MIND THE GAP

UK residual waste infrastructure capacity requirements, 2015 to 2025

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FOREWORD

Forward planning in the waste management sector is challenging. Not only is the policy and legislative landscape changing rapidly as we strive to extract more value from waste before we finally dispose of it, but the sector suffers from poor statistics, particularly on how much commercial / industrial waste we generate – arisings which comprise the majority of the waste we discard. Taken together, that makes it very difficult to forecast what types of facilities we need to build over the next 10 to 15 years, at what scale and at which locations.

This is a challenge we have to address if the UK aspires to become a resource-efficient circular economy. After reusing and recycling as much of our discards as is practicable and economic to do, we must then manage our residual waste in a way that again maximises the recovery of any remaining value. To do this requires significant investment in new treatment facilities for residual waste that we currently landfill, investment which in turn must be supported by business plans based on forecasts of how much residual waste will be generated in future years, and of the appropriate technology mix we should deploy.

SITA UK is the first UK waste management operator to have embraced the concept of the circular economy to guide its business decisions. Engaging with our municipal and commercial customers, we have gained an understanding of the waste and resource management issues they will be facing in future years, and of the market trends that will shape the investment decisions we expect to take.

We need robust forecasts of residual waste infrastructure capacity requirements to underpin these investment decisions. Drawing on SITA UK's experience as frontline operators, we present our estimates of residual waste generation over the next ten tears and the additional treatment capacity that we believe will be required in the UK if the circular economy is to become a reality.

David Palmer-Jones
Chief Executive Officer, SITA UK

INTRODUCTION

The waste management sector has undergone rapid change over the past decade, as we begin to appreciate the intrinsic value of the materials we have hitherto disposed of predominantly in landfills.

At the turn of the millennium, the UK landfilled 84 million tonnes of municipal and commercial / industrial waste of similar composition (hereafter referred to as similar commercial / industrial waste), compared to 40 million tonnes in 2012/13. By 2012/13, driven by key policy instruments such as landfill tax, landfill diversion targets and statutory recycling targets, the UK's overall recycling rate for municipal and total commercial / industrial waste touched 49 per cent, with energy recovery at 16 per cent and direct landfill at 35 per cent.

This trend is set to continue. The UK's municipal waste recycling performance improved significantly from 12 per cent in 2001 to 39 per cent in 2011, but still fell well short of the Netherlands (60 per cent), Belgium (56 per cent), Germany (62 per cent) and Austria (62 per cent)[1]. The devolved administrations of Scotland and Wales have set an ambitious recycling target of 70 per cent of municipal and total commercial / industrial waste by 2025.

Municipal waste is waste collected by local authorities, mainly waste from households.

'Similar' commercial and industrial waste is waste from commercial / industrial premises that is of similar composition to municipal waste.

Residual waste is material that is left over after recycling and other recovery activities have been performed on the waste as collected.

Diverting waste from landfill requires investment. For every million tonnes of waste diverted from landfill, 10 to 20 new treatment facilities have to be built. Our industry has estimated that by 2020, the UK needs an injection of over £10 billion of investment in alternative treatment facilities for municipal waste diverted from landfill, with a further £10 to £15 billion if total commercial / industrial waste currently going to landfill is also to be diverted and treated.

Providing a secure footing for this significant funding requirement is critical if lenders and developers are to invest in the sector. We need to be able to forecast the future shape and structure of our sector with sufficient confidence to support a robust business case for investment in waste management infrastructure. This relies on our ability to interpret the impact that demographic, technical and economic indicators will have on waste arisings, how policy drivers might lead to changes in waste composition over time, to anticipate what types of treatment technologies might be needed and at what scale, and how these might be influenced by the market for recyclates and recovered energy.

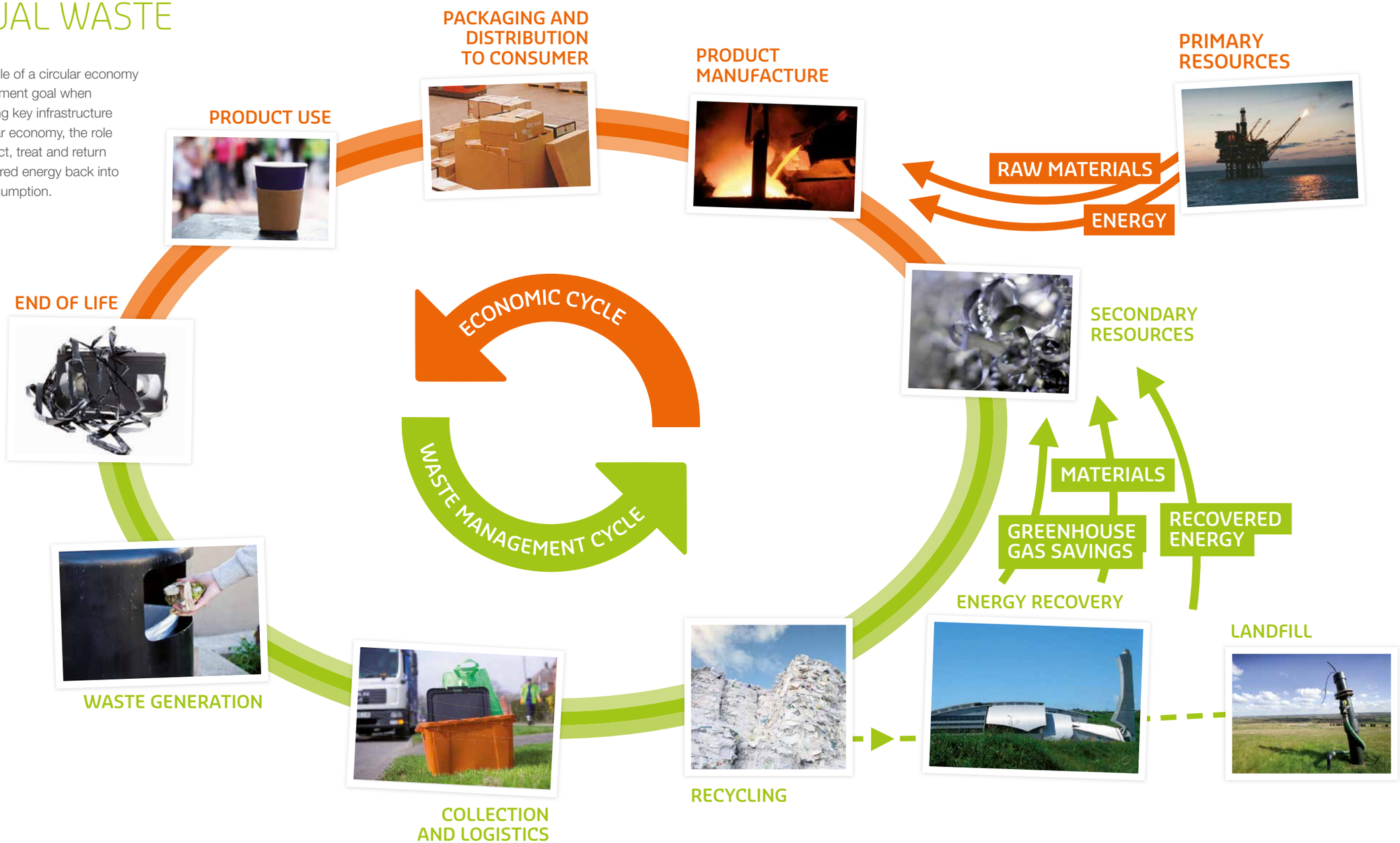
Major policy decisions, such as government-funded financial support for waste management infrastructure development, also rely on robust forecasts of future capacity requirements.

