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Trust in water

Economic asset valuation for the bioresources RCV allocation at PR19

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About this document

This document sets out the approach for water and sewerage companies (WaSCs) to value their bioresources assets, following our consultation on this topic in March 2017. It sets out the information we require from WaSCs in September 2017.

In order 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 legacy wastewater RCV at 31 March 2020 between the network plus and bioresources controls at PR19.

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1. Executive Summary

Development of markets for bioresources will inform, enable and incentivise companies operating in the sector to do more for less; to make the best use of resources and to find new ways of doing things. This will help bring benefits for customers, investors and the environment.

In **Water 2020: our regulatory approach for water and wastewater services in England and Wales**, May 2016, we set out our decision to introduce a binding separate price control for bioresources at PR19 that was set using an explicit Regulatory Capital Value (RCV) allocation, as part of the measures to help support the development of bioresources markets.

In March 2017, we published our consultation on the approach to value bioresources assets of WaSCs. This included technical guidance for asset valuation, information requirements for WaSCs to supply to Ofwat and the valuation process and timeline. We are grateful for the input we have received from stakeholders that has helped us to develop these requirements. Companies overall supported the approach we set out in our consultation. We have finalised our approach in this statement including revising technical guidance and information tables, based on the responses to our consultation.

WaSCs will complete a valuation based on the future economic value of bioresources assets, as at 31 March 2020. An allocation of the pre-2020 legacy wastewater RCV between the bioresources and wastewater network plus price controls using this valuation will help promote a level playing field for the development of markets.

WaSCs should undertake cross checks to provide assurance that the RCV allocation based on economic value is appropriate and protects customer interests. These should include 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.

If the cross checks reveal an issue arising from the proposed allocation of RCV, the company should propose an alternative allocation of the RCV, explaining why this allocation is appropriate to protect customers including by promoting a level playing field for markets.

Collecting bioresources asset economic valuation information at site level will allow WaSCs to make best use of the most relevant information available to them, at a

lower cost than requiring costing of existing assets and collecting data on their condition as at previous valuation exercises.

WaSCs must submit a detailed explanation of their proposed RCV allocation including the underlying information in the format we have set out by 29 September 2017. This timetable will allow us to provide feedback by the end of January 2018, well in advance of submission of their business plans in September 2018.

We will confirm the allocation of RCV to the bioresources price control and network plus price control (the remainder) as part of PR19 determinations.

We have committed that our price control framework for PR19 will provide the same nature and degree of regulatory protection as at present, for the RCV allocated to bioresources at 31 March 2020.

A [report by Reckon LLP and Jacobs](#) provides supporting information that WaSCs may assist WaSCs in undertaking their valuation.

2. Background to the bioresources RCV allocation at PR19

This section sets out background information on why an allocation of the pre-2020 legacy wastewater RCV to the bioresources control is required to support the development of markets.

2.1. Introduction

In “Water 2020: our regulatory approach for water and wastewater services in England and Wales”, we explained that promoting markets in bioresources will deliver efficiencies in treatment and usage and encourage technological innovation. This means:

- WaSCs can trade with each other and use processing centres in other company areas to improve efficiency in the short term;
- more efficient investment to make the most of sludge processing across company boundaries in the longer term; and
- better interaction and integration with the wider organic waste market, enabling efficient site and resource sharing.

As we set out in May 2016 to set the conditions to enable markets in bioresources to develop we will:

- introduce separate binding price controls in PR19;
- allocate WaSCs’ assets to the controls to encourage transparency and market entry;
- protect efficiently incurred investment up to 2020 to provide investor certainty; and
- develop information platforms to enable potential new entrants to see opportunities in the market.

This document sets out how we will allocate the value of WaSCs’ assets to the new bioresources price control. We currently have a single value for wastewater RCV that is the capital value of its wastewater assets, including bioresources assets, for regulatory purposes. We created this regulatory tool shortly after privatisation for the purposes of setting price controls. It captures the capital invested in the business and forms part of our building block approach to price controls.

To allocate part of the wastewater RCV to the new bioresources price control we will take a focused approach, where the allocation is based on the value of the assets used. A focused allocation means that the RCV allocation to the bioresources control

is not influenced by the historic discount to the RCV at privatisation (i.e. the difference between the value of the RCV and the value of the assets). This is important as undervaluation of assets might distort the bioresources market and potentially lead to loss of value for customers. The remainder of the RCV after deducting the economic value of the sludge assets will be allocated to the wastewater network plus control.

The allocation is only for the purpose of setting price controls and is at a company level rather than site level.

For the purposes of this bioresources asset valuation exercise, we will use the services definitions in [RAG 4.06](#). The date of valuation is 31 March 2020, so WaSCs will need to accurately forecast asset additions from 2017 to 2020.

We have committed that our price control framework for PR19 will provide the same nature and degree of regulatory protection as at present for the RCV allocated to bioresources price control at 31 March 2020. 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.

The remainder of this section sets out the importance of markets to this valuation and allocation exercise.

2.2. Market context of the valuation

The [report](#) of the targeted review by Cambridge Economic Policy Associates Ltd (CEPA) of sludge and water resources set out a range of objectives and issues associated with valuing sludge assets for the purposes of setting a separate bioresources price control at PR19.

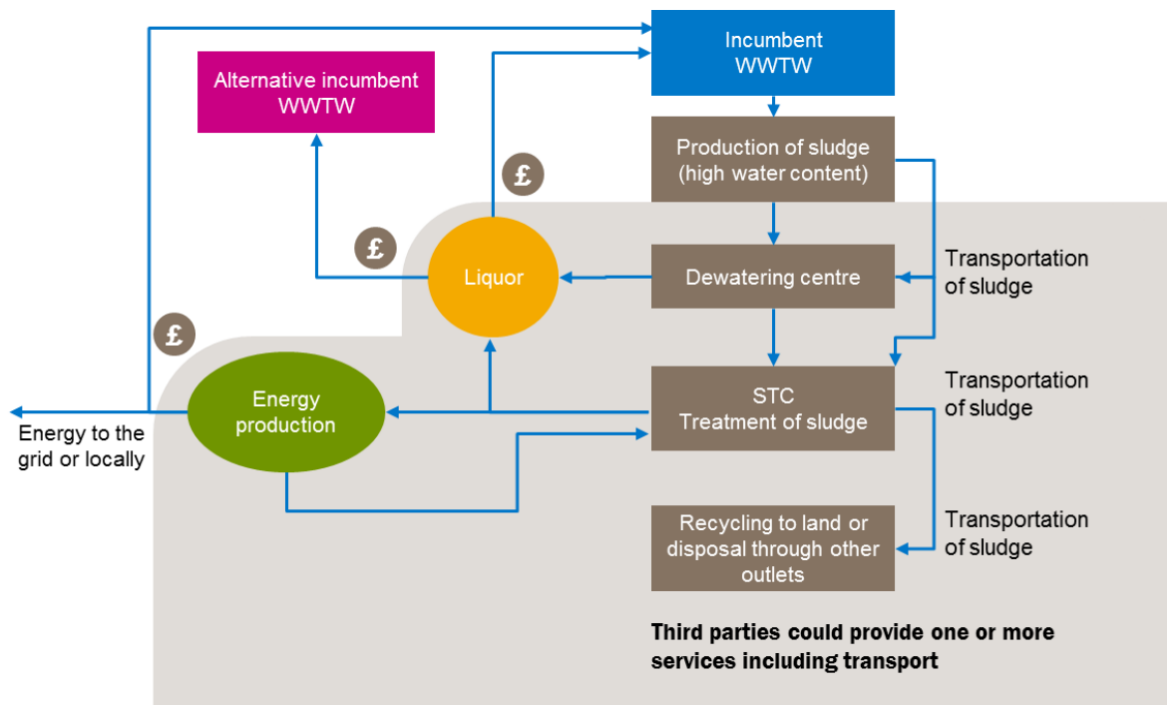
The purpose of valuing sludge assets for the bioresources RCV allocation is different to the past MEAV valuation exercises that WaSCs have undertaken for price reviews and for regulatory accounts prior to 2015. In particular, the assumptions that are

made about the assets being valued may be on a different basis. The approach and assumptions need to be considered in the context of the markets that could develop.

WaSCs are already able to outsource some of the sludge transport, treatment, recycling and disposal services to third parties (e.g. liming of sludge, or recycling sludge to land) and there is some but very limited market activity between WaSCs to provide sludge processing.

The diagram shows the bioresources service and how third parties could offer to provide parts of the service, including likely interactions between the two parties.

Figure 2.1 Potential bioresources markets



The interactions could include:

- **Incumbent pays or receives payment from the third party for (one or more) sludge services.** Where the value of sludge is considered to be negative we would expect the incumbent to pay the third party to provide sludge services. However, where sludge has a material and positive value, the entrant could pay the incumbent to provide its services.
- **Third party pays the incumbent to treat liquor.** If the entrant provides treatment or dewatering services, it may produce a liquor, which could need treating. It is likely that it will pay the incumbent for treatment, based on a trade effluent

charges system if the liquor is sent to the incumbent's Wastewater Treatment Works (WwTW). The cost of treatment could be reduced if the entrant is able to pre-treat any of its liquor prior to discharging it to the wastewater treatment works.

- **Incumbent pays the entrant for its energy.** Energy that is produced from treating sludge could be sold back to the incumbent for use in its wastewater treatment.

Market innovations

Beyond bioresources processing and energy generation, there is further scope for markets to add value through innovation. That markets identify opportunities is a large part of the value that they bring. Wherever a third party could utilise a higher value from bioresources than the existing processes, the potential for a market exists. For instance a range of substances end up at sludge treatment works which could be better utilised if collected or treated in a specific way. Whether such resources should be utilised will depend on the extra cost of collecting that specific resource compared to the extra value that a third party can make of it. If and what specific resources should be collected will emerge over time, but a number of possibilities have been put forward in the recent past:

- **Phosphorus** – Treatment works remove phosphorus from wastewater to avoid damaging rivers. However under the wrong conditions phosphates damage equipment and block pipes. However, these phosphates can be particularly valuable if collected.
- **Gold** – Gold is washed into sewers from a number of sources, in tiny quantities. At the moment it is not economic to collect this.
- **Fats oils and greases (FOG)** – In our 2015 discussion paper we highlighted how Argent energy were turning FOGs that blocks sewers into biodiesel. FOG also ends up at a treatment works and is a component of the resulting bioresources.

In each case, it will be important that asset value underpinning commercial arrangements promote efficient outcomes and ensure that customer interests are protected.

2.3. Importance of an appropriate RCV allocation

The legacy RCV allocation will impact on how markets develop. And while it is important to recognise that WaSCs are responsible for setting charges, markets could be distorted and value lost to customers if the RCV allocation is not set at an appropriate level.

