NORTH LINCOLNSHIRE GREEN ENERGY PARK

Planning Act 2008

Infrastructure Planning

North Lincolnshire Green Energy Park

5.2 RDF Supply Assessment

PINS reference: EN010116

December 2022

Revision number: 2

1. Introduction

1.1 Background

1.1.1 This RDF Supply Assessment Version 1 has been prepared on behalf of the Applicant in relation to the North Lincolnshire Green Energy Park (NLGEP) (the Project).

1.1.2 The Project located at Flixborough, North Lincolnshire, is a Nationally Significant Infrastructure Project (NSIP) comprising an Energy Recovery Facility (ERF) capable of converting up to 760,000 tonnes of non-recyclable waste into 95 MW of electricity and a carbon capture, utilisation and storage (CCUS) facility which will treat a proportion of the excess gasses released from the ERF to remove and store carbon dioxide (CO_2) prior to emission into the atmosphere. The design of the ERF and CCUS will also enable future connection to the Zero Carbon Humber pipeline, when this is consented and operational, to enable the possibility of full carbon capture in the future.

1.1.3 The Examining Authority (ExA) commenced their examination of the Project on 15th November 2022 and an Issue Specific Hearing (ISH) on the Scope of the Proposed Development (ISH1) was held on 16th November 2022 with an ISH on the draft Development Consent Order (ISH2) being held on 17th November 2022.

1.1.4 At ISH1, the ExA asked some initial questions on the national and local need for the Project. The Applicant undertook to submit an updated RDF Supply Assessment, recognising that the report submitted with the Application reflected the position in November 2021.

1.1.5 This RDF Supply Assessment Version 1 provides an analysis of the position based on the latest available information from October 2022. The assessment was undertaken by AFRY Management Consulting and is provided at **Appendix A** of this report.

1.2 Summary of National Waste Policy Position

1.2.1 The Applicant made oral submissions at ISH1 on the policy position regarding national waste supply.

1.2.2 The national need position for the Energy Recovery Facility (ERF) is two-fold – firstly in terms of its role in generating low carbon electricity and secondly in relation to its role in treating waste that would otherwise be sent to landfill. This RDF Supply Assessment Version 1- principally addresses the second element; the policy need for the ERF in relation to the treatment of waste, although the report does take account of contribution towards low carbon electricity when assessing available Energy from Waste (EfW) capacity.

1.2.3 The Planning Statement [**APP-035**] explains the national policy position on the ERF (otherwise referred to as EfW).

1.2.4 The Overarching National Policy Statement for Energy (NPS EN1) confirms that energy recovery from residual waste has a lower GHG impact than landfill (paragraph 3.3.33).

1.2.5 The National Policy Statement for Renewable Energy (NPS EN3) recognises the role of EfW generating stations in taking fuel that would otherwise be sent to landfill (NPS EN3 paragraph 2.5.9).

1.2.6 The ERF takes Refuse Derived Fuel (RDF) that would otherwise be destined for landfill and therefore addresses both of these policy aims.

1.2.7 The Government published a revised suite of energy NPSs in 2021. Revised Draft EN1 continues to recognise role of EfW, noting that only waste that cannot be re-used or recycled with less environmental impact and would otherwise go to landfill should be used for energy recovery (paragraph 3.3.33). In this regard, the Applicant drew attention at ISH2 to Requirement 15 in the draft DCO [AS-006] which specifies that the ERF would process RDF only.

1.2.8 Revised Draft EN3 contains a new paragraph that Applicants must demonstrate that proposed EfW plants are in line with Defra's policy position on the role of energy from waste in treating municipal waste (paragraph 2.10.4) and that the proposed plant must not result in over-capacity of EfW waste treatment at a national or local level (paragraph 2.10.5).

1.2.9 This RDF Supply Assessment Version 1 seeks to address both adopted and emerging national Government policy.

1.2.10 Defra's most up to date policy position is contained within the Resources and Waste Strategy - Our waste, our resources: a strategy for England (2018) which is then reviewed on a yearly basis with the most recent monitoring report published in November 2022. The role of EfW in the waste hierarchy is that it is preferred to landfill, but less preferred than prevention, recycling and reuse. One of the aims of the Resources and Waste Strategy is also to drive greater efficiency in EfW plants.

1.2.11 The Project is consistent with this latest policy position in that it proposes to use waste (RDF) that would otherwise be destined for landfill to generate energy, thus moving it up the waste hierarchy. It also addresses other important aims of the Resources and Waste Strategy through the inclusion of the Plastics Recycling Facility (PRF), which will enable plastics which would otherwise be packaged with the RDF to be source-segregated and recycled and a concrete block manufacturing facility (CBMF) which reuses ash generated by the Energy Recovery Facility (ERF) to produce construction materials, rather than sending it to landfill.

1.2.12 In terms of fuel availability, this RDF Supply Assessment Version 1 provides analysis of fuel availability on both a national and regional level. The Report concludes that in a scenario in which England meets it existing recycling targets, and assuming all capacity must be fitted with carbon capture to comply with the UK's target to decarbonise the electricity sector by 2035, an additional 4 million tonnes of recovery capacity is required to ensure that residual waste that cannot be recycled can be processed for energy recovery in 2035.

1.2.13 The RDF Supply Assessment Version 1 further identifies that within Yorkshire & Humber and East Midlands, there could be around 2 million tonnes of waste without access to recovery operations in 2035, again assuming all capacity must be fitted with carbon capture. On a regional level, ES Chapter 15: Waste [APP-063] identifies that there are a number of landfill and incineration facilities within the East Midlands region with limited remaining capacity.

1.2.14 The RDF Supply Assessment Version 1 focuses on ERFs which have a high or medium likelihood of being fitted with carbon capture. This reflects the fact that in the Net Zero Strategy of October 2021, the Government announced that all electricity should be generated from low carbon sources by 2035.

1.3 Summary of Local Waste Policy Position

1.3.1 The Applicant also made oral submissions at ISH1 on the policy position regarding local waste supply.

1.3.2 The North Lincolnshire Core Strategy 2011 (Policy CS20) states that new and enhanced facilities for the treatment and management of waste will be located at five broad locations, including the Flixborough Industrial Estate. The ERF itself is located predominantly within the Flixborough Industrial Estate and therefore accords with adopted local waste policy.

1.3.3 North Lincolnshire submitted their new Draft Local Plan for examination in November 2022 (the Regulation 22 draft Local Plan).

1.3.4 Emerging Local Plan policy WAS1 states that development that encourages and supports the minimisation of waste production and the re-use and recovery of waste materials will normally be supported.

1.3.5 Emerging Local Plan policy WAS2 states that new waste management facilities should be located in sustainable locations that are appropriate to the proposed waste management use and its operational characteristics, and where impacts on the community and the environment can be avoided or addressed appropriately. It also states that new EfW facilities will be supported provided that they meet specified criteria, including that they follow a sequential approach to site selection, including on employment sites. All proposals need to meet criteria including that there is a need for the facility.

1.3.6 The sequential approach follows the spatial strategy with sites preferred in the following order, unless an alternative site can be demonstrated, including for technical reasons:

a) Sites allocated or with permanent planning permission for waste management purposes;

b) Employment sites where co-location with existing waste facilities is possible;

c) Employment sites suitable for B2 & B8;

d) Sustainable locations within vacant previously developed land;

e) Existing/former mineral workings;

f) Existing farm buildings/complexes.

1.3.7 The draft Local Plan identifies a residual capacity gap (see analysis below) and therefore it is clear with regard to criteria a) that further sites, in addition to allocations and existing permissions, need to come forward.

1.3.8 The Applicant has carried out comprehensive approach to site selection (see Chapter 3 of the ES Project Description and Alternatives [APP-051]) and there is no opportunity to co-locate the facility with existing waste management facilities, whilst still delivering the same sustainability benefits as the Application site, being served by both river and rail. The Project does however offer the opportunity for co-location of the ERF with recycling facilities, in an employment area, which is consistent with the principles of this spatial strategy. The ERF itself is located predominantly on a designated employment site, which is identified in the adopted Local Plan as being appropriate for EfW facilities. On this basis, the Applicant has followed the spatial strategy set out in the draft Local Plan. Notwithstanding this, there is a technical reason why the ERF should be located at Flixborough, which is the access to sustainable means of transport through the wharf and existing rail link, which is to be upgraded and reinstated as part of the Project.

1.3.9 Emerging Local Plan Policy WAS3 sets out the principle of net self-sufficiency in waste management.

1.3.10 North Lincolnshire prepared a Local Waste Needs Assessment (LWNA) in 2020 as part of evidence base for its draft Local Plan. This identified that there would be a residual capacity of Local Authority Collected Waste (LACW) of 24,715 tonnes in 2020 (after recycling and recovery is allowed for) falling to 10,827 in 2038, assuming an increase in recycling to 65%.

1.3.11 However, the LWNA 2020 also notes that two existing landfill sites are due to close in the mid-2020s (Roxby) and 2030 (Crosby) respectively. This will result in 925,000 tonnes of permitted LACW landfill capacity being lost.

1.3.12 The LWNA also notes that North Lincolnshire currently receives substantial amounts of imported waste from other local authorities in Lincolnshire and that if this continues, there will be a significant shortfall in landfill capacity over the plan period.

1.3.13 The overall local policy position is therefore that further EfWs are supported in appropriate locations to address a residual capacity issue and the landfill to be lost as a result of Roxby and Crosby closing in the mid-2020s.

1.3.14 It is in this context that the RDF Supply Assessment Version 1 is presented.

Appendix A – RDF Supply Assessment Version 2 – AFRY, December 2022

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RDF SUPPLY ASSESSMENT FOR NORTH LINCOLNSHIRE GREEN ENERGY PARK

A report to North Lincolnshire Green Energy Park Limited

Revision 2~~1~~
9~~1~~ December 2022

Report

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RDF Supply Assessment for North Lincolnshire Green Energy Park

Revision 1

Disclaimer

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Executive summary

North Lincolnshire Green Energy Park Limited (The Project) is developing the Project at Flixborough Industrial Estate, North Lincolnshire. A key component of the development is an energy recovery facility generating electricity and heat from residual refuse derived fuel (RDF) and non-hazardous household and commercial & industrial waste. This report is on behalf of the Project, to support its' application for a Development Consent Order under Section 37 of the Planning Act 2008. This report was originally written in 2021 – in this version the analysis has been updated to reflect information available in October 2022.

The Project will process up to 760,000 tonnes of RDF and non-hazardous residual household and commercial & industrial waste per year. It is estimated that up to 5,000 tonnes of scrap metal will be recovered for recycling per annum and up to 25,000 tonnes of recyclable plastic will be processed to produce 20,000 tonnes of recycled plastic in an onsite plastic recycling facility. Waste left after recycling will be combusted at high temperatures to produce steam, which will drive a turbine to create electricity. Electricity output will be up to 95MWe. Flue gas treatment residues and bottom ash produced by the energy recovery process will be used on site to make concrete blocks, recycling around 130,000 tonnes of ash. The Project includes CCU and will be CCUS-enabled, with plans to accommodate carbon capture technology and plans to connect to Zero Carbon Humber to enable the long-term storage of carbon dioxide.

There is currently a significant capacity gap between residual waste arising and existing or committed EfW capacity. This gap will gradually close (at the national and local level) by 2035 if Government recycling targets of 65% are met, but recent plateauing of recycling rates at around 42% means there is significant uncertainty as to whether these targets will be met. The difference between the target of 65% recycling and the current levels achieved equates to an additional 6 million tonnes

of waste that will need to be diverted from landfill to appropriate reprocessing capacity, based on 2020 figures.

While a considerable amount of energy from waste capacity is under development, there is a high level of uncertainty about how much of this capacity will be realised. If new build energy from waste is required to be CCUS-ready in order to align with the UK's Net Zero commitments, then the Project is among the minority of pipeline projects which are well placed geographically to connect to a CCUS cluster.

Furthermore, we think it is unrealistic to assume that all of the existing EfW fleet will be retrofitted with carbon capture, as many projects are not well suited for this for various reasons. Assuming all capacity is required to have carbon capture by 2035, to comply with the Net Zero Strategy, then we project a capacity gap based on existing and committed capacity of over 4 million tonnes nationally and around 2 million tonnes at the local level in 2035 if low-CCS potential projects are excluded (even if recycling targets are met). Based on our projections the Project does not result in over-capacity of EfW waste treatment at a national or local level.