In this report, we present SITA UK's assessment of the UK's infrastructure requirements for the management of residual municipal and similar commercial / industrial waste over the period 2015 to 2025.

[1] Eurostat news release 33/2013, Environment in the EU27.

THE CIRCULAR ECONOMY AND RESIDUAL WASTE

SITA UK has adopted the principle of a circular economy as its strategic business development goal when planning for the future and making key infrastructure investment decisions. In a circular economy, the role of waste management is to collect, treat and return secondary resources and recovered energy back into the cycle of production and consumption.



Although aspiring to circularity, the UK's economy falls short of this ideal. In 2013, the UK generated 89 million tonnes of municipal and total commercial / industrial waste, of which 49 per cent was recycled and 51 per cent was left as residual waste.

Minimisation, re-use and recycling are priority elements of the waste solution and will be better delivered through the principles of the circular economy. For example, dealing with waste at the design stage of a product is generally acknowledged to significantly lower the quantity of waste that occurs in the production, use and post-consumer stages.

However, while having a clear view of our destination – a circular economy – we nevertheless must also deal with the waste management issues of today. It is not possible to economically and environmentally recycle all the materials that enter the waste stream and as such we must build facilities for today's residual waste, albeit with an eye to the future. Even economies that currently achieve high recycling rates generate residual waste that needs to be managed.

Germany recycles 62 per cent of its municipal waste. Of the remaining 38 per cent residual waste, 37 per cent goes to energy recovery facilities and one per cent goes for landfill disposal.

The Netherlands recycles 60 per cent of its municipal waste. Of the remaining 40 per cent residual waste, 39 per cent goes to energy recovery facilities and one per cent goes for landfill disposal[2].

Apart from factors such as population growth and economic activity, residual waste generation depends on interlinking issues such as the participation rate of householders and commercial customers in recycling schemes, the design of the collection scheme, the care with which dry recyclates are kept apart from non-recyclable waste in separate containers, and cross-contamination of one potentially recyclable stream with another (for example, contamination of paper with glass, or of plastics with food).

These operational factors tend to limit the extent to which recycling rates can not only be raised, but maintained at a very high level. Taking the example of a high-recycling society such as Germany, 62 per cent recycling of municipal waste implies that 38 per cent remains as residual waste.

Were Scotland and Wales to meet their target of 70 per cent recycling by 2025, that would still leave 30 per cent of their waste streams as the residual waste fraction – more in the run-up to achieving this goal in 2025.

[2] Eurostat news release 33/2013, Environment in the EU27.

FORECASTING RESIDUAL WASTE INFRASTRUCTURE CAPACITY

DATA LIMITATIONS

Robust forecasts rely on good data, sensible modelling and a good understanding of the market place – from production through collection to treatment. The first-hand experience of waste-related operations gives a valuable insight into the commercial niches of the sector's key players and market trends. Indeed, it is the active participation in the sector as frontline operators with direct access to a sizeable municipal and commercial customer base that we believe gives industry-derived forecasts the edge. For operators and facility developers, this is a fundamental component of commercial understanding, focused development and targeted delivery.

Nowhere is this more important than in forecasting infrastructure capacity requirements for commercial / industrial waste. With an established reporting and tracking system such as Defra's WasteDataFlow, municipal waste arisings – strictly speaking, local authority collected waste, which includes a small proportion, perhaps about five to 10 per cent of similar commercial / industrial waste – are reasonably well collated nationally.

Such is not the case for commercial / industrial waste arisings where, generally, estimates are reliant on small-scale ad hoc waste surveys, and interpretation of certain facility and landfill tax returns. The most recent commercial / industrial waste arisings survey conducted by the various devolved authorities dates from around 2010.

With the lack of formal reporting systems equivalent to WasteDataFlow, up-to-date information on commercial / industrial waste arisings and likely future trends is not available from Government sources, but is held by commercial / industrial waste generators themselves and by companies such as SITA UK that manage their waste.

Since SITA UK commenced the introduction of regular on-board weighing for our commercial and industrial customers, our data is giving us an increasingly accurate insight into the nature of commercial / industrial waste generation and composition which assists in forecasting future trends.