If assets are overvalued, the unit cost for sludge treatment, recycling and disposal will also be overstated. In the short-term this could increase sludge treatment costs for customers, although this would be offset by a decrease in wastewater network plus wholesale costs. WaSCs will be disadvantaged compared to new entrants and potentially to other incumbent providers (depending on their costs). In the long-term, inflated asset values may artificially incentivise new companies, such as other organic waste providers and alternative incumbents, to enter the market.

Conversely, if sludge assets are undervalued, the unit cost for sludge will be lower, leading to lower charges for sludge wholesale treatment and disposal, offset by higher charges for wastewater network plus wholesale services. Undervaluing assets could result in WaSCs having lower costs than other organic waste (OOW) companies and WaSCs could use this to their advantage in competing with OOWs and other incumbents. It could also increase profitability for non-appointed sludge processing and so mean that companies rather than customers benefit from transactions. WaSCs may have an artificial incentive to sell undervalued assets to capture the actual value of the assets, which may not benefit customers.

The binding price control will constrain the average revenues that WaSCs can recover for the bioresources element of their wholesale charges, but WaSCs will retain responsibility for the individual charges that they set. WaSCs therefore have an interest in proposing an appropriate allocation consistent with their duties to comply with both charging rules and competition law.

3. Stakeholder views and our approach

This section sets out how we have developed our approach. We have taken a collaborative approach and have reflected on stakeholder views throughout the process.

3.1. Marketplace of Ideas

A number of reports commissioned by the sector as part of the Water 2020 “Marketplace for Ideas” considered RCV allocations. Each included the option of using Modern Equivalent Asset Valuation (MEAV), which has been the approach used in utilities and in particular the water sector to value assets for regulatory purposes.

As set out in section 2, the objectives of the focused legacy RCV allocation to bioresources are different to past MEAV valuation exercises. For PR09 it was intended to check that the economic value implied by the run off of the MEAV was consistent with the long run maintenance of sludge assets, through an overall comparison between expenditure and depreciation. For PR19 the RCV allocation is concerned with providing appropriate price signals to potential new entrants, mitigating the risk that WaSCs could distort competition in waste markets and recognising the discount within the existing wholesale RCV.

We note that there were some differences of approach between WaSCs in past valuations, which may affect the comparability of the results. There has been a substantive change in the technologies and processes used for sludge treatment and disposal, since 2009 valuations. This includes the commercial models, with an increasing role for energy generation as a core part of sludge treatment activities. However, companies will need to consider the impact of the RCV allocation on customer charge structures, as any changes in asset values from the previous MEAV valuation could have implications for their PR19 RCV run off rates.

Comparison to past MEAV valuations will therefore be a necessary cross-check for a new valuation, irrespective of approach. In considering this companies should describe the quality of their past and proposed valuations, taking into account the relevance to them of the industry-level observations set out in section 4.4.

3.2. Sector working groups

Discussions with companies, in particular at the [sludge working group](#), welcomed an approach that would allow consistency in valuation method to be established. This would help to avoid the uncertainty and potential cost for WaSCs from a variety of

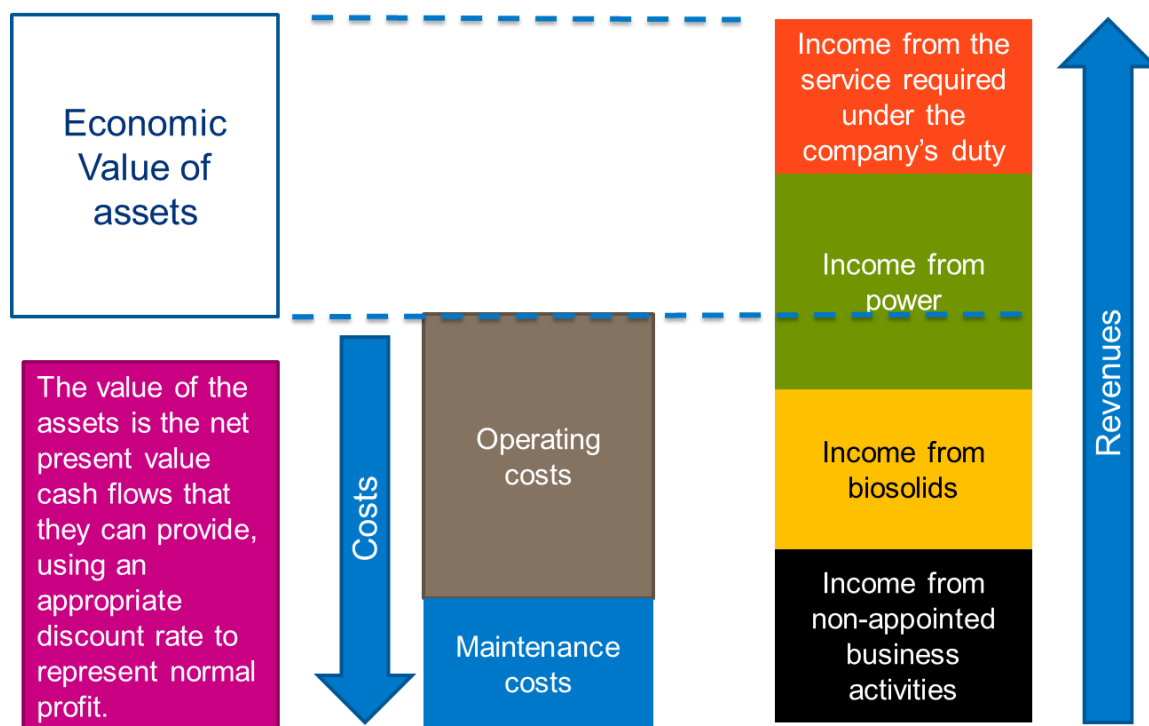
valuation approaches being taken, whilst recognising the range of bioresource technologies that exist.

Companies believed that sludge asset valuation approaches had varied and were not valued independently of co-located wastewater treatment works. The development of an industry standard template using site size bands and treatment types for costing was suggested, although it was felt that more granular data at site level might be needed given the market context of this valuation exercise. As WaSCs will need data at a site level to complete a template based on size bands, collecting more granular data does not have additional costs. We also explored collecting information on asset value at the 28 February 2017 Regulatory Accounts Working Group, exploring further that companies would for any valuation need in any case to prepare data at a detailed level for each sludge treatment site, irrespective of Ofwat's data requirements.

Another area we explored with companies is the basis to cost assets, including the relative focus on existing assets compared to what would be built in the future to provide the same service. A [bioresources form of control workshop](#) discussed the merits of an economic value approach that allows WaSCs to use the most relevant data available to them, including from recently built assets, rather than placing over-reliance on older site valuation information.

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.

The economic value of an asset can be derived from the income less costs (net income) that an asset generates over time, as shown in Figure 3.1. This is a forward looking concept that fits well with the development of markets. If we adjust the net income by the return that an investor would require to provide capital, we can calculate the present value of future net cash flows. This is a useful measurement of asset value.

Figure 3.1 Illustration of the economic value of bioresource assets

Practically the value of an asset can be derived from the:

- cost of the new assets, adjusted if there is a difference in remaining life of the actual asset to the new asset;
- difference in present value terms of annual operating and maintenance costs between the new asset and the old asset over the lifetime of the actual assets; and
- difference in present value terms of the income which is not controlled by the price control, between the new asset and the actual asset.

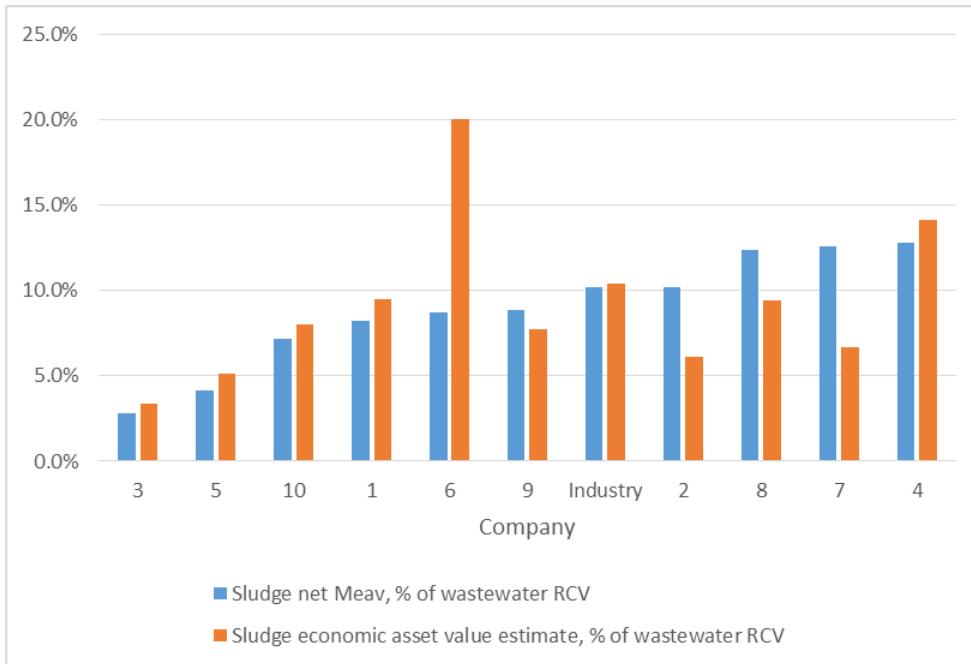
In Appendix 1 we explain further what we mean by economic value and how this leads to the above steps to calculate it. It is also covered in Reckon's report.

This economic approach is similar to our previous guidance, RAG 1.05, which applied until the requirement for WaSCs to prepare annual current cost balance sheets was withdrawn. This made it clear that the context of net value of the tangible assets should reflect what potential competitors would find it worth paying for them, even if the competition was hypothetical.

