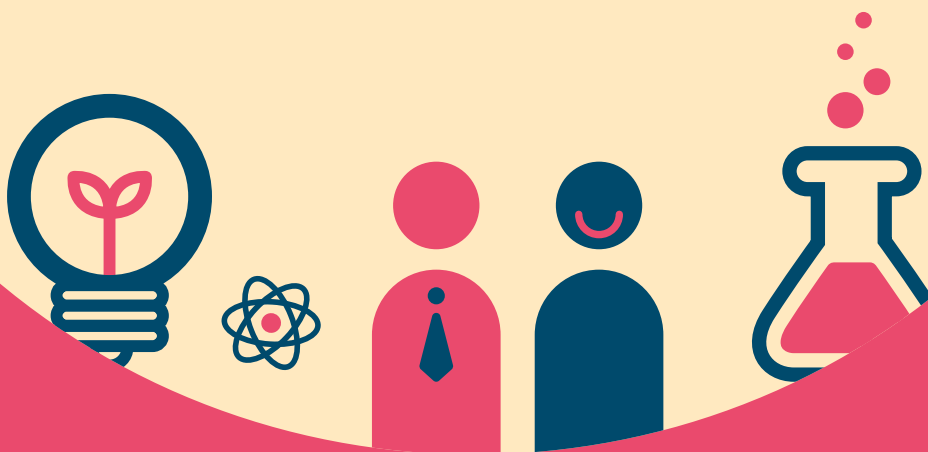


# Establishing a bioresources market in Yorkshire

Proposed RCV allocation



September 2017



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**01.**

# Introduction

**This document is intended to inform key stakeholders about how we have approached creating our bioresources price control. It aims to be fully transparent about how we have done this. As such it is technical by nature.**

If you would like any of this information explaining to you or you would like to discuss our bioresources strategy please contact us at [publicaffairs@yorkshirewater.com](mailto:publicaffairs@yorkshirewater.com)

## What is bioresource

Everyday we collect and treat about 1 billion litres of sewage in Yorkshire. As part of this process the solids are separated out of the sewage, this is called sludge.

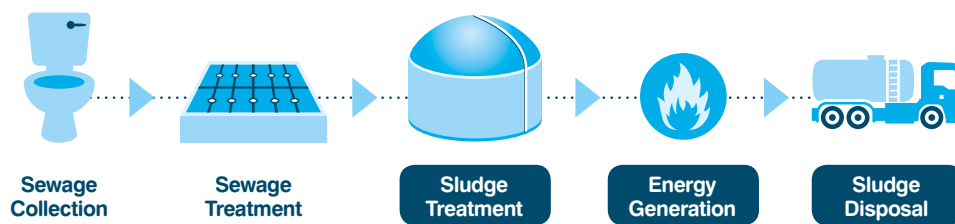
We take this sludge and use the gas from it to create electricity, we make a compost product as well.

This makes sludge a valuable resource rather than a waste product, we call it bioresources.

To make sure that we get the best value of our bioresources, which helps keep bills low and benefits the environment, a market in bioresources is being created.

**A bioresource market will deliver financial efficiencies and encourage innovation. It will allow us to:**

- Trade with other companies and use their treatment centres;
- Invest in assets that promote sludge processing across companies; and
- Interact and integrate with the wider organic waste market.



**Work carried out by Ofwat has found that a bioresource market will enable:**

- Better and more effective optimisation;
- Greater participation from businesses operating in the wider waste markets;
- Significant benefits from development of markets for sludge processing transformation to gas and fertilisers (OFT/Ofwat study); and
- Possible benefits of £780 million in England and Wales.

## About this document

**This publication explains how, based on Ofwat's April 2017 guidance document, we have allocated the RCV to our bioresource price control.**

To enable a market to be developed for bioresources in England and Wales, Ofwat require all the water companies who treat sewage to separate out bioresource activities. This is being achieved by separating out some of the overall value of the company (called regulatory capital value, RCV) into a bioresources area called a price control.