WASTE MOBILITY

Waste has also become more mobile over the years, making the prediction of regional capacity requirements ever more difficult. For instance, a contract in the south east might move waste to a residual treatment facility in the south west. Unless care is taken, the south east regional treatment requirement would include the south east waste but not the south west treatment facility, giving a false impression of the treatment capacity balance in the south east. Conversely, in the south west, the new facility being constructed would be wrongly assumed to be counted against the waste arising in that area.

Considering each currently operating, in-build, in-development and proposed facility on its merits, taking into consideration their technical and commercial boundaries and access to appropriate feedstock, is an essential element of forecasting the delivery of new treatment infrastructure. We must consider all aspects that influence how much new capacity is likely to be delivered, and what existing capacity may not continue or may be amended.

FUTURE WASTE ARISINGS AND CHANGES IN TECHNOLOGY MIX

Key assumptions

- Population growth is in accordance with each relevant authority's latest projections.
- Municipal and similar commercial / industrial waste reduction per head continues.
- Recycling increases, but at rates influenced by policy implementation and commercial reality.
- Landfill remains more expensive than energy recovery from waste alternative solutions.
- Energy incentives remain at present levels and energy incentive budget allocations for thermal technologies do not inhibit deployment.
- England, Scotland, Wales and Northern Ireland policies on municipal and similar commercial / industrial waste remain as proposed.

SITA UK's methodology for forecasting residual waste infrastructure requirements followed a systematic process.

Starting with baseline conditions of waste arisings and treatment routes up to and including 2013 and looking forward to 2025, total future municipal and similar commercial / industrial waste arisings were predicted based on our assessment of the efficacy of waste prevention measures to dampen growth associated with positive population and economic trends.

MUNICIPAL WASTE

For municipal waste, an increasing population will not only generate more household residual and recyclable waste, but by engaging with the commercial and industrial sector and buying more goods and services, will also generate potentially more waste in certain sectors, such as in food and retail.

We have considered policy implications by region, likely success levels in waste minimisation and re-use, forecasting forward from historic trends.

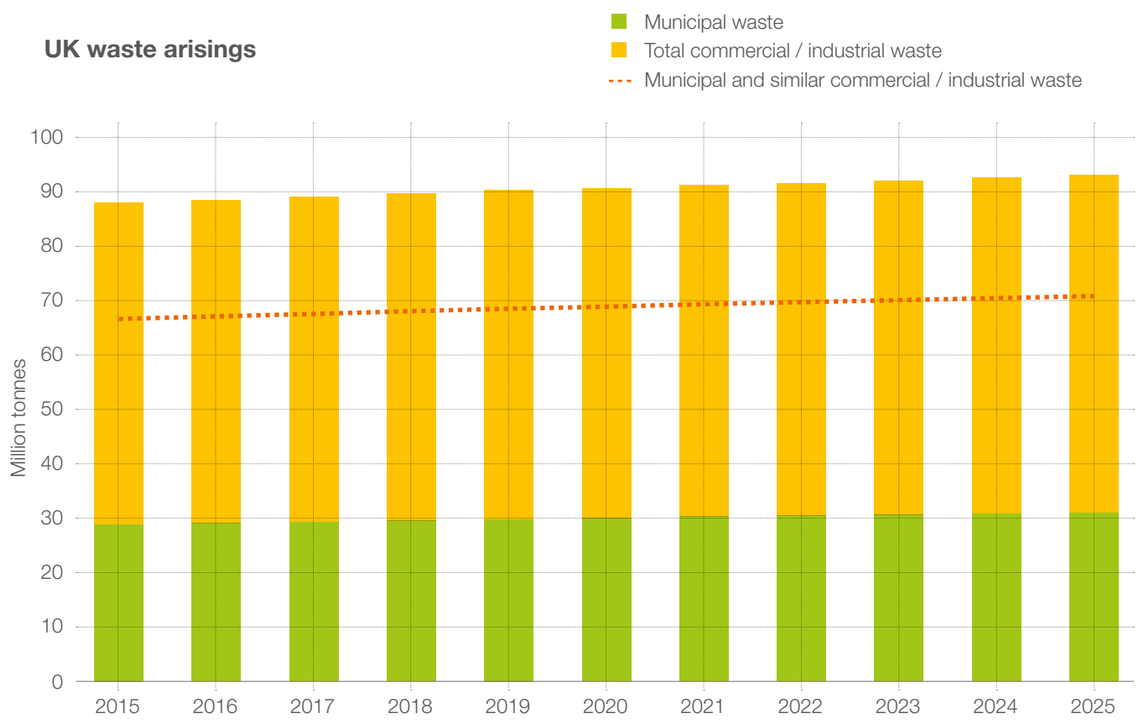
COMMERCIAL / INDUSTRIAL WASTE

For similar commercial / industrial waste, the model for each region was constructed on a sectoral basis (such as food, drink and tobacco, retail and wholesale, and public sector) using data from surveys, regional development forecasts and population statistics. In addition, data from our own database and customer activity have been used to inform and fine-tune the available information and assist with the analysis of current production and composition together with forecasting forward.

Trends in waste minimisation, re-use and recycling were then applied on a sector-specific basis to provide both a regional and activity-based analysis.

In considering similar commercial / industrial waste, we have calculated total waste arisings for the full range of waste. From this figure, we have subtracted wastes that are not similar to municipal waste and which therefore could not be treated and managed in facilities that are designed to treat municipal-type waste. This allows us to compare our forecasts against those of Defra and other bodies on a like-for-like basis.

UK waste arisings



TREATMENT OPTIONS

There are a range of treatment options that could potentially be applied to the waste stream. The main technology types we have considered are:

- **Recycling** – in which specific materials present in the waste are either segregated at source or separated out in materials recycling facilities for sale as recyclate.
- **Biological treatment** – composting and anaerobic digestion of separately collected food waste.
- **Energy recovery from waste** – including waste-derived fuels that are used in industrial boilers and kilns, both in the UK and abroad.