At the workshop group we shared with companies an illustration of the impact that an economic value approach could have compared to past valuations. We used information on MEAV provided in regulatory accounts, adjusted for expenditure and

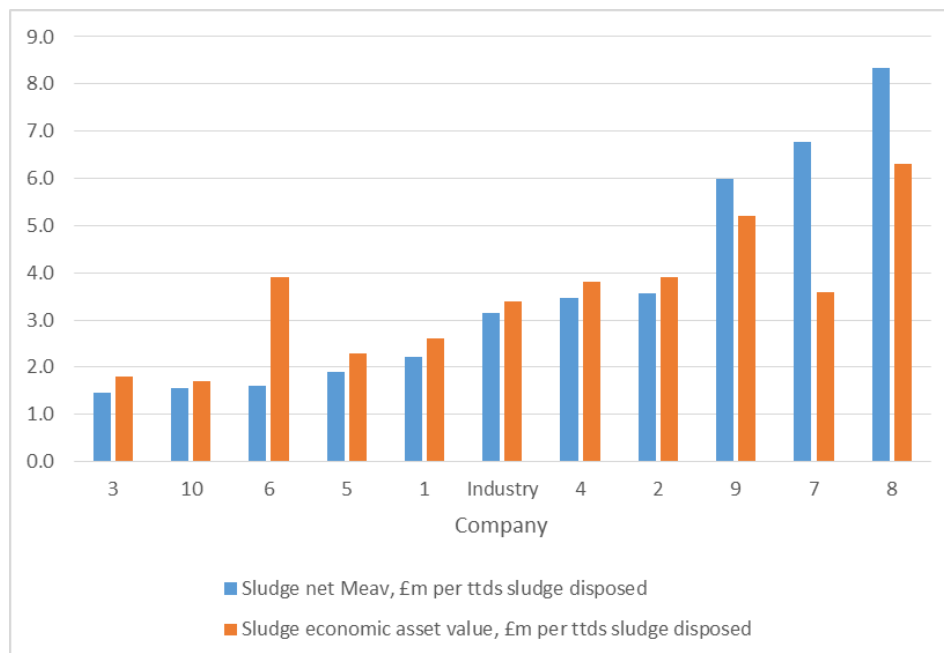
depreciation. We compared this to our assessment of possible cost and income sources including income from power. Significant assumptions are required and we place little weight on this analysis as an indication of the appropriate legacy RCV allocation, at this stage - it serves to illustrate the potential impact between the two approaches.

Figure 3.6 Illustrative comparison of allocating the RCV using economic value as opposed to the previous MEAV approach.



Of greater relevance to the future market is the net MEAV and economic value by unit weight of biosolids produced through company sludge assets. This illustrates that WaSCs will need to consider productive capacity of their sludge assets for a forward looking estimate of economic value.

Figure 3.7 Illustrative comparison of RCV per unit from allocating the RCV using economic value as opposed to the previous MEAV approach.



Both approaches show a wide range of asset valuation between WaSCs. This may reflect the different scale of facilities, processes, quality of end bioresources and disposal route. The total industry valuation compared to the existing wastewater RCV appear to be similar for the two approaches. While for individual WaSCs, in some cases, the two valuations are similar, for others there is divergence. Some WaSCs have high power generation value from their sludge compared to others. This results in a higher value under the economic value approach.

We consider that our approach, which takes full account of the benefits from generating energy will lead to appropriate RCV allocations that will help to promote a level playing field, and protects customers compared to an approach that does not fully recognise the wider value of existing assets.

As well as WaSCs completing a valuation based on the future economic value of bioresources assets, as at 31 March 2020. WaSCs should undertake cross checks to provide assurance that the RCV allocation based on economic value is appropriate and protects customer interests. These should include testing if the allocation has an impact on customer bills or on the WaSC's ability to set charges in line with both charging rules and competition law.

If the cross checks reveal an issue arising from the proposed allocation of RCV, the WaSC should propose an alternative allocation of the RCV, explaining why this

allocation is appropriate to protect customers including by promoting a level playing field for markets.

3.3. Consultation

Building on our engagement our consultation proposed:

- an approach based on economic value;
- a detailed process for WaSCs to follow in valuing their bioresources assets;
- requiring WaSCs to perform cross checks to provide assurance that an RCV allocation based on its valuation will not have unintended consequences;
- the timetable we would follow in allocating the RCV;
- the detailed information that WaSCs would provide on asset valuation by 29 September 2017; and
- we also sought views on what, if any, information WaSCs could publish on their websites as well as providing information to us.

We received 10 responses from each of the WaSCs. We have updated our guidance and proposed tables for technical points made in the consultation responses. We summarise below responses against the following themes and provide our response to these issues.

1. Economic Value
2. Market prices
3. Assumptions about future throughput
4. Asset lives and maintenance costs
5. Cross checks and proposal of the RCV allocation
6. Timetable, assurance and proportionality
7. Consistency with RAGs
8. Site level process
9. Publication
10. Continued engagement

1. Economic Value

The economic value approach is generally supported and no respondents opposed it altogether. Two WaSCs raised alternatives to the May 2016 decision to allocate the 2020 RCV between bioresources and wastewater network plus.

Two WaSCs are concerned that the economic value approach would disadvantage them in trading services with other WaSCs as it would lead their bioresources RCV

to be higher than for less effective WaSCs. In particular one WaSC proposes that we do not take account of future income generated by bioresources assets. The other WaSC notes that the Competition Appeals Tribunal (CAT) in setting water access prices in one case¹ concluded that actual assets should be considered, rather than hypothetical assets.

A further WaSC sets out that land should not be valued and remain as part of the network plus price control RCV, and that the economic value approach should be applied to a greater range of assets than our proposal to only require information on the modern equivalent for sludge treatment centres.

The valuation is to inform the RCV allocation which we require for the purpose of setting the two price controls for the appointed wastewater business. As the Reckon report highlighted, the case the CAT were considering has little relevance to this valuation exercise as it regards excessive and anti-competitive access prices, rather than setting price controls such as via overstatement of the value of the assets associated with monopoly service. In any case, although our approach requires WaSCs to report information on hypothetical assets, this is merely to reduce the reliance of the valuation on estimates of market prices. Our approach requires WaSCs to adjust the hypothetical asset cost to reflect the economic value of the existing assets.

After reviewing consultation responses we consider it is appropriate for the valuation to be based on the economic value of the existing assets at 31 March 2020, including all income, such as that derived from energy production. The RCV at 31 March 2020 is protected and it is important to safeguard customers by ensuring that the full value of these assets is allocated to bioresources price control and so keep the historic discount between the RCV and asset values in the network plus price control. This reflects the absence of market risk in generating the value of existing bioresources assets, which is effectively guaranteed by customers.

The RCV allocation will also help to provide a level playing field between WaSCs and other companies that may provide services in this market. For this reason is important that the valuation includes all aspects that a new entrant would face such as the cost of land.

We will only require information from WaSCs on the economic value for sludge treatment centres. We will collect simpler information on other assets. Each WaSC

¹ Competition Appeal Tribunal, *Albion Water v Water Services Regulation Authority (Shotton case)*, judgment of 6 October 2006 and judgement of 7 November 2008.

can take a more sophisticated approach if they consider it will be significant to their overall valuation.

Where we have strong evidence that particular WaSCs have unrealised opportunities to generate income, we will consider if we need to take this into account in allocating the RCV. The approach we are taking is designed to reveal information to inform our decisions.

2. Market prices

Three WaSCs raised concerns over how to calculate market prices, including one WaSC that asked for clarity on sludge gate prices. They asked whether we would provide consistent assumptions on future energy prices.

Our approach reduces the reliance on market prices as it only takes into account differences in incomes and costs between the hypothetical and existing assets. Therefore we do not need consistent forecasts of energy prices, as we are interested in what companies are assuming in planning the economic use of their bioresources assets.

We expect WaSCs, unless they have clear evidence to the contrary, to assume that bioresources are processed in the same locations, but not necessarily with the same technology. WaSCs have the best knowledge to judge what the most appropriate technology would be if new bioresources assets were to be built on greenfield land, without the constraints of the current site.

The valuation should not be sensitive to the current arrangements in terms of whether energy is used by the WaSC or sold, as companies are incentivised to choose the approach that maximises the value. We expect that in most circumstances the approach will not vary between the existing and hypothetical assets, particularly as we require companies to assume that the March 2020 configuration of sites remains unchanged.

Judgements about market prices and the selection of hypothetical assets are closely linked. We are not providing prescriptive guidance on either area. We expect WaSCs to expose the assumptions they make. We expect WaSCs will, in any case, require forecasts on market prices for their long term sludge strategies. However, the approach we are taking should limit the impact on valuations if there are differences in assumptions between WaSCs. If helpful, we will provide feedback on WaSCs' assumptions in January 2018.

3. Assumptions about future throughput

A number of WaSCs make comments or suggestions about assumptions about throughput at sites. These include that:

- these should take into account the agreements as at 2020;
- these should exclude capacity required to treat third party sludge; and
- Ofwat should give guidance on population growth and additional throughput due to increased environmental requirements.

In principle, this is a key issue as the future revenue streams determine economic value. However, under our approach, the valuation will be more sensitive to the selection of the modern equivalent as opposed to the forecasts of throughput.

Companies should assume that the modern equivalent has the same capacity as the existing assets at 31 March 2020, in line with the guidance in **table 4.1**. While in practice a WaSC might size future assets differently compared to existing assets, it should not for this exercise. Therefore the throughput for the hypothetical assets should be the same as the existing assets. The only difference in income should arise if there is a differing capability of existing and hypothetical assets, for example more efficient production of energy. We do not expect WaSC estimates of valuations, following our process, to be sensitive to company forecasts of throughput.

For the submission in the autumn 2017 WaSCs should use best judgment in forecasting throughput. For business plans in September 2018 we will expect internal consistency between the valuation of bioresource assets and the rest of a WaSC's assumptions.

4. Asset lives and maintenance costs

One WaSC emphasises the importance of maintenance costs in considering asset lives. It suggests that both the Common Framework for Capital Maintenance Planning are used in assessing asset lives and that the adjustment for asset lives was on a linear basis, rather than through a present value adjustment. The latter will lead to a lower adjustment, which the WaSC thought was inconsistent as maintenance costs increase over the life of an asset. A further WaSC highlights the difference in approach in the consultation document that suggests a present value adjustment and the Reckon report that suggests a number of approaches, including a straight line approach. It also notes the difficulty of aggregating different assets.

We agree that the increase of maintenance costs over asset lives should be reflected in the valuation. But we consider this should be carried out explicitly, rather than being conflated with the adjustment for asset lives. We agree that the Common Framework for Capital Maintenance is likely to be useful for companies to consider in assessing asset life. Section 4.3 notes the difficulty of aggregating different assets and recommends that where possible adjustments are carried out at the lowest level possible. Whenever assets of different asset lives and/or asset ages are aggregated inaccuracies can occur under both a straight line and a present value approach.

Due to the underlying rationale of the economic value approach a present value approach to adjusting asset age is most appropriate as explained in section 4.3.

It is important that companies take a proportionate approach to the work that they undertake focusing on issues that have greatest impact on the overall valuation.

5. Cross checks and proposal of the RCV allocation

Nine WaSCs support the suggested approach to use cross checks to provide assurance that an RCV allocation based on its valuation will not have unintended consequences. No additional cross checks to those set out in the consultation were suggested. One WaSC's view was that cross checks are not necessary and we should use the economic valuation to allocate the RCV for all WaSCs.

