

16 February 2018

Trust in water

Economic value of bioresources assets – feedback to companies

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About this document

This document sets out feedback to the ten largest water and sewerage companies in England and Wales (companies) on their assessments of the value of their bioresources assets that each company submitted in September 2017.

To provide a level playing field for bioresources trading and processing and to protect customer interests, it is important that a robust and accurate valuation of assets supports the allocation of the wastewater regulatory capital value (RCV) at 31 March 2020 between the network plus and bioresources controls at the 2019 periodic review (PR19).

We expect companies will use this feedback to improve their valuations and proposed RCV allocations that they will submit in their business plans by 3 September 2018.

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1. Introduction

- 1.1 In April 2017 we provided guidance for water and sewerage companies (companies) to assess the economic value of their sludge assets, propose a RCV allocation to the bioresource price control and provide this information to us by 29 September 2017.
- 1.2 This document summarises our feedback to companies, which we expect them to use to improve their valuations and consider the RCV allocation that they propose which they will submit in their business plans by 3 September 2018.
- 1.3 We require a valuation of these assets to set a separate revenue control for bioresources; the 2019 Periodic Review (PR19) is the first time we will do this. Introducing a separate binding revenue control for bioresources will inform, enable and encourage an effective market by revealing improved information.
- 1.4 Companies have proposed that the RCV is allocated on the basis of a detailed valuation taking account of our guidance. Each company has sought independent assurance to help provide confidence in the information they have provided.
- 1.5 Our guidance asked companies to complete a forward looking valuation, which required some exercise of judgement. In places companies have taken inconsistent approaches through varying interpretations of our guidance. Where this is the case our feedback clarifies what we expect companies to do.
- 1.6 Chapter 2 provides a brief background to why we need this information and sets out the five steps of our guidance to companies.
- 1.7 Chapters 3 to 8 each follow one of the five steps of our guidance. The first step of our guidance is considered in both chapters 3 and 6. In each chapter we summarise our guidance, comment on the information that companies submitted and provide feedback.
- 1.8 Chapter 9 sets out next steps that we and companies will take to assess the economic value of their bioresource assets and allocate the wholesale wastewater RCV between the bioresources and wastewater network plus price controls.

2. Background

Why set a separate bioresources control?

- 2.1 Our aim is to promote a greater role for markets in bioresources services, creating opportunities for companies to look beyond traditional company boundaries and their own in-house solutions to meet the long-term needs of customers.
- 2.2 This should deliver increased optimisation of activities across companies and greater participation from firms operating in wider waste markets. This will drive benefits of greater efficiency, improved resilience in services, and broader environmental benefits.
- 2.3 We are setting a separate control for bioresources to bring management focus and transparently delineate activities between bioresources and the rest of the wholesale wastewater activities. A separate control will reveal information that will help us to promote markets.

Why do we need to know the value of bioresources assets?

- 2.4 We use a building blocks approach to setting a price control; calculating the efficient costs companies need to run their business and making sure that customers do not pay more than this. An important building block is the cost of the capital invested in the company, the regulatory capital value (RCV).
- 2.5 We created this regulatory tool shortly after privatisation for the purposes of setting price controls. The RCV reflects the investment shareholders made at privatisation and the additional finance required by companies since that date. The RCV tends to be a lower value than provided by other methods of valuing the assets of water companies.
- 2.6 We currently have a single value for the wastewater RCV that reflects the value of the capital that is invested in all of a company's wastewater assets, including bioresources assets. We need to allocate this RCV between the new bioresources and wastewater network plus price controls that we will set in our 2019 price review. The allocation is only for the purpose of setting price controls and is at a company level rather than site level.

2.7 In **Water 2020: our regulatory approach for water and wastewater services in England and Wales**, May 2016, we set out we will take a focused approach to the allocation of the RCV to the bioresources control. This is where the allocation is based on the value of the assets used. A focused allocation means that the RCV allocated to the bioresources control is not influenced by the historical discount to the RCV at privatisation (i.e. the difference between the value of the RCV and the value of the assets).¹

2.8 We set out the objectives in allocating the RCV in May 2016 as:

- **Ensuring a level playing field for sludge transport, treatment, recycling and disposal** so that third-party service providers have clarity and confidence that they are participating in markets on equal terms with WaSCs.
- **Ensuring a level playing field for wider markets and protecting the interests of wastewater customers where WaSCs are involved.** A WaSC could use assets that exist at 31 March 2020 to offer services to customers outside its existing area or for nonregulated activities. One example is providing organic waste treatment outside the core area of wastewater treatment.
- **Avoiding over-recovery of gains from legacy asset sales/purchases** by WaSCs.
- **Maintaining consistency** between charges and cost recovery.

What did we ask companies to do?

2.9 Our [guidance](#) set out that companies should assess the economic value of their bioresources assets.

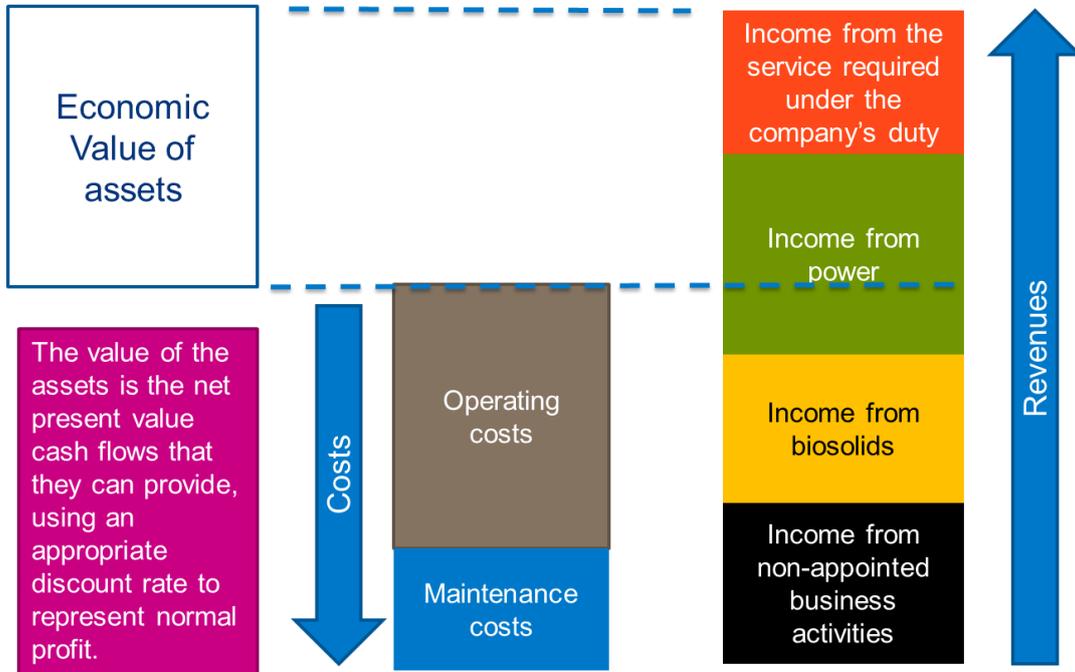
2.10 The value of the sludge assets is not simply that they are part of providing a basis for costing an essential service for protecting public health and the environment, but that they can yield value in energy generation and the ultimate biosolids product.

2.11 The economic value of an asset can be derived from the income less costs (net income) that the asset generates over time, as shown in figure 2.1. This is a forward looking concept that fits well with the development of markets. The

¹¹ The cost of replacing water industry assets with those of similar capabilities – as measured in modern equivalent asset value (MEAV) terms – is materially higher than the RCV. This is because, when the industry was privatised in 1989, the RCV was set based on the companies' market capitalisation after 200 days. Further background to the RCV is set out in [RD 04/10: Regulatory capital values 2010-15](#).

economic value can be calculated as the present value of future net cash flows from the asset by adjusting the net income over time by the return that an investor would require to provide capital.

Figure 2.1 Illustration of the economic value of bioresources assets



2.12 As we set out in our guidance calculating the economic value directly is difficult in practice. In the guidance we therefore set out that companies should value their assets using an alternative approach, which under certain assumptions, can provide equivalent values

2.13 The derivation of the alternative process is set out in detail in appendix 1 of our guidance document. The essential point is that the cost of the assets that a new market entrant would require to provide the same services helps provide a hypothetical local market price for the regulated services the company provides. These assets are called modern equivalent assets.

2.14 We set out a five step process for companies to follow to propose an RCV allocation to the bioresources price control.

Figure 2.2 Process for companies to propose an RCV allocation



2.15 Step 1 is to decide what modern equivalent asset would provide the same service as the current assets. Important decisions are the capacity that the assets need to have and the technology that should be used.

2.16 Step 2 is to estimate the capital cost of the modern equivalent assets that the company has defined. This estimate is the gross modern equivalent asset value (MEAV).

2.17 Step 3 is to adjust the gross MEAV to reflect the current assets. There are three main reasons why adjustments are required:

- The current assets may have different age profiles and remaining economic lives than new modern equivalent assets.
- There may be differences in the maintenance and operating costs of new modern equivalent assets compared to what the existing assets are already delivering.
- There may be different expectations of the external income that could be earned by modern equivalent assets from energy generation and from selling the bioresources end product as opposed to what current assets can receive. By external income we mean income which is in addition to the revenue collected from its wastewater customers.

2.18 The gross MEAV is reduced if current assets have shorter economic lives; or would earn less income; or would cost more to operate than modern equivalent assets. In these cases the current assets have net cash flows that are lower than the modern equivalent assets would have and therefore a lower economic value.

2.19 The opposite is also the case and where current assets have longer economic lives, would earn more income or be cheaper to operate than modern

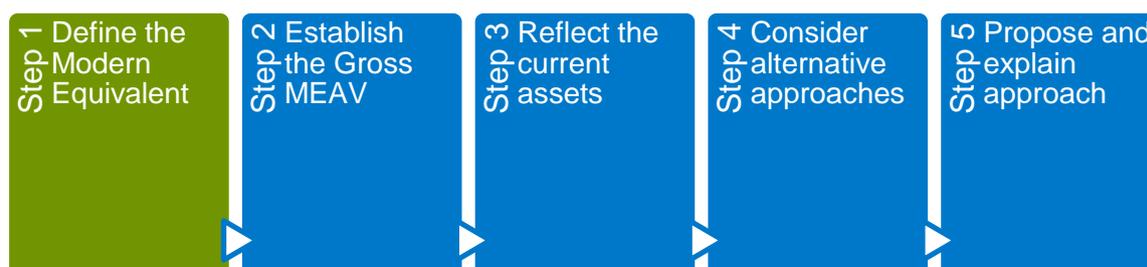
equivalent assets, positive adjustments to increase the gross MEAV are required.

2.20 Step 4 of our guidance is that companies should undertake cross checks to provide assurance that the RCV allocation based on economic value is appropriate and protects customer interests. These included testing if the allocation has an impact on customer bills or on the company's ability to set charges in line with both charging rules and competition law.

2.21 Step 5 is for the company to propose the RCV allocation. Where companies identify an issue with allocating the RCV on the basis of economic value, we ask them to propose an alternative RCV allocation. We expect them to explain how the allocation they propose will protect consumers' interests, including by promoting a level playing field for markets.

3. Step 1: define the modern equivalent asset (capacity)

- 3.1 In this chapter we consider a key assumption that companies made in defining modern equivalent assets that a new market entrant would require to provide the same regulated services, which is the capacity of the modern equivalent.



- 3.2 We will consider a further key assumption, the choice of technology, in chapter 6. This is because the choice of technology depends to a large extent on costs and revenue that are discussed in chapters 4 and 5.
- 3.3 In our guidance we set out that companies should consider what they would put in place based on their own assumptions of what would represent the best economic value for the market they operate without the constraint of the existing bioresources assets on the site.
- 3.4 While the modern equivalent assets must provide the same services as the existing assets, they do not need to be in precisely the same location and can be assumed not to have the existing local constraints that arise from historical investment decisions. To reduce complexity and judgement, we asked companies to start by considering modern equivalent assets as close as possible to their actual assets.
- 3.5 It is important that companies exercise judgement to identify when it is appropriate to diverge from the constraints of their actual sites. The modern equivalent asset is required to be realistic for the local market circumstances – in other words how a third party would provide efficient services. Unnecessary constraints of a particular site that are driven by past investment decisions should be relaxed if they are significant and unlikely to be faced by a third party.