Recycling of materials in the waste stream – such as paper, metals, glass and plastics – will reduce the amount of residual waste remaining, as will food waste dispatched for composting or anaerobic digestion.

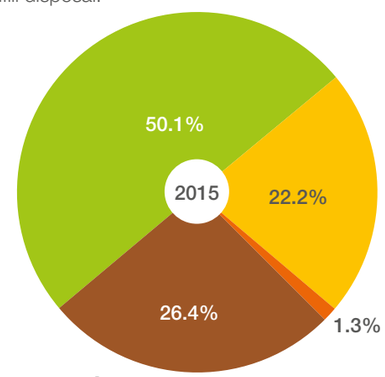
Judgement based on SITA UK's operational experience, customer feedback, technology constraints and market conditions was exercised to arrive at the modelled mix of technologies, backed up by our comprehensive list of operating, in-construction, planned and proposed facilities.

By 2025, allied to increasing dry recycling rates, population changes and changes to collection methods (in particular, the separate collection of food waste), we forecast the major treatment routes to be dominated by recycling (55 per cent) followed by energy recovery from waste (35 per cent), landfilling (eight per cent) and anaerobic digestion (two per cent).

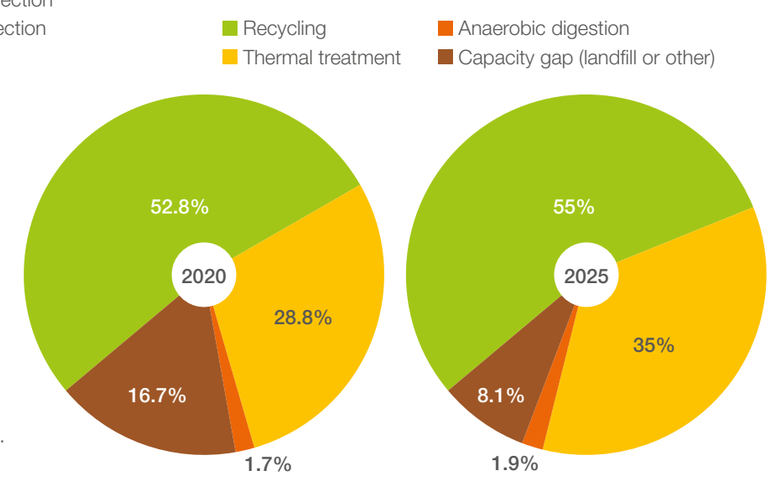
The capacity splits show the dominance of recycling today and through to 2025. Our modelling and forecasting indicates that current recycling activities will not be impacted by the growth in energy recovery from waste, except in the case of food waste.

For food waste, we expect that some of the feedstock diverted to anaerobic digestion will derive from existing composting facilities, especially when existing contracts come to an end and where gate fees are influenced by the energy incentive support for anaerobic digestion, changing the economic balance between these two technology solutions.

We do not envisage the risk of landfill capacity shortage, although there may be local shortages which force the waste to travel further than is currently the case. Current UK landfill capacity far exceeds the likely future need for landfill disposal.



UK treatment summaries

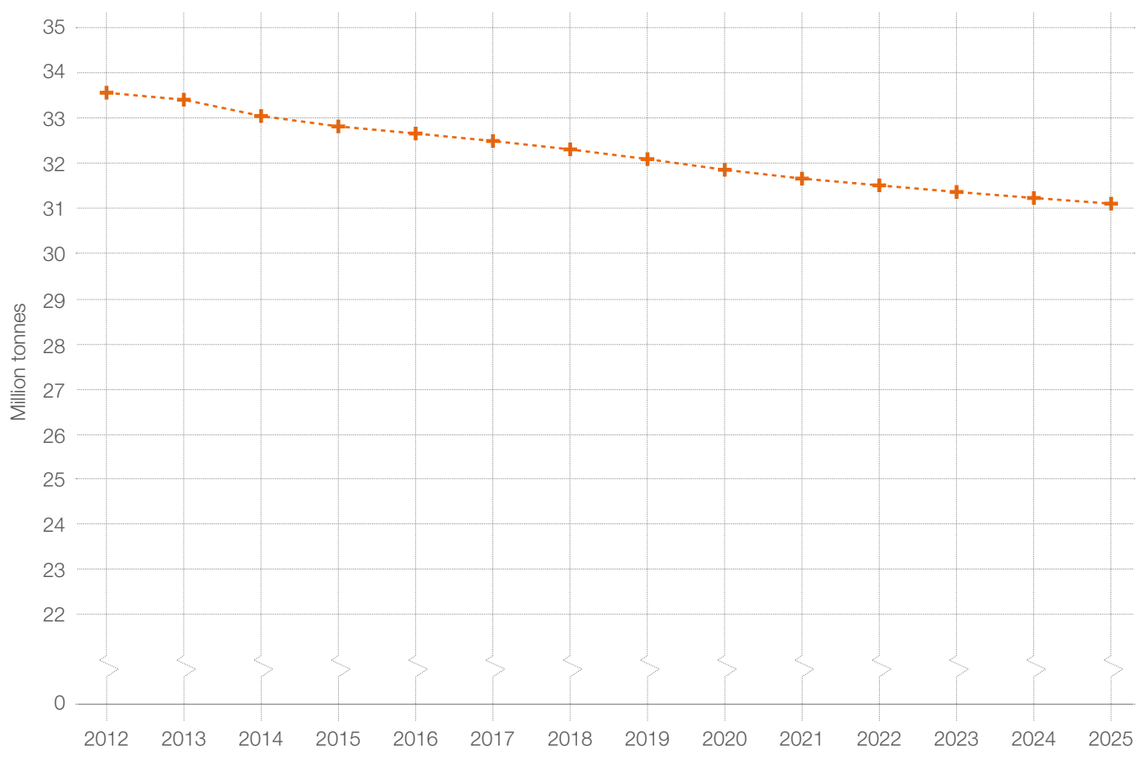


RESIDUAL WASTE ARISINGS

Forecasts of the tonnage of residual waste arisings are obtained by subtracting from total waste arisings the waste that will be prevented through minimisation strategies and materials that will be taken out of the waste stream through operations such as recycling, composting and anaerobic digestion.