The 2019 Price Review (PR19) will see the introduction of a separate binding five-year price control on revenues from bioresources at a company level, accompanied by the requirement to publish market information in a structured form.

Yorkshire Water (YW) has a single Regulatory Capital Value (RCV) for its wastewater assets, including its bioresources assets. To determine the level of revenue that a company can recover as part of the new bioresources price control, companies need to provide Ofwat with information and a proposed assessment of how much of the single RCV to allocate to bioresources.

All companies are required to re-value their bioresources assets and must allocate a proportion of their existing RCV to that new price control on a 'focused' basis, i.e. broadly in line with the costs that would be faced by an entrant to that market operating to the same capacities as the incumbent company. The remainder of the existing RCV will apply to the wastewater network plus price control.



It is a condition of our licence that we provide Ofwat with the information and the data that it requires to set the price controls.



We recognise the importance in the quality of this data provided and have therefore implemented quality assurance processes aligned with our regulatory reporting assurance process. This follows a 'three levels of assurance' approach and consists of both internal and external assurance. The external element was provided by our technical assurance provider, Halcrow (ch2m).



Our Board understands that it is accountable for the quality and transparency of the information provided within this publication. They have read the publication, reviewed the content and are supportive of the information that is presented. They have obtained comfort from the Board Audit Committee that there are appropriate controls and assurance processes in place regarding the information contained within the publication.

# Our valuation proposals are:



**Gross valuation of our  
bioresources assets -  
£599 million**



**New economic value of  
our bioresources assets -  
£454 million**

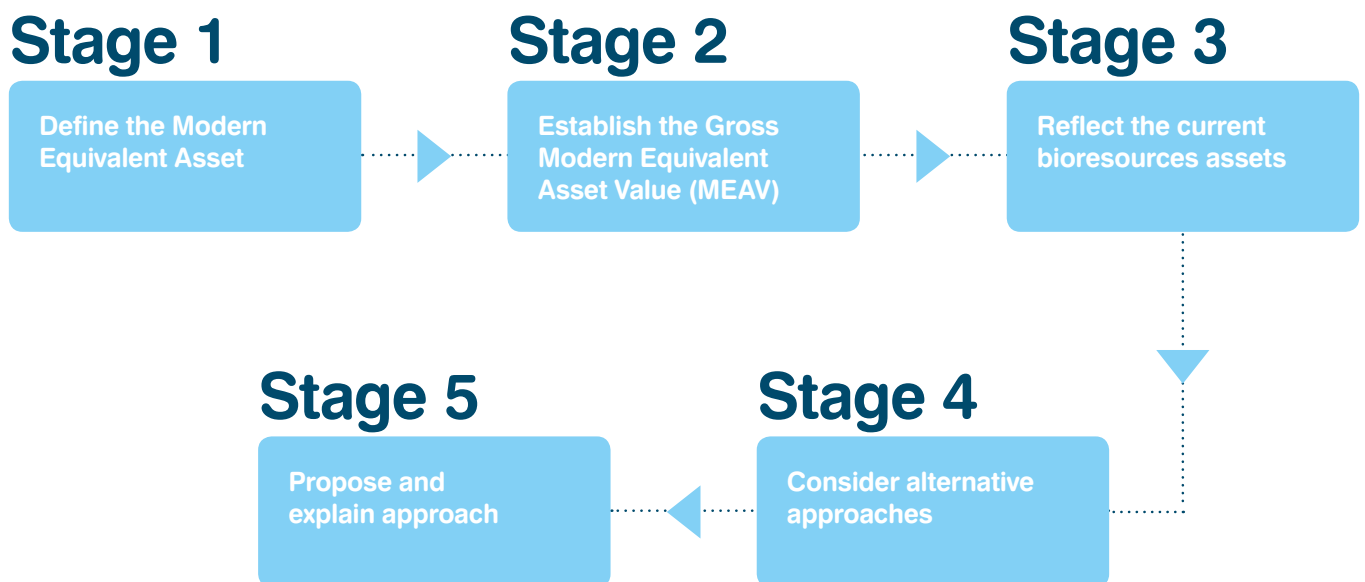


**Proposed bioresources  
RCV allocation -  
£454 million**

**02.**

# RCV Allocation Process

To create the separate bioresources RCV we have followed a 5 stage process in line with the guidance provided by Ofwat.



