that the UK must use calculation method 3 set out in the Decision and use national data to report on the recycled amount of household waste. “Household waste” is defined at Article 1(1) of the Decision as “waste generated by households”.

More ambitious targets and other changes are being introduced through the Circular Economy Package.

7. Glossary of terms and measures

Waste from households

The 'waste from households' measure was introduced to statistical publications by Defra in May 2014. It is also used to construct a harmonised UK indicator based comparable calculations for each of the four UK countries. This provides a consistent approach with which to report household recycling rates at UK level under the Waste Framework Directive (2008/98/EC).

'Waste from households' is a narrower version of the 'household waste' measure which was used previously. The difference is that 'waste from households' excludes local authority collected waste types not considered to have come directly from households, such as street bins, street sweepings, parks and grounds waste and compost like output (CLO) from Mechanical Biological Treatment (MBT) plants. As explained above under 'Methodology and 'Data Notes and Development' we are introducing a change to the waste from households recycling calculation to now include metal recovered after incineration. Further information on the difference has been published on the gov.uk website and is summarised in the table below.

Recycling (including composting and reuse)	**Waste from Households recycling**	**Household waste recycling**
from households and other premises similar to households, CA sites, Bring banks	Y	Y
from street bins	N	Y
from household-related parks and grounds	Community skips only	Y
from soil	N	Y
from rubble and plasterboard	N	N
from compost-like output from MBT plant	N	Y
from incineration bottom ash (IBA)	N	N
From metal recovered and recycled from incinerator bottom ash	Y*	N
other, from residual streams	Y	Y
recycling rejects	N	N

Residual waste	**Waste from households residual**	**Household waste residual**
from regular household collection	Y	Y
from civic amenity sites	Y	Y
from bulky waste	Y	Y
from other household waste	Y	Y
from street cleaning/sweeping	N	Y
from gully emptying	N	Y
from separately collected healthcare waste	N	Y
from asbestos waste	N	Y

*Revised to include IBA metal in 2017 and applied to data from April 2015.

We have continued to report the 'household waste' recycling measure in our annual publication on a financial year basis to maintain continuity with the existing data series and in order to meet the wider needs of users. However it is no longer reported in the quarterly releases on recycling which will report the 'waste from households' measure only. Full data on household waste is available and can be downloaded on the gov.uk website.

The local authority recycling rate is based on the **NI 192 National Indicator** recycling calculation. The National Indicator calculation has been widely used by local authorities for many years for local strategic planning purposes, discussions with contractors and for benchmarking against other authorities and captures a broader scope of household waste than 'waste from households', e.g. it includes street sweepings and compost like output. This calculation will be made available as the NI 192 report on the wastedataflow portal (http://www.wastedataflow.org/) and also on gov.uk website. This is reported on a financial year basis to meet the needs of local authorities.

Useful links

Scotland	*https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/household-waste-data/*
Wales	*http://new.wales.gov.uk/topics/statistics/theme/environment/wasterecycle/?lang=en*
Northern Ireland	*Northern Ireland local authority collected municipal waste management statistics | Department of Agriculture, Environment and Rural Affairs*
Eurostat	*http://ec.europa.eu/eurostat/web/waste*
Wastedataflow portal	*http://www.wastedataflow.org/*

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Website: https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs
Public Enquiries: 03459 335577; Media enquiries: 020 8225 7317

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Waste Hierarchy and Fuel Availability Assessment

Annex D
Waste Wood at Tilbury Green Power

1. Waste Wood at Tilbury Green Power

1.1 Introduction

1.1.1 Tilbury Green Power Ltd's project at Tilbury Dock is comprised of two phases: Phase 1 is nearing the end of its construction phase and is expected to be operational in 2019; however '*no decision has been made on whether to proceed*'[1] on Phase 2, for the remaining 220,000 tonnes.

1.1.2 Phase 1 of Tilbury Green Power Ltd's project therefore has a reasonable prospect of being delivered, but not Phase 2. Phase 1 is permitted to receive 270,000 tonnes of waste wood.

1.1.3 Waste wood (of a type that would also be appropriate for K3/WLN) can be recorded in the WDI as one of three different waste types, categorised in the LoW under codes: 17 02 01 wood; 19 12 07 wood other than mentioned in 19 12 06[2]; and 20 01 38 wood other than that mentioned in 20 01 37[3].

1.1.4 In 2017, just under 410,500 tonnes of these waste types were received at facilities within the Study Area. Just 319 tonnes was disposed of to landfill, 0.08%.

1.1.5 Very little waste wood is disposed of to landfill, not least because it would be recognised as a biodegradable waste and consequently incur the Landfill Tax. Further, it has a value, either as a material to be recycled or as a fuel from which to recover energy. Looking again at the data within the WDI shows that just over 482,000 tonnes of waste wood was removed from facilities (excluding transfer stations) operating within the Study Area. This is shown in Table D.1.

Table D.1 Waste wood removed from waste management facilities in the Study Area, 2017

Area	17 02 01 wood	19 12 07 wood other than 19 12 06	20 01 38 wood other than 20 01 37	Total
East London	6,944	8,840	176	15,960
East Sussex	4,105	7,740	1,447	13,292
Essex	531	164,860	255	165,646
Kent	8,321	88,272	38,526	135,120
South East London	5,986	20,102	547	26,634
South London	5,875	23,048	2,304	31,227
West Sussex	2,704	91,509	n/r	94,213
Total	**34,466**	**404,372**	**43,255**	**482,092**

Source: Environment Agency, WDI, 2017
n/r = none reported

[1] https://www.tilburygreenpower.com/about-the-project/
[2] wood containing dangerous substances
[3] wood containing dangerous substances

1.1.6 Looking further into waste type 19 12 07 (the most substantial) the data held within the WDI shows that 230,000 tonnes had a destination of incineration outside the UK.

1.1.7 None of the waste types considered in Table D.1 feature in any of the waste types considered for K3/WKN, as confirmed in Table D.2.

1.1.8 Table D.1 demonstrates that there is a substantial amount of waste wood available for Tilbury Green Power Ltd's project to be gained from sources (waste types) that have not been considered in identifying the fuel availability for K3/WKN.

Table D.2 Comparison of waste types considered

Description	List of Waste Chapters and specified waste types														
Waste disposed to landfill	01	02	03	06	07	08	10	11	12	15		16	18	19	20
Shortlisted waste types														19 12 10[a]	20 03 01
														19 12 12	20 03 07
RDF prepared and exported														19 12 10[a]	
														19 12 11	
Waste Wood											17 02 01			19 12 07	20 01 38

a: Waste type 19 12 10 is used in both elements of the Fuel Availability Assessment, but have been selected within the WDI data as having a destination of either landfill or overseas. Whilst the same waste type is referred to in both elements of the assessment, the wastes recorded under that waste type have different destinations. Consequently, they are separate waste tonnages and not the same tonnes being counted twice.

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