For municipal and similar commercial / industrial waste, we estimate that the UK's residual waste will total 32.8 million tonnes in 2015, falling to 31.1 million tonnes in 2025, reflecting a steady rise in waste prevention and recycling measures.

Total residual UK municipal and similar commercial / industrial waste arisings



RESIDUAL WASTE INFRASTRUCTURE CAPACITY FORECASTS

Key assumptions

- Population growth increases the volume of waste (including food waste) from both municipal and commercial / industrial sources.
- Extraction of source-separated food waste is constrained due to the cost of collection.
- Some feedstock drawn into anaerobic digestion is captured from existing composting facilities and is not new material extracted from the residual waste stream.
- Waste-derived fuel exports continue to increase through 2015, but are in decline by 2020 as more UK capacity comes into operation.

Residual waste treatment capacity is estimated by subtracting residual waste arisings in the target years from the available or potentially available treatment capacity for various technology options. An excess of residual waste arisings over the total available and proposed capacity signifies a deficit in treatment capacity, whereas the reverse situation signifies a likely saturation of the market and possibly an excess of treatment capacity in the event that all planned capacity is built and operational.

The robustness of these forecasts depends on the quality of the waste arisings data, and on market intelligence in relation to current and planned waste treatment capacity. In addition, we rely on government policies impacting on our sector having sufficient clarity to allow the sector to model their impact and on the competent authority to consistently enforce the regulations under which our sector operates.

SITA UK maintains a list of projects which it monitors and adds to as new information becomes available. This information includes planning permissions, technology type, transport options, likely gate fee requirements, developer history, facility details and local waste sources. Based on these factors, each project is given a probability of delivering an operational facility.

The treatment routes we have considered are:

- **Energy recovery from waste** – including waste-derived fuels that are currently being exported to dedicated combustion facilities and to industrial boilers and kilns.
- **Anaerobic digestion** of separately collected food waste – while not strictly residual waste, this material is nevertheless a residue from other treatment processes, such as composting and mechanical biological treatment.

ENERGY RECOVERY FROM WASTE

Energy recovery from waste describes thermal technologies used to recover energy from residual waste in a controlled and highly regulated way. Energy recovery from waste in all its forms is likely to be the dominant form of treatment applied to residual waste, and therefore merits particular consideration.

Energy recovery from waste comprises a number of different technologies:

- **Combustion** – in which the waste is burned at temperatures of around 850°C in an excess of air to directly release the energy.
- **Pyrolysis and gasification** – in which waste is heated in a restricted or oxygen-free atmosphere to produce syngas, which is combusted to generate energy. Syngas can also be converted into biomethane, which can be injected into the gas distribution network or converted into component gases or chemicals that can be used in their own right.
- **Waste-derived fuel preparation** – these fuels are commonly called refuse derived fuel or solid recovered fuel, the latter being a more refined product.

COMBUSTION, PYROLYSIS AND GASIFICATION

The delivery of combustion technologies reflects current municipal waste-based financing solutions, contract styles and technology maturity and reliability. More recently, gasification and pyrolysis facilities based on municipal waste contracts have begun to be delivered. Continuing experience and maturity of technologies such as pyrolysis and gasification is expected to enable the delivery of more of these facilities over time.

Further, as funding is such a vital element of project development, currently less than five per cent of the new infrastructure in operation or in build is based on funding relying on feedstock drawn from merchant similar commercial / industrial wastes. In 2025, we expect that around 22 per cent of the energy recovery from waste capacity will be founded on a majority of similar commercial / industrial waste and 78 per cent founded on municipal waste feedstock.

REFUSE DERIVED FUEL AND SOLID RECOVERED FUEL

Refuse derived fuel and solid recovered fuel are typically combusted in power stations, kilns and converted industrial boilers and power plants as a substitute for or supplement to conventional fossil fuels, such as coal or petroleum coke.

Use of solid recovered fuel (and refuse derived fuel) is growing in the UK and there is additional capacity with exports of this material growing from 67,000 tonnes in 2010/11 to 890,000 tonnes in 2012 and 1.6 million tonnes in 2013.

This deployment in the UK and abroad is far quicker than could be achieved through the construction of new residual waste management facilities in the UK, and has thus provided a necessary and timely solution to landfill diversion. As this market is relatively immature, predicting the UK market and likely export potential over the next 10 years requires in-depth knowledge of the refuse derived fuel and solid recovered fuel production and utilisation market.