In the following sections we summarise how we have progressed through these stages and highlight the assumptions and assurances provided where appropriate.



# Stage 1

## Define the modern equivalent asset

The first step of an economic evaluation is to understand the value of the assets being used. If we use historic information this may distort the outcome.

We have defined the modern equivalent asset (MEA) in accordance with Ofwat's guidance, in that the hypothetical new entrant would build the MEA (i.e. the same type of treatment asset) at the same locations as our existing assets (as at 31 March 2020), and the assets would be of the same capacity.

In respect of technology choice, we have determined that the solution offering the best economic value within the YW region is anaerobic digestion.

### Rationale for Anaerobic Digestion

Our technology choices are based on whole life cost assessment of technologies. The appropriate technology depends firstly upon the product to be recycled. In most cases within the YW region we can recycle conventionally treated sludge, so there is little advantage in producing enhanced treated sludges at present.

The decision to operate with anaerobic digestion (conventional AD) is therefore based primarily on an assessment of the whole life cost of technology. Whilst there is some indication that at the very largest scales, advanced anaerobic digestion (AAD) may deliver a suitable whole life cost, in general conventional AD achieves a lower whole life cost. Conventional AD is less complex to operate, experiences lower failure rates, has fewer single points of failure, and presents lower safety risks.

In every case we have investigated both of these technologies are cheaper than destruction technologies (i.e. incineration), which are only suitable where the product cannot be recycled.

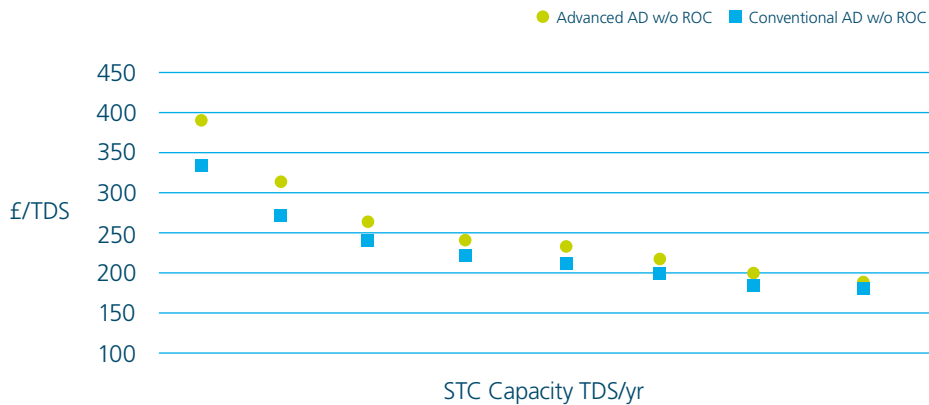
The preference for conventional AD over AAD will largely be determined by whether the higher capital expenditure and additional costs of process intensification associated with AAD are off-set by the benefits of additional energy revenues and the reduced cost of digestate transport.

The relative cost position between AD and AAD will, therefore, be site specific and will partly depend on legacy external factors such as EA ammonia consents and future conditions in the energy market. Given the extent of ammonia removal (and associated lower proportion of surplus activated sludge) across the YW region, plus the recent removal of the Renewables Obligation Certificates (ROC) regime, we conclude that conventional AD is most likely to be the technology choice of a hypothetical new entrant in the region we serve.

An indication of the comparative whole life cost position (pre and post ROC regime closure) is profiled in the figure below. This indicates that the cost differential between AAD and conventional AD is marginal and can be influenced on site specifics. In 2020 conventional AD is most likely to provide the lowest cost solution.