Capacity

Key considerations

- 3.6 Capacity is a key assumption in the definition of the modern equivalent asset as it will have a direct impact on the cost of new assets and therefore on the resulting economic value.
- 3.7 There are a number of options to how companies might define the capacity of a modern equivalent asset. These range from the lowest possible capacity required to treat the expected throughput of bioresources to the maximum capacity of the current assets, whether they expect to use the capacity or not.
- 3.8 We asked companies to define modern equivalent assets with a capacity that was the same as the potentially useful capacity that they expect current assets to have at 31 March 2020. This is because how assets are used in the future may change, indeed the purpose of introducing a separate price control is to support a greater role for markets in bioresources services so that services can be optimised across the sector.
- 3.9 We expect capacity that is not useful and has no economic value to be excluded from this. This includes mothballed incinerator sites that are not expected to be used under any circumstance.
- 3.10 Company practice may affect the capacity of an asset, both in terms of the resilience required and the way assets are operated.
- 3.11 To provide a **resilient service**, companies may choose to maintain headroom between the volume of bioresource they expect to treat annually and the theoretical capacity of their assets. Volumes treated at bioresource treatment centres over a year are not constant week by week. Seasonal variations of production may occur due to factors such as temporary changes in population from tourism, natural variation in wastewater treatment processes. And for some companies variations in treatment capacity reflect the inability to dewater bioresources to the same extent in winter. Companies may also need to have spare capacity to manage both planned and unplanned maintenance. Companies could provide this headroom through contracts with third parties, spare capacity across a number of different sites or even dedicated assets.
- 3.12 Company **operation of assets** can also affect the capacity that is available from it. The main treatment process for the majority of bioresources is to keep it

in large tanks to allow biological processes to make it safe – primary anaerobic digestion. How long it is kept in those tanks will directly affect capacity. This is normally around 15 days, but, according to company data, ranges from 9 to 24 days. A site that retains bioresources in tanks for 24 days will have less than half of the capacity of a similar sized digester that retains bioresources for 9 days.

- 3.13 We checked that all companies' definitions of modern equivalent assets included all potentially useful capacity.

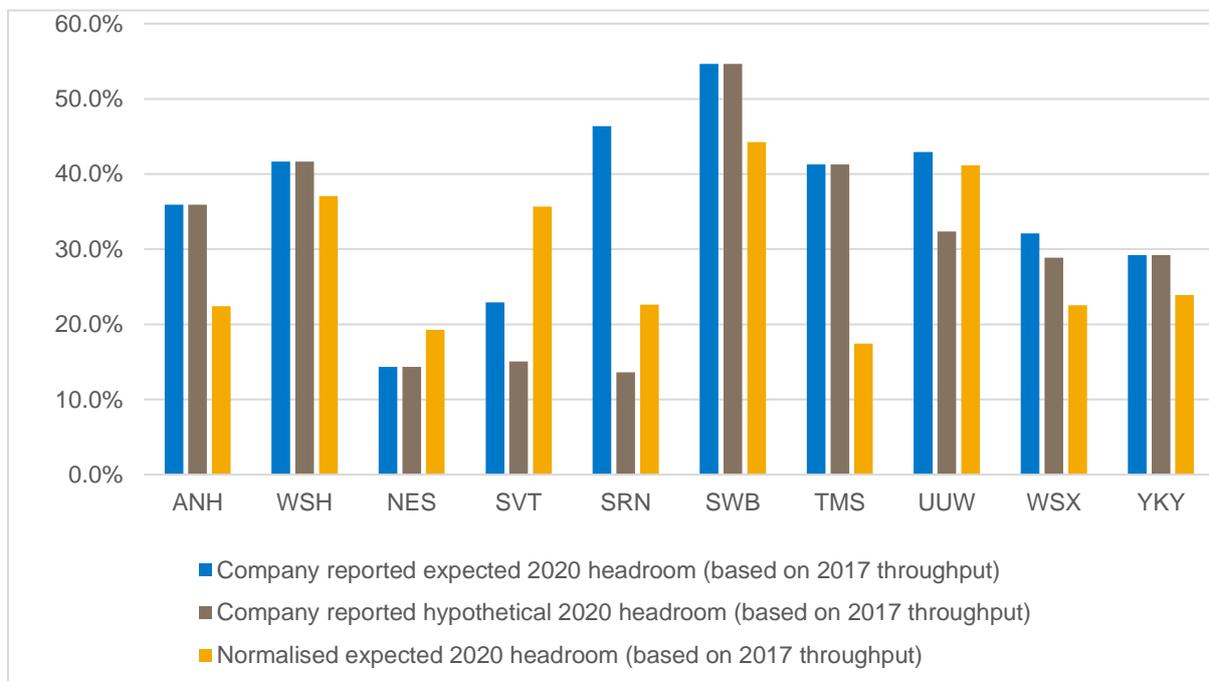
Observations on capacity

- 3.14 Three companies, Southern Water, Severn Trent Water and United Utilities proposed that the hypothetical capacity that they value should be less than the actual capacity they expect to have at 2020. In addition Wessex Water did not include a site that it does not expect to normally use, but that it will keep for resilience purposes.
- 3.15 As well as considering the capacity reported by companies, to assist comparisons we have normalised the capacity across companies. As set out above certain assets may have different assumed capacities depending on company practice. Assets that are most affected are digestion tanks and we have normalised capacity to adjust for the differences in how long companies retain bioresources in treatment. We have also normalised capacity to adjust for different approaches by companies to required headroom.
- 3.16 We have normalised capacity by calculating the capacity that companies would have if they retain bioresources in primary digestion for 15 days. We reduced capacity by 15% to reflect the required headroom to cover all other factors. We have used the same approach for both advanced and conventional digestion. We found no clear difference across the sector in hydraulic retention and required headroom between these different technologies, even though we would expect the retention time for advanced digestion to be shorter. For liming we have allowed a 15% required headroom factor. We have not adjusted for any other factor. We do not suggest the assumptions we have made should be taken as a standard. Each company should keep its own design and operational assumptions under review.
- 3.17 In figure 3.1 we present the percentage of additional headroom. These calculations are based on both the capacities companies reported and the normalised capacity. By additional headroom we mean headroom in addition to

the required headroom that companies include in their design assumptions or included in our normalised capacity.

3.18 To produce figure 3.1 we have used the throughput that companies reported in annual performance reports for 2016-17. Strictly we could use the expected throughput at 2020 to calculate utilised capacity. However the reported figures for 2016-17 are the most robust comparable figures that we have on the bioresources that companies treat in a year. We calculated excess headroom as the additional capacity available above the throughput volume. This is presented as a percentage of the throughput volume.

Figure 3.1 Comparison of additional headroom of expected assets at 2020 compared to company proposed hypothetical assets using information on utilised capacity from 2016-17.



3.19 There is significant headroom across the industry. We accept some variation in headroom may reflect requirements of dispersed populations which may have remote assets and so less flexibility to economically transport bioresources to different sites. We consider the four companies that propose to value modern equivalent assets that have a lower capacity than the capacity of their actual assets are not clear outliers against the rest of the sector. This is either on each companies' assessment of actual headroom, or on our normalised basis.

3.20 Defining the modern equivalent with a lower capacity than actual assets implicitly carries the judgement that the excluded capacity has no economic

value. The four companies that have excluded capacity (Southern Water, Severn Trent Water, United Utilities and Wessex Water) have not provided compelling evidence that their capacity should be treated differently to other companies. We therefore consider that companies should value the capacity of all assets they anticipate may be used to provide bioresource services.

Feedback on capacity

- 3.21 Our guidance set out that companies should consider the economic value of all their capacity at 2020. We expect that all companies will value modern equivalent assets with the same capacity as their expected actual assets at 2020. This excludes assets that are not expected to be used in any circumstance and therefore have no economic value.
- 3.22 Our guidance allows companies to ascribe varying levels of value to the capacity of different assets. In practice no company has done this, and to do so would be overly complicated. Companies have either ascribed the same value to capacity or no value. For simplicity, we recommend that companies ascribe the same value to all potentially useful capacity by including it in the definition of the modern equivalent.
- 3.23 Assets that are not expected to be used in any circumstance, for example unused sludge lagoons or mothballed incinerators, should remain in the network plus business.
- 3.24 We expect companies to value modern equivalent assets that are retained purely for resilience purposes. We see no distinction between required headroom maintained across a number of assets for resilience purposes and a single site being retained solely to provide resilience. We consider that the extra capacity has value from the resilience that it provides.

4. Step 2 – Establish the gross modern equivalent asset value

4.1 Step 2 is to estimate the costs of building modern equivalent assets defined in step 1.



4.2 We would expect some similarity between companies' estimates of gross value for similar assets. Key differences will occur because of the capacity of assets, the particular technology used and, to a lesser extent, company factors such as regional costs.

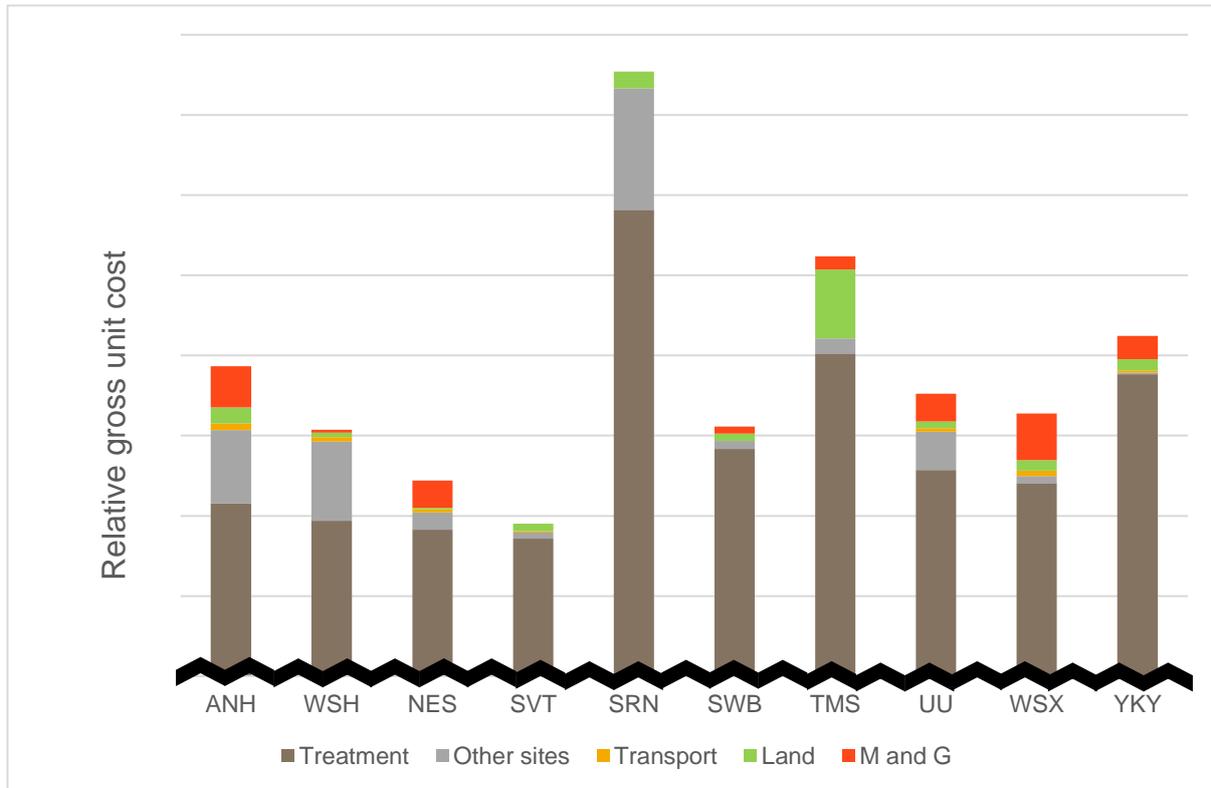
4.3 Bioresource treatment centres make up more than 75% of the value of modern equivalent assets. We have compared company assumptions on the costs of treatment centres by calculating unit costs using the normalised capacities that we used in assessing step 1. We have differentiated between the types of technology used.