Whilst consented pipeline projects may come forward and reduce these capacity shortfalls, there is a high degree of uncertainty about which projects will be developed and about which will be able to fit carbon capture. The Project is well positioned for carbon capture, being close to one of the first CCUS clusters.

The Project meets the objectives of the North Lincolnshire Council's Waste Strategy, as the facility will take RDF feedstock made from residual waste from which previously recyclate and compostable material has been removed through separate collection or at MRF facilities, and so the production of feedstock to be recovered in the facility will not negatively influence recycling targets. Energy from waste using residual RDF feedstock is classified as energy recovery consistent with the principles of the waste hierarchy as it diverts waste from landfill. Furthermore,

the Project site at Flixborough Industrial Estate is aligned with the local council's strategy where the site is identified as suitable for a waste management facility.

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Report history

Version	Description	Checked	Approval	Date
P0	Issued for DCO submission	Lucy Nattrass	Ali Lloyd	28.02.2022
P1	Revised to update for developments since P0	Ali Lloyd	Ali Lloyd	1.12 2022
P2	Correct error on Table 4 and added footnotes to tables on rounding	Ali Lloyd	Ali Lloyd	9.12.2022

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Abbreviations

Abbreviation	Description
BEIS	Department for Business, Energy and Industrial Strategy
C&I	Commercial and Industrial waste
CCC	Climate Change Committee
CCS	Carbon Capture and Storage
CCU	Carbon Capture and Usage
CCUS	Carbon Capture, Usage and Storage
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EC	European Commission
EfW	Energy from Waste
ETS	Emissions Trading System
EWC	European Waste Catalogue
GHG	Greenhouse gas
GVA	Gross value add
Kt or kte	Kilotonne
MBT	Mechanical-biological treatment
MRF	Materials Recovery Facility
Mt or mte	Million tonne
MWe	Megawatt electricity
NLGEP	North Lincolnshire Green Energy Park (The Project)
NLGEPL	The Applicant
OECD	Organization for Economic Co-operation and Development
RDF	Refuse Derived Fuel
SRF	Solid Recovered Fuel

Formatted: English (United Kingdom)

Report

1 Introduction

1.1.1.1 This Fuel Availability and Waste Hierarchy Assessment is for the North Lincolnshire Green Energy Park (the Project). This report is on behalf of North Lincolnshire Green Energy Park Limited (the Applicant), to support its' application for a Development Consent Order (DCO) under Section 37 of the Planning Act 2008 (the Act).

1.1.1.2 The Project requires a DCO as it falls within the definition and thresholds for a Nationally Significant Infrastructure Project under sections 14 and 15(2) of the Act, requiring consent for the building, commissioning and operating of a generating station with an energy generating capacity greater than 50 MWe.

1.2 The Project

1.2.1.1 The North Lincolnshire Green Energy Park (NLGEP) ('the Project'), located at Flixborough, North Lincolnshire, is a Nationally Significant Infrastructure Project (NSIP) with an Energy Recovery Facility (ERF) capable of converting up to 760,000 tonnes of non-recyclable waste into 95 MW of electricity at its heart and a carbon capture, utilisation and storage (CCUS) facility which will treat the excess gasses released from the ERF to remove and store a proportion of carbon dioxide (CO_2) generated prior to emission into the atmosphere.

1.2.1.2 The NSIP incorporates a switchyard, to ensure that the power created can be exported to the National Grid or to local businesses, and a water treatment facility, to take water from the mains supply or recycled process water to remove impurities and make it suitable for use in the boilers, the CCUS facility, concrete block manufacture, hydrogen production and the maintenance of the water levels in the wetland area.

1.2.1.3 The Project will include the following Associated Development to support the operation of the NSIP:

- a bottom ash and flue gas residue handling and treatment facility (RHTF)
- a concrete block manufacturing facility (CBMF)

- a plastic recycling facility (PRF)
- a hydrogen production and storage facility
- an electric vehicle (EV) and hydrogen (H_2) refuelling station
- battery storage
- a hydrogen and natural gas above ground installations (AGI)
- a new access road and parking
- a gatehouse and visitor centre with elevated walkway
- railway reinstatement works including, sidings at Dragonby, reinstatement and safety improvements to the 6km private railway spur, and the construction of a new railhead with sidings south of Flixborough Wharf
- a northern and southern district heating and private wire network (DHPWN)
- habitat creation, landscaping and ecological mitigation, including green infrastructure and 65 acre wetland area
- new public rights of way and cycle ways including footbridges
- Sustainable Drainage Systems (SuDS) and flood defence; and
- utility constructions and diversions.

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1.2.1.4 The Project will also include development in connection with the above works such as security gates, fencing, boundary treatment, lighting, hard and soft landscaping, surface and foul water treatment and drainage systems and CCTV.

1.2.1.5 The Project also includes temporary facilities required during the course of construction, including site establishment and preparation works, temporary construction laydown areas, contractor facilities, materials and plant storage, generators, concrete batching facilities, vehicle and cycle parking facilities, offices, staff welfare facilities, security fencing and gates, external lighting, roadways and haul routes, wheel wash facilities, and signage.

1.2.1.6 The developer plans to start construction in 2024 with a view to the ERF being operational by2026

1.2.1.7 The intent is that carbon dioxide released during the energy recovery process will be captured. The project will capture and use approximately 55,000 tonnes of carbon dioxide initially, and carbon dioxide will be used in the onsite manufacture of concrete blocks. The East Coast Cluster, which has been selected as a 'Track 1' project for development by the mid-2020s, plans to install a carbon dioxide pipeline that will enable the long-term storage of compressed carbon dioxide under the North Sea as part of the Zero Carbon Humber program. The proposed pipeline (currently undertaking a DCO process) is planned to be routed only a few kilometres from the Project to the west at Keadby, the south at the M180 and to the east at the Scunthorpe Steel Works. The Applicant proposes seeking a separate consent to connect to the East Coast Cluster to enable the long-term storage of up to 650,000 tonnes of carbon dioxide per year. Whilst the Project was not shortlisted in the current Cluster Sequencing Phase-2 process, primarily as it is earlier in the development process than competing projects, it remains very well placed to connect in the future.

1.2.1.8 The Project is accessible via rail, river and road. The railway connection between Flixborough Wharf and the steel works at Scunthorpe will be reinstated and a new railhead will be built to transport feedstocks to the Project. The movement of containerised waste by rail is long-established, dating back to 1977, with services operating from West London, Manchester, Merseyside and South Yorkshire. The Project will use Flixborough Wharf to transport feedstocks via the River Trent. The movement of containerised waste by river is also well-established – Cory Riverside transports 650,000 tonnes of waste per annum via the River Thames. A new access road to join the A1077 and M181 motorway is also planned to improve access by road.

1.3 Purpose of this report

1.3.1.1 The Overarching National Policy Statement for Energy (EN-1)[1] and the National Policy Statement for Renewable Energy Infrastructure (EN-3)[2] provide the primary basis for decisions on applications for nationally significant renewable energy infrastructure, including the Project.

1.3.1.2 Generic issues are covered in EN-1, and EN-3 is concerned with matters specific to biomass, energy from waste, onshore and offshore wind energy, or where, there are further specific considerations arising from the technologies.

1.3.1.3 EN-3 (paragraphs 2.5.66 – 2.5.69) requires applicants to undertake

"An assessment of the proposed waste combustion generating station […] 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

[1] "Overarching National Policy Statement for Energy (EN-1)", July 2011, UK Department of Energy and Climate Change
[2] "National Policy Statement for Renewable Energy Infrastructure (EN-3)", July 2011, UK Department of Energy and Climate Change

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 to the IPC."

1.3.1.4 In September 2021 the Government consulted on an updated draft of EN-3, which includes a statement that:
"The proposed plant must not result in over-capacity of EfW waste treatment at a national or local level."

Whilst the new EN-3 has not yet been formally designated, the Government confirmed this position in a written response to a parliamentary question in July 2022.

1.3.1.5 The purpose of this document is therefore to demonstrate:

- the Project will contribute to recovery targets and not result in over-capacity in EfW facilities at the national or local level;
- the Project complies with the waste hierarchy; and
- the Project complies with local waste plans.

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2 Market and regulatory overview

2.1.1.1 Waste management is a devolved matter and subject to local regulations in England, Scotland, Northern Ireland, and Wales. Each have somewhat different an approach and targets. The legal framework for waste management in England remains largely unchanged after Brexit. Regulations in England are in line with the European Waste Framework Directive and are outlined in the Waste (England and Wales) Regulation 2011[3] and the Resource and Waste Strategy for England[4].

2.2 Waste (England and Wales) Regulations 2011

2.2.1.1 The Waste Regulations aim to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.

2.2.1.2 The Regulations establish the waste hierarchy as a priority order in waste prevention and management policy and set targets for the preparation for re-use, recycling, and recovery of household waste in 2020. The waste hierarchy is defined as follows:

- Prevention
- Preparation for re-use
- Recycling
- Other recovery (including energy recovery)
- Disposal

[3] "Environmental Protection, England and Wales 2011 No.288 The Waste (England and Wales) Regulations 2011", March 2011, UK Government
[4] "Resources and waste strategy for England", December 2018, Department for Environment, Food & Rural Affairs and Environment Agency

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2.3 Resource and Waste Strategy for England 2018

2.3.1.1 The Resource and Waste Strategy aims to preserve material resources by minimizing waste, promoting resource efficiency and moving towards a circular economy. It also sets strategies to minimize the damage caused to the environment by reducing and managing waste safely and carefully and by tackling waste crime.

2.3.1.2 It outlines a strategic ambition to eliminate avoidable waste of all kinds by 2050, and it outlines the following targets:

- 10% or less of municipal waste to landfill in 2035
- 65% recycling rate for municipal solid waste by 2035
- 75% recycling rate for packaging by 2030
- all plastic packaging to be reusable, recyclable or compostable by 2025 with 30% average recycled content across all plastic packaging

2.3.1.3 The Strategy recognizes that recycling rates have plateaued since 2013, with household waste recycling at around 42-43% in recent years, and outlines a number of measures to improve recycling rates including ensuring a consistent set of dry recyclable materials to be collected from all household and businesses; ensuring every household and business has weekly separate food waste collection; and working with businesses and local authorities to improve urban recycling rates.

2.3.1.4 The strategy also outlines the need for greater efficiency in energy from waste facilities including increasing the use of heat and ensuring all future energy from waste facilities achieve recovery (R1) status.

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2.4 Waste Management Plan for England 2021

2.4.1.1 An analysis of the current waste management situation in England is detailed in the Waste Management Plan for England[5]. The Plan recognizes that in order to deliver net zero virtually all heat will need to be decarbonised, and heat networks will play a vital role in this. The Plan targets energy from waste plants to produce heat for heat networks, with £320 million of government funding through the Heat Networks Investment Project and support from the BEIS's £270 million Green Heat Network Fund Transition scheme[6].

2.5 Environment Bill

2.5.1.1 The Environment Act 2021 requires the Secretary of State to set long-term, legally binding targets in four areas, one of which is resource efficiency and waste reduction.

2.5.1.2 The resource efficiency and waste reduction targets are intended to encourage sustained improvement across the whole resources and waste system, while strengthening and supporting commitments made in other government strategies. Targets currently under consideration are increasing resource productivity and reducing the volume of 'residual' waste we generate. The Act also creates the powers necessary to deliver the commitments in the Resource and Waste Strategy, for example the introduction of greater consistency in recycling collections in England.

2.6 Committee on Climate Change

2.6.1.1 The 2021 Progress Report[7] from the Committee on Climate Change (CCC) provides an assessment of UK's progress in reducing emissions and adapting to climate change.

2.6.1.2 The report identifies key gaps in the waste sector that need to be addressed in government policy and calls for stronger commitments on waste and resource efficiency, including recommendations to:

- raise recycling targets for England from 65% by 2035 to at least 68% by 2030; and

- ban biodegradable waste streams such as paper, card, textiles, wood, food and garden waste from landfill from 2025.

2.6.1.3 The CCC stresses that the government must take a whole system approach to improve waste prevention, re-use and recycling. This includes encouraging investment in recycling and re-use services and infrastructure to ensure that, as much as possible, waste is diverted from landfill through increased recycling; and phasing out exports of waste by 2030 at the latest while strengthening tracking and enforcement, to ensure waste intended for recycling or recovery are treated as such.