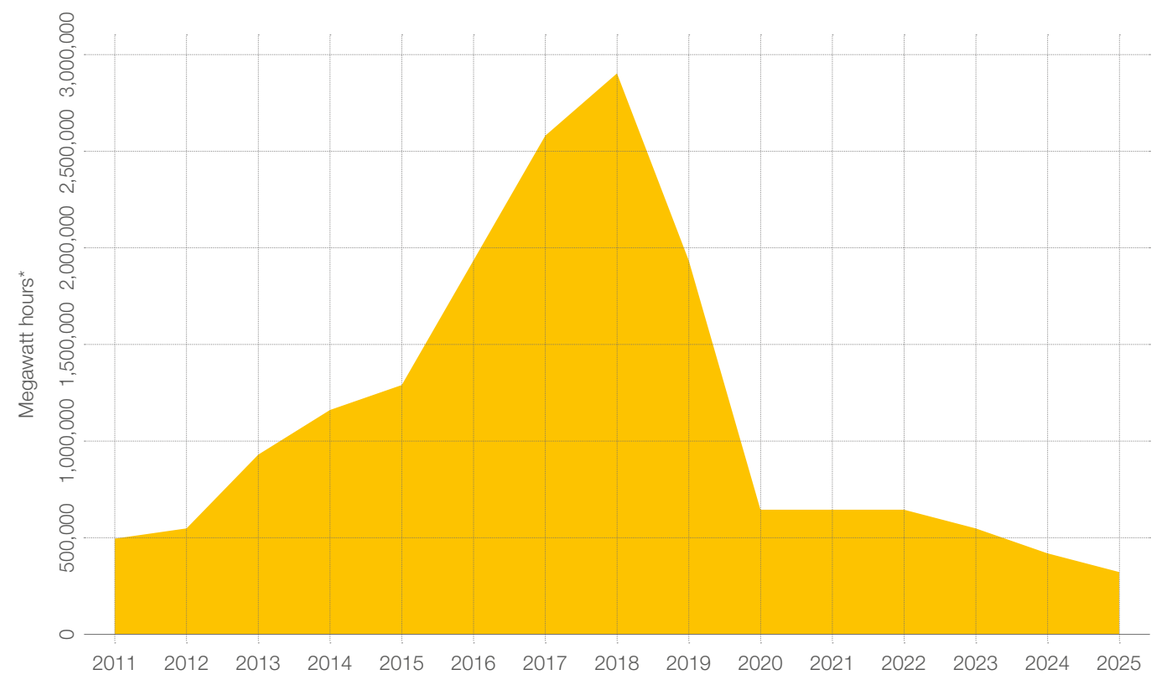
Refuse derived fuel and solid recovered fuel utilisation in industrial boilers

With regard to the potential for existing or future waste wood biomass facilities converting to operate with a refuse derived fuel and solid recovered fuel mix, we have assessed the potential against technology, market and planning constraints. One significant limitation is the 10 per cent limit of non-biomass input under the Renewables Obligation, whereas most refuse derived fuel and solid recovered fuels are 50 to 60 per cent biomass. The 10 per cent limit constrains the volume of potential feedstock replacement. Through our waste wood supply operations and links to the waste wood biomass industry, we have constructed a matrix of potential facility conversions and feedstock displacement rates.

Retaining refuse derived fuel and solid recovered fuel treatment within the UK

Given the UK's need for security of energy supplies, there is a strong case for internalising the current export trade in refuse derived fuel and solid recovered fuel as and when new capacity becomes available. At its peak, we estimate the refuse derived fuel and solid recovered fuel capacity exported to be approximately the equivalent of 350 to 400 megawatts of annual installed capacity, sufficient to supply the energy needs of 525,000 to 600,000 homes. Given that the UK needs new reliable baseload capacity, this fuel is a net loss to UK generating capacity.

Potential electrical energy lost to UK supply through refuse derived fuel and solid recovered fuel export



* Capacity (megawatts) multiplied by operating hours.

THE CAPACITY GAP

For energy recovery from waste, our forecast indicates that growth in population and the economy will result in more waste needing to be managed and hence new treatment capacity to be built. Even allowing for continued minimisation and recycling, the need for more waste infrastructure across the full range of treatment options is apparent.

UK residual waste treatment capacity gap (million tonnes)*

	2015	2020	2025
Total residual waste arisings	32.8	31.8	31.1
Total energy recovery from waste operational, installed and planned capacity	15.0	20.1	25.4
Net residual capacity gap	17.8	11.7	5.7
Feedstock funding basis (municipal waste / similar commercial and industrial waste)	95% / 5%	86% / 14%	78% / 22%

* The calculated tonnages of waste arisings and treatment capacity have been rounded to the nearest 0.1 million tonnes.

UK residual waste treatment projections (million tonnes)*

	2015	2020	2025
Energy-from-waste combustion	9.5	13.3	16.4
Pyrolysis / gasification	0.6	2.2	4.3
Waste biomass conversions	0.6	0.8	1.3
Cement works	0.6	0.6	0.6
Mechanical / biological / heat treatment	1.7	2.2	2.3
Refuse derived fuel exported	2.0	1.0	0.5
Total operational, installed and planned capacity	15.0	20.1	25.4
Forecasted proportion of total capacity comprising net new capacity	4.8	10.0	15.1

* The calculated tonnages of waste arisings and treatment capacity have been rounded to the nearest 0.1 million tonnes.