4.4 We have also reviewed other company assumptions which can be significant cost drivers such as land and management and general costs.

Observations on gross MEAV

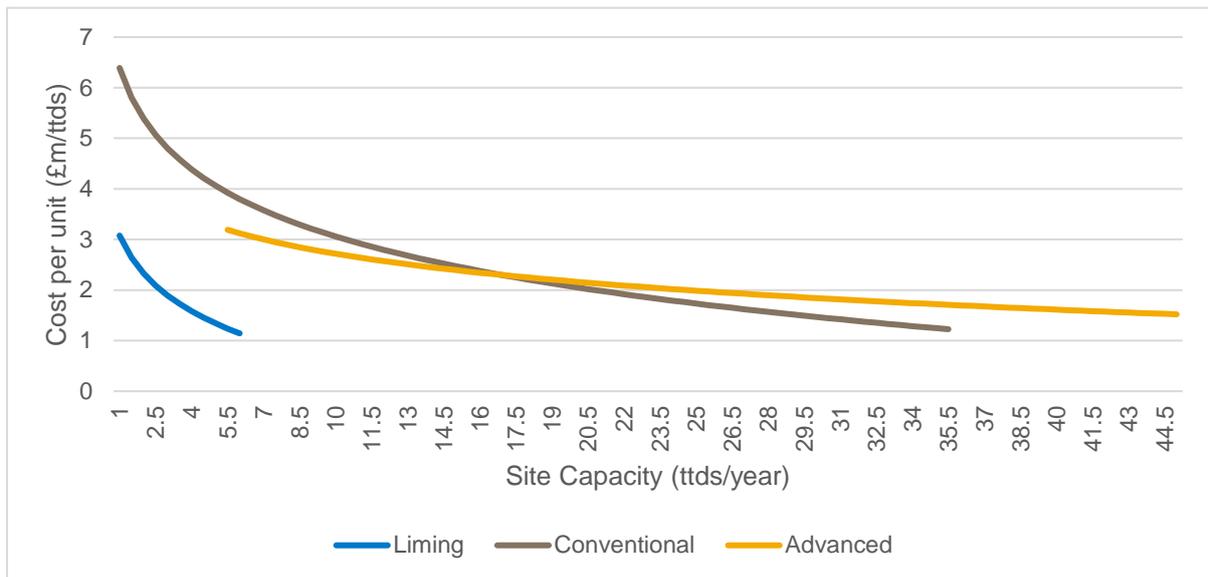
4.5 Figure 4.1 compares companies' modern equivalent costs per unit of normalised capacity.

Figure 4.1 Relative capital cost of modern equivalent assets per unit of normalised capacity



4.6 We have compared the capital costs for the three main bioresource treatment technologies: liming; conventional digestion; and advanced digestion, based on data supplied by the companies. Advanced digestion processes use a pre-treatment which typically allows greater biogas generation from digestion, higher quality resulting biosolids, and often a reduced volume of treated biosolids to recycle. Using such pre-treatment can also provide pathogen reduction meaning that secondary digestion is then not required to meet microbiological standards.

Figure 4.2 Comparison of average capital costs for three treatment technologies for different capacities of treatment centres.

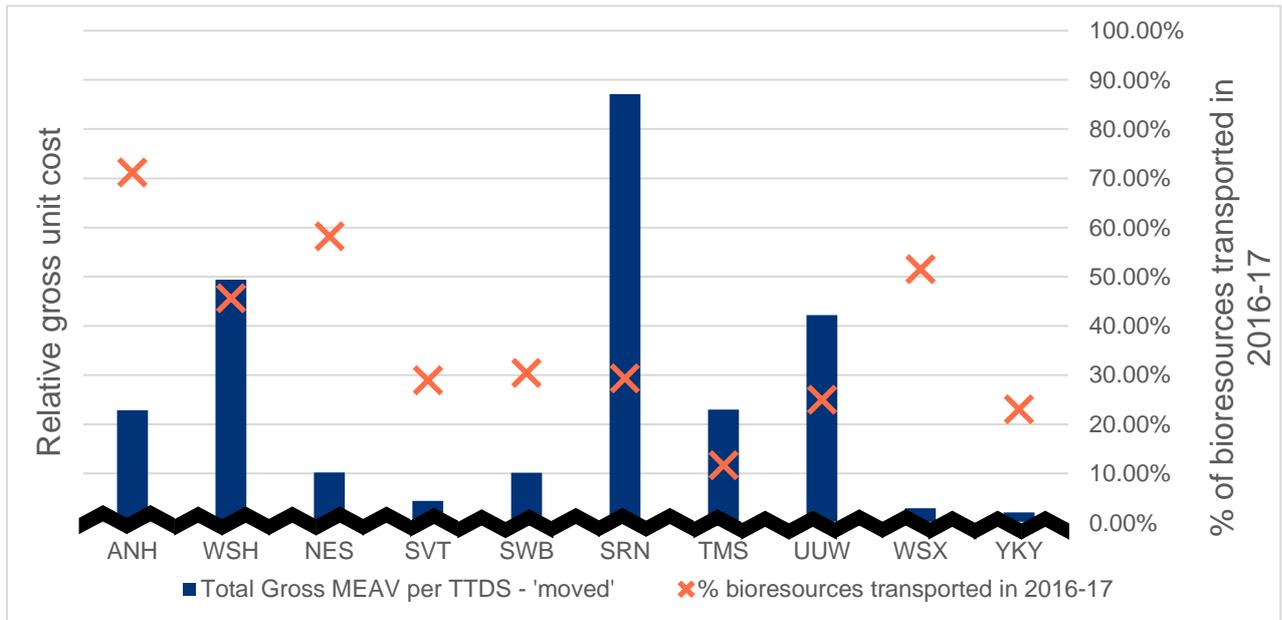


- 4.7 As expected, liming has the lowest capital costs. We expected that the capital costs for advanced digestion would be higher than conventional digestion, but this is not always the case. When outlier sites are removed the two curves converge. It may be that the extra costs of the pre-treatment for advanced digestion is offset by the reduced costs of not needing secondary digestion that is typically required for conventional digestion. The cost of land, is not taken into account in figure 4.2.
- 4.8 Overall, it appears that there is little difference between the capital costs of conventional and advanced digestion treatment technologies. We remain cautious of this result as it could be influenced by company and site specific factors. We note that, when considering whether to implement advanced technologies at a conventional digestion site, most companies' decisions will be influenced by sunk costs on site, such as secondary digestion assets.
- 4.9 We provide further details of gross costs of treatment in the [accompanying spreadsheet](#) to this report.
- 4.10 As well as reporting modern equivalent costs of treatment sites we also asked companies to specify the costs of any other sites used by the bioresource business unit that are not used for treatment of bioresources. The majority of these other sites are intermediate thickening sites. Companies have more than 6,000 wastewater treatment sites, but fewer than 200 sites that treat bioresources. When transporting bioresources over large distances,

intermediate sites can be used to thicken bioresources to reduce the volume carried. The modern equivalent asset capital costs of other sites are less than 10% of gross costs across the industry. But for companies with large rural areas these sites can account for up to a third of gross costs.

4.11 We have compared the capital costs of other sites per unit of bioresources transported, to reflect that intermediate sites are likely to be linked to the transportation of bioresources. We would expect the unit cost to be similar between companies. However, there are large differences between companies' unit capital costs. We note that not all other site costs will be intermediate thickening sites and not all of the bioresource that is moved is thickened at an intermediate site. However, it suggests that there is variation in the capital costs companies have assumed for intermediate thickening sites that is not explained by how rural companies are.

Figure 4.3 Relative unit cost of gross capital costs of other sites per unit bioresources transported in 2016-17



4.12 There are large differences between management and general costs across companies. These costs include the allocations of shared assets within the overall wastewater business to particular bioresources sites. Often bioresource sites are co-located with wastewater treatment sites and therefore share assets such as power connections to the grid. For most companies management and general costs make up less than 5% of the economic valuation. For United Utilities and Wessex Water these assets make up over 10% of the economic

valuation. These two companies did not provide us with compelling reasons why their management and general costs are so large.

- 4.13 Anglian Water considers it is inconsistent with the regulatory accounting guidelines (RAGs) if the RCV allocation reflects shared assets where the bioresources business unit is not the principal user. The RAGs ask companies to report assets by business unit on a principal use basis. An operating charge is made to other business units that use the assets. Wastewater network plus is likely to be the principal user of most assets shared with bioresources. Therefore if the bioresources RCV reflects a proportion of these shared assets and the bioresource business unit also pays an operating cost to the network plus business unit, the same costs would be reflected twice.
- 4.14 There is a variation in the values companies have assumed for land. Companies provided reasonable evidence to support this.

Feedback on gross MEAV

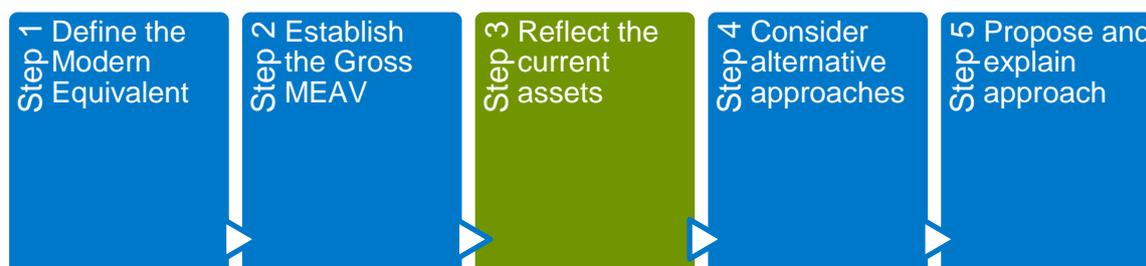
- 4.15 All companies should consider the information we are publishing and test the assumptions they have made on gross costs.
- 4.16 We will consider further Anglian Water's view that shared assets, where the bioresources business unit is not the principal user, should not be included in the economic valuation. We expect all companies to identify a proportional allocation of the capital value of shared assets where the bioresource business unit is not the principal user. We will amend business plan table WWS12 to allow companies to report this information. We discuss amendments to WWS12 further in paragraph 5.73.
- 4.17 Companies should consider whether the proportional allocation of shared assets is reasonable, especially if the cost of shared assets are greater than 5% of their overall valuation. We expect companies to provide independent assurance on their allocation of shared assets if they account for more than 5% of the economic value of bioresource assets.
- 4.18 As set out in paragraph 8.8 all companies should take a view as to whether the RCV allocation should include or exclude a valuation of shared assets. Companies should comment on whether they consider the approach they suggest would lead to double counting on costs within the bioresources business unit, and if so to what extent, on the basis of the current regulatory accounting guidelines. We will consider company business plan submissions

and will propose a consistent approach in our PR19 draft determinations. As long as a company has provided appropriate reasoning, companies' inclusion (or exclusion) of a proportionate allocation of shared assets will not negatively affect our initial assessment of plans.

- 4.19 Where significant costs are driven by the specific nature of a site that a third party would not face, these constraints should be relaxed in producing an estimate of the cost of the modern equivalent. If site costs appear atypical compared to industry data, we expect companies to provide business plan commentary on whether there are site specific factors driving costs.