2.6.1.4 Further recommendations from CCC relate to the emissions from the energy from waste segment, specifically:

- set out capacity and utilisation requirements which are consistent with plans to improve recycling and waste prevention, by the end of 2021,
- consult on the introduction of a carbon price on energy from waste emissions (either as part of the UK Emissions Trading System (ETS) or a separate carbon tax), by the end of 2022,
- provide the necessary support to enable existing plants to begin to be retrofitted with carbon capture, usage and storage (CCUS) from the late 2020s; and
- introducing policy to ensure that any new plants are built either with CCUS or are 'CCUS ready'.

2.6.1.5 The CCC submitted an updated progress report in June 2022, following submission of the initial version of this report[8]. The key messages are essentially the same, and the CCC advocates that all EfW facilities should be fitted with CCUS by 2040.

[5] "Waste Management Plan for England", January 2021, UK Department for Environment, Food and Rural Affairs
[6] Note that the Project will apply for funding under this scheme. The Project supported the North Lincolnshire Council application for the Towns Investment Fund for Scunthorpe.
[7] "Progress in reducing emissions 2021 Report to Parliament" and "Progress in adapting to climate change 2021 Report to Parliament", June 2021, Climate Change Committee
[8] "Progress in reducing emissions 2022 Report to Parliament", June 2022, Climate Change Committee

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2.7 Net Zero Strategy and Carbon Capture, Usage, and Storage (CCUS) Policy

2.7.1.1 In its Net Zero Strategy[9] the Government states that:

> "By 2035, all our electricity will need to come from low carbon sources, subject to security of supply, bringing forward the government's commitment to a fully decarbonised power system by 15 years…".
>
> This poses a challenge for the EfW sector, since currently around half of CO_2 emissions emanate from non-biogenic waste.

2.7.1.2 The Net Zero Strategy sets out proposals to deliver four CCUS clusters by 2030. Following Phase 1 of the Cluster Sequencing Process, the East Coast Cluster has been selected as one of the two Track 1 clusters for the mid-2020s and will be taken forward into Track 1 negotiations. If the clusters represent value for money for the consumer and the taxpayer then subject to final decisions of Ministers, they will receive support under the government's CCUS Programme.

2.7.1.3 The East Coast Cluster spans the Teesside and Humber area. The East Coast Cluster is comprised of the Net Zero Teesside and Zero Carbon Humber consortia of industrial partners. The Humber branch will feature a carbon dioxide pipeline running from Drax Power Station via Keadby Power Station to Immingham. The preferred pipeline route, which is being consulted on passes through Keadby, only a few kilometers from Flixbrorough.

2.7.1.4 In March 2022, the Government issued a call for evidence on proposals to include EfW within the UK Emissions Trading Scheme from the mid-2020s. If implemented, this would mean that EfW installations would be required to purchase carbon allowances to cover emissions of CO_2 from the fossil-based component of waste burnt. This would incentivise treatment of waste in EfW facilities with CCUS capability. At the time of writing the Government response to the call for evidence has not been published.

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2.8 UK Plan for Shipments of Waste

2.8.1.1 New regulations on the shipments of waste will likely create some additional availability of waste which can be consumed domestically.

2.8.1.2 The UK Plan for Shipments of Waste[10] implements the UK government policy of self-sufficiency in waste disposal by prohibiting trade of waste to and from the UK for disposal. This was last updated in 2012 and it is currently due another update in order to reflect certain policy and minor technical changes. The Environment Agency (EA) is the competent authority responsible for regulating waste shipments for England. The government has committed to banning the export of plastic waste to countries that are not members of the OECD and will consult on the date by which this should be achieved[11].

[9] "Net Zero Strategy: Build Back Greener", October 2021, UK Department for Business, Enterprise, and Industrial Strategy
[10] "Draft Updated UK Plan for Shipments of Waste", January 2021, UK Department for Environment, Food and Rural Affairs
[11] The Select Committee for Environment, Food and Rural Affairs has recently recommended that exports of plastic waste should cease by the end of 2027.

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3 RDF and residual waste assessment

3.1.1.1 This assessment evaluates the availability of fuel for the Project, based on the assumption that the Project will be fuelled by residual waste that would otherwise be managed at a lower level of the waste hierarchy or exported for energy recovery outside of the UK.

3.1.1.2 Separate analysis conducted for the Project[12] estimates that in 2019, 2.9 million tonnes of general waste were received by landfill sites within 100 miles of the Project, of which 866,000 tonnes were received by landfill sites in North Lincolnshire and within 25 miles of the Project. The most significant landfill site is the Roxby Landfill operated by Biffa Waste Services. This site alone received 844,000 tonnes of general waste in 2019, tonnages steadily increased between 2017 and 2019.

3.2 Catchment area

3.2.1.1 We undertake the assessment at two levels – national and local, in line with the draft EN-3 Planning Guidance. The national assessment covers the whole of England. For this analysis we have interpreted 'local' as comprising the Yorkshire & Humber and East Midlands regions.

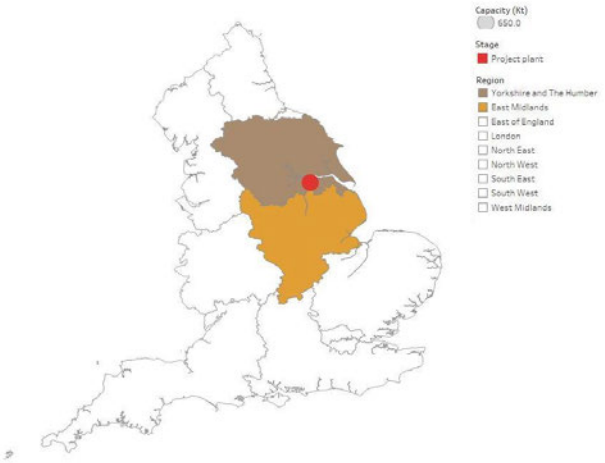
3.2.1.2 The proximity principle as set out in the Waste (England and Wales) Regulations[13] states that waste should be treated in one of the nearest appropriate installations. Considering the size of the Project, its access to transport of waste by rail and river, its location close to the border between these two regions, and the distances that waste is typically transported, it will be an appropriate installation to treat residual waste at the local level as well as further afield where waste is arriving by rail or river.

[12] "North Lincolnshire Green Energy Park: Regional Waste Assessment", August 2021, Footprint Services
[13] "The Waste (England and Wales) Regulations 2011, SI 2011/0988

3.2.1.3 Whilst waste may be treated locally to produce RDF, local recovery of energy from that RDF may not always be feasible, environmentally preferable, or economically rational. This is recognised in the Waste (England and Wales) Regulations, which recognises that there may be particular geographical circumstances influencing the location of waste treatment installation. For example, assuming that future EfW capacity should be fitted with carbon capture, it is likely to be more appropriate to locate facilities in areas where transport of the captured carbon dioxide is easier – for example close to a CCS cluster.

3.2.1.4 Figure 1 shows the location of the Project in relation to the Yorkshire and Humber and East Midlands regions[14].

Figure 1 – Map of regions used for assessment



[14] Focusing at the regional level is consistent with Government reporting of waste statistics, which is generally at regional level.

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3.3 Types of waste

3.3.1.1 The assessment includes household waste and commercial and industrial (C&I) waste, and specifically focuses on residual waste, after the waste hierarchy has been applied and materials either source-separated or later removed for recycling and composting.

3.3.1.2 Household waste is based on the EC definition "waste generated by households" (Commission Decision 2011/753/EU, Article 1(1)[15]) and "similar waste" as "waste in nature and composition comparable to household waste, excluding production of waste and waste from agriculture and forestry". Household waste collected by local authorities includes waste street bins, street sweepings, and parks and grounds. It does not include metals from incinerator bottom ashes. European Waste Catalogue (EWC) codes included in the household waste are listed in Appendix A.2.

3.3.1.3 C&I waste excludes EWC chapter 01 mine and quarry wastes, chapter 17 construction and demolition wastes and chapter 19 waste and water treatment wastes as well as waste code 02 01 08* agrochemical waste containing hazardous substances. EWC codes and sectors included in C&I are listed in Appendix A.3.

3.3.1.4 The Project will recover energy from residual Refuse Derived Fuel (RDF). The term RDF refers to residual waste which has been pre-processed in some way before being delivered to an EfW facility. There is a wide range of different pre-processing treatments in use, ranging from the bulking of residual waste after separate collections of source-separated recyclables, to simple sorting and separation of recyclables at a materials recycling facility (MRF), to full mechanical and biological treatment at an MBT plant. As a result, the specification for RDF covers a range of feedstock content. The Project has been designed to meet a wide range of residual fuel specifications to facilitate seasonal and source variations.

[15] "Commission Decision 2011/753/EU, Article 1(1)", November 2011, European Commission

3.3.1.5 For this assessment we project residual waste arising, and assume that all residual waste has been through some form of source segregation or processing such that it can be delivered to the Project as RDF. This may result in a change of mass – for example if material such as metals can be separated for recycling. In our analysis we make assumptions about the mass of material removed from the residual waste stream in RDF production – in reality this will depend on the nature of the pre-treatment or source segregation applied to the different sources of RDF for the Project.

3.4 Data sources

3.4.1.1 Household waste data is from the WasteDataFlow database, a UK-wide system managed by Department for Environment, Food and Rural Affairs (Defra) together with Devolved Administration partners to record the collection, treatment, and disposal of waste from local authorities. Question Structure for Treatment and Disposal Questions (Q100) was used to understand the detailed waste treatment practices from local authorities.

3.4.1.2 Data for C&I waste is based on the Waste Data Interrogator also published by Defra. The data collection methodology for household and C&I waste from Defra is used to analyse the data.

3.5 Household and commercial & industrial waste arisings

3.5.1.1 The most recent figures for total household and C&I waste relate to 2020 and 2021 respectively. These figures are presented in the following section alongside the previous few years. The waste treatment classifications are based on the definitions provided in the EU Waste Framework Directive 2008/98[16] and are presented in Appendix A.3.

3.5.2 England

[16] "EU Waste Framework Directive 2008/98", November 2008, European Union

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3.5.2.1 In England household[17] waste totalled around 26 million tonnes in 2020. Annual household waste arisings have been broadly constant between 2017 and 2020, with a slight increase in 2020 possibly resulting from the Covid lockdowns (Table 1).

3.5.2.2 In 2020 42% of household waste was recycled. The majority of the residual waste remaining after recycling was incin~~e~~erated, but a significant minority (8%) was sent to landfill. Between 2017 and 2020[18], the volumes of waste going to recycling and composting have been stable, while the volume of waste treated by incineration has increased by 15%. Landfill has steadily declined from 3.5 million tonnes to 2.0 million tonnes, with most of this volume moving to incineration.

Table 1 - Historical household waste in England

Year	Waste collected								
	Incineration		Landfill		Other[19]		Recycling and composting		Total
	mte	%	m~~M~~te	%	mte	%	mte	%	mte
2017	10.7	42%	3.5	14%	0.4	2%	10.8	43%	25.4
2018	11.2	44%	2.9	12%	0.5	2%	10.5	42%	25.1
2019	11.5	45%	2.3	9%	0.8	3%	10.8	43%	25.3
2020	12.3	47%	2.0	8%	1.0	4%	10.9	42%	26.1

Source: AFRY analysis of WasteDataFlow. Note that figures are rounded to the nearest 0.1m tonnes and so stated totals may differ slightly from the sum of the components.

3.5.2.3 C&I waste in England amounted to around 27 million tonnes in 2021. Annual commercial and industrial waste arisings have declined particularly in 2020 and 2021 – this is likely to have been largely as a result of COVID (Table 2).

3.5.2.4 The greatest volume was sent to recycling and composting, 75%. 12% was sent to landfill and 4% incinerated. Other disposal, which includes biological treatment resulting in material which is discarded by disposal such as landfill, and blending, mixing or storage prior to disposal by for example landfill. The description and classification of disposal and recovery operations can be found in Appendix A.3 (Tables 4 & 5).

[17] In this report we use the term 'household waste' to refer to all Local Authority collected waste.
[18] At the time of writing full data for 2021 was not available
[19] Other treatment includes waste which were treated or disposed of through other unspecified methods as well as process and moisture loss.