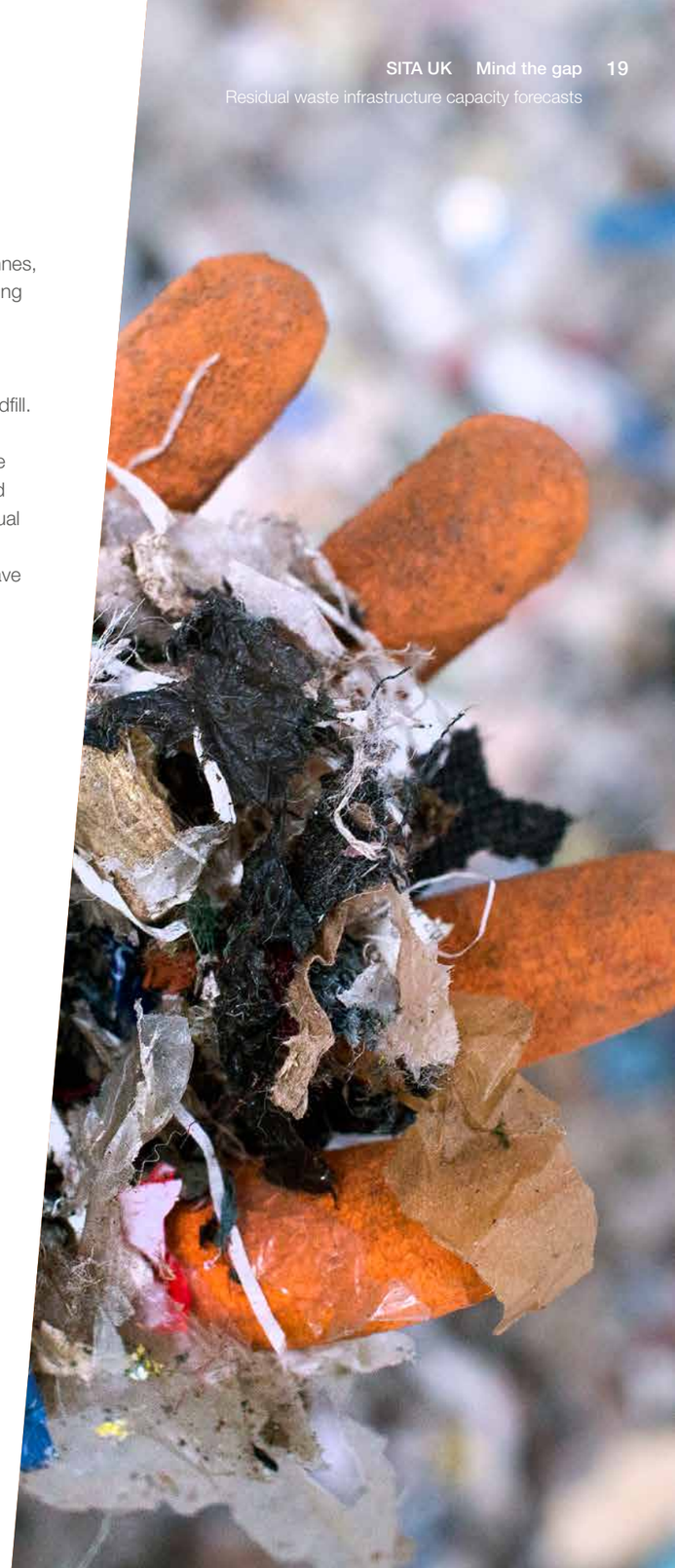
The capacity gap in 2015 is forecast to be 17.8 million tonnes, compared to the 18.7 million tonnes of active waste entering UK landfills in the period 2012/13.

The current build-out of new energy-from-waste facilities reflects the success of landfill tax in driving waste from landfill. But this has not been matched to the provision of new residual waste treatment facilities – the main reason for the development of the refuse derived fuel and solid recovered fuel export market. The UK was fortunate that spare residual treatment capacity was available in Northern Europe, without which the diversion of waste from landfill would have been significantly slower than has actually been achieved.

In our model, we have assumed refuse derived fuel and solid recovered fuel export continues, with especially solid recovered fuel finding long-term off-take contracts in Europe and beyond. These exports are expected to peak at around four million tonnes per year and then decline as UK-based capacity becomes available, and as spare capacity that currently exists in other European countries is used up. Thus, we expect that through to 2025 there will be a rebalancing of this market as more UK-based facilities utilising refuse derived fuel and solid recovered fuel become operational.

For municipal waste, Defra has expressed the view that sufficient capacity for residual waste treatment will be delivered – resulting in the withdrawal of private finance initiative (PFI) credits for projects designed to deliver residual treatment solutions.

From our modelling, it is not at all certain that all municipal waste has a non-landfill treatment solution. It is also clear that for residual similar commercial / industrial wastes a substantial residual waste treatment capacity gap exists, which is likely to continue through to 2025.



ANAEROBIC DIGESTION

Anaerobic digestion of source-separated food waste (including waste from processes such as composting and mechanical biological treatment) depends not only on the volume of waste existing today, but also when forecasting forwards the likely success of minimisation campaigns such as WRAP's Love Food Hate Waste. Using WRAP definitions, we have modelled moderate success in removing the 'avoidable' waste, but no success in the 'possibly avoidable' or the 'unavoidable' food wastes[3].

UK anaerobic digestion treatment capacity gap for source-separated food waste (tonnes)*

	2015	2020	2025
Total UK source-separated feedstock available	887,000	1,349,000	2,279,000
Total anaerobic digestion source-separated feedstock treatment capacity	867,000	1,150,000	1,405,000
Net capacity gap	20,000	199,000	874,000
Number of facilities**	72	96	117

* The calculated tonnages of waste arisings and treatment capacity have been rounded to the nearest 1,000 tonnes.
** Average plant scale assumed as 40,000 tonnes per year.

According to our forecasts, we anticipate continued growth in the number of facilities, constrained by the costs of collection of source-separated food waste, especially in the municipal sector where budgets available for waste management over the next five years are under pressure.

[3] **Avoidable** food waste is defined as [edible] "food and drink thrown away because it is no longer wanted or has been allowed to go past its best". **Possibly avoidable** food waste is defined as [edible] "food and drink that some people eat and others do not (e.g. bread crusts and potato skins)". **Unavoidable** food waste is defined as "waste arising from food and drink preparation that is not and has not been edible under normal circumstances (such as egg shells, banana skins and apple cores)".

THE CAPACITY GAP

Putting in place policies that drive materials from one type of management system to another is but one step in the system management. Landfill tax has been very successful in driving waste from landfill, but a general lack of policy on what to do with that waste when it is diverted from landfill has meant that delivery of alternative treatment has been ad hoc and significantly lacking in capacity.

SITA UK'S ASSESSMENT OF WASTE GROWTH AND CAPACITY REQUIREMENTS

We estimate that UK **municipal and similar commercial / industrial waste arisings will grow** by just over 10 per cent through the period 2015 to 2025. Our modelling suggests that, given the current suite of waste policies in England, waste arisings will significantly exceed the 'sustainability turn' scenario modelled by Defra[4].

Based on current infrastructure deployment and market trends, and further assuming that residual waste currently dispatched to landfill will require alternative treatment, we estimate total residual waste requiring treatment in 2015 (our baseline year) to be 32.8 million tonnes.

As a consequence, SITA UK estimates that the UK approaches 2015 **with a residual waste infrastructure capacity gap of 17.8 million tonnes**. Taking into account waste growth and projections of new waste infrastructure deployment based on current trends, we estimate the net capacity gap will still be around 11.7 million tonnes in 2020 and 5.7 million tonnes in 2025.