5. Step 3 – Reflect the current assets

5.1 Step 3 is to make adjustments to reflect the differences between current and modern equivalent assets.



5.2 There are three main reasons why adjustments to gross modern equivalent asset values are required.

- The current assets may have different age profiles and remaining economic lives than new modern equivalent assets.
- There may be differences in the maintenance and operating costs of new modern equivalent assets compared to existing assets.
- There may be different expectations of external income that could be generated by modern equivalent assets compared to current assets. By external income we mean income which is in addition to the revenue collected from its wastewater customers such as income from energy generation and selling bioresources end products.

5.3 The gross MEAV is reduced if current assets have shorter economic lives; or would earn less income; or would cost more to operate than modern equivalent assets. In these cases the current assets have net cash flows that are lower than the modern equivalent assets would have and therefore a lower economic value.

5.4 The gross MEAV is increased where current assets have longer economic lives, would earn more income or be cheaper to operate.

5.5 This chapter considers each of the reasons for adjustments to asset values:

- asset lives;
- external income from bioresources; and
- operating and maintenance costs;

5.6 Each section considers what companies submitted and then provides feedback. The chapter then updates our guidance on how companies should calculate adjustments.

Asset lives

5.7 Companies' existing assets may have different service lives to modern equivalent assets. In our guidance we stated that companies should adjust the capital value of modern equivalent assets to reflect the different time period over which the actual assets and modern equivalents will deliver value.

5.8 We asked companies to split information between 16 different processes in the information they provided to us.

5.9 How companies compare actual and modern equivalent assets can have a significant impact on the adjustment. Processes on a site tend to have different lives. If companies calculate the average age of the entire site and make an adjustment on this basis it will give a less accurate asset life adjustment than if they calculate asset lives for each process. Processes in turn are made up of different components and companies can therefore consider life at even more granular levels than the 16 processes we requested.

5.10 We asked companies to make the asset life adjustment at the lowest level at which they can derive equivalent robust information for actual assets and the modern equivalent assets.

Observations on asset lives

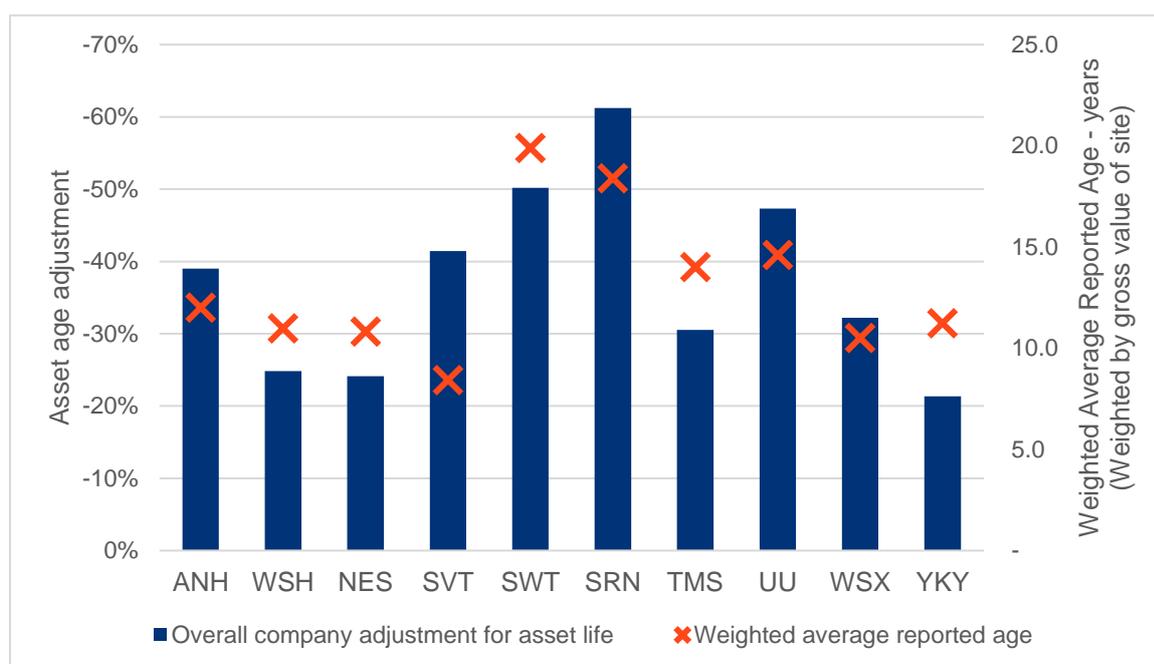
5.11 In this section we first compare the overall adjustments that companies have made to reflect asset age and then consider the assumptions that companies have made in calculating these adjustments. These are principally company assumptions on modern equivalent asset lives and the remaining economic life of existing assets.

5.12 At a high level, company asset life adjustments are broadly in line with our expectations. However, our confidence is reduced as there is considerable variation in companies' underlying assumptions that are unexplained.

5.13 Average age is a useful comparator because it requires less judgement than either the expected life of modern equivalent assets or the remaining life of

actual assets. As we have observed, we expect companies with older assets to have larger adjustments. This gives us some confidence in company adjustments.

Figure 5.1 Comparison of adjustment for asset life compared to weighted average reported age of assets at 2020



5.14 While at a high level company adjustments appear reasonable, the approaches and assumptions companies have used in calculating these adjustments vary considerably.

5.15 All companies stated they had followed our recommended approach to making adjustments. Companies applied the information at different levels of granularity. Some companies did not have confidence they could allocate information between the 16 processes we set out and completed the adjustments at a site level. Some completed it at the process level and others used more granular information.

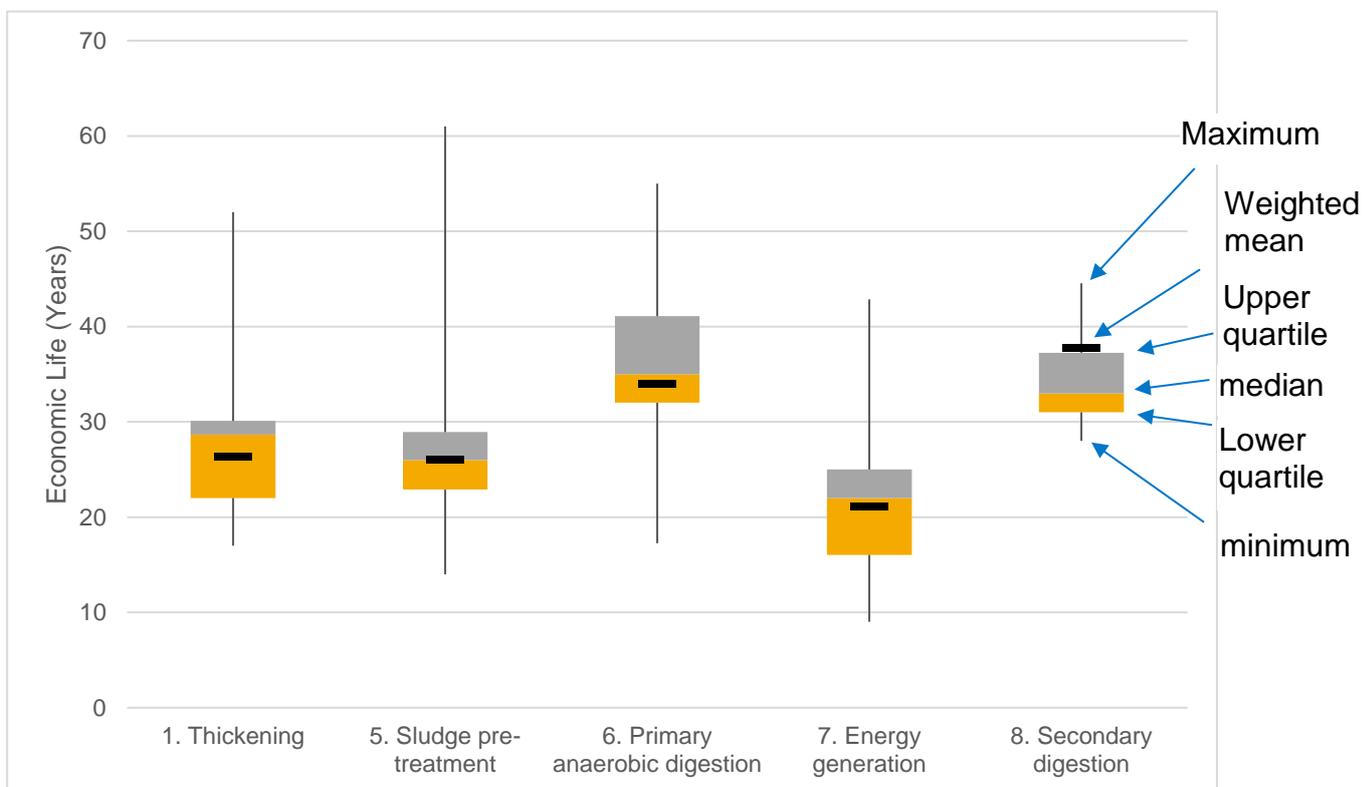
5.16 Company expectations of modern equivalent asset age are derived from their internal bottom-up systems. It appears that these are largely influenced by the proportion of a site classed as civil structures (long life) as opposed to mechanical or electrical systems (short life).

5.17 The variation between companies is significant and more than we expected for what we assume are similar assets built at the same time. Figure 5.2 shows the

variation between different companies for five of the key processes. Further information is provided in the [supporting spreadsheet](#).

5.18 While anonymising each company's data, we have illustrated the variation in asset lives using box and whisker charts. For each process we have ordered the asset lives in ascending order and identified the lowest (minimum) value, the median (middle) value, the lower and upper quartile and the highest (maximum) value. We have also calculated the mean value by weighting asset lives by each site's gross capital cost. Sites with higher gross capital costs have a larger impact on this average.

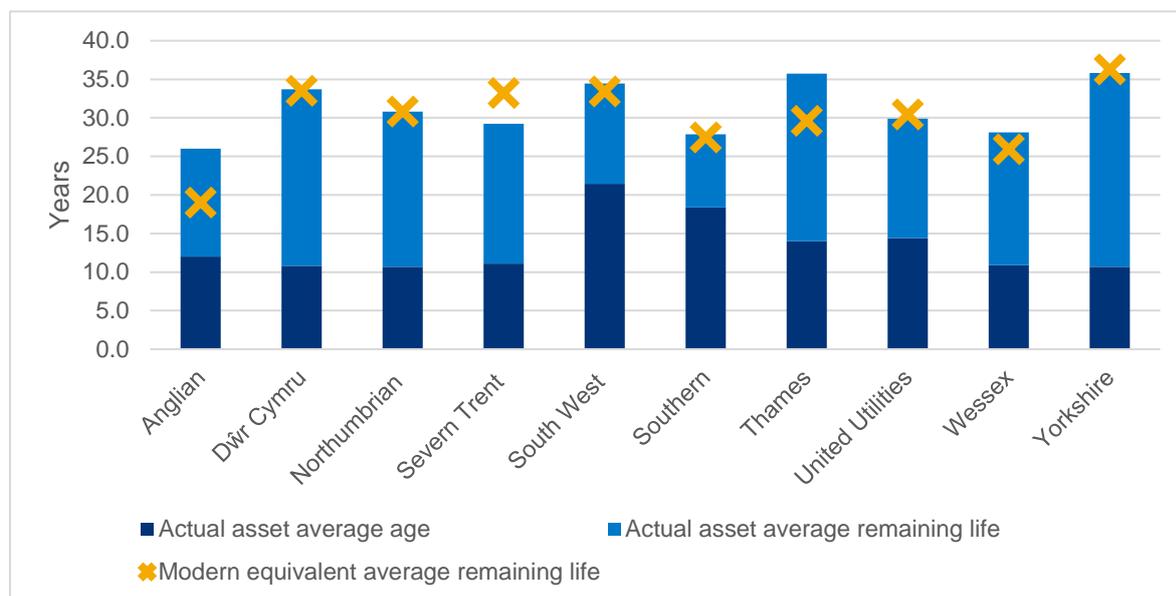
Figure 5.2 Distribution of reported modern equivalent life by process (box and whiskers chart with added weighted mean life)



5.19 We had expected that differences between the lengths of asset life would be due to the trade off with cost. For instance a company might be willing to incur a higher capital costs for a longer asset life or pay less for an asset that would not last as long. However, we could not find any relationship between cost and asset life.