Table 2 - Historical commercial and industrial waste in England

Year	Incineration		Landfill		Other disposal[20]		Recycling and composting		Total
	mte	%	mte	%	mte	%	mte	%	mte
2017	0.9	3%	4.5	15%	8.0 6.4	21%	19.1	62%	30.9
2018	1.0	3%	4.6	15%	5.4 3.2	10%	21.8	71%	30.6
2019	0.9	3%	3.6	12%	5.5 3 1	11%	21.7	74%	29.2
2020	1.0	4%	2.9	10%	5.1 2.8	10%	21.1	76%	27.9
2021	1.0	4%	3.2	12%	2.5 .7	9%	20.1	75%	26.9

Source : AFRY analysis of Environment Agency's Waste Data Interrogator. Note that figures are rounded to the nearest 0.1m tonnes and so stated totals may differ slightly from the sum of the components.

3.5.3 Yorkshire and Humber and East Midlands

3.5.3.1 In 2020, 5.4 million tonnes of household waste were collected in Yorkshire and Humber and East Midlands.

3.5.3.2 The greatest volume of waste was sent to recycling, 46%, 42% was incinerated and 7% was landfilled. Whilst recycling volumes have decreased in recent years, they still exceed the national average.

Table 3 - Historical household waste in Yorkshire & Humber and East Midlands

Year	Waste collected								
	Incineration		Landfill		Other		Recycling and composting		Total
	mte	%	mte	%	mte	%	mte	%	mte
2017	1.9	35%	0.6	12%	0.1	2%	2.8	51%	5.5
2018	2.1	39%	0.5	10%	0.1	2%	2.7	49%	5.4
2019	2.1	39%	0.5	9%	0.3	5%	2.5	47%	5.3
2020	2.3	42%	0.4	7%	0.3	5%	2.5	46%	5.4

Source: AFRY analysis of WasteDataFlow. Note that figures are rounded to the nearest 0.1m tonnes and so stated totals may differ slightly from the sum of the components.

3.5.3.3 In 2021, C&I waste in Yorkshire and Humber and East Midlands amounted to around 6 million tonnes, 78% of which was sent to recycling and 12% was landfilled.

[20] Other disposal includes disposal operation codes which are listed in Appendix A.3: Table 5 – Disposal operations as defined in the EU Waste Framework Directive

Table 4 - Historical commercial and industrial waste collected and treated in Yorkshire and Humber and East Midlands

~~Year~~	~~Waste collected~~										
	~~Incineration~~		~~Landfill~~		~~Other disposal~~		~~Recycling and composting~~		~~Other recovery~~		~~Total~~
	~~mte~~	~~%~~	~~mte~~	~~%~~	~~mte~~	~~%~~	~~mte~~	~~%~~	~~mte~~	~~%~~	~~mte~~
~~2017~~	~~0.2~~	~~2%~~	~~1.4~~	~~18%~~	~~1.4~~	~~19%~~	~~4.5~~	~~60%~~	~~0.9~~	~~11%~~	~~7.4~~
~~2018~~	~~0.2~~	~~3%~~	~~1.2~~	~~16%~~	~~0.7~~	~~9%~~	~~5.4~~	~~73%~~	~~1.0~~	~~12%~~	~~7.5~~
~~2019~~	~~0.2~~	~~3%~~	~~0.8~~	~~11%~~	~~0.6~~	~~9%~~	~~5.5~~	~~77%~~	~~1.2~~	~~13%~~	~~7.1~~
~~2020~~	~~0.3~~	~~4%~~	~~0.7~~	~~10%~~	~~0.5~~	~~7%~~	~~5.2~~	~~79%~~	~~1.3~~	~~15%~~	~~6.6~~
~~2021~~	~~0.2~~	~~3%~~	~~0.7~~	~~12%~~	~~0.4~~	~~6%~~	~~4.8~~	~~78%~~	~~2.1~~	~~23%~~	~~6.1~~

Year	Incineration		Landfill		Other disposal		Recycling and composting		Total
	mte	%	mte	%	mte	%	mte	%	mte
2017	0.2	2%	1.4	18%	1.4	19%	4.5	60%	7.4
2018	0.2	3%	1.2	16%	0.7	9%	5.4	73%	7.5
2019	0.2	3%	0.8	11%	0.6	9%	5.5	77%	7.1
2020	0.3	4%	0.7	10%	0.5	7%	5.2	79%	6.6
2021	0.2	3%	0.7	12%	0.4	6%	4.8	78%	6.1

Source: AFRY analysis of Environment Agency's Waste Data Interrogator. Note that figures are rounded to the nearest 0.1m tonnes and so stated totals may differ slightly from the sum of the components.

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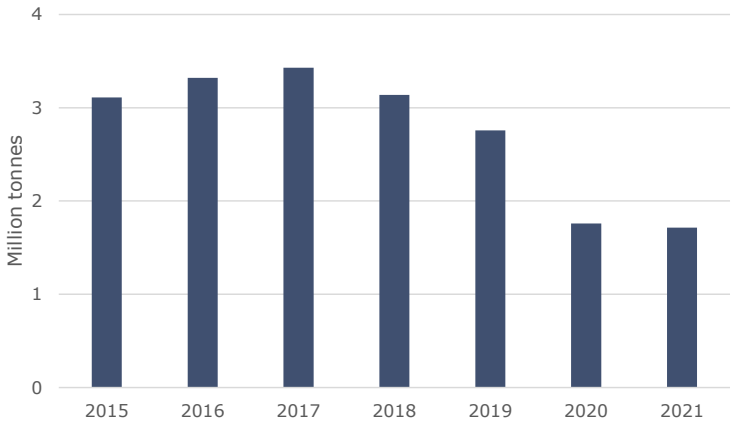
3.5.4 RDF Exports

3.5.4.1 England exports RDF and solid recovered fuel (SRF) for energy recovery overseas. The volume of RDF and SRF exported from England has rapidly declined since 2017 (Figure 2). Typically, around one quarter of exports are from Humber ports.

3.5.4.2 The majority of the recent decline has been in exports to the Netherlands, previously the largest export country for RDF and SRF from England. The Netherlands introduced a tax on imported wastes, including RDF, in 2020 intended to help achieve its GHG emission targets. Since then, RDF import to the Netherlands has declined dramatically and the Dutch government expects RDF imports to "evaporate completely" in three years as the tax raises the total cost of waste incineration in the Netherlands above the average price in competing countries.

Figure 2 – Historical RDF and SRF exports from England (Mt)



Source: Footprint Services

3.5.5 Summary of RDF and residual waste disposal routes

3.5.5.1 In summary, the total volume of household and relevant commercial and industrial waste sent to landfill and other disposal routes in England was around 9 million tonnes in 2020, of which around 2 million tonnes were generated in Yorkshire & Humber and East Midlands.

3.5.5.2 In total, 22 million tonnes of waste generated in England was managed by disposal or recovery options in 2020, of which just over 4 million tonnes wereas in Yorkshire & Humber and East Midlands. These volumes, that are at the recovery and disposal level of the waste hierarchy are of relevance to this assessment and form the starting point for our projections of future residual waste arising.

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Table 5 – Summary of RDF and residual waste disposal routes (mte) 2020

	England	Yorkshire & Humber and East Midlands
Household waste to landfill	2.0	0.4
C&I waste to landfill	2.9	0.7
Total waste to landfill	**4.9**	**1.1**
C&I waste to incinerat on without energy recovery	0.1	0
C&I waste to other disposal routes	2.8	0.5
Household waste to other disposal routes	1.0	0.3
Total waste to landfill and disposal	**8.7**	**1.8**
Household waste to incinerat on with energy recovery	12.3	2.3
C&I waste to incinerat on with energy recovery	0.9	0.2
Total residual waste and RDF exports	**22.0**	**4.3**

Note that figures are rounded to the nearest 0.1m tonnes and so stated totals may differ slightly from the sum of the components.

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3.6 Household and commercial & industrial waste projections to 2035

3.6.1.1 This section 3.6 estimates future household and C&I waste arising to 2035 and the volume of residual waste that will require treatment other than preparation for re-use and recycling. In section 3.7 we then compare this with available waste treatment capacity.

3.6.1.2 For household waste, population growth and historic trends in the waste generated per person are used to calculate the future volumes. While recycling rates for household waste have plateaued at around 45% since 2017, waste strategies at national and local levels commit to increase recycling rates to 65% by 2035 and national and local waste plans outline many activities which aim to help England reach this ambitious target. In this projection, it is assumed in our base case that the recycling rate gradually increases to reach 65% in 2035.

3.6.1.3 C&I waste is projected forward in line with economic growth in the commercial and industrial sectors, measured by gross value added (GVA). Recycling rates for C&I waste are assumed to remain at around 75% by 2035.

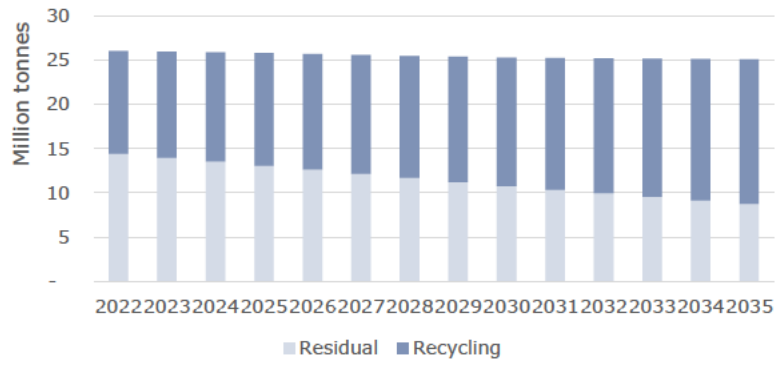
3.6.1.4 The detailed methodology and assumptions used to obtain our projections can be found in Appendix A.1.

3.6.2 England

3.6.2.1 In our estimate increases in population and reduction in waste generated per person, mean that total household waste will remain at around 25 million tonnes until 2035.

3.6.2.2 Assuming England reaches its 2035 recycling target of 65%, residual household waste could decline from around 15 million tonnes in 2020 to around 9 million tonnes in 2035. This will require a significant step change in the development of additional recycling facilities to achieve this.

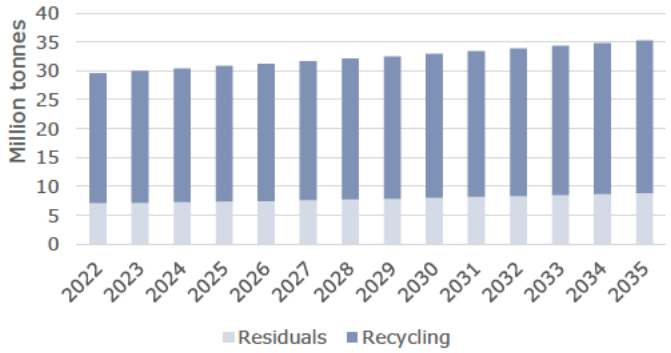
Figure 3 – Base case household waste arising outlook in England (Mt)



Source: ARFY estimate

3.6.2.3 In 2020 and 2021, the total C&I waste in England decreased compared to 2019 levels due to the impact of the pandemic. However, we project annual growth of around 1.3% from 2022 onwards reaching around 35 million tonnes in 2035. Residual C&I waste is expected to remain at around 9 million tonnes until 2035.

Figure 4 – Base case C&I waste arising outlook in England (Mt)



Source: AFRY estimate

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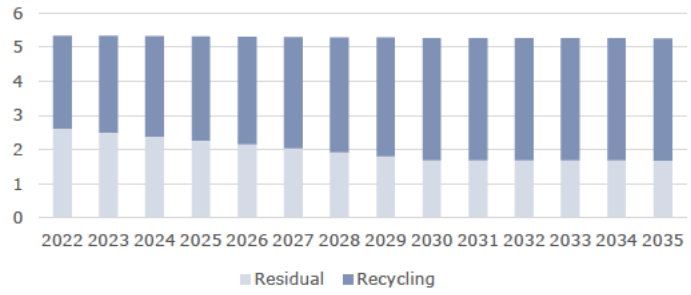
3.6.3 Yorkshire and Humber and East Midlands

3.6.3.1 Household waste arising in Yorkshire and Humber and East Midlands is projected to remain at slightly above 5 million tonnes to 2035. Residual household waste is estimated to reduce by around 1 million tonnes by 2035 to around 1.5 million tonnes.