It is important that WaSCs are able to propose a different RCV allocation in order to ensure there are no unintended consequences to customers. This allows companies to consider any concerns they have on the impact of the economic value approach (as noted above), whilst still providing a valuation using a consistent methodology.

6. Timetable, assurance and proportionality

Four WaSCs accept the proposed timetable is necessary, for instance noting that we had provided advanced notice in January 2017 to aid company preparation. The remaining WaSCs suggest either delaying the September 2017 submission by up to 4 months and/or reducing the expectations of the quality of the submission such as not requiring board assurance. WaSCs also raised the process for updating the valuation in the business plan.

The purpose of companies submitting information in September 2017 is to provide time for us to provide feedback and companies to take this into account when they provide business plans in September 2018.

Delaying the submission would increase the pressure on Ofwat and WaSCs at a later stage or reduce the quality of the analysis and feedback to WaSCs that Ofwat will provide in January 2018. Neither is desirable. It is important that the data provided is of a sufficient quality that we can use it to make industry cross comparisons and that Boards own the proposals that companies make. Given the range of views, on balance we will retain the timetable we set out in [IN17/01](#) and in our consultation.

A number of WaSCs set out that the valuation exercise should be proportionate. We agree. It is important that WaSCs focus on significant aspects that may affect valuation, as opposed to seeking a perfect theoretical answer. We expect WaSCs to highlight any weaknesses in the valuation that they submit and set out the steps they propose to take to address these issues or otherwise improvements that they consider they should make before submitting business plans. WaSCs should discuss with us any adjustments to the standard submission timetable (such as to update estimates or to accommodate board dates for assurance) they would like us to consider.

The prospect that a WaSC should discuss its submission with customers or its CCG was raised. While it will be important to discuss various elements of the bioresources service with customers, we do not anticipate it is productive to engage on the technical aspects of this valuation exercise. We make suggestions on the transparency we think is appropriate for customers and wider market participants in section 5.

7. Consistency with RAGs

A number of WaSCs raised potential issues between the definition of bioresources assets in RAG 4.06 and in the consultation. It was not our intention for any conflict to be suggested. They questioned whether any 'shared' asset value where the principal use was not bioresources should be included in the RCV allocation.

The **principal use** rule is set out in the RAGs, this applies at the **price control unit** level. For the current version of the RAGs this already applies to bioresources in anticipation of separate price controls for PR19.

For bioresources we do not expect significant levels of 'shared' assets. At co-located treatment works for instance, the operational assets will largely be distinctive as belonging to network+ or bioresources according to our RAG definitions. For assets which typically form part of overheads, such as site or area management offices, then these will typically fall under network+ under principal use. Where this is the

case, then under the RAGs bioresources will pay a recharge to reflect their usage of the assets in the regulatory accounts in the Annual Performance Report (APR). This use of shared assets is unlikely to be reflected through the economic value approach unless reflected within the hypothetical asset valuation. The allocation of the RCV is a separate issue to principal use allocations required in RAG 2.06, and therefore companies should include under a focused valuation an element of asset value for any assets the bioresources business materially relies on, that they believe they have not separately considered in their calculation of economic value.

8. Site level process

Two WaSCs propose that information should be provided at a site level rather than on individual processes.

We disagree. It is important that companies reveal information at a site level so that we can compare and contrast companies in order to be confident in the consistency of different WaSCs valuations. Sites are not homogeneous and so we need more granular information to be able to make comparisons. Where WaSCs consider the most appropriate data on valuation is at a site level, our tables allow this to be used, but wherever possible should then be allocated between the different processes.

9. Publication

Six WaSCs consider that a summary of information could be published in Autumn 2017, but it was important not to reveal site level data because of commercial confidentiality. Four WaSCs saw no reason to publish in September 2017, especially with the issues of commercial confidentiality, with three suggesting it could be published at a later date.

The purpose of publishing would primarily be to provide transparency on the bioresources RCV allocation process. It is important that the process is transparent and that customers and other stakeholders are able to understand the proposals that WaSCs make and the decisions we take. It is likely to be beneficial to all WaSCs by revealing information on the comparative values across different companies and ultimately enabling more robust valuations.

We therefore invite companies to publish on their websites a high level summary of their submission focused on interested parties that principally sets out at a company level (or where companies consider this appropriate categorised by works size bands and/or technology):

- the overall gross valuation of assets;
- the net economic value of assets; and
- the proposed RCV allocation.

We expect to publish our feedback to companies in January 2018, along with industry level information. As well as publishing the company level gross valuation, net economic valuation and proposed RCV allocations, we are likely to also publish more detailed information, such as where company values sit within ranges categorised by size bands and technology type where this is relevant to the feedback we need to provide.

10. Continued engagement

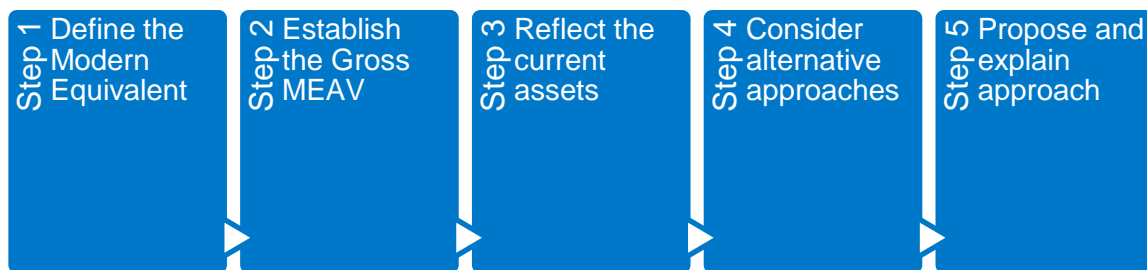
Most WaSCs ask for some form of continued engagement to be able to raise issues and receive further clarification to avoid unnecessary inconsistencies between companies.

We agree that this is sensible and we will provide companies and interested stakeholders a process for clarification questions to be raised and responses shared with stakeholders.

4. Process

In this section we summarise the step by step process that WaSCs will follow to value their bioresources assets and propose an allocation of the RCV for the bioresources control. This process, and the information that WaSCs provide, will allow us to review the consistency of approach between WaSCs and to ensure that customer interests are protected.

Figure 4.1 Process for WaSCs to propose an RCV allocation



4.1. Step 1 – Define the Modern Equivalent

To assess each WaSC RCV allocations we expect WaSCs to clearly set out how they have defined the modern equivalent asset. As set out above in section 3, this is the asset that they believe a hypothetical efficient new entrant would build at that location in order to provide the same service. We do not suggest that WaSCs speculate or survey potential new entrants to establish this. It should merely reflect what the WaSC would put in place with its 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.

The capacity of the modern equivalent should reflect the capacity of actual assets at 31 March 2020.

WaSCs should identify their assumptions in the context of their strategy for bioresources services. WaSCs will need to consider their expectations of market prices in the choice of the modern equivalent asset. The potential for energy production is likely to be an important consideration, including whether the energy would be best used by the WaSC or sold.

WaSCs must estimate the cost of building the asset on a new build basis. Throughout where we refer to an asset we are referring to the overall site and this could be a combination of assets and processes with a capacity to deliver the same level of service as the actual site, given the inputs they receive and the outputs that are required.

The valuation must include land and we expect each WaSC to have a clear distinction between the area of land that is required for bioresources and that of other services co-located on the same site. WaSCs must keep a record of the allocation of land at sites for the valuation that is then used to allocate the RCV to bioresources.

Where there are choices about the modern equivalent that could affect the valuation, we expect WaSCs to set this out and explain which of the alternatives they prefer, and why.

The table below sets out the key assumptions for WaSCs to make in defining the bioresources assets being valued:

Table 4.1 – Common assumptions for WaSCs to use in defining the modern asset

Definition	Guidance on assumption
Boundary for assets	<p>For the purposes of RCV allocation WaSCs must use the definition in RAG 4.06.</p> <p>Where consistent with bioresources assets in RAG 4.06, all transfers between intermediate sites should be included within sludge transport. Sludge assets (including storage for blending, mixing and consolidation with imported sludge) should use the 10% de-watering threshold for inclusion within the valuation.</p>
Capacity of facilities	<p>We expect WaSCs to assume the location, volumes and composition of sludge to continue, subject to normal central forecasts and approved plans for changes that are within the WaSC’s strategy for bioresources services. The capacity assumed should be sufficient to enable the WaSC to accommodate uncertainty in the forecast of future annual volumes and fluctuations or peaks in volumes within a year.</p> <p>We do not expect companies to speculate on potential trades with other companies beyond those that have already been agreed. We would expect that, unless there is clear evidence to the contrary, any trades in existence will continue.</p> <p>The economic value of spare capacity should be considered, including from mothballed assets. Excess capacity that would not be maintained with the hypothetical new build and has no economic value is to be excluded. Adjustments can also be made to the hypothetical new build cost to reflect expenditure would be necessary on process bottlenecks and mothballed assets that exist for the asset. No adjustment should be made where this reflects a backlog at a point in the cycle of normal maintenance for the actual asset.</p>
Location of facilities	<p>The current location and configuration of sites should be assumed to continue, except where the WaSC intends to</p>

	<p>change configuration as part of specific current or future business plans.</p> <p>The purpose of this assumption is to reduce the work required to complete the valuation and determine a realistic valuation (i.e. perfect optimisation is not realistic). For avoidance of doubt, we do not expect companies to undertake studies to consider the feasibility of construction of new assets.</p> <p>Where there is an inefficiency within the existing configuration of facilities, evidence to support an adjustment should be provided.</p> <p>The actual transportation assets owned by the appointee is to be valued, consistent with the assumption on capacity and location of facilities.</p>
<p>Level of valuation</p>	<p>As far as possible, WaSCs are to value sludge assets for each sludge treatment centre.</p> <p>It is likely to be proportionate to take different approaches when valuing other assets. Assets that are at remote thickening sites can be categorised by size band and type. For commonly used assets or allocated assets from other business units, for the purposes of the focussed RCV allocation these should be valued separately where they are not included within individual site cost models.</p>
<p>Sub site processes</p>	<p>As far as possible, WaSCs are to cost at a process level, or allocate the valuation to a process level. WaSCs should set out whether the valuation is at process level or an allocation has been used. A list of the standard processes that we expect WaSCs to use is set out in the data tables that accompany this document.</p>
<p>Ownership of assets</p>	<p>WaSCs do not need to consider assets that are not owned by the appointed business if these are not integral to the valuation of hypothetical assets for the site. This includes those owned by associated and non-appointed businesses and those owned by third parties where activities are outsourced.</p> <p>Where the hypothetical new build includes assets not owned by the appointed business, an adjustment will be made between the gross and the net value to reflect this (reflecting the difference in economic value).</p>
<p>Treatment of sludge liquors</p>	<p>The value should assume no change to the existing treatment of sludge liquors as set out in RAG 4.06.</p> <p>Where the hypothetical new build asset results in a change in the sludge liquor treatment cost of the network plus business and WaSCs can identify this, an adjustment would be made to reflect the existing arrangements for the net valuation.</p>

Reckon provide in their report a number of scenarios for how WaSCs should establish the hypothetical new build asset that may help to illustrate the assumptions in the above table.