5.20 The other piece of information required to make an adjustment is the remaining life of actual assets.

- 5.21 Three companies (Dŵr Cymru, Northumbrian Water and Yorkshire Water) assumed that, where their actual assets were similar to the modern equivalent asset, then they would have the same overall asset life. The remaining life was therefore provided by subtracting existing asset age.
- 5.22 Companies have used different definitions of asset age. Some companies count age since first installation, whereas other companies count age since the last major refurbishment. There are also cases of companies including assets in the average of asset lives that they do not expect to use to deliver bioresource services at any point in the future. An example are sludge lagoons, which have long lives and therefore increase the average life of assets.
- 5.23 Anglian Water and Wessex Water started with a similar approach (modern equivalent life less actual asset age), but adjusted the results based on expert judgement. Southern Water also stated with a similar approach and made adjustments to asset life, but in a way we did not expect. We expected companies to reduce the number of years of remaining life for assets in a poor condition and increase the life for assets with better than expected condition. Instead Southern Water made a percentage change to the value of the asset. This is a less transparent approach and makes comparisons between companies more difficult.
- 5.24 United Utilities and South West Water used asset management systems to assess asset life and Severn Trent and Thames Water used values based on the remaining accounting life of their assets.
- 5.25 Figure 5.3 compares actual and modern equivalent average asset lives. We have weighted asset lives by the capital value of modern equivalent assets, as the adjustment for asset life is applied in proportion to the capital value.

Figure 5.3 Average asset lives of modern equivalent and actual treatment centres

Feedback on asset life

- 5.26 Companies should reconsider if their reported modern equivalent asset lives are realistic in the context of their RCV valuation. In particular if site specific aspects are unduly affecting modern equivalent asset lives the company should consider relaxing these constraints. For consistency, if a company makes changes to its asset life it should also consider if it should change its assumptions on cost.
- 5.27 Companies should consider if it is practicable to cross check remaining lives of existing assets against information on asset condition/serviceability. If companies make adjustments based on asset condition/serviceability then they should adjust the remaining life in direct proportion to asset condition/serviceability. For example if a company considers that the condition of a particular asset is worse than normally expected and likely to reduce the economic life of the asset by a quarter, it should reduce the assumed life by a quarter.
- 5.28 We expect that companies will only base their asset age adjustment on assets they expect to use after 2020. We expect this to include all assets that provide resilience. Assets that are not reflected in the modern equivalent assets, such as unused sludge lagoons, should not affect the adjustment for asset life.

- 5.29 We expect companies to calculate asset age as the time since the last substantial change to the asset. For example when the accounting net value increased by more than 50% following capital works.
- 5.30 We expect companies to seek independent assurance regarding their adjustments to reflect asset life, including the underlying assumptions made on both actual asset remaining life and modern equivalent life.
- 5.31 Further feedback on the discount rate to use in the recommended calculation is set out in the last section of the chapter.

External income from bioresources treatment activities

- 5.32 Companies can earn income by generating renewable energy and selling the biosolids produced for fertiliser. Companies are therefore able to gain income which off-sets the cost to customers of treating bioresources.
- 5.33 Many bioresources treatment sites generate a source of renewable energy, biogas, through the process of anaerobic digestion. Biogas can be cleaned up and injected into the national gas grid, or it can be burned in combined heat and power (CHP) engines to produce both heat and electricity. Companies can either sell the energy or use it on the bioresources treatment site or on a co-located network plus site. Much of the energy production attracts renewable energy incentives.

Key considerations

- 5.34 If companies installed CHP engines to generate electricity from biogas before 1 April 2017 they receive income from renewable obligation certificates (ROCs). This income is typically guaranteed for 20 years from the commissioning date of the CHP assets. While companies can no longer receive income from ROCs for new assets, there are other renewable incentives available to companies. One incentive is the renewable heat incentive (RHI) for injecting biogas into the national grid.
- 5.35 It is not clear what renewable energy incentives will be available for new assets from 31 March 2020. Companies have therefore made judgements on the incentives they would receive.
- 5.36 To compare companies that might make use of energy in different ways, we asked companies to include the value of energy as income whether used by the

bioresources business unit, used by a different business unit within the regulated business or sold outside the regulated business.

Observations on external income

- 5.37 All companies receive a benefit from generating electricity or producing biogas.
- 5.38 Where companies expect to sell energy to the national grid they have used the export price. It was not always clear how companies had valued energy that it used itself. Generally companies used the average import price for the value of energy “sold” to any co-located sewage treatment works or used on bioresources sites.
- 5.39 The impact of income from renewable incentives is marked and is likely to be a significant driver of economic value.
- 5.40 Companies have taken different approaches to their assumptions about future income from renewable incentives. Some companies assumed that there will be no income from incentives for new modern equivalent assets; some assumed ROCs reduce and RHI continues; some assumed ROCs and RHI continue at the same rate for 20 years; and some assumed there will be a new incentive regime for the hypothetical assets that will replace ROCs, giving an equivalent income to that enjoyed by the company’s current assets.
- 5.41 Companies can also receive income from the sale of treated biosolids when they are recycled to agricultural land. For all companies this is not significant compared to the income from energy. Income also varies between companies depending on the treatment technology used and the demand from agriculture.

Figure 5.4 Relative annual average income per unit of throughput for modern equivalent and actual STCs, excluding the impact of renewable energy incentives

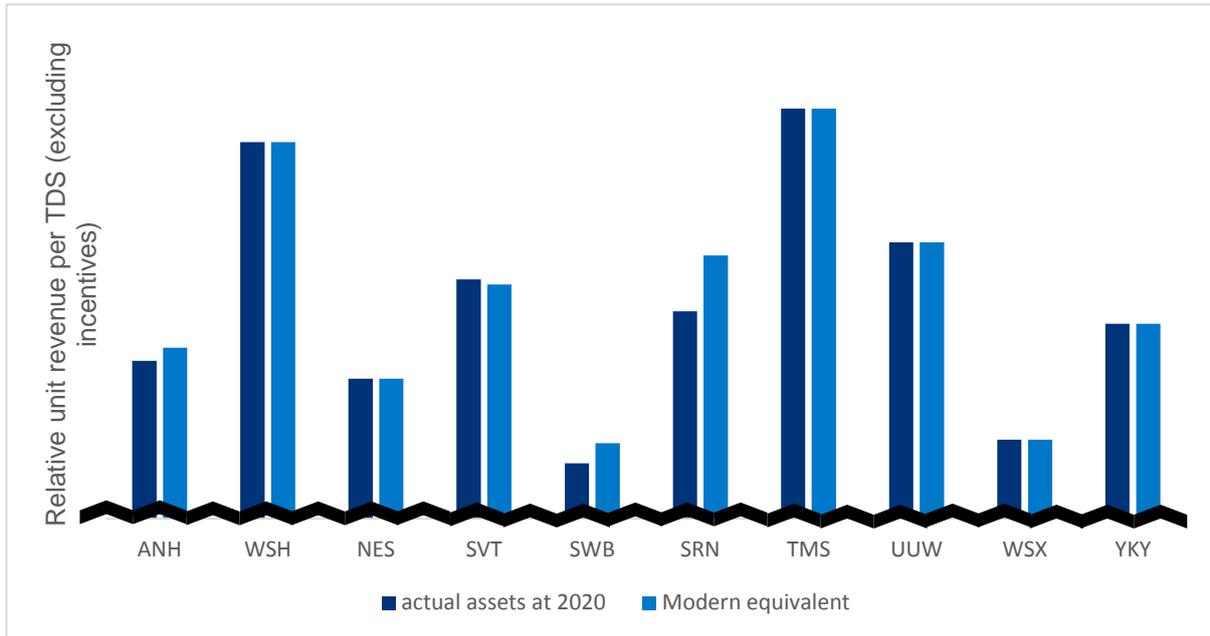
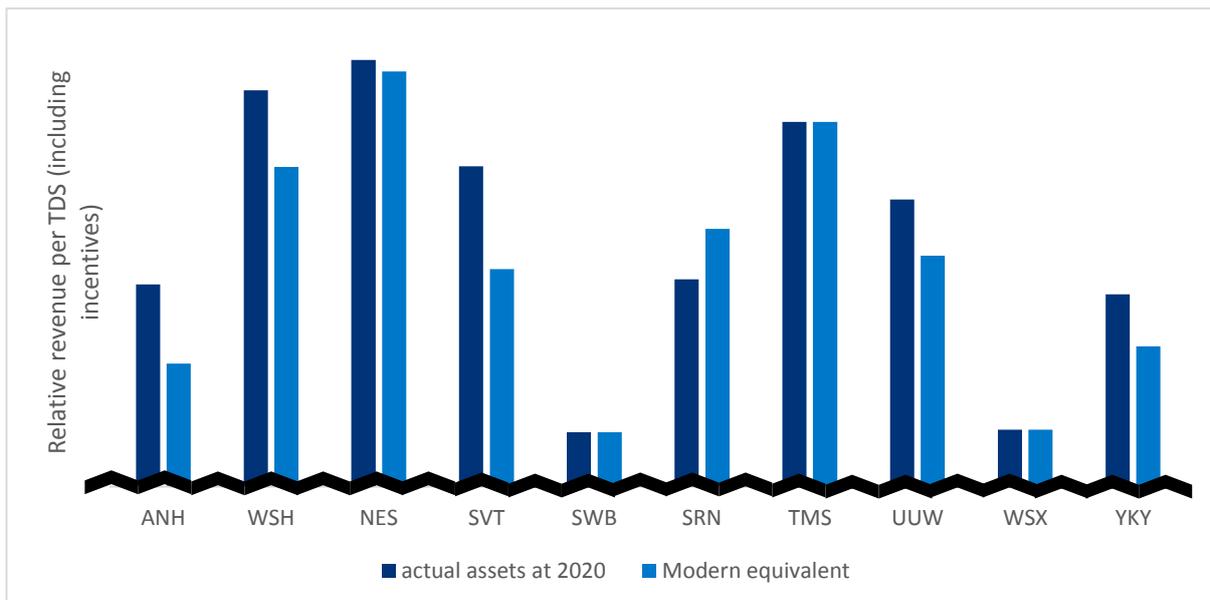


Figure 5.5 Relative average income per unit of throughput for modern equivalent and actual STCs, including income from renewable energy incentives



Feedback on external income

- 5.42 We expect companies to base the incentives available for existing assets and modern equivalent assets at 2020, according to what is set out at 30 April 2018. This includes what the government may indicate will apply at 2020 and companies should assume that the government will enact any commitments made by this date. Companies should consider the full range of incentives that may be available for modern equivalent assets.
- 5.43 We expect companies to assess the renewable incentives that they will receive for actual assets from 2020.
- 5.44 We expect companies to make a separate assessment of the available incentives for new modern equivalent assets.
- 5.45 If incentives are available for actual assets, but not for the modern equivalent, then this will lead to an upwards adjustment to the valuation.
- 5.46 For example, modern equivalent assets built at 2020 will not receive income from ROCs. If a company currently receives ROCs at a site, but the modern equivalent asset would not receive income from renewable incentives, we expect the company to make an upwards adjustment. It is important to make this adjustment to reflect the value that the actual assets have from receiving a cash flow that a modern equivalent asset would not receive.
- 5.47 To aid consistency, we expect all companies to use their average import price for the value of the energy generated and used by the appointed business, whether it is used on a bioresources site or “sold” to any co-located wastewater treatment works.
- 5.48 This may mean that a company assesses the value of the energy “sold” to the network plus wastewater treatment works is greater than the value it could achieve for electricity on the open market.
- 5.49 We expect all companies will use the actual export price for the value of energy sold to National Grid.
- 5.50 Further feedback on how to make the adjustment is set out in the last section of the chapter.