In our valuation we have assumed a MEA to be on a 'like for like' technology and capacity based on our actual assets as at 31 March 2020. This equates to conventional AD at all but one site. For the Bradford Esholt STF we have assumed the MEA would use an AAD solution, currently this is thermal hydrolysis.

Indicative cost per TDS comparison between the two technologies within the Yorkshire Water region.



<sup>1</sup> Ofwat's Regulatory Accounting Guidelines (RAG) 4.06

We have outlined in the table below the key characteristics and assumptions that we have made in defining the modern equivalent bioresources assets being valued based on the categories Ofwat describe in its April 2017 guidance.

### Asset characteristic and assumptions

<b>Asset process technology</b>	We have assumed all MEA use the same primary technology as actual assets at 31 March 2020 on a 'like for like' basis.
<b>Boundary of assets</b>	We have complied with the definitions of the boundary of bioresources assets in RAG 4.06. <sup>1</sup>
<b>Capacity and location of facilities</b>	We have assumed all MEA have the same capacity as the assets as at 31 March 2020. We also assume they would be located at the same sites as our existing assets, in accordance with Ofwat's expectations. Consistent with our bioresources strategy, we have assumed hypothetical assets would be of the same type as existing assets. This includes continuation of a current sites configuration.
<b>Level of valuation</b>	Our approach has been to value assets for each STF within our asset register.
<b>Sub site processes</b>	Our approach has been to cost at a process level for each STF.
<b>Ownership of assets</b>	We have only considered assets that are owned by the appointed business as part of this valuation. All assets are owned and operated by YW.
<b>Treatment of sludge liquors</b>	We have assumed there is no change to the existing treatment of sludge liquors as set out in RAG 4.06.
<b>Wastewater RCV</b>	We have taken the RCV forecast from PR14 Final Determination for the waste water control (as published within the FD14 company specific appendix) and inflated this to the relevant period, using the RPI values as published by the Office for National Statistics (ONS).

<sup>1</sup> Ofwat's Regulatory Accounting Guidelines (RAG) 4.06

# Stage 2

## Establish the gross modern equivalent asset value

In order to establish the gross modern equivalent asset value (MEAV) we have used the economic valuation approach as outlined by Ofwat in its guidance of April 2017.

We have used the gross and net (MEA) values as published in our Regulatory Accounts for 2015. Asset disposals or additions since April 2015 to March 2017 have been accounted for.

Following this step, we have made adjustments to reflect where sludge treatment or sludge disposal assets have been reclassified due to boundary changes, as set out in RAG 4.06.

### Economic value of energy generation

We have considered the economic value for energy generation and renewable energy incentives attributable to our sludge assets. Renewable obligation certificates (ROCs) will remain for the appropriate existing assets. We have assumed the hypothetical new build assets will not be in receipt of renewable energy incentives.

### Other assets

YW moves sewage sludge from smaller catchment sites into larger processing sites to ensure compliance and sludge treatment. The collection of sludge is carried out by the Company's fleet, consisting of 26,000kg, 32,000kg and 44,000kg gross plated weight vehicles.

This activity utilises Kelda Transport Management Limited (KTML) information around fleet availability and, our business planning processes to understand the capacity of the existing assets and the expected volumes to be moved.

Data relating to sludge disposal management and general, transport (raw cake) and transport (digestate cake) has been excluded as YW does not own any assets relating to this activity. This activity has been outsourced to service partners.

It has been assumed that the hypothetical capacity of the replacement of the logistics fleet is the same as the current fleet capacity. Any marginal changes in sludge demand are planned to be delivered through non-YW owned (outsourced) vehicles.





## Stage 3

### Reflect the current assets

YW have applied an economic approach consistent with Ofwat’s published economic value formula.

#### Value and economic adjustments

To understand and reflect any adjustments in the gross value of the sludge assets we need to understand the economic value of the current assets that will be in operation at 31 March 2020.