4.2. Step 2 – Establish the gross MEAV

Some WaSCs will have made recent investment in their assets using a modern technology. For others, they may be successfully optimising revenue and costs through using their existing assets. However, in all cases the WaSC level RCV allocation should reflect the economic value of those assets, which may raise different issues to the use of MEAVs in previous regulated price controls.

To approximate for this, companies should estimate their costs for the asset processes for the Modern Equivalent. Companies should be clear about data and assumptions underpinning their view of Modern Equivalent and are to provide this evidence to Ofwat as part of their valuation.

For this exercise WaSCs are to forecast the economic value of their sludge assets as at 31 March 2020. Where WaSCs base their valuation on the actual assets as at 1 April 2017, they will need to roll forward to 31 March 2020 with forecast expenditure and run off of depreciation.

The Reckon report considers a wide range of issues that should assist companies in establishing the valuation of the sludge assets. Reckon also highlight that it is important that a consistent approach between companies is taken to the valuation. However, given the variety of sludge assets and the potential for differing sludge strategies between WaSCs, there may be scope for variations in approach between them. We will need to test the appropriateness of WaSC approaches when we review company estimates of the economic value of their bioresources assets.

Given the nature of sludge assets, WaSCs are to consider separately the economic value and the related assumptions for:

- Energy generation and renewable energy incentives for bioresources;
- Bioresources end product value (e.g. sale as fertiliser to agriculture); and
- Transport and treatment of sludge for treatment and disposal, including third party waste.

The RCV allocation that WaSCs propose will reflect the value for the appointed bioresources activities for the WaSC as a whole. For the purposes of the valuation exercise we expect WaSCs to estimate the economic value components of Sludge Treatment Centres (STCs), and allocate the revenue streams including energy, bioresources end product value and third party income to this. This reflects the approach of establishing the hypothetical new build asset for each STC, and then

adjusting this to reflect the actual assets and differences in the economic value such as from operating and maintenance costs and revenues.

WaSCs will therefore also need to include in the valuation other assets that contribute to sludge transport, treatment and disposal, including:

- Sludge assets at satellite waste water treatment works.
- Vehicles and other plant involved in sludge transport and disposal.
- A share of management and general assets where the principal use is within the sludge business unit.
- A share of other assets that the sludge business relies on where the principal use is in other business units.

4.3. Step 3 – Reflect the current assets

The gross value of the WaSC's sludge assets needs to be adjusted to reflect the economic value of the current assets that will be owned by the WaSC on 31 March 2020. We expect these adjustments, as far as possible, to reflect differences in economic value to the hypothetical new build costs that have been assumed. There are a number of reasons to consider adjustments including:

- The existing assets will have different age profiles and remaining economic lives than the new build assets.
- Where assumptions have been made on the maintenance and operating costs of the new build asset, adjustments are required to reflect differences to what the existing assets are already delivering.
- Where WaSCs identify what revenues (e.g. from energy generation and from bioresources end product) would be generated from the hypothetical new build assets, adjustments are required to the net value to reflect the existing potential revenue generation from the actual assets. We expect WaSCs to clearly set out how they have arrived at market prices assumed in making any adjustment.

Adjustments need to take into account the economic value concept. The impact that this has on differences in asset age is set out in the section below. Other adjustments (differences in revenues and ongoing costs), need to be made in present value terms and so discounted over the remaining economic life of the existing asset.

We expect companies to take a proportionate approach. Where a company considers there are no material differences between the modern equivalent and actual assets then the only adjustment that may need to make is to adjust for the difference in asset age. However, companies need to consider if there are likely to be differences in net costs as actual assets reach the end of life. For instance,

maintenance costs can be an important factor in considering the remaining life of actual assets.

We summarise below our suggested approach that WaSCs should take to a number of the valuation issues. Where a WaSC can justify taking an alternative approach, we expect it to highlight this and explain why.

Table 4.2 – Common assumptions that WaSCs should use in valuations

Valuation issue	Suggested approach
Land Values	<p>Land should be valued based on a hypothetical new build basis. Where WaSCs do not have site specific estimates for the market value of their actual sites, WaSCs could consider using the standard value for industrial land published by DCLG by region. This is consistent with the assumption that the assets would be based on the existing site configuration, rather than greenfield.</p> <p>Adjustments can be made to reflect the existing assets where this occupies a different area of land compared to the hypothetical new build. WaSCs are to keep a record of the allocation of land reflected in the economic value of the actual assets.</p>
Shared services and management and general	<p>The valuation is to include an efficient element of construction cost overheads and management and general overheads in site costing. In addition, WaSCs are to also include in the sludge asset valuation a proportionate allocation of other business assets that would be required by a separate sludge business, such as central IT infrastructure, HR and finance systems, head office buildings and other assets which the sludge business may be indirectly benefit from, but for which the sludge business use is not the principal user of the asset.</p> <p>WaSCs can either reflect shared assets within site level valuations or separately, but should be clear on their approach in the commentary.</p> <p>Assets primarily used by the sludge business but not part of the sludge process site costing (e.g. vehicles) are to be included within the sludge valuation. Adjustments to recognise any shared use of other business units are to be stated clearly in the narrative accompanying the submission.</p>
Work in progress	<p>This should be included at cost in the valuation. This would form an adjustment to the existing assets as the WaSC with new site processes would assume that this was the same as the hypothetical new build.</p>
On costs	<p>WaSCs are to identify what costs are included in any cost models and how construction and other overhead costs that are not included have been incorporated.</p>

Grants and contributions	No adjustments should normally be made to the net value for historic grants and contributions as they are not relevant to the forward looking economic value, except where the hypothetical new asset would attract a grant or contribution.
Infrastructure assets	<p>Where WaSCs consider that the valuation of infrastructure assets is significant to the overall valuation it should take a proportionate approach as part of the economic value of the bioresources assets.</p> <p>In other cases we would expect infrastructure assets to be valued on the basis of a new build construction cost. The overall economic value adjustment for the site could be used to establish the net value of the infrastructure assets, given their relatively low value within the sludge business unit. In most cases we do not think WaSCs need to identify infrastructure assets separately from non-infrastructure assets for the purposes of valuation for the RCV allocation.</p>
Discount rate to be used in the economic value calculation	For the purposes of the September 2017 submission WaSCs should use the PR14 real weighted average cost of capital of 3.6%. WaSCs in their commentary should test the sensitivity of the valuation to this assumption on the sludge valuation. For the purposes of sensitivity testing we suggest that a WACC increment of -0.5% (ie 3.1%) should be used.

In addition WaSCs will find supporting information in Reckon’s report that accompanied our consultation helpful in considering the valuation of their assets. This Ofwat document takes precedence over the Reckon report.

Reflecting the economic lives of existing assets

WaSCs need to set out the average age and remaining economic life assumptions for each sub-category of non-infrastructure assets. WaSCs may have a variety of ways of understanding the economic life. The most robust could rely on a condition based approach, rather than the remaining accounting life which may be a conservative estimate. However, if companies have strong evidence to suggest that the remaining accounting life is unlikely to be conservative and is reflective of expected useful life this could be used.

In previous valuation exercises companies have often used straight line depreciation to reflect differences in asset life.

Net MEAV = Gross MEAV * (remaining asset life / (age + remaining asset life)).

This approach was appropriate for the context of previous asset revaluations, in particular understanding current cost depreciation and conducting an overall comparison of expenditure and depreciation to ensure customers paid an appropriate amount. The current regulatory framework does not require such a comparison.

Whilst understanding the age and asset condition of the sludge assets is still relevant, WaSCs should not automatically apply this approach. Understanding the discounted forward-looking economic value of the actual assets in terms of their operating costs, cost of maintaining the capacity and product quality and revenue generated compared to the hypothetical new build asset is our preferred approach.

WaSCs need to consider the mix of the different sludge asset lives within this assessment. In past valuations WaSCs often considered the civil, M&E and ICA assets separately. We would expect transport and IT equipment to also be considered separately.

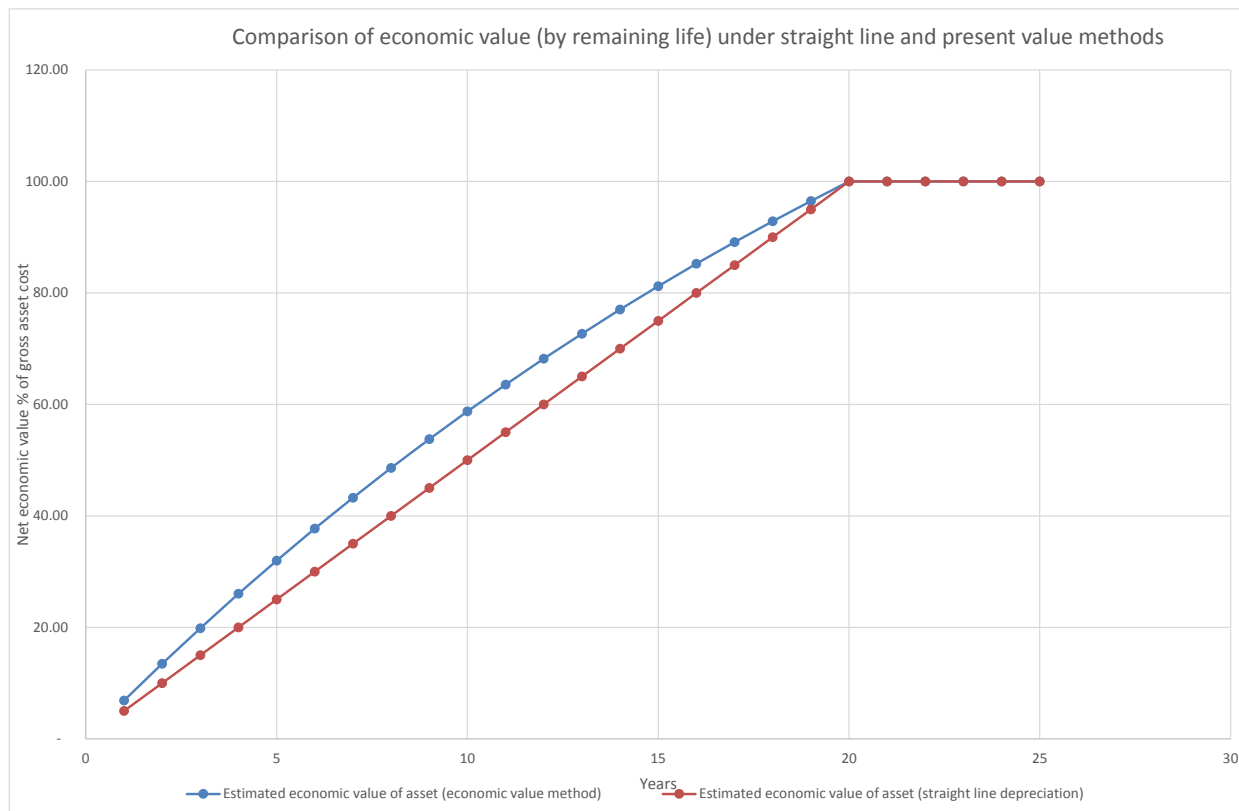
Reckon have provided guidance on how to derive overall economic lives from individual elements. This requires an understanding of the values of the elements, although this could be a relative amount, for example a percentage of the overall value. As the value of assets is the aim of the exercise this potentially adds a level of circularity. Therefore it is worth avoiding this if possible. Therefore:

1. If the processes of the existing asset can be mapped directly to the processes of the hypothetical asset and there is no need to understand average asset life to make any other adjustments for differences in cost or income, then we expect adjustments for asset age to be done at this granular level.
2. In other circumstances either,
 - a. determine at a site level the economic life. Adjustments to the economic value of the existing assets in this case are required to take account of elements that have a different asset life. Elements with lower asset lives would lead to a negative adjustment to take account of the extra maintenance costs and any elements that have longer asset lives require a positive adjustment to reflect the residual resale/scrap value, or
 - b. the values of the elements, which could be relative values, can be used as weights to calculate an average weighted asset life.

Where WaSCs establish a hypothetical asset that has a different economic life to their existing assets, they will need to make adjustments between the gross cost of the hypothetical asset and the net value of the existing assets in a way that is consistent with the economic value concept.

Where the existing asset has a different economic asset life to the hypothetical asset, there is a risk of undervaluing the existing asset if straight line depreciation is assumed when calculating the net value. This is illustrated in the diagram below:

Figure 4.2 – Comparison of adjustment to economic value to take account of economic life of existing assets under straight line and present value adjustment methods



In the example above the hypothetical asset has a life of 20 years. For the short cut in the absence of market prices we are effectively assuming that the construction cost of the assets would reflect the economic value, with the discount rate of the future revenue stream reflecting the return. The adjustment to reflect differences in the economic value of the existing assets and differences in its remaining life from the 20 years of the hypothetical asset needs to be reflected in the net economic value. If straight line depreciation is used, this does not recognise that hypothetical asset and actual asset both existed in the most recent years, and would only produce the same economic value over 20 years as an approach using discounted present values. This could represent a misallocation of the value at any point in time.

It is also important to separately consider the differing net cost (e.g. maintenance requirements) as the assets reach the end of their economic lives. This should not be conflated with the adjustment for differences in asset life.

Therefore, in order to reflect the economic value, we expect adjustments for differences in age between the hypothetical and existing asset will reflect the proportion of the discount rate over the asset life. This reflects that the existing asset will remain in use at the time period closest to the point of valuation. So in the diagram above, an adjustment to reflect an existing asset with a remaining economic life of 10 years would have c58% of the gross construction cost of the hypothetical asset with a 20 year life, rather than 50%.

If WaSCs propose linking their run off of their 2020 RCV to the remaining life of their existing assets, this would appropriately use straight line depreciation over the remaining life of the asset, in this example 10 years, rather than a run-off approach that matched the economic value method. Given the purposes of the RCV allocation, we anticipate that straight line depreciation rather than a reducing balance approach will be appropriate to the run off of the historic bioresources RCV.

Table 4.3 Illustrative example of adjusting the gross MEAV to reflect the actual assets

Step	Value
a. New construction cost of process A of hypothetical new asset with a life of 11 years.	£10m
b. New construction cost of process B of hypothetical new asset with a life of 23 years.	£30m
c. = a. + b. Total hypothetical cost of sludge treatment centre	£40m
d. Asset life of hypothetical asset (weighted according to construction cost)	20 years
e. Sum of present value factors over 20 years for hypothetical asset at 3.6%. (Practically this can be found by a present value calculation with a single unit of value in each future year.)	14.09 (where year 1 is $1/(1+3.6\%)$) and subsequent years are previous year / $(1+3.6\%)$)
f. Sum of present value factors over 10 years remaining life for actual asset at 3.6% (Practically this can be found by a present value calculation with a	8.27

Step	Value
single unit of value in each future year.)	
g. = f / e. Adjustment factor to reflect remaining life of existing asset	58.8%
h. Annual additional operating and maintenance costs and lower revenues from existing asset compared to hypothetical	£0.1m
i. Discounted present value of h. over 10 years of remaining life of actual asset	-£0.84m
j. = i. / c. Adjustment factor for differences in operating and revenue costs	-2.1%
k. = g. + j. Net economic value of existing sludge treatment centre assets as proportion of hypothetical new build cost	56.7%
l. = k. * c. Economic value of sludge treatment centre	£22.7m (implied RCV run off of £2.27m over 10 years remaining life from 2020)
m. net asset valuation of intermediate sites, management and general and transport assets	£3m
n. Total sludge asset economic value proposed for historic RCV allocation	£25.7m

In their report Reckon raise further potential refinements to the adjustment for actual assets that could better reflect their economic value. These include differences in the profile of income streams due to assets degrading over time; variations in prices and costs over time; and adjustments that could reflect uncertainty of assumptions. We do not require that as standard WaSCs make adjustments to reflect these matters. These would require a degree of complexity, which we do not consider necessarily lead to a more robust valuation. In particular we do not think that the absence of these adjustments will lead to a systemic bias.

4.4. Step 4 – Consider alternative approaches

Rather than relying on a single approach to the asset valuation, WaSCs may want to take account of information from alternatives to this approach.

Whilst we are proposing to collect data at site level, this is for the purpose of ensuring that WaSCs approach valuation consistently across the industry. The RCV allocation will be a total for each WaSC, rather than being linked to the individual site. The cross checks and alternative approaches that WaSCs consider therefore can also be considered at a higher level than individual processes or sites.

One cross check that is likely to be relevant is for WaSCs to explain how the valuation has moved compared to the previous full revaluation carried out at PR09. The [CEPA targeted review](#) provides a useful analysis for companies to consider. Our analysis of the PR09 submissions has identified the following inconsistencies:

- WaSCs took a range of approaches to how they defined the modern equivalent asset. A few assumed standard advanced digestion technology and may have applied this consistently across the sites. Other WaSCs valued the existing processes at each site.
- Most WaSCs valued the processes (in terms of capacity and product) rather than the individual assets. Most WaSCs used costs curves, in some cases supplemented by third party information prepared by cost consultants. Standard industry cost models were used where WaSCs did not have sufficient data. A few WaSCs engaged consultants to undertake specific costing exercises to establish a unit cost against capacity and sense checked this against the costing models.
- One WaSC took a hypothetical approach to valuation based on design standards rather than directly referencing the existing assets on the site.
- A range of approaches were taken for valuing land. In some cases it was not allocated to sludge treatment centres separate to sewage treatment works. Some WaSCs used a separate inventory of land and others used a standard percentage of the other GMEAV costs.
- Some WaSCs indexed asset values and cost models using RPI, whilst others used COPI.
- Some WaSCs established the net value in relation to book life and age, whilst others made explicit assessments of asset condition in order to establish the remaining life and the Net MEAV.

The approaches and availability of data saw a range of accuracy grades being applied to the asset valuation, varying from +/- 5% to 25% of the reported total. Therefore we think that while the PR09 valuation provides a valuable reference

point, it is important that the RCV allocation to bioresources control represents a forward looking economic valuation of the assets. Current valuations will be more relevant for more recent sludge assets. However we will need to consider the quality of company past and current valuations in forming a view on company RCV allocation proposals.

WaSCs can cross check the valuation against the post privatisation expenditure and depreciation on sludge assets. Similarly, the more recent the expenditure, the more relevance that WaSCs can place on statutory accounts cost and depreciation information. WaSCs should also consider whether there are any asset types or lives where the statutory account book life is inconsistent with the age and remaining life of the remaining assets. The accounting life information will be more useful where there is no systematic inconsistency on average with the existing assets in use, even where at an individual sites there may be assets still in use that have no remaining statutory book life. The profile of maintenance and enhancement expenditure at a site may mean that the site has been substantially renewed, even where some asset types such as civils appear life expired in statutory accounts.

However, WaSCs will need to consider any issues with the reliability and accuracy of their measurement of tonnes of dry solids of sludge. Currently tonnes of dry solids are not measured in all locations and are frequently estimated. WaSCs will need to consider the reliability of scaling information where they are considering cross checks between the valuation information from different sources or between sites.

WaSCs will need to consider in their business plans the link between the RCV allocation and the maintenance of their existing asset base in their sludge investment plans. The level of maturity and certainty of their sludge strategies will inform how useful explaining the proposed RCV allocation against historic and future maintenance investment may be. For this submission, we expect that WaSCs will:

- Reflect the expected development of bioresources markets.
- Protect customers of bioresource and network plus businesses by not transferring value from customers to WaSCs owners, such as through changes in wholesale charge structures and avoiding undervaluation of assets in the more competitive bioresources business.
- Be transparent on assumptions and approaches to allow Ofwat to scrutinise WaSC proposals proportionately.
- Demonstrate that valuation is consistent with evidence on the economic value of the sludge assets.

WaSCs do not need to base their valuation on the cost of existing assets, or provide condition data, where WaSCs provide assurance and evidence to support their hypothetical new build definition and costings. Where WaSCs use alternative

approaches to their proposed RCV allocation, we still expect WaSCs to set out the information on the economic value of the assets using the valuation approach set out in this guidance. The adjustment lines in the tables, either at site or in total as appropriate can be used for WaSCs to include their proposed RCV allocation, with an explanation for these adjustments in their commentary.

Existing asset costing should be provided by WaSCs as a cross check (with an alternative set of tables where necessary), if WaSCs believe there is a material difference to an economic value basis that affects their proposed RCV allocation.