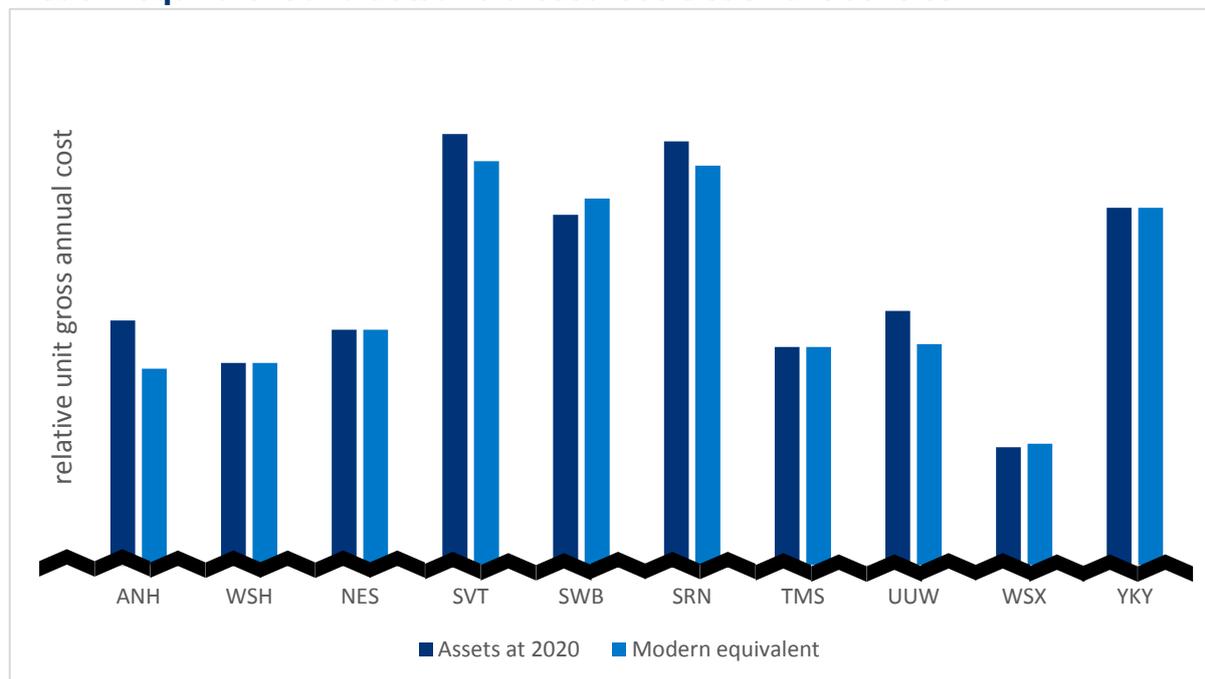
Annual costs

- 5.51 We asked companies to provide information about expected gross annual average costs of their bioresources treatment centres from 2020 and the gross annual average costs of modern equivalent assets. We expected companies to consider both average annual operating and capital maintenance costs.
- 5.52 We also asked for actual costs for two years, 2015-16 and 2016-17. Capital maintenance costs for a particular year are unlikely to be exactly the same as the annual average. Therefore we requested that actual costs should exclude capital maintenance costs.
- 5.53 While it is only the difference between the annual costs of companies' actual and modern equivalent assets that is important for valuation purposes, we asked for cost information on all sites to assist comparisons.
- 5.54 Annual costs need to reflect the value of electricity used by the bioresources site, even if the electricity is generated on site. This allows comparisons between different sites that may have different arrangements for using or selling generated energy.

Observations on annual costs

- 5.55 In general it was not clear to us if companies had considered whether there were likely to be differences in forecast capital maintenance costs between actual and modern equivalent assets over the remaining life of their assets. This may explain some of the variation in unit costs between companies.
- 5.56 Two companies, Anglian Water and United Utilities, noted that they expected modern equivalent assets would have lower costs of disposal than actual assets and had reflected this in their valuations.

Figure 5.6 Relative average annual cost per unit of bioresource throughput for modern equivalent and actual bioresources treatment centres



Feedback on annual costs

- 5.57 We expect all companies to consider if capital maintenance costs are likely to be different between actual and modern equivalent assets.
- 5.58 We expect companies to make adjustments for non-sites costs, such as disposal costs, where companies consider that there would be significant differences between the costs of actual and modern equivalent assets.
- 5.59 We expect all companies to use their average import price to value electricity that they use to operate bioresources sites even if they generate it themselves. Companies should not calculate the cost of the heat generated by CHP engines which they may use to heat the digestion process.

Calculation of adjustments

- 5.60 Companies should adjust the gross modern equivalent asset value to reflect the differences they have identified between actual and modern equivalent assets. The adjustment should reflect the period over which the differences in costs

and income would be expected to occur; normally the remaining life of actual assets.

- 5.61 The value of money is not constant over time; receiving a payment at some time in the future normally has less value than receiving a payment today. Companies used present value calculations to take account of the time value of money.
- 5.62 Our guidance asked all companies to use the real cost of capital from the 2014 Price Review for the purposes of this exercise and to provide a valuation in 2016-17 retail price index (RPI) financial year average prices.

Observations on calculations

- 5.63 As set out in the preceding sections some companies assumed that there would be no difference between the costs and income of the actual assets and their modern equivalent assets. If actual assets and modern equivalent assets have the same costs and income no adjustment to the gross modern equivalent asset value is required.
- 5.64 We asked all companies for further details of their calculations at a site level. Some companies calculated the adjustment for costs and energy generation using a different time period than the remaining life of the assets they had stated in their submissions. Most companies that identified differences used the excel formula “PV” to calculate the adjustment.
- 5.65 Anglian Water explained that in addition to the differences in costs it had reported at a treatment site level it had also identified consequential impacts in disposal costs. We only requested detailed information for treatment sites and so it had not reported these differences in the costs it reported. It did however include these cost differences in adjusting the gross MEAV.
- 5.66 One company had originally assumed that the costs for power would increase by more than other costs over time. It later changed its approach. One of the issues that led to this change was a concern over the appropriate discount rate to use in this situation.

Feedback on calculations

- 5.67 The RCV will be allocated between the network plus and bioresource price controls as a midnight adjustment as at 31 March 2020, however, the business plan tables require companies to report RCV allocations in the business plan tables in 2017-18 year end prices. As the price controls will switch to CPIH indexation from 1 April 2020, adjustments for inflation should reflect RPI until 31 March 2020 and CPIH from 1 April 2020.
- 5.68 Present value calculations require a discount rate. If companies carry out calculations in nominal terms then the nominal wholesale weighted average cost of capital should be used as a discount rate. If companies work in real terms, then we would expect companies to use the real wholesale weighted average costs of capital on a CPIH basis as a discount rate. The cost and revenue streams are from 1 April 2020 and we consider that that the appropriate indexation to use is CPIH. Our early view, in our PR19 methodology, is that the nominal wholesale WACC is 5.37% and the real wholesale WACC on a CPIH basis is 3.3%, assuming a long term CPIH of 2%. This replaces the guidance we provided for the September 2017 submission.
- 5.69 We consider it acceptable for companies to complete present value calculations using a constant real average annual cost or revenue. Attempts to forecast changes in costs over time (real price effects) may be spurious, especially in the longer term.
- 5.70 If companies have used differing assumptions of how various costs or revenues will change over time this should not affect how it deflates from nominal to real prices or the discount factor it uses in its present value calculations.
- 5.71 Table 5.1 shows the steps companies can take. Companies can choose to work in nominal prices or real prices. The first column shows the calculation in nominal prices. The second column shows the adjustment based on constant real prices.

Table 5.1 Method to produce a 2020 present value in 2017-18 FYE prices (RPI)

	Method 1 (Calculations in nominal terms)	Method 2 (Simplified – real terms)
Initial adjustment to price base	Inflate to 2019-20 FYE prices using RPI	Inflate to 2017-18 FYE prices using RPI
Adjustment for general inflation beyond 31 March 2020	CPIH	None
Discount Rate used to produce present value at 31 March 2020.	Nominal Wholesale WACC = $(1 + \text{CPIH}) * (1 + \text{Real wholesale WACC CPIH basis})$	Real Wholesale WACC CPIH basis
Adjustment to price base for reporting	Deflate from 2019-20 FYE to 2017-18 FYE using RPI.	None

5.72 Table 5.2 shows a worked example assuming that there is a difference between the actual and modern equivalent asset of £2 million per year in 2016-17 financial year average prices.

Table 5.2 Worked example to produce a 2020 present value in 2017-18 FYE prices (RPI) assuming that net cost is in 2016-17 FYA prices.

Inflation indices	Index					
2016-17 FYA RPI	264.99					
(assumed 2017-18 FYE RPI)	277.4					
(assumed 2019-20 FYE RPI)	294.3					
Year	Constant	Unit	2020-21	2021-22	2022-23	2023-24
Method 1 (Calculations in nominal terms)						
Net annual difference in cost (2016-17 RPI FYE)		£m	2.000	2.000	2.000	2.000
Net annual difference in cost (2019-20 RPI FYE)	1.1106	£m	2.221	2.221	2.221	2.221
Net annual difference in cost (Nominal prices- CPIH at 2%)	2.00%	£m	2.266	2.311	2.357	2.404
Net present value as at 31 March 2020 (2019-20 CPIH FYE)	5.37%	£m	2.150	2.082	2.015	1.951
Total net present value as at 31 March 2020 (2019-20 CPIH FYE)		£m	8.198			
Total net present value (2017-18 RPI FYE)	0.9426	£m	7.727			
Method 2 (Simplified – real terms)						
Net annual difference in cost (2016-17 RPI FYE)		£m	2.000	2.000	2.000	2.000
Net annual difference in cost (2017-18 RPI FYE)	1.0468	£m	2.094	2.094	2.094	2.094
Net present value (as at 31 March 2020) in 2017-18 RPI FYE prices	3.30%	£m	2.027	1.962	1.899	1.839
Total net present value (2017-18 RPI FYE)		£m	7.727			

5.73 Companies could also choose to use the excel formula “PV” which if the difference is constant over time can calculate the present value in a single step.

5.74 Where differences in costs/revenues relate to a combination of processes on a site, such as the ability to generate electricity, the period companies should use to make the adjustment is the average remaining life of the actual assets on the site. This should be consistent with the adjustments for asset age.

5.75 Where a company receives income from renewable incentives, that a new site would not receive, it should make a positive adjustment to increase its valuation. It must consider the time frame that it will be entitled to receive the income. If this is less than the remaining life of the site it will need to ensure its calculations are adjusted accordingly. Income received from selling energy must be considered over the average remaining life of the site and the income received from renewable incentives over the period that these will be received.

5.76 Companies should identify the impact of different factors on the valuation. This extra information should help to reduce the need to query companies following receipt of business plans. We will amend the business plan table WWS12 to collect the following information.