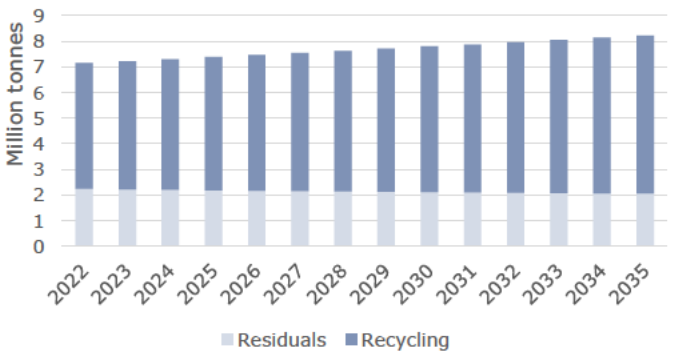
Figure 5 – Base case household waste arising outlook in Yorkshire & Humber and East Midlands (Mt)



Source: AFRY estimate

3.6.3.2 C&I waste arising is estimated to reach around 8 million tonnes in 2035. Residual waste is projected to remain at around 2 million tonnes to 2035.

Figure 6 – Base case C&I waste arising outlook in Yorkshire and Humber and East Midlands (Mt)



Source: AFRY estimate

3.6.3.3 Clearly there is uncertainty in these projections. In the following section we also show waste arisings projections for two other cases: one where even higher recycling targets are imposed and met, and one where the existing recycling targets are not met.

3.7 Residual waste treatment capacity

3.7.1.1 This section considers residual waste treatment capacity that is operational and under development and estimates how much residual waste cannot be processed by energy recovery facilities in England, the so-called capacity gap.

3.7.2 Treatment capacity and the capacity gap

3.7.2.1 At the time of writing there are around 48 EfW facilities operating in England with a total headline capacity of around 15 million tonnes of RDF, SRF and unprocessed residual waste. In 2021 plants reported treating just over 13 million tonnes of waste according to annual performance reports[21]. At least three of these plants are expected to cease operating before 2030. As a result, existing energy recovery facilities are projected to process 12.7 million tonnes of residual waste by 2026 and 11.1 million tonnes by 2035.

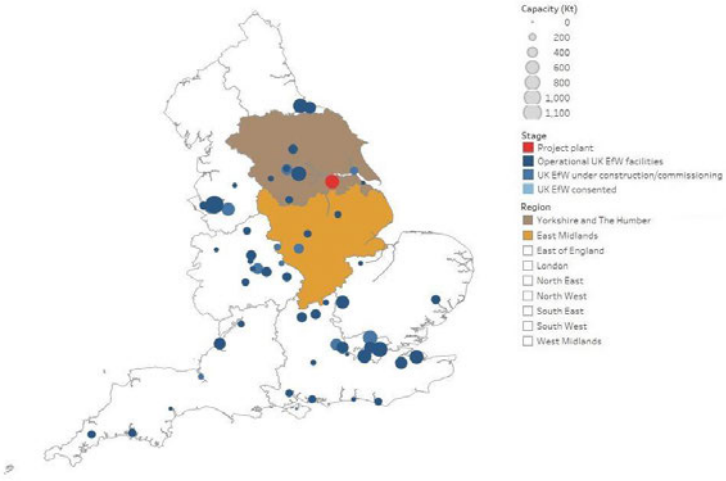
3.7.2.2 Existing MBT processes remove an additional 1.9 million tonnes of residual waste per annum[22]. We have used this figure as our assumption for the volume of waste removed from residual waste arising in pre-processing of waste to produce RDF. As discussed in section 3.3.1.5, this figure is uncertain because of the wide variety of pre-processing approaches in use. We believe that holding this assumption constant, even though total residual waste arising declines, represents a conservative approach (as the mass removed represents an increasing percentage the total).

[21] "UK Energy from Waste Statistics – 2021", May 2022, Tolvik Consulting
[22] WIPD Infrastructure facilities list, UK Government database

3.7.2.3 Of the 48 operational facilities, only 36 of these have achieved 'R1 status'[23], meaning that they have achieved the efficiency threshold required for the facility to be classified as an energy recovery facility rather than a disposal facility. The remaining facilities (representing around 2 million tonnes per year) are generally older and less efficient, and are unlikely to achieve R1 status and as such are regarded as disposal facilities. This is a significant factor in considering the capacity gap, given that non-R1 facilities are below the proposed Project in the waste hierarchy.

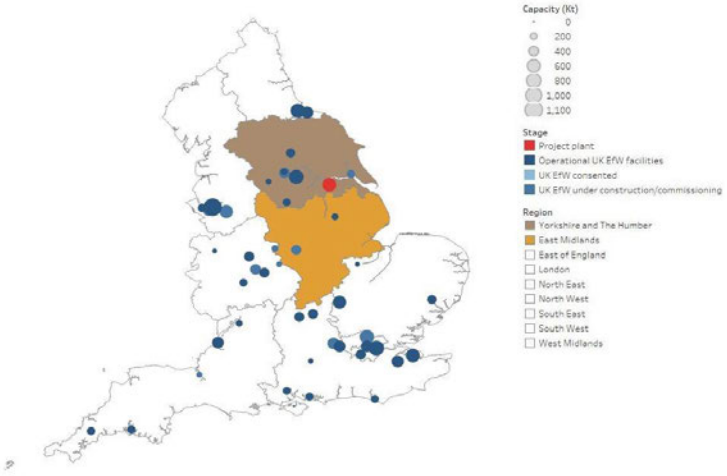
3.7.2.4 There are an additional 12 energy recovery projects that are reported to have reached financial close and are in commissioning or under construction, with headline capacity of around 4.0 million tonnes per year[24]. Assuming an average construction time of 2-4 years, these projects are expected to process an additional 3.6 million tonnes of residual waste per year by 2026. We assume all new facilities will achieve R1 status.

Figure 7 – Location of existing treatment capacity in England including projects in construction/commissioning (kte)



Source: AFRY

Figure 8 – Location of existing treatment capacity in England excluding non-R1 facilities (kte)



Source: AFRY

3.7.2.5 Based upon these operational and soon to be operational facilities, despite ambitious recycling targets for England (that are still a considerable distance from being achieved), there could still be around 3 million tonnes of residual waste in England without access to recovery in England in 2026 (when the Project is planned to enter operation). Within Yorkshire & Humber and East Midlands, there could be around 0.6 million tonnes of residual waste unable to access to recovery facilities in 2026 (Table 6).

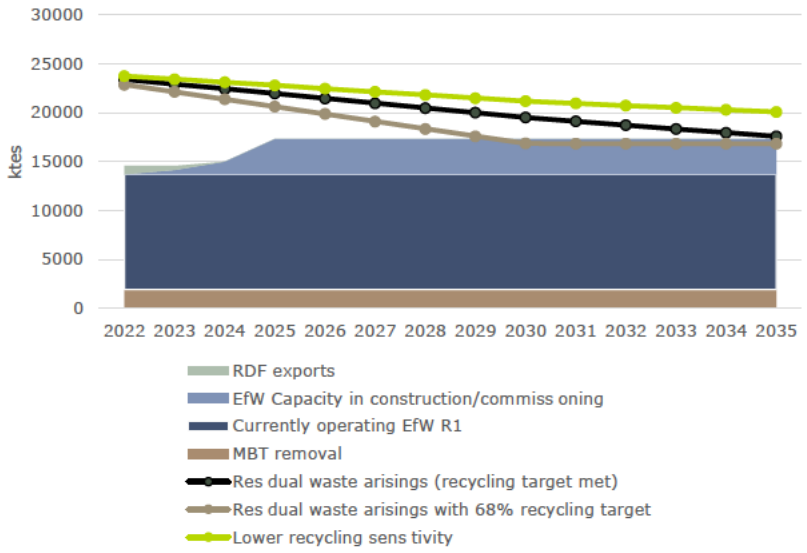
Table 6 – 2026 Forecast of future RDF and residual waste arisings (mte)

Tonnes	England	Yorkshire & Humber and East Midlands
Household residual waste forecast	12.1	2.4
Residual C&I waste forecast	8.8	2.1
Total residual waste	**21.0**	**4.5**
MBT removal	1.9	0.3
Operational EfW	12.7	2.5
Under construction EfW	3.6	1.1
Total treatment capacity	**18.3**	**3.9**
CAPACITY GAP	**2.7**	**0.6**

Source: AFRY estimate. Operational EfW includes R1 and non-R1. Note that figures are rounded to the nearest 0.1m tonnes and so stated totals may differ slightly from the sum of the components.

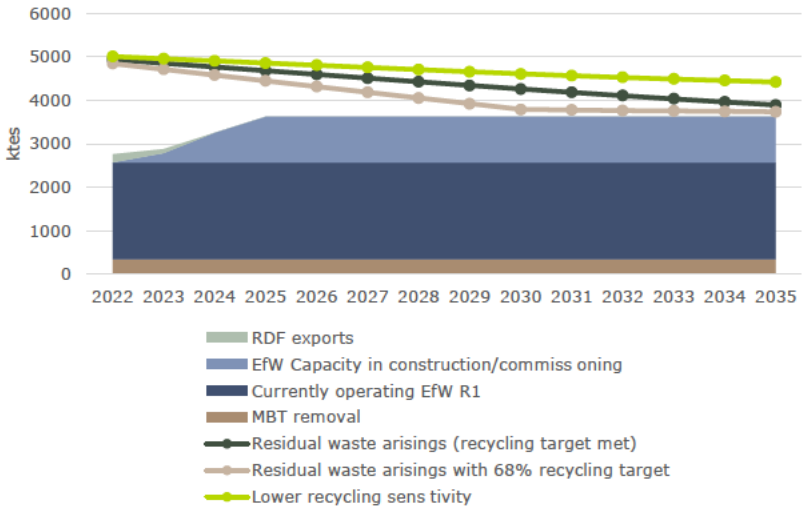
3.7.2.6 Figure 9 compares our projections for residual waste arising with R1 EfW capacity for England, while Figure 10 shows the comparison for East Midlands and Yorkshire & Humber. In each case we show three cases for residual waste arisings: (i) the base case assumes the Government's 65% recycling target for municipal solid waste is met (black line); (ii) a higher recycling target, as recommended by the CCC, is met (brown line); and (iii) recycling rates continue to improve, but the 65% target is not met (green line), recognizing that recycling rates have recently plateaued and achieving the 65% target will be extremely challenging. We assume exports of waste cease after 2023. Non-R1 facilities are not included as incineration without energy recovery is lower down the waste hierarchy than the proposed Project.

Figure 9 – Treatment capacity in England (kte)



Source: AFRY estimate

Figure 10 – Treatment capacity in Yorkshire & Humber and East Midlands (kte)



Source: AFRY estimate

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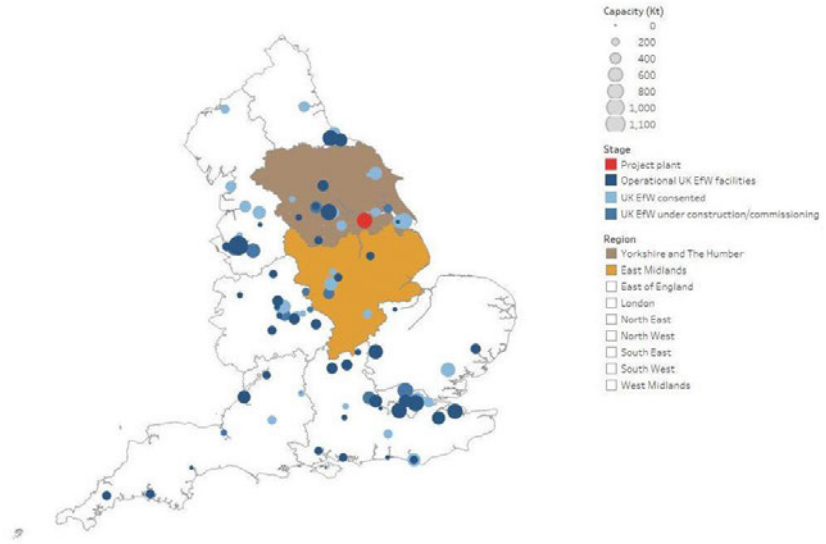
3.7.2.7 There are several energy recovery projects under development in England. By 'development', we mean projects that have gained planning consent, have not yet reached a final investment decision, but are still being actively progressed by the developer in our view (based on our experience and market intelligence in the sector). After an analysis of the Renewable Energy Planning Database[25] and ENDs Plant Tracker[26], 38 projects were identified that have been consented by the relevant authority and are under active development in our view – these are listed in Appendix A.4. There is a high level of uncertainty around how many of these projects will be successfully realized. Figure 11 includes consented pipeline projects.