The table below summarises some of the issues WaSCs could consider as cross checks or alternative approaches in arriving at their proposed RCV allocations.

Table 4.4 – Potential cross checks and alternative approaches to RCV allocations

Cross checks and alternative approaches to RCV allocation	Issues for WaSCs to consider
Roll forward of PR09 valuation	WaSCs can consider a roll forward of the 2014-15 Net MEAV (based on the full revaluation of assets carried out at PR09). This comparison is a useful cross check, but would need consideration of the limitations of the valuation and the change in context.
Gross MEAV approach to RCV allocation	This would not reflect an appropriate approach to a focused allocation of the RCV to the bioresources price control.
Splitting pre-privatisation assets at a discount to the RCV and post privatisation assets at full value	This is particularly relevant if all or most sludge assets have effectively been replaced since privatisation. However, this may be difficult to calculate given changes to asset records and accounting classification since privatisation.
Historical expenditure	Depending on the data and how new the assets are, this information may provide a useful cross check.
Projected expenditure – e.g. proportion of future expenditure expected on bioresources assets	Future maintenance expenditure could be compared to the proposed net value and remaining life of the assets as a cross check.
Net MEAV	Comparing an approach based on the valuation of the existing assets and their remaining life to a hypothetical new build adjusted for differences in economic value will be a useful cross check.
Averaged or hybrid approaches	In arriving at the RCV allocation, the choice between different approaches should consider the wholesale charge structure impacts.

4.5. Step 5 – Propose and explain approach

Having information that is robust helps everyone build trust and confidence in the sector. We expect WaSCs to provide a comprehensive narrative which will aid our understanding and allow for proportionate scrutiny of each WaSC submission.

We provide below a non-exhaustive list of elements that we expect each WaSC to cover accompanying the specific information we request in section 5.

Table 4.5 – Non-exhaustive list of elements WaSCs should explain to support their proposed RCV allocation

No	Item
1	A clear explanation of the approach taken to the valuation.
2	A rationale of the valuation approach and how it satisfies the guidance document.
3	A clear explanation for how the economic value of the assets has been assessed, both how the hypothetical new asset has been defined and adjustments made to reflect the life and differences in economic value for the actual assets . A commentary for the submission tables, cross-referenced to supporting evidence may be useful.
4	An explanation of the sources of asset cost, asset life and operating cost and revenue information, and the degree of confidence that WaSCs have in this data.
5	An overview of the sludge assets should be provided: We expect this to include: <ul style="list-style-type: none"> • An asset description. • Site and capacity information.
6	Land values separately disclosed and approach to valuations explained.
7	An overview of the sludge processes for each site.
8	Where applicable an explanation for “ on-costs ”, which have been added to project values. This, is not limited to, and could include: <ul style="list-style-type: none"> • Project Overheads (project management, central overheads, etc.). • Risk and contingencies applied. • Any Preliminaries. • Design and Management Factors. • Any commercial settlements arising from disputes.
9	An explanation of the assurance procedures undertaken.
10	A description of the cross checks that the WaSC has considered and the sensitivity of the proposed allocation to the approach taken. WaSCs should confirm that they have followed the specific expectations set out in this guidance. Explanation of how the impact on wholesale charges, including trade effluent, has been considered should be included. Where appropriate please support the explanations with evidence .
11	An explanation of the proposed RCV allocation taking into account all of the above.

We will determine the RCV allocation to bioresources (and therefore to wastewater network plus) as part of PR19 final determinations after WaSCs have had an opportunity to address any issues when they submit their business plans and our comments on the allocation in our PR19 draft determinations

We consider that the information and data we are requesting from WaSCs is reasonably required for us to set a separate price control for bioresources. WaSCs licences have been modified so that we will set a separate price control at PR19. Licence conditions require WaSCs to provide us with information that we reasonably require to enable us to set price controls.

We will take into account assurance (including Board assurance) that WaSCs provide in support of their proposed RCV allocation in deciding what level of scrutiny is proportionate for this information. Our scrutiny will inform our decisions at PR19 and our view on the quality of their plans.

5. Requirements for information to be provided by 29 September 2017

This section sets out the requirements for the information that WaSCs need to provide on their valuation and proposed RCV allocations by **12 pm on 29 September 2017**. Submissions should be sent to rcv.allocation@ofwat.gsi.gov.uk

We have decided to request information in advance of PR19 business plans for two purposes:

- It will help avoid issues in business plans that could not easily be foreseen by WaSCs which if they existed would reduce the quality of the business plan which would not be in the interests of customers.
- Asking for this information that is required for price setting early will help to reduce the demands on both WaSCs and us in the peak of PR19 process.

Guidance for the information that we propose to collect is set out in section 4 and the tables that will collect specific information are described in section 6 below.

WaSCs should provide a named contact for any queries in relation to the submission.

Assurance of the sludge valuation submission is important given the variation in the approach and the quality of information provided by WaSCs for the full asset revaluation carried out at PR09. The change in context for this valuation as a focused allocation of the RCV also requires a wider range of considerations for WaSCs that requires Board assurance.

It is important that WaSCs focus on significant aspects that may affect valuation, as opposed to seeking a perfect theoretical answer. We expect the Board assurance statement to highlight any weaknesses in the valuation that they submit and set out the steps they propose to take to address these issues or other improvements that they consider they should make before submitting business plans.

In the table below we provide our view on the assurance that WaSCs categorised as self-assurance under the company monitoring framework should provide on their submission.

Table 6.1 – Expected assurance for September 2017 submission

No	Assurance Item
1	A signed statement by the Board that the valuation approach and proposed RCV allocation is supported by the Board. The assurance statement is to set out the accuracy of the data tables and supporting information and confirm any material assumptions have been exposed. The statement is to confirm that the approach taken reflects the guidance provided by Ofwat, setting out any areas where an alternative approach has been taken, and why this is. The statement to set out the assurance information that the Board has considered in making this statement. We expect it to highlight any weaknesses or uncertainty found in providing this data and how this will be rectified.
2	We expect that WaSCs will want to provide any evidence from independent reviews of the approach, information or data that supports the assumptions made in the submission. This could include: <ul style="list-style-type: none"> • Assurance on the source of costing and supporting information used to support the calculation of economic value. • Assurance on the quality of underlying data used to support this costing information. • Assurance on the asset data appropriate to the source. For engineering estimates this may include assurance on the procedures for these estimates. For underlying data sources we expect this to include the reliability of the information extracted from source systems, including underlying accounting records.

In addition to the signed statement above,

- WaSCs in the targeted category must set out how it considered whether external independent assurance was required for each of the areas set out in table 6.1, or further areas that the WaSC identifies as having a significant risk of impacting its calculation of economic value. Any reports provided by a third party should be provided.
- A WaSC in the prescribed category of the company monitoring framework must provide external independent assurance on each of the areas set out in table 6.1 and for any further areas that the WaSC identifies as having a significant risk of impacting its calculation of economic value. It must provide copies of the reports provided by independent third parties.

We will take into account the quality of the assurance that WaSCs provide regarding their information and the confidence we can place in the data provided when completing our assessment of the company monitoring framework.

Publication of information

It is important that regulatory processes are transparent and that customers and other stakeholders are able to understand the proposals that WaSCs make and the decisions we take. We accept that there is a balance between this and commercial confidentiality. Greater transparency will help each company develop a better RCV allocation for PR19.

We therefore believe that companies should publish on their websites a high level summary of their submission focused on interested parties that principally sets out at a company level (or where companies consider this appropriate categorised by size bands and technology):

- the overall gross valuation of assets;
- the net economic value of assets; and
- the proposed RCV allocation.

This will allow all WaSCs to be consider their own valuations against results for other WaSCs and should help develop more robust allocations for PR19. We expect to publish the feedback to companies in January 2018, along with industry level information. As well as publishing the company level gross valuation, net economic valuation and proposed RCV allocations, we are likely to also publish more detailed information, such as where company values sit within ranges categorised by size bands and technology type where this is relevant to the feedback we need to provide.

Data tables

Current cost asset values were collected in the regulatory accounts up to 2014-15. Since the introduction of the annual performance report we have not collected any asset information on an annual basis.

This valuation exercise will require more detailed information than was collected in the regulatory accounts. Asset information was collected at PR09 and PR14, some elements of this are repeated in this exercise.

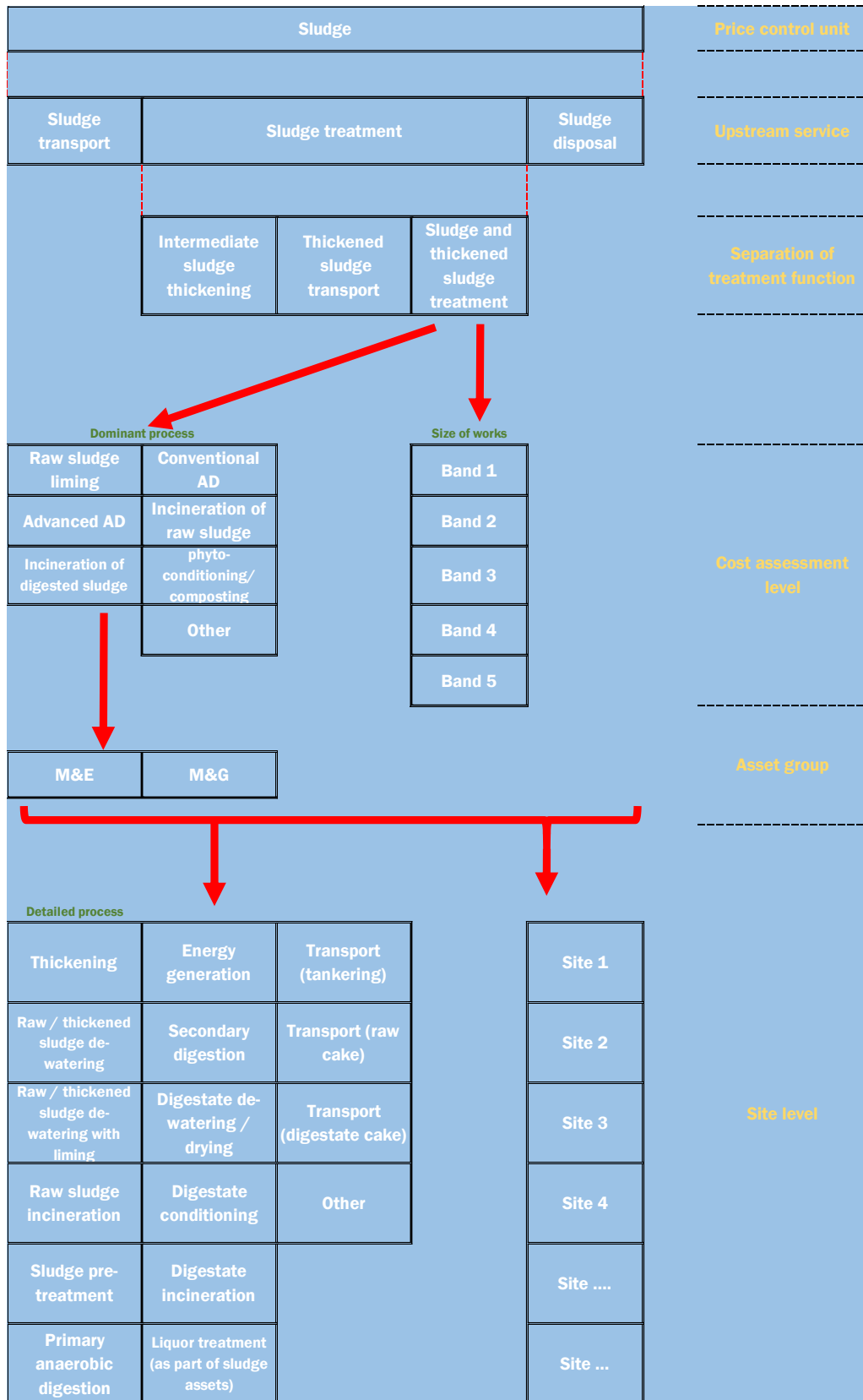
However, for bioresources, the information needed is at a more granular level than that collected in business plans submitted at previous price reviews. We will collect information on a site by site level. We are also taking into account the size of works and the treatment types used at each works. Although the data we are collecting is granular, it would have to be summarised from source records in any case.