The economic valuation approach requires an estimate of the income that we would receive at the sludge boundary from the service provided as part of our statutory duty. Ofwat has assumed this will be equivalent to the minimum price that a new entrant would be willing to accept to build new assets.

In operating cost terms the new technology is assumed to be identical to the existing technology. Other revenues from end product sales are also deemed to be equivalent.

We have assumed that:

- The operating costs for the current assets (as at 2020) are equal to the operating costs of the new hypothetical assets; and
- The income from the sale of bioresource end products for the current assets is equal to the income the new hypothetical assets would attract.

We have used the asset lives - existing remaining and hypothetical new build for each individual process, to assess the value of the present value adjustment term. The value of capital cost for the hypothetical new build is the estimated (gross) replacement cost of each equivalent individual process item.

For energy generating income we have assumed that the hypothetical new build will not have access to ROC revenues post 2020. The current asset will have access to 20 years’ of ROC revenue from the date of the original accreditation. This remaining ROC revenue period is used to calculate the second present value adjustment term. The income difference between current and hypothetical new build assets is reflected in the differential in the reported revenues received from power generation.

Ofwat have provided an illustrative example of the economic adjustment in table 4.3 of its bioresources RCV allocation guidance.<sup>1</sup>

Our approach to other key valuation issues are outlined on the following pages.

<sup>1</sup> Economic asset valuation for the bioresources RCV allocation at PR19 – Ofwat (27 April 2017)

## Land values

In order to support the submission we need to consider the value of our land. The valuation exercise undertaken was based on a desktop assessment, and is aligned to industry best practice techniques in deriving a value.

The boundary measurements include all our sludge treatment facility assets. Where there are split facilities on a site, separate measurements are taken and added together.

For clarity:

- Access roads associated with the sludge treatment facility are included;
- Bioresource assets include all assets mapped in the process; and
- Sludge phyto-conditioning and sludge lagoons are excluded.

The land values have been sourced<sup>2</sup> externally based on comparable industrial land values from market data reports and transactions completed by the Group's land development company Keyland Developments. The comparable evidence is based on completed transactions. Valuing land using comparable evidence is a surveying profession standard, and recognised by the Royal Institution of Chartered Surveyors (RICS) for deriving a value.

## On costs

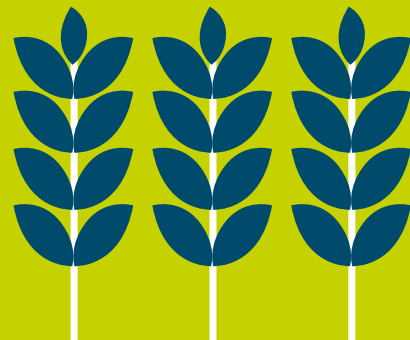
In addition to considering the value of our land we also need to consider on costs for the submission.

Our standard costing methodology comprises a core asset cost derived using models from the Unit Cost Database (UCD),

The on-cost model captures:

- Project design, management and supervision; and
- Ancillary costs, covering; roads, drainage, power supplies, fencing, lighting, security.

As the UCD cost models are built from observed out-turn costs they contain for example all materialised risk, contingencies used, settlement of claims. We make no specific adjustments for additional risk or contingency costs.



<sup>2</sup> Carter Jonas Market Data, Department for Communities and Local Government - Land values estimated for policy appraisal (2015).

# Stage 4

## Consider alternative approaches

### Alternative approaches

We consider that the most appropriate approach to allocating the RCV for bioresources is a ‘focused economic value’ method. In assessing the materiality of the impact from the allocation we have taken a proportional approach to cross checks.

Using the economic valuation method has meant that current and future cost considerations have been used for the basis of allocation where available.

This ensures that the allocation is robust; we are not reliant on historic asset valuations that were last updated in the 2009 price review. We continue to monitor MEAV allocation on a roll forward basis, we have placed greater emphasis on the impacts of the economic valuation method as a cross check. In assessing the impact, we have evaluated against key considerations, including our compliance with charging rules, our obligations under competition law and protection for our customers.