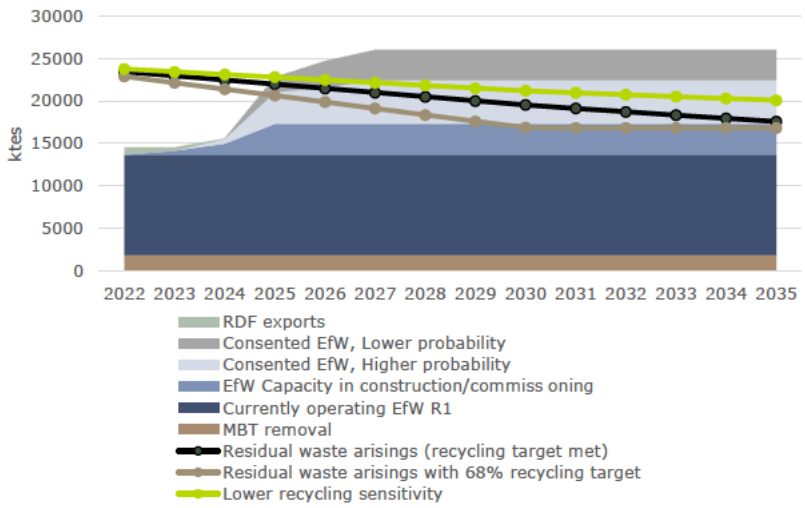
Figure 11 – Location of treatment capacity in England including consented projects deemed to be under active development (kte)



[25] "Renewable Energy Planning Database", Eunomia Research and Consulting Ltd on behalf of Department for Business, Energy and Industrial Strategy.
[26] EWB Plant Tracker, August 2022, ENDs Waste & Bioenergy.

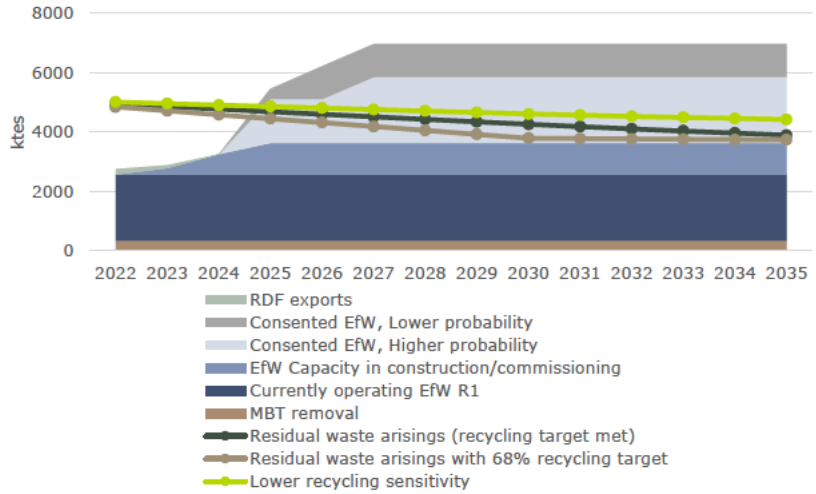
3.7.2.8 We have categorized active consented pipeline projects as having higher probability or lower probability of realisation. Figures 12 and 13 add these projects to the comparison of projected waste arisings to projected capacity. In reality, commercial considerations dictate that projects will only secure funding and proceed if they can be confident of securing feedstock. Furthermore, these projections do not take account of the impact of the UK's net zero policy on the EfW fleet – this is examined next in Section 3.8.

Figure 12 – Potential treatment capacity in England including consented projects which are not committed (kte)



Source: AFRY estimate

Figure 13 – Potential treatment capacity in Yorkshire & Humber and East Midlands including consented projects which are not committed (kte)



Source: AFRY estimate

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3.8 UK commitments to Net Zero

3.8.1.1 In June 2019 UK Government increased the UK's legislated target for GHG emissions reductions from at least 80% by 2050 to 100%. The target means that all activities will need to move to emitting as close to zero emissions as possible by 2050, with the remaining emissions removed from the atmosphere. As a result, the UK's climate objectives must be integrated into all policy making.

3.8.1.2 In the Net Zero Strategy of October 2021, the Government announced that all electricity should be generated from low carbon sources by 2035.

3.8.1.3 Waste accounted for 4% of UK GHG emission in 2019, as emissions reductions have stalled in recent years following a period of steep emission reductions due to the diversion of waste from landfill. In 2021 the CCC recommended that UK Government address with urgency the rising emissions from energy recovery facilities[27]. Specifically:

- ensuring that the use of energy from waste is consistent with necessary improvements in recycling and resource efficiency
- providing support to enable existing energy from waste plants to begin to be retrofitted with CCUS from the late 2020s; and
- introducing policy to ensure that any new energy from waste plants is built either with CCUS or are 'CCUS ready'.

3.8.1.4 In addition, the CCC recommend implementing the following targets on waste within the Environment Bill:

- banning landfilling of municipal and non-municipal biodegradable wastes from 2025; and
- setting a target for a 68% recycling rate by 2030 covering all waste in England

[27] "Progress in Reducing Emissions, 2021 Report to Parliament", Climate Change Committee

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3.8.1.5 In its 2022 Progress Report, the CCC recommend that no EfW facilities without CCS should be in operation beyond 2040.

3.8.1.6 The Project includes carbon capture and will be CCUS-enabled, with plans to accommodate carbon capture technology and plans to connect to Zero Carbon Humber to enable the long-term storage of carbon dioxide. Zero Carbon Humber is a consortium of energy and industrial companies operating in the Humber region in the North East of England working together to deliver region-wide infrastructure to enable CCUS. The Zero Carbon Humber project is part of the East Coast Cluster coalition (along with Net Zero Teesside) which has been selected as a 'Track 1' project for development by the mid-2020s (subject to negotiation with the Government).

3.8.1.7 Central to Zero Carbon Humber plans is a carbon dioxide pipeline that will enable compressed carbon dioxide to be stored under the North Sea. The pipeline will run from Drax Power Station via Keadby Power Station to Immingham and Hull. Flixborough is only a few kilometres from Keadby. The Project therefore provides a very good opportunity to treat residual waste not suitable for re-use or recycling in a way that is consistent with the UK's Net Zero commitments.

3.8.1.8 In order to determine how requirements for CCUS-readiness could impact the development of residual waste treatment capacity in England, we have made an assessment of existing and consented energy from waste projects. Potential for CCUS was determined 'High', 'Medium' or 'Low' according to the following criteria:

- All projects close to a Track 1 CCUS cluster identified in the UK industrial decarbonisation strategy are classified as 'High CCS potential'. In England these are Humberside, Teesside, and Merseyside.

- Projects are classified as 'Medium CCS potential' if they are located on the coast or a major river. At least one such project has announced plans to fit carbon capture and transport the captured CO_2 to a storage site by ship. In our view this is likely to be more expensive than connecting to a nearby CO_2 pipeline in a CCUS cluster, making the economics of adding CCUS more challenging.

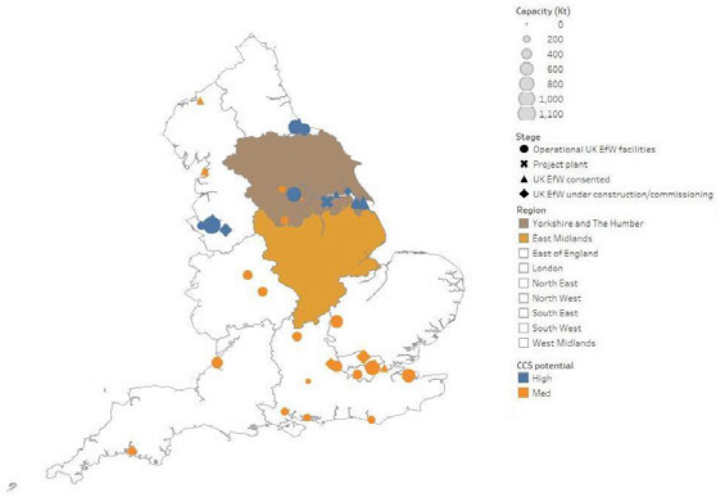
- In addition we have classified as 'Medium CCS potential' other projects which are remote from a CCUS cluster or the coast, but where the operator has announced an intention to fit carbon capture. We have not investigated the economic feasibility of this but would expect CCUS to be generally more expensive for these facilities, and this could have the potential to affect the overall viability of the facilities in the longer term in terms of attracting fuel.

- We have assumed CCUS will not be fitted to smaller facilities (below 100kte) or to facilities greater than 25 years old on the assumption that it will not be cost-effective compared to alternatives.

3.8.1.9 Another consideration for CCUS potential is whether a site has adequate space for the carbon dioxide capture and compression equipment, but due to limited access to information on projects, we have not been able to investigate this. Similarly we have not considered whether any projects would not be able to secure planning permission for CCUS. Whilst there is considerable uncertainty about which plants will be able to fit CCUS, both practically and economically, we believe we have taken a prudent approach in our assessment (in that we are more likely to have over-estimated rather than under-estimated the amount of EfW capacity capable of being retrofitted with CCUS).

3.8.1.10 Figure 14 shows those facilities which are regarded as having high or medium CCS potential.

Figure 14 – Location of facilities with high or medium CCS potential



Source: AFRY assessment. Includes operational projects, projects under construction/commissioning, and active consented projects.

3.8.1.11 Figures 15 and 16 illustrate the scenarios of capacity development in which only operating and committed R1 capacity deemed to have 'High' or 'Medium' CCS potential is included. At both the national and local level there is a significant capacity gap going forward

3.8.1.12 In Figures 17 and 18 we have added in active consented pipeline projects, differentiated by higher and lower probability of realisation and by high and medium CCS potential. Clearly there is uncertainty in both of these dimensions. Figure 17 shows that virtually all of these projects need to be developed to close the capacity gap at the national level.

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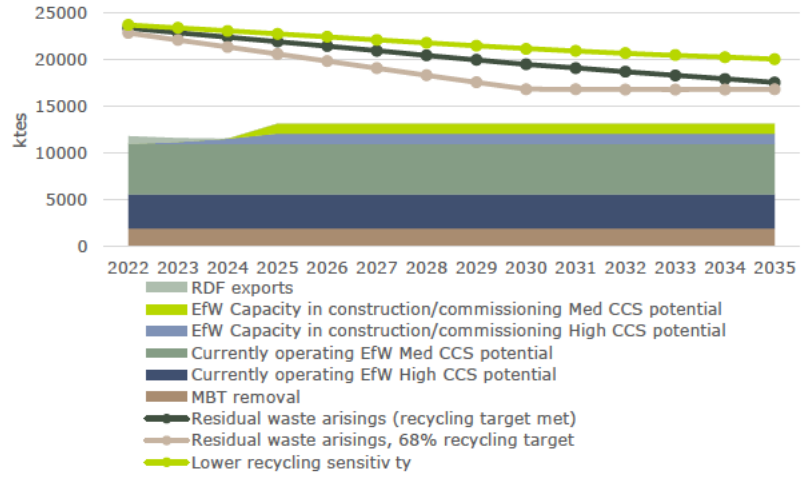
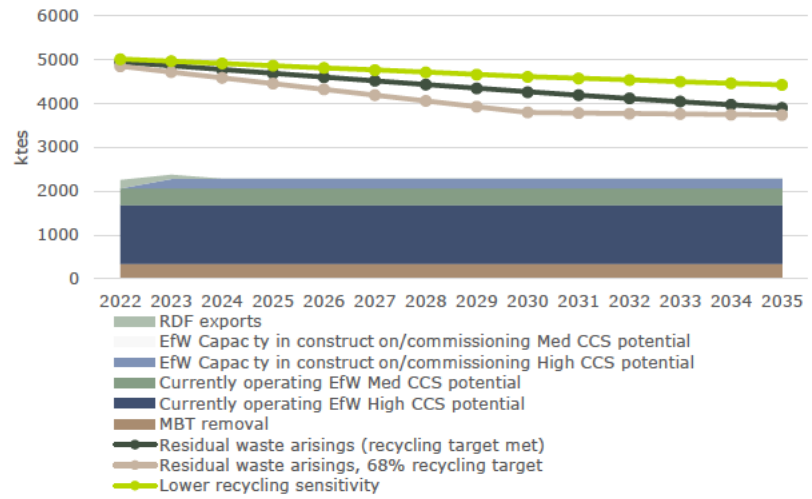
3.8.1.13 At the local level, higher probability high CCS potential projects are not sufficient to treat residual waste arising in the regions, even assuming recycling targets are met. If all pipeline projects are built, including those with only medium CCS potential, then there would be sufficient capacity to process waste arising in the regions we have assessed (Yorkshire & Humber and East Midlands). However, once all EfW capacity is required to have CCUS, it is likely that more facilities will be located close to CCUS cluster infrastructure, with waste travelling longer distances by rail to these facilities (as transporting RDF is expected to be cheaper than transporting carbon dioxide).