Definition	Unit	Decimal places	Price Base
Gross cost of modern equivalent assets owned by appointed business excluding shared assets where the bioresource business unit is not the principal user.	£m	3	2017-18 FYE (RPI)
Adjustment for the difference in the remaining economic life of actual and modern equivalent assets at 2020.	£m	3	2017-18 FYE (RPI)
Adjustment for the difference between actual and modern equivalent assets gross operating costs on bioresource treatment sites – By gross cost we mean the cost as if no electricity was generated on bioresource sites and no income is received from other business units or third parties.	£m	3	2017-18 FYE (RPI)
Adjustment for the difference between actual and modern equivalent assets in capital maintenance costs on bioresource treatment sites	£m	3	2017-18 FYE (RPI)
Adjustment for the difference between actual and modern equivalent assets in non-treatment site costs. This includes all other differences in costs, for instance where companies have identified significant differences in the operating costs of transport, thickening at intermediate sites or disposal.	£m	3	2017-18 FYE (RPI)
Adjustment for the difference between actual and modern equivalent assets in income from electricity and gas produced. This includes where electricity or gas is used on site or provided to associated companies within the wider group.	£m	3	2017-18 FYE (RPI)
Adjustment for the difference between actual and modern equivalent assets in income received from renewable obligation certificates (ROCs)	£m	3	2017-18 FYE (RPI)
Adjustment for the difference between actual and modern equivalent assets in the income received from other incentives	£m	3	2017-18 FYE (RPI)

Adjustment for the difference between actual and modern equivalent assets in other income including income from sale of biosolids	£m	3	2017-18 FYE (RPI)
Economic valuation of bioresources assets excluding the allocation of shared assets (sum of the above)	£m	3	2017-18 FYE (RPI)
Proportional allocation of the net value of shared assets where the bioresource business unit is not the principal user	£m	3	2017-18 FYE (RPI)
Economic valuation of bioresources assets including an allocation of shared assets (sum of above two lines)	£m	3	2017-18 FYE (RPI)

5.77 Where a company expects that the income or costs in any of these categories would be the same between the assets that are expected to exist at 2020 and the modern equivalent it can simply report this and does not need to complete a calculation.

6. Step 1: define the modern equivalent asset (technology)

6.1 In this chapter we return to step 1 to consider the assumptions on the treatment technology that companies have used in defining modern equivalent assets.



6.2 We expect companies to choose the technology that will represent the best economic value for the services they operate without the constraint of the existing bioresources assets on the site.

6.3 We consider this issue now as the preceding two chapters provided a number of observations that we expect companies to consider when deciding on the technology of their modern equivalent assets.

Observations on technology

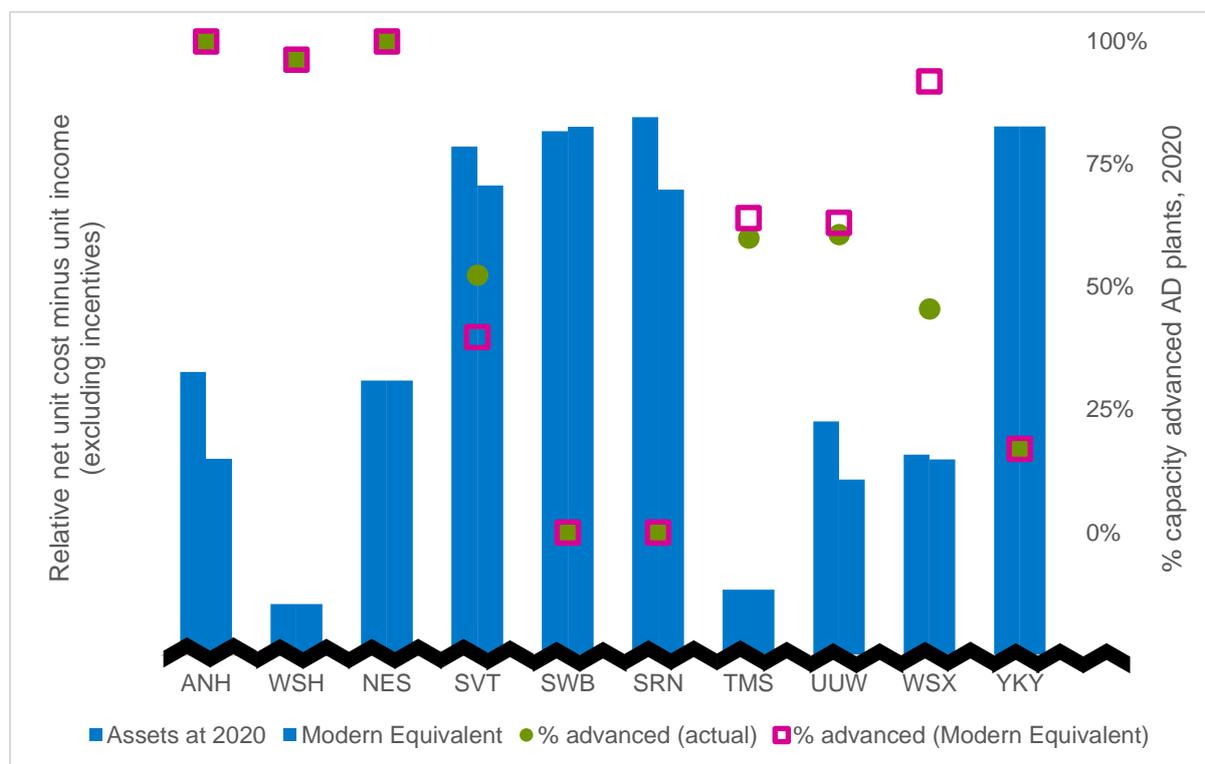
6.4 Anglian Water, United Utilities and Wessex Water made significant changes to the choice of technology of modern equivalent assets compared to their actual assets. United Utilities has assets driven by investment decisions many years ago that it states would not be repeated now. Wessex Water proposed that modern equivalent assets would use more advanced technologies. Anglian Water proposed the modern equivalent would use a consistent advanced technology while its actual sites have slightly different technologies that have developed over time.

6.5 Most other companies considered the technology of the assets that they would have by 2020 was appropriate for the modern equivalent assets. Some of these have, or will, complete a programme of changing technology by 2020. Others considered, while they used a wide mixture of different technologies, that these were the most appropriate. One company set out that advanced technologies were only likely to be the best option for very large capacity works. A further

company considered that changing technology at any works would make little difference to the overall assessment of economic value.

- 6.6 In paragraph 4.7 we noted that we could not identify a difference between the gross capital costs of conventional and advanced digestion sites. Furthermore companies have not identified differences in asset age depending on technology. This implies that the potential future cash flows of different technologies could help to determine the choice of modern equivalent technology.
- 6.7 To understand potential future cash flows we have calculated annual net costs as operating costs, including capital maintenance, less external revenue. We have excluded income from renewable incentives. This allows us to make a fairer comparison between companies as not all treatment sites are able to receive the same level of renewable incentives.
- 6.8 Companies should consider whether a modern equivalent asset could receive renewable incentives. We expect it to do this on a site specific basis. What incentives could be available may depend on factors such as the proximity of the site to gas mains. If a company is able to receive renewable incentives it could further reduce its net costs.
- 6.9 Figure 6.1 shows annual net unit cost by dividing annual net cost by the throughput. It also shows the proportion of bioresources capacity provided by advanced anaerobic digestion plants in 2020.

Figure 6.1 Relative net unit annual cost (excluding renewable incentives) per unit of throughput and proportion of bioresources treated using advanced technologies.



6.10 Figure 6.1 suggests that the higher the proportion of bioresources treated with advanced technologies, the lower its net unit cost of operation. It should be noted that this excludes the income from incentives. Advanced technology will tend to produce more biogas and so has a greater potential to receive income from renewable incentives.

Feedback on choice of technology

6.11 After considering the industry data provided in this feedback, we expect all companies to consider whether their choice of technology for modern equivalent assets is appropriate. The industry data implies that the new build cost of conventional and advanced digestion sites are similar, but the net annual cost of an advanced digestion site tends to be lower, even without income from renewable incentives.

6.12 We expect companies to consider the full range of incentives that could be available for each site in choosing the modern equivalent asset, based on what is known at 30 April 2018.

6.13 We note that modern equivalent assets will not necessarily reflect companies' actual investment strategies. Sunk costs, especially in secondary digestion, may lead to differences between what is optimal in modifying an existing site and what should be built if starting afresh. It is important that all companies consider the definition of modern equivalent assets irrespective of their sunk costs.

7. Step 4: Consider alternative approaches

7.1 The fourth step of the process is to undertake cross checks to provide assurance that the RCV allocation based on economic value is appropriate and protects customer interests.



7.2 Companies have considered a number of ways to cross check that the RCV allocation based on the economic value will be robust and protect customers. In some cases companies noted that they would complete checks for final business plans and did not fully complete all cross checks at this time.

7.3 Our guidance asked all companies to consider the potential impact that the RCV allocated on economic value could have on customer bills.

7.4 In addition to this we expect that all companies would explain how the valuation has moved compared to the previous full revaluation carried out at PR09.

7.5 Companies should consider additional checks depending on their individual circumstances and the information available to them.

7.6 This chapter is split into the following sections:

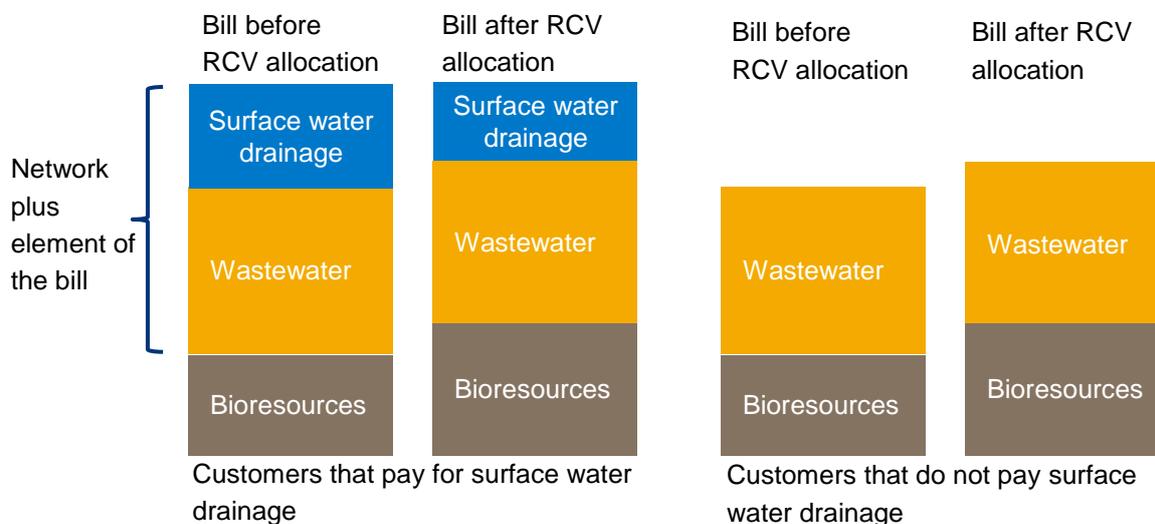
- Customer bill impact;
- Comparison to previous valuation; and
- Other cross checks.

7.7 Each section considers the cross checks that companies have completed and provides feedback.

Customer bill impact

- 7.8 We would expect the allocation of the RCV to only have a noticeable impact on customers' bills where the valuation exercise has revealed that the consistency between charges and cost recovery can be improved.
- 7.9 Where the valuation exercise produces new information that allows bills to be more cost reflective it is important that any significant impact on customers is phased over time.
- 7.10 If all customers paid a single average charge for both bioresource and wastewater services that recovered all of companies' costs there could be no impact on bills from the RCV allocation. A change in the part of the charge for bioresource services will be offset by an opposite change in the part of the charge for wastewater network plus services. This would keep the overall cost recovery the same.
- 7.11 The majority of customers may approximate to this circumstance. Most customers pay an average charge that covers both bioresource and network plus services, with companies not setting separate bioresources and network plus charges.
- 7.12 An example of a group that may be impacted are customers that do not pay surface water drainage charges. This would be the case if, for example, the change in the RCV allocation leads to an increase in the bioresources part of the charge that was offset by a reduction in surface water drainage charges. While there may be no impact for the majority of customers that pay surface water drainage charges, there would be an impact for customers that do not pay surface water drainage charges. Figure 7.1 illustrates the potential impact.

7.13 Figure 7.1 Example of how the bills of customers that do not pay surface water charges could be impacted from the RCV allocation



7.14 Trade effluent customers are a further example of customers that could be impacted by the allocation of the RCV. Trade effluent customers pay different charges to the majority of customers. Trade effluent customers' bills vary according to the suspended solid content of discharges. The suspended solid content directly impacts the bioresources service required. As the bioresources part of trade effluent bills depend on the actual service received, the corresponding change to the network plus part of the bill may not necessarily be equal and opposite leading to an overall impact on bills.