Setting the allocation based on a ‘focused’ economic valuation method will allow bioresource markets to develop whilst protecting customers. It does this by considering the forward-looking revenues for bioresource assets and activities. The forward-looking revenues are important as these reflect what hypothetical entrants would pay for them. This ensures a level playing field within the industry as well as in adjacent external markets such as organic waste treatment. It also maintains consistency between charges and costs, aiding in the transparency of the market.

### Cross checks

Following our analysis we consider that there will be no material impact on wholesale charging structures. We will continue to charge for trade effluent via the Mogden formula and charge domestic customers and non-household retailers for foul sewage services on a measured volumetric/unmeasured rateable value basis.

These tests have been undertaken in isolation from any other drivers of future bill movements, resulting from the implementation of PR19 policies, and the delivery of our own bioresources strategy. We have done this to aid clarity in understanding the impact resulting from this specific policy.

In conclusion, our assessment indicates the shift to the ‘focused’ approach to RCV allocation will not materially impact on customer’s bills and will not impact on our ability to set charges in line with both charging rules and competition law.

We will keep this under review through the business planning process.



# Stage 5



## Supporting information to explain approach

Throughout this document we have provided an explanation of the valuation approach taken and the assumptions made.

### Material Assumptions

The material assumptions that are pertinent to the economic valuations exercise and RCV allocation are summarised in the table below.

Area	Description of the assumption
<b>Locations and capacities</b>	We have assumed all hypothetical new builds assets would be located at the same sites and have the same capacities as the YW sludge assets as at 31 March 2020.
<b>Asset technology</b>	We have assumed all hypothetical new build assets would use the same process technologies, on a like for like basis, including the current configuration of sites, as the YW sludge assets as at 31 March 2020.
<b>Renewable energy incentives</b>	We have assumed the hypothetical new build assets would not be in receipt of renewable energy incentives.
<b>Energy generation</b>	We have assumed the hypothetical new build assets would generate the same level of energy as YW sludge assets as at 31 March 2020, due to their like for like technology, capacities and configuration. In addition, we have assumed there would be no change in the underlying cost of energy imported or price of energy exported.
<b>Operating expenditure</b>	We have assumed the operating costs for hypothetical new build assets would be equal to the operating costs of the YW sludge asset bases as at 31 March 2020.
<b>On costs for project values</b>	We have used our standard costing methodology, with project on-costs being based on observed levels for bioresources assets. We have assumed the level of on-costs associated with hypothetical new build assets would be the same as those we evaluated using our universal approach.
<b>Land values</b>	The valuation of land was based on a desktop assessment aligned to industry best practice. The distribution of primary, secondary and tertiary land values are based on an understanding of the property market, demand and supply. We have not assessed or applied any premium land values.
<b>Processes not used in our assets</b>	As at 31 March 2020 we will not utilise the following process categories across our assets: <ul style="list-style-type: none"><li>• Raw / thickened sludge de-watering using lime;</li><li>• Raw sludge incineration;</li><li>• Secondary digestion; and</li><li>• Digestate incineration.</li></ul>



**03.**

# Next Steps

**This proposal forms part of our business plan submission in September 2018. It covers the period 2020 – 2025. We have outlined the industry timetable below.**

<b>29 September 2017</b>	We submitted our bioresources valuation, RCV allocation and assurance summary and are awaiting feedback from Ofwat.
<b>November 2017</b>	We will be publishing our bioresources initial market data on our website. We welcome contact from interested parties.
<b>January 2018</b>	Ofwat will be providing us with its feedback on our valuation and proposed RCV allocation.
<b>3 September 2018</b>	We will consider the feedback from Ofwat and along with Ofwat's final methodology which is released in December 2017, we will revise the information in our business plans.
<b>July 2019</b>	Ofwat will propose the allocation of the RCV to the bioresources control as part of its draft determination.
<b>December 2019</b>	Ofwat will confirm the allocation of the RCV to the bioresources control as part of the final determination.





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