Figure 15 – Treatment capacity in England with High/Medium CCS potential (kte)



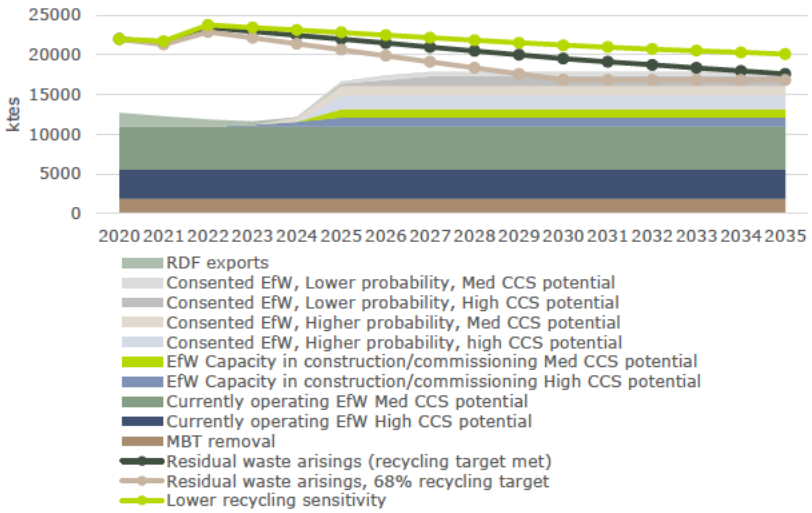
Source: AFRY estimate

Figure 16 – Treatment capacity in East Midlands and Yorkshire & Humber with High/Medium CCS potential (kte)



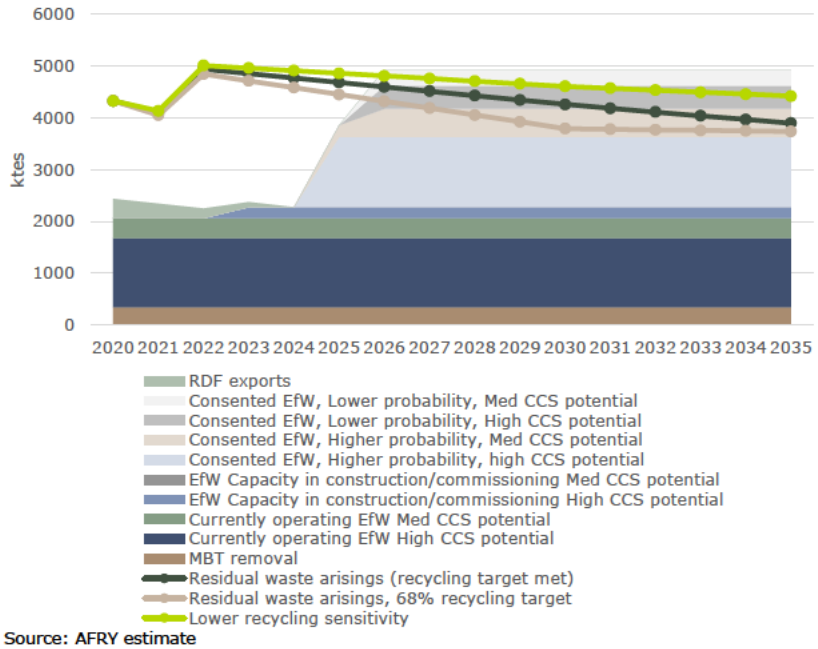
Source: AFRY estimate

Figure 17 – Potential treatment capacity in England with High/Medium CCS potential including consented projects which are not committed



Source: AFRY estimate

Figure 18 – Potential treatment capacity in East Midlands and Yorkshire & Humber with High/Medium CCS potential, including consented projects which are not committed



Source: AFRY estimate

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3.9 Summary

3.9.1.1 This analysis demonstrates that there is currently a significant capacity gap between residual waste arising and existing or committed EfW capacity. This gap will gradually close (at the national and local level) by 2035 if Government recycling targets are met, but recent plateauing of recycling rates means there is significant uncertainty as to whether these targets will be met.

3.9.1.2 Whilst a considerable amount of energy from waste capacity has been consented, there is a high level of uncertainty about how much of this capacity will be realised. If new build energy from waste is required to be CCUS-ready in order to align with the UK's Net Zero commitments, then the Project is among the minority of pipeline projects which are well-placed to connect to a CCUS cluster.

3.9.1.3 Furthermore, we think it is unrealistic to assume that all of the existing EfW fleet will be retrofitted with carbon capture, as many projects are not well-suited for this for various reasons. Assuming all capacity is required to have carbon capture by 2035, to comply with the Net Zero Strategy, then we project a capacity gap based on existing and committed capacity of over 4 million tonnes nationally and around 2 million tonnes at the local level in 2035 if low-CCS potential projects are excluded (even if recycling targets are met). Based on our projections the Project does not result in over-capacity of EfW waste treatment at a national or local level.

3.9.1.4 Whilst consented pipeline projects may come forward and reduce these capacity shortfalls, there is a high degree of uncertainty about which projects will be developed and about which will be able to fit carbon capture. The Project is well-positioned for carbon capture, being close to one of the first CCUS clusters.

4 Compliance with local waste plans

4.1.1.1 North Lincolnshire Council's Waste Strategy was published in 2012. The Strategy aims to limit the growth of municipal waste through waste reduction and minimization programmes and increase the level of recycling and composting to a minimum of 60% of household waste.

4.1.1.2 The Strategy aspires to treat residual waste not suitable for recycling in facilities located within North Lincolnshire using energy recovery and public consultations by the council showed strong support from the public for treating non-recyclable waste in a recovery facility within North Lincolnshire. The Strategy recognises the area as an ideal place to locate a waste management facility, as there is abundance of brown-field sites together with well-developed power transmission infrastructure and transport links. Furthermore, as the area has relatively low volume of waste arisings compared to the scale of many facilities, the council acknowledges that waste management facilities within North Lincolnshire could treat additional waste from the surrounding regions.

4.1.1.3 The North Lincolnshire Local Development Framework contains waste planning related policies and identifies locations in which a waste management facility could be located. Broad strategic areas for waste management and treatment are Scunthorpe, South Humber Bank employment area, Flixborough Industrial Estate, and power station sites and farms directly using products derived from waste treatment. The Project is located within one of the identified areas.

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4.1.1.4 A new North Lincolnshire Local Plan is under development and the Publication Plan was published for final consultation on 15 October 2021. The Local Plan sets out the Council's strategic planning framework and principles for sustainable waste management. It states that the Council seek to move the management of all waste streams up the waste hierarchy and to ensure there are more opportunities for recovery and recycling of waste across the area. Policy WAS1: Waste Management Principles states that the Council will ensure sufficient capacity is located within the area to accommodate forecast waste arisings, and that they will facilitate the development of a network of local waste management facilities and effective methods of waste management. Policy WAS2: Waste Facilities states that proposals for energy from waste facilities will be supported provided they meet the criteria set out in the policies for Waste Facilities and Renewable Energy Proposals.

4.1.1.5 Neighbouring authorities in the Yorkshire & Humber and East Midlands are in the process of updating their waste management strategies, but it is expected that local plans will continue to focus on fulfilling the targets set at national level, especially the targets on increasing recycling rate and diverting more waste from landfill. Many neighbouring councils are open to liaise with other areas to utilise their waste management capacities and allow the movement of waste between regions.

4.2 Summary

4.2.1.1 The Project meets the objectives of the local waste plans, as the facility will take RDF feedstock made from residual waste previously subject to recycling at a separate collection or MRF facility. Hence the production of feedstock to be recovered in the facility will not negatively influence recycling targets. Energy from waste using RDF feedstock is a recovery option consistent within the principles of the waste hierarchy as it diverts waste from landfill, the recyclable materials have been extracted from the feedstock and the operation has flexibility in terms of calorific value and waste composition of its feedstock.

4.2.1.2 The Project site at Flixborough Industrial Estate is aligned with the local council's strategy where the site is identified as suitable for a waste management facility.

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5 Summary and conclusions

5.1.1.1 There is currently a significant capacity gap between residual waste arising and existing or committed EfW capacity. This gap will gradually close (at the national and local level) by 2035 if Government recycling targets are met, but recent plateauing of recycling rates means there is significant uncertainty as to whether these targets will be met.

5.1.1.2 Whilst a considerable amount of energy from waste capacity has been consented, there is a high level of uncertainty about how much of this capacity will be realised. If new build energy from waste is required to be CCUS-ready in order to align with the UK's Net Zero commitments, then the Project is among the minority of pipeline projects which are well placed to connect to a CCUS cluster.

5.1.1.3 Furthermore, we think it is unrealistic to assume that all of the existing EfW fleet will be retrofitted with carbon capture, as many projects are not well-suited for this for various reasons. Assuming all capacity is required to have carbon capture by 2035, to comply with the Net Zero Strategy, then we project a capacity gap based on existing and committed capacity of over 4 million tonnes nationally and around 2 million tonnes at the regional level in 2035 if low-CCS potential projects are excluded (even if recycling targets are met). Based on our projections the Project does not result in over-capacity of EfW waste treatment at a national or local level.

5.1.1.4 Whilst consented pipeline projects may come forward and reduce these capacity shortfalls, there is a high degree of uncertainty about which projects will be developed and about which will be able to fit carbon capture. The Project is well positioned for carbon capture, being close to one of the first CCUS clusters.

5.1.1.5 The Project meets the objectives of the North Lincolnshire Council's Waste Strategy, as the facility will take RDF feedstock made from residual waste previously subject to recycling at separate collection or MRF facility, and so the production of feedstock to be recovered in the facility will not negatively influence recycling targets. Energy from waste using RDF feedstock is a recovery option consistent with the principles of the waste hierarchy as it diverts waste from landfill, the recyclable materials have been extracted from the feedstock and the operation has flexibility in terms of calorific value and waste composition of its feedstock.

5.1.1.6 The Project site at Flixborough Industrial Estate is aligned with the local council's strategy where the site is identified as suitable for a waste management facility.

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Appendix A

A.1 Waste projection

For household waste, the development of population out to 2050 as well as the forecast of waste generated per person were used to calculate the waste generated in the future. 4% reduction of waste generated per person is assumed until 2030. The projection also assumes that the recycling target of 65% is met by 2035 and keeps the same proportion until 2050.

The projection for commercial and industrial waste is based on Gross Value Added (GVA) which is the value generated by any unit engaged in the production of goods and services as well as the forecast of economic growth. We use 2019 data as the starting point as 2020 and 2021 C&I waste volumes are likely to be atypically ow because of the COVID lockdowns. We assume 75% recycling.