For **anaerobic digestion**, considering the extraction of food waste from the residual waste stream against the affordability of separate collection and the economics of composting, indicates that in the period 2015 to 2020 there is likely to be a fine balance between installed capacity and feedstock availability, with local over-capacity a real possibility. Furthermore, should minimisation campaigns be more successful, such as the removing all 'avoidable' food waste together with a proportion of the 'possibly avoidable' food waste, then this will significantly reduce the infrastructure required in 2020 and 2025, potentially halving the tonnage required to be treated. Monitoring and predicting these potential variations is essential to help the industry fine-tune the delivery of new capacity.

Turning to **energy recovery from waste**, we estimate that there is insufficient UK capacity to treat both the anticipated similar commercial / industrial residual waste arisings and the waste-derived fuel that is currently exported, leading to a potential capacity gap of 5.7 million tonnes by 2025 if no additional new capacity beyond that modelled is delivered.

Insofar as municipal and similar commercial / industrial waste is concerned, this contrasts with Defra's assessment in late 2013 that current and planned infrastructure projects are sufficient to meet capacity demand in 2020.

On the contrary, the UK needs to continue with the provision of residual waste treatment capacity. Given the commercial balance between recycling and energy recovery, we do not believe that this additional capacity, if delivered, will detract from achieving high recycling.

[4] Defra. The Economics of Waste and Waste Policy, Report PB1354, March 2012. Sustainability Turn is a scenario in which future waste generation reflects a decision by society to adopt strong environmental behaviours and legislation, with a strong overall focus on waste prevention.

BRIDGING THE CAPACITY GAP

In contrast to the devolved administrations in Wales and Scotland, England's waste management performance appears to be levelling out, with the combined overall recycling rate at about 49 per cent. Other than further small increments, England is unlikely to experience a step change in recycling or waste reduction under its current policy regime – new initiatives are needed. This is an important consideration given that England produces 90 per cent of the UK's waste, and therefore dominates the UK's waste management performance.

The quantity of residual waste generated is wholly dependent on the efficacy of measures towards the apex of the waste hierarchy, namely waste minimisation, re-use and recycling. Beyond that, what the UK does with its residual waste depends on the seriousness with which we embrace the concept of the circular economy. As the examples of Germany and the Netherlands show (see page eight), even residual waste can be put to good use by extracting energy (power and heat) for use in our domestic economy and communities, rather than consigning this material to landfill.

Minimising waste arisings while extracting the maximum value from unavoidable residual waste are central tenets of a resource-efficient economy. Defra's current policies will not deliver this outcome. The UK needs clear and farsighted policies in order to stimulate the investment in the waste and resources sector needed to drive the circular economy.

In addition, the ability to forecast the expected trajectory of waste arisings and treatment options is critical if we are to safeguard the significant investment that is needed to divert waste from landfill.

We make some recommendations that address these issues:

RECOMMENDATION ONE

Improve capture of data on similar commercial / industrial waste arisings by hardwiring an electronic system of reporting and tracking, to mirror WasteDataFlow for local authority-collected waste.

After an initial test period, the Government's edoc[5] initiative should be rolled out by 2018/19 as a mandatory requirement placed on all actors within the waste management chain under their Duty of Care. This should also include mandatory weighing of collections using on-board weighing technologies or similar systems.

[5] edoc (electronic duty of care) is an online system that enables a user to create waste transfer notes; store, review, edit and sign records; and to track the fate of a waste consignment as it travels through the management chain.

RECOMMENDATION TWO

Introduce stronger policies and incentives to further increase and maintain higher recycling rates.

Flagging recycling rates will only exacerbate the problem of how to deal with residual waste. Measures could include extending the current requirement on households for source separation of targeted materials to commercial / industrial premises. This is especially important in England, where strong policies and incentives do not currently exist in the commercial / industrial sector and where capture at source of commercial / industrial waste similar to municipal waste is patchy.

RECOMMENDATION THREE

Issue guidance on collection techniques designed to minimise cross-contamination of recyclate streams.

Defra has decided not to issue guidance on how to interpret the requirement in Waste Directive 2008/98/EC for separate collections of paper, glass, metals and plastics where they are technically, environmentally and economically practicable.

To support higher recycling rates, local authorities and private sector operators would benefit from guidance on the design of waste collection systems that deliver high-quality recyclate streams. For example, is food waste best collected separately? Should glass ideally be kept separate from paper and plastic recyclate streams in commingled collections that comply with the technically, environmentally and economically practicable test?

RECOMMENDATION FOUR

Integrate energy recovery from waste into the UK's spatial plans for energy delivery in order to encourage the repatriation of exported energy-rich refuse derived fuel and solid recovered fuel back to the UK.

Considering that the UK is searching for ways of bridging potential energy shortages in the years to come, making use of the residual waste fuel source is an obvious opportunity. This is especially relevant when considering that energy produced from waste will generally be between 50 and 100 per cent renewable and will therefore provide reliable green base load power to the UK market.

RECOMMENDATION FIVE

Incentivise the utilisation of heat from the significant increase in energy recovery from waste forecasted.

Heat will be the dominant form of energy that will be recovered. Some form of incentive or other financial support will be required to enable grids and heat distribution networks to be established in a timely and economic manner.

ABOUT SITA UK

SITA UK is a recycling and resource management company. Our purpose is to protect our environment by putting waste to good use.

We employ more than 5,500 people and provide specialist recycling and waste management services to over 40,000 organisations and 12 million residents nationally.

We operate from over 300 locations throughout the UK and have a network of recycling and waste recovery facilities where waste is put to good use – enabling our customers to reduce their impact on the environment.

More information

For more information or to talk to us about this report, please contact our **Technical Development Director**, **Stuart Hayward-Higham**, on **01628 513100**.

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