However, it is important that the boundaries that have been developed for PR19, and are used in the APR for 2016-17, are repeated for this data. Therefore we need data at the most granular level to reconcile back to the level of reporting seen in the annual performance report, in particular the operating expenditure and capital expenditure data in table 4E (which shows costs at the 'upstream service' level).

This will give confidence that the granular data has been extracted from the same source data that populates the annual performance report.

The following diagram shows how the hierarchy of data flows from the annual performance report down to the granular site based data.

Figure 7.1 Hierarchy of data flows



The data tables are summarised below:

Table 7.1 Summary of data tables

Table	Purpose
1 Summary - RCV	<p>This table contains the economic value for bioresources (described for this purpose as net MEAV) and the company view of the allocation of the wastewater RCV at 31 March 2020 to the bioresource and wastewater network plus controls.</p> <p>Companies are required to forecast additions and disposals, using forecast data for additions consistent with their current expenditure plans and capital maintenance charges consistent with their approach to table 4G of their Annual Performance Report.</p> <p>If companies do not have sufficient data to calculate the economic value of sludge assets at 31 March 2020, they should complete a valuation at 31 March 2017 and use the forecast additions and depreciation lines to arrive at the net MEAV.</p>
2 Summary – MEAV	<p>This table contains information to roll forward the last reported MEAV value from the 2015 regulatory accounts through to the new valuation at 31 March 2017.</p> <p>Here the MEAV is split between the treatment functions and the management and general (M&G) element is separated from this. M&G should include allocations from non-sludge business units.</p> <p>Block A to be completed in nominal prices. Block B and C to be completed in March 2017 prices.</p>
3 – Site detailed data – sludge thickening plants	<p>Site level data for relevant thickening plants classified to bioresources under RAG 4.06 including the land and M&G element of the MEAV.</p> <p>MEAV data to be completed in March 2017 prices. 2015-16 and 2016-17 data to be completed in nominal actual prices, consistent with the equivalent lines as defined in the Annual Performance Report sections 2 and 4. Companies are not to duplicate expenditure with data reported for Sludge Treatment Centres.</p> <p>The actual asset age and actual asset remaining life should reflect a weighted average by GMEAV. Companies are to set out how they have calculated or recorded this information. We expect companies to also set out any adjustments to the proposed remaining life. These lives are to be as at 31 March 2020 consistent with the GMEAV estimates, or 31 March 2017 if companies are unable to do this.</p> <p>Companies should focus the economic value adjustments on the Sludge Treatment Centre sites. We do not require companies to establish a hypothetical asset for sludge thickening plants that are separate to Sludge Treatment Centres. Operating costs and revenues from intermediate thickening sites that differ because of the hypothetical STC should be adjusted through the STC value. A similar</p>

Table	Purpose
	<p>approach applies to differences in transport assets. Therefore the valuation for intermediate sludge thickening plant and vehicles should be based on company costing for a modern equivalent asset and is unlikely to need adjustments for economic value differences to actual assets, other than reflecting the estimated remaining life of the actual assets.</p> <p>We expect energy consumption, sludge volumes and population equivalent data to be consistent with Annual Performance Reporting and cost assessment submission data for 2015-16 and 2016-17. Companies should highlight any difference to the sludge volume definition in IN 17/04.</p> <p>Companies to include the name and location of the sludge thickening site.</p>
<p>4 – Site detailed data – sludge treatment centres</p>	<p>The data for sludge treatment centres includes the same definitions as table 3.</p> <p>The dominant process reflects the process that best describes the bulk of the sludge treatment volumes for the actual assets forecast to be in place at the sludge treatment centre on 31 March 2020 from:</p> <ul style="list-style-type: none"> • Raw sludge liming • Conventional Anaerobic Digestion • Advanced Anaerobic Digestion • Incineration of raw sludge • Incineration of digested sludge • Phyto conditioning / composting • Other <p>Size band are based on sludge volumes produced:</p> <p>Band 1: < 5 ttds</p> <p>Band 2: 5 to <10 ttds</p> <p>Band 3: 10 to < 20 ttds</p> <p>Band 4: 20 to < 30 ttds</p> <p>Band 5: 30 ttds and above</p> <p>We expect that the total GMEAV will match the total for each sludge treatment centre on the 6 – Inputs sheet. We expect the Net MEAV will match the total on the 7 – Calculations sheet.</p>

Table	Purpose
5 - Site detailed data - reconciliation to table 4E 'Sludge treatment'	This table reconciles the operating and capital expenditure data collected in tables 6 and 7 to table 4E of the published annual performance report.
6 – Inputs	<p>This table contains the valuation information. We expect companies will complete a column for each Sludge Treatment Centre and include non-site assets in the additional column. Intermediate thickening site assets are captured in table 3.</p> <p>Block A: Includes the name of the site. We expect companies to also list the processes at the site for the actual and hypothetical new assets, using the number references in column A:</p> <ol style="list-style-type: none"> 1. Thickening 2. Raw / thickening sludge de-watering 3. Raw / thickening sludge de-watering with liming 4. Raw sludge incineration 5. Sludge pre-treatment 6. Primary Anaerobic digestion 7. Energy generation 8. Secondary digestion 9. Digestate de-watering, drying 10. Digestate conditioning 11. Digestate incineration 12. Liquor treatment (as part of sludge assets) <p>Additional non-site lines are included for transportation. Screening should be included at the appropriate stage of the process. Cake storage would be under “9, Digestate dewatering, drying”.</p> <p>Block B contains the capacity of the existing asset processes. The units represent the output of that process. The actual asset is the current asset except where there are specific approved plans where this will be different by 31 March 2020.</p> <p>Block C contains the assumed capacity for the hypothetical new build asset. This will normally be the same as Block B, except whether</p>

Table	Purpose
	<p>bottlenecks or the nature of the asset requires a different hypothetical capacity.</p> <p>Block D contains the forecast average throughput / volumes, as a comparison to the total capacity in Blocks B and C.</p> <p>Block E contains the gross cost (excluding land) for the hypothetical new asset. We expect companies to explain the basis for the choice of asset. Companies are to also include the full cost (including on-costs) at process level. Where allocation to processes from cost data sources has been necessary, we expect companies to explain this.</p> <p>Block F contains the cost to be deducted from the hypothetical asset for assets that do not currently form part of the appointed business i.e. non-appointed assets.</p> <p>Block G contains the new built asset life for the hypothetical asset. Where this is weighted between different asset lives, companies are to set out the weighting factor used and explain this.</p> <p>Block H contains the remaining economic life of the actual processes. This input is required as a cross check and is to reflect the actual assumed remaining life, or a calculation from asset records. Where this is weighted between different asset lives, companies should set out the weighting factor used and explain this.</p> <p>Block I contains the age of the appointee assets existing processes. Where this is weighted between different asset lives, companies are to set out the weighting factor used and explain this, particularly where this differs from the approach used for block G and H.</p> <p>Block J shows the NPV adjustments to the economic value of the actual sludge assets for age and remaining life. This is to be calculated from the proportion of the asset life for the actual assets compared to the life of the hypothetical asset. Where the actual asset life is different from the hypothetical asset life, this is to be based on the proportion of discount factors rather than on a straight line depreciation basis. We expect companies to set out the calculation of these adjustments in a commentary and supporting spreadsheet calculations could also be provided.</p> <p>Block K can be applied instead of Block J as it applies the age and remaining life adjustment for the actual assets at site rather than process level. For each site, only one of Block J or Block K is to be completed, with the other input as zero.</p> <p>Companies can adjust the calculations in blocks J/K and L to reflect their RCV allocation proposals, using supporting information to justify their proposals.</p> <p>Block L shows the NPV adjustments to the economic value of the actual sludge assets for factors other than actual asset age and remaining life. This could be calculated as the discounted difference over the remaining life of the actual asset between the costs and</p>

Table	Purpose
	<p>revenue differences between the hypothetical and the actual assets. The calculation of these adjustments is to be set out in a commentary and supporting spreadsheet calculations could also be provided.</p> <p>Block M contains land valuation proposals and adjustments between hypothetical and actual assets.</p> <p>Block N sets out adjustments for any assets or land that are included in the hypothetical asset but should not form part of the economic value of the appointed business.</p> <p>Block O contains other adjustments to the valuation. Block O includes information on the operating costs and revenues (annual average in March 2017 prices) that have been calculated for the hypothetical and actual asset. We expect this to be consistent with the calculation of the hypothetical and actual asset adjustments in Block L. Companies are to explain any material differences from the actual reported data for 2015-16 and 2016-17.</p>
7. Calculations	<p>This table contains calculations of the economic value from the tables in section 6. We expect the totals will be reconciled to the values used in tables 1-4. We have left it open to companies to propose their own valuation on tables 1-4 after considering cross checks, whilst still completing 5, 6 and 7.</p>

All data in the tables to be completed in March 2017 prices, except for actual 2015/16 and 2016/17 data which is to be entered in actual nominal values.

6. Timetable

Table 7.1 Timetable for the bioresources RCV allocation