Table A1 – Economic growth forecast assumptions

Region	GVA (real terms) annual increase from 2022 to 2030
England	+1.35%
East M dlands	+1.16%
Yorkshire and Humber	+1.03%

Source: "Briefing Paper, Regional and country economic indicators", September 2022, House of Commons Library

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A.2 Household waste

Table A2 – Waste included in the household waste according to the EWC codes

Waste Mmaterials	Waste code according to Decision 2000/532/EC
Paper and cardboard	20 01 01, 15 01 01
Metals	20 01 40, 15 01 04
Plastic	20 01 39, 15 01 02
Glass	20 01 02, 15 01 07
B odegradable kitchen and canteen waste	20 01 08
B odegradable garden and park waste	20 02 01
Non-b odegradable garden and park waste	20 02 02, 20 02 03
Wood	20 01 38, 15 01 03
Textiles	20 01 10, 20 01 11, 15 01 09
Batteries	20 01 34, 20 01 33*
Discarded equipment	20 01 21*, 20 01 23*, 20 01 35*, 20 01 36
Other municipal waste	20 03 01, 20 03 02, 20 03 03, 20 03 07, 15 01 06

Source: "Decision 2000/532/EC", May 2000, European Commission

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A.3 Commercial and industrial waste

The C&I waste arisings exclude EWC chapter 01 (Mine and quarry wastes), 17 (construction and demolition wastes) and 19 (waste and water treatment wastes) as well as waste code 02 01 08* (agrochemical waste containing hazardous substances).

Sites categorised as "Transfer" are also excluded in order to avoid double-counting between sites.

Table A3 – Waste included in the C&I waste according to the EWC codes

EWC Chapter	Description	Notes
02	Wastes from agr culture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	20 01 08* excluded
03	Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard	
04	Wastes from the leather, fur and textile industries	
05	Wastes from petroleum refining, natural gas purification and pyrolyt c treatment of coal	
06	Wastes from inorganic chemical processes	
07	Wastes from organic chem cal processes	
08	Wastes from the manufacture, formulation, supply and use (MFSU) of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks	
09	Wastes from the photograph c industry	
10	Wastes from thermal processes	
11	Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy	
12	Wastes from shaping and physical and mechanical surface treatment of metals and plastics	
13	Oil wastes and wastes of l quid fuels (except edible oils, 05 and 12)	
14	Waste organic solvents, refrigerants and propellants (except 07 and 08)	
15	Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	
16	Wastes not otherwise specified in the list	
18	Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)	
20	Municipal wastes (household waste and similar commercial, industrial and inst tutional wastes) including separately collected fractions	

Table A4 – Recovery operations as defined in the EU Waste Framework Directive 2008/98

Treatment	R & D code	Description
Incineration	R1	Use principally as a fuel or other means to generate energy
Recycling and composting	R2	Solvent reclamat on/regeneration
Recycling and composting	R3	Recycling/reclamation of organic substances wh ch are not used as solvents (including composting and other biological transformat on processes)
Recycling and composting	R4	Recycling/reclamation of metals and metal compounds
Recycling and composting	R5	Recycling/reclamation of other inorgan c materials
Recycling and composting	R6	Regenerat on of ac ds or bases
Recycling and composting	R7	Recovery of components used for pollution abatement
Recycling and composting	R8	Recovery of components from catalysts
Recycling and composting	R9	Oil re-refining or other reuses of oil
Recycling and composting	R10	Land treatment resulting in benefit to agriculture or ecolog cal improvement
Recycling and composting	R11	Use of wastes obtained from any of the operations numbered R1 to R10
Recycling and composting	R12	Exchange of wastes for submission to any of the operations numbered R1 to R11
Other recovery	R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)

Source: "EU Waste Framework Directive 2008/98", November 2018, European Union

Table A5 – Disposal operations as defined in the EU Waste Framework Directive 2008/98

Treatment	R&D code	Description
Landfill	D1	Deposit into or onto land, e.g. landfill
Other disposal	D2	Land treatment, e.g. biodegradat on of liqu d or sludgy discards in soils
Other disposal	D3	Deep injection, e.g. inject on of pumpable discards into wells, salt domes or naturally occurring repos tories
Other disposal	D4	Surface impoundment, e.g. placement of liquid or sludgy discards into p ts, ponds or lagoons
Landfill	D5	Specially engineered landfill, e.g. placement into lined discrete cells which are capped and isolated from one another and the environment
Other disposal	D6	Release into a water body, except seas/oceans
NA	D7	Release into seas/oceans, including sea-bed insertion
Other disposal	D8	Biolog cal treatment resulting in final compounds or mixtures wh ch are discarded by any of the operat ons numbered D1 to D12
Other disposal	D9	Physico-chemical treatment resulting in final compounds or mixtures wh ch are discarded by any of the operat ons numbered D1 to D12, e.g. evaporation, drying, calcination
Incineration	D10	Incinerat on on land
NA	D11	Incinerat on at sea
Other disposal	D12	Permanent storage, e.g. emplacement of containers in a mine
Other disposal	D13	Blending or mixing pr or to submission to any of the operat ons numbered D1 to D12
Other disposal	D14	Repackaging pr or to submission to any of the operat ons numbered D1 to D13
Other disposal	D15	Storage pending any of the operat ons numbered D1 to D14 (excluding temporary storage, pending collection, on the s te where it is produced)

Source: "EU Waste Framework Directive 2008/98", November 2018, European Union

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A.4 Residual waste treatment capacity

Table A6 – Operational Energy from Waste plants in England

Plant name	Region	Feedstock capacity [kt]	CCS potential identified
Advanced Plasma Power Pilot Plant	South West	13	No
Allerton Waste Recovery Facility	Yorkshire and Humber	320	No
Allington EfW Plant	South East	500	No
Ardley Energy Recovery Facility	South East	326	Med
Avonmouth Resource Recovery Centre	South West	300	Med
Battlefield ERF	West M dlands	90	No
Beddington Energy Recovery Facil ty	London	347	Med
Bolton WtE plant	North West	85	No
Cornwall Energy Recovery Centre	South West	240	No
Cory Rivers de Energy	London	785	Med
Coventry EfW Plant	West M dlands	315	No
Devonport EfW CHP Facility	South West	265	Med
Dudley EfW plant	West M dlands	105	No
Eastcroft EfW plant	East M dlands	200	No
EnviRecover	West M dlands	230	No
Exeter Energy Recovery Facil ty	South West	60	No
Ferrybridge Multifuel 1 (FM1)	Yorkshire and Humber	725	High
Ferrybridge Multifuel 2 (FM2)	Yorkshire and Humber	725	High
Gloucestershire (EfW) plant (Javelin)	South West	190	No
Great Blakenham EfW plant	Eastern	295	No
Greatmoor	South East	345	No
Integra North (Chineham)	South East	102	Med
Integra South West (Marchwood)	South East	200	Med
Kirklees EfW plant	Yorkshire and Humber	150	No
Lakes de Energy from Waste facil ty	South East	450	Med
Leeds Recycling & ERF	Yorkshire and Humber	180	Med
Lincolnshire EfW Plant	East M dlands	190	No
LondonWaste ERF (Edmonton)	London	675	No
Milton Keynes Waste Recovery Park	South East	132	No
Newhaven Energy Recovery Facility	South East	210	Med
Newlincs EfW plant	Yorkshire and Humber	56	High
Peterborough Energy Recovery Facility	Eastern	85	No
Portsmouth Energy Recovery Facility	South East	210	Med
Runcorn EfW plant	North West	1100	High
SELCHP Energy Recovery Facil ty	London	464	No
Severns de Energy Recovery Centre	South West	467	Med
Sheffield Energy Recovery Facility	Yorkshire and Humber	225	Med
Stoke EfW Plant	West M dlands	210	No
Tees Valley EfW Facility (Billingham)	North East	756	High
Tyseley Energy Recovery Facil ty	West M dlands	350	Med
W2R Staffordshire ERF	West M dlands	340	Med
Wheelabrator Kemsley (K3)	South East	657	Med
Wilton 11 EfW Plant	North East	500	High
Wolverhampton EfW Plant	West M dlands	115	No
Enviropower Lancing	South East	75	No
Hooton B o Power	North West	266	High
Rookery P t	Eastern	585	Med
Surrey ECO Park	South East	60	No

Source: ENDs Waste & Bioenergy, EWB Plant Tracker. CCS potential based on AFRY assessment of proximity to likely CCUS cluster.

Table A7 – Energy from Waste plants under construction in England

Plant name	Region	Feedstock capacity [kt]	CCS potential identified
Baddesley EfW plant	West Midlands	130	No
Br dgwater Resource Recovery	South West	123	No
Drakelow Renewable Energy Centre	East Midlands	169	No
Energy Works Hull	Yorkshire & Humber	240	High
Isle of Wight	South East	30	No
Lostock Sustainable Energy Plant	North West	600	No
Newhurst Quarry EfW plant	East Midlands	350	No
Protos EfW plant	North West	400	High
Slough Multifuel	South East	480	Med
Edmonton EcoPark	London	700	Med
Skelton Grange EfW Plant	Yorkshire & Humber	410	No
Wheelabrator West Bromwich	West Midlands	400	No

Source: ENDs Waste & Bioenergy, EWB Plant Tracker

Table A8 – Consented Energy from Waste plants in England deemed to be under active development

Plant name	Region	Feedstock capacity [kt]	CCS potential identified
3Rs EfW Plant (Britannia Crest)	South East	230	No
Billingham EfW Haverton Hill ext (Suez)	North East	200	High
Bloomfield Recycling Depot	West M dlands	180	No
Corby Energy Recovery Centre	East M dlands	260	No
Cory Rivers de Energy Park (REP)	London	665	Med
Darwen EfW Plant	North West	500	No
Derwenthaugh Ecoparc	North East	320	No
Eastcroft EfW (3rd Line)	East M dlands	140	No
Graythorpe Energy Centre (Hartlepool)	North East	500	High
Greengate EfW Plant	North West	130	High
Heysham EfW Plant (Lancaster West Business Park)	North West	330	Med
Keighley EfW Plant (Aire Valley Road)	Yorkshire and Humber	130	No
Kingmoor Park	North West	250	Med
Knottingley EfW Plant (Southmoor)	Yorkshire and Humber	350	Med
North Beck Energy EfW plant	Yorkshire and Humber	500	High
Purbrook Road	West M dlands	12	No
Redcar Energy Centre	North East	450	High
Red Scar Industrial Estate - EfW (Preston EfW)	North West	395	No
Solar 21 EfW plant (Melton EfW)	Yorkshire and Humber	250	High
South Humber Bank Energy Centre	Yorkshire and Humber	753	High
Tilbury Docks - Phase 2 (EfW)	Eastern	300	Med
Walsall EfW Plant	West M dlands	478	No
Waste-to-Jet Fuel Facility	Yorkshire and Humber	500	High
Wren Power and Pulp (Rivenhall Airfield)	Eastern	595	No
Doncaster EfW plant	Yorkshire and Humber	300	No
Northacre RRC	South West	243	No
EMERGE	East M dlands	525	No
Reading EfW plant	South East	150	No

Source: AFRY interpretation of ENDs Waste & Bioenergy, EWB Plant Tracker & Renewable Energy Planning Database, Department for Business, Energy, & Industrial Strategy.

Table A9 – Planning applications submitted, Energy from Waste plants in England

Plant name	Region	Feedstock capacity [kt]	CCS potential identified
Boston Alternative Energy Facil ty	East M dlands	1000	No
Exeter EfW plant	South West	125	No
Stoke Replacement EfW Plant	West M dlands	210	No
Teesport EfW 1	North East	300	High
Teesport EfW 2	North East	0	High
Tipton Multifuel Plant	West M dlands	180	No
New Circular Technology Park (Ford)	South East	295	No
Alpha Grimsby Renewable Centre	Yorkshire and Humber	169	High
North Lincs Green Energy Park	Yorkshire and Humber	760	High

Source: ENDs Waste & Bioenergy, EWB Plant Tracker and AFRY research.

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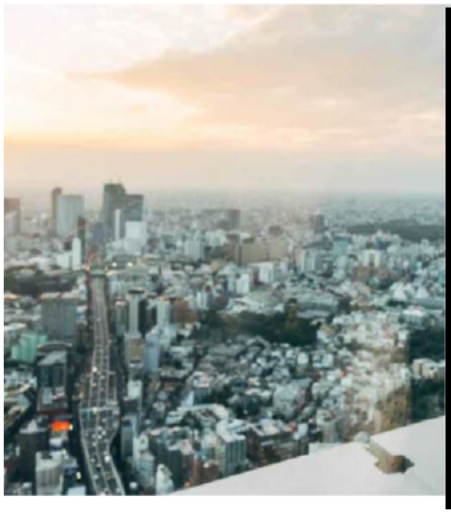

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