Observations on customer bill impact

7.15 Nine of the companies commented on the impact of the valuation on their customers' end bills. Some companies noted that they would complete further analysis alongside their business plans.

7.16 Two companies, Wessex Water and Yorkshire Water, considered the potential impact of the change to end customer bills in detail. One company provided evidence that the impact on any customer bill would be small. The other company identified potential impacts for certain of its trade effluent customers. To smooth bills the company intends to start adjusting tariffs in the coming charging year. This gives it an extra year to phase in the tariff changes to smooth the impact on customer bills.

- 7.17 The impact on bills will depend on a number of factors and requires careful consideration by companies.
- 7.18 An important factor that could affect customer bills is the difference between how companies will recover capital costs following the RCV allocation and the implied (or explicit) recovery of capital costs for bioresource under their existing charges.
- 7.19 Companies also need to understand the relationships between cost recovery for different services. It is possible that the cost recovery of these services and hence charges will not be directly proportional to a different RCV allocation. For instance if capital charges are allocated according to MEAV, an increase in the RCV is likely to have a greater impact on wastewater collection as opposed to wastewater treatment. This is because the cost of replacing all sewers would be far greater than replacing all treatment plants.

Feedback on customer bill impact

- 7.20 While we note that companies have stated that more information will be available at business plan stage we commend Wessex Water and Yorkshire Water that considered the issue in detail. This allowed one to take early action to smooth bill the impact on the small number of customers affected.
- 7.21 We accept that impact of the RCV allocation on charges will be less of an issue for companies that expect to significantly reduce bills to all customers from 2020. As the general reduction in bills could more than offset any increase that individual customers would see from the RCV allocation.
- 7.22 It is essential that all companies carefully consider whether the allocation of the RCV will have significant impact on any customer's bill. To do this companies need to consider how the change may affect its underlying charges including how they allocate the recovery of capital costs within its charging structure.
- 7.23 Where companies identify customers that would see bill increases, we expect companies to consider how to phase in the bill change to minimise the customer impact.

Comparison to past valuations

7.24 Most sludge assets last decades. Therefore an asset valuation, even ten years earlier, will have some relevance to a new valuation. We used previous valuations in price setting and they had an impact on customers' bills. It is therefore important we understand the reasons for differences between past and current valuations before we accept the new values.

7.25 We expect companies to be able to identify the reasons for significant changes in asset valuations over time. We expect that companies should be able to both quantify and reconcile the differences between asset valuations. This will help provide confidence in the accuracy and robustness of the new valuation.

Observations on comparison to previous valuation

7.26 Companies referred to their previous valuation of assets required for the 2009 Periodic Review (PR09). Companies' explanation of the difference between their PR09 valuation and their current valuation varied significantly. The best company submissions attempted to quantify the reasons for the differences that they identified and commented on the remaining difference.

7.27 Most companies considered both the difference in gross values and the difference in net values. Other companies only considered the difference between net values.

7.28 The main reasons companies gave for differences in the gross value were:

- changes in assets since the last valuation;
- that the previous valuation was focused on replicating the assets that companies have, but the new valuation is focused on the assets required to deliver a service – hence different considerations of obsolete assets can lead to significant differences;
- that available inflation indices used to update the previous valuation do not necessarily accurately reflect how the costs of bioresources assets change over time; and
- land was not included in the previous valuation.

7.29 The main reasons companies gave for differences in the net value were:

- differences in the calculation of asset lives, including that the new approach focuses on remaining economic life, which may ascribe value to assets that are fully depreciated in accounting terms;
- differences in the way that the adjustment for asset lives is taken into account. The method in our guidance leads to a higher net valuation compared to more traditional accounting treatment such as straight line depreciation;
- that the economic valuation includes an adjustment for future cash flows which was not included in the previous valuation; and
- inaccuracies in how annual additions and removals of assets have been reflected in the previous valuation over time.

Feedback on comparison to previous valuation

7.30 Understanding the principal reasons for differences between the proposed economic valuation and the previous valuation of bioresource assets provides an important cross check on company proposals. It is important that these cross checks are carried out on both a gross and net basis to understand what is driving the differences in valuations.

7.31 We expect all companies to estimate the impact for each of the reasons they identify for differences between the current and previous valuation. We expect companies to explain on the residual unexplained difference. Companies should consider both the difference in gross valuations and net valuations. Companies may want to provide a range rather than a point estimate for each of the reasons that they identify.

Other cross checks

7.32 Our guidance asked companies to use available information to cross check their valuations. This will increase the confidence that the allocated RCV is appropriate. We expect companies to consider what cross checks would have most value for their own circumstances.

Observations on other cross checks

7.33 Companies used a variety of information to undertake cross checks, including:

- Sensitivity of the valuation to alternative assumptions, such as different methods to produce asset ages;
- Comparing the valuation to the historical book value of assets at the company level;
- Reviewing the consistency of the gross unit costs of assets proposed;
- Reviewing the assumed gross values against the company's own recent data on asset values;
- Comparing publicly available information on the definition of modern equivalent assets such as that in OJEU notices and previous reported information on past valuations provided by other companies; and
- Reviewing the valuation against the PR19 key themes: affordability; innovation; resilience; and customer service.

Feedback on other cross checks

7.34 We see value in companies continuing to consider a range of cross checks. The most appropriate cross checks will depend on each company's circumstances.

7.35 The cross checks that appeared to provide most confidence in asset valuations were the sensitivity of the valuation to alternative assumptions and cross checks on the gross values of modern equivalent assets companies had assumed.

8. Step 5: Propose and explain approach

8.1 The final step is for the company to propose an RCV allocation and explain the approach taken.



8.2 If companies identify an issue through applying a cross check, our guidance asked companies to consider if an alternative allocation of the RCV allocation would better protect customers including by promoting a level playing field for markets. If companies identify an alternative approach to allocate the RCV that better protects customers then companies should propose this.

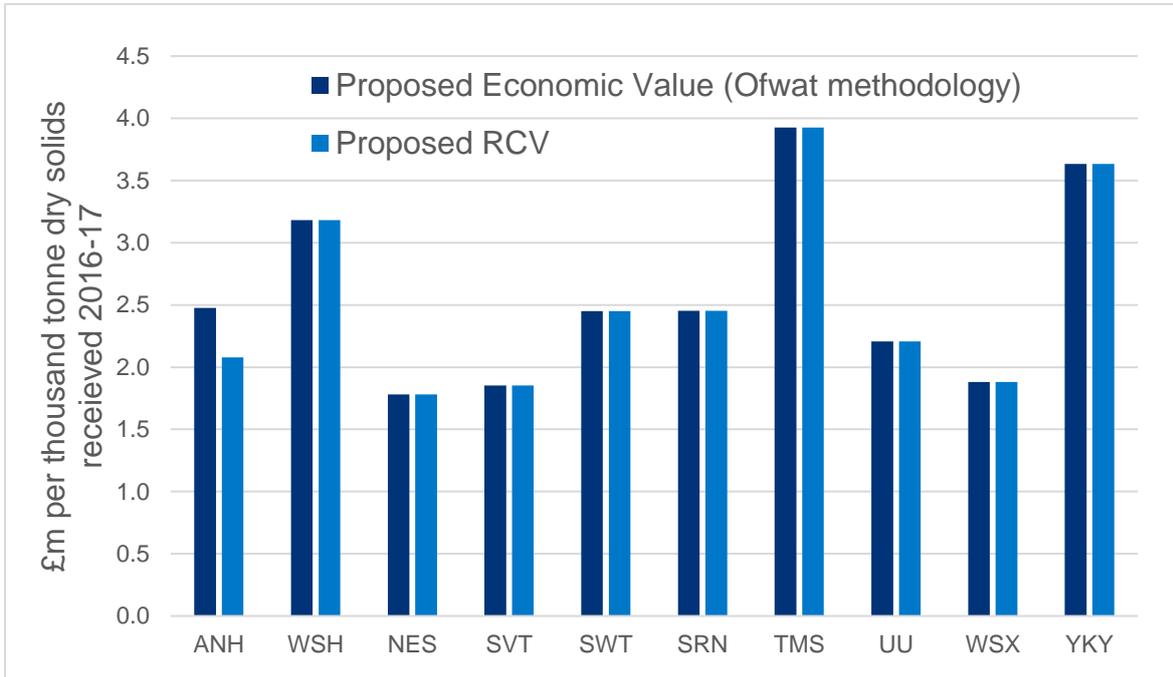
8.3 Companies have all proposed to allocate the RCV based on the economic value of their assets.

8.4 Anglian Water suggested that its economic value should be lower than the value it derived by following our methodology because of two issues.

- Our methodology set out that companies should allocate a proportion of the capital value of shared assets to bioresources. When allocating the RCV, Anglian Water removed the value of shared assets from its valuation.
- Our methodology set outs that where actual assets receive income from renewable obligation certificates (ROCs), but new modern equivalent assets would not be eligible to receive renewable incentives, actual assets have a greater value than modern equivalent assets. When allocating the RCV, Anglian Water removed this increase in the value of its actual assets because of income from ROCs.

8.5 Figure 8.1 sets out companies' proposed RCV allocations to the bioresources control and how they compare to economic value.

Figure 8.1 Comparison of economic value and proposed RCV allocation



8.6 Figure 8.2 shows company estimates of economic value split between different asset types.

Figure 8.2 Economic value associated with different assets (£m per ttds)



Feedback on RCV Allocation Proposals

- 8.7 We expect companies to continue to consider if an alternative allocation of the RCV allocation would better protect customers including by promoting a level playing field for markets.
- 8.8 Companies may propose to allocate the RCV based on an economic value that includes a proportional allocation of shared assets or excludes shared assets for which the bioresource business unit is not the principal user. We will consider company business plan submissions and propose a consistent approach in our PR19 draft determinations. Companies' inclusion (or exclusion) of a proportionate allocation of shared assets for which the bioresource business unit is not the principal user in their proposed RCV allocation will not negatively affect our initial assessment of plans as long as a company sets out a considered view to support its decision.
- 8.9 We disagree with Anglian Water's view that the RCV allocation should not reflect the value of its assets from receiving renewable incentives that modern equivalent assets would not receive. We set out the approach that companies should follow in paragraph 5.45.

9. Next steps

- 9.1 We expect companies to include transparent, well evidenced and acceptable proposals on pre-2020 RCV allocation.
- 9.2 We expect companies to consider this feedback and where appropriate improve their valuation of their bioresource assets and the associated cross checks that they submit as part of their business plans. Companies should also identify if they have any new information which they should reflect in their valuations and their business plans.
- 9.3 As discussions could include commercially confidential information we are happy to meet companies individually to discuss feedback on their proposed RCV allocation.
- 9.4 We expect companies to submit updated summary RCV information in the business plan tables in September 2018. As set out in our [guidance on business plan data tables](#) this is to include a reconciliation to the information they provided in September 2017. We also require companies to provide information to check the potential impact on a customer's bill.
- 9.5 We are limiting the information we are requesting for business plans on the basis that we expect most companies to be able to address the points we make in our feedback. We expect this feedback to be appropriately addressed in company business plans.
- 9.6 If this is not the case, we may ask a company to update the full set of detailed RCV tables either before or after it submits its business plan. In addition, companies may decide to submit the full set of detailed RCV tables alongside their business plans. Companies should do this if they make significant changes to their valuations, or otherwise do not have confidence that we will be able to understand the changes they have made from their business plan tables.
- 9.7 In providing information on their economic valuation in their business plans we expect companies to follow the assurance requirements set out in chapter 13 of our final methodology.
- 9.8 As part of the [initial assessment of business plans](#) we will assess the appropriateness of companies proposed pre-2020 RCV allocation between

bioresources and wastewater network plus. This will take into account of the guidance and feedback we have provided.

- 9.9 We will confirm the allocation of RCV to the bioresources control and wastewater network plus control as part of PR19 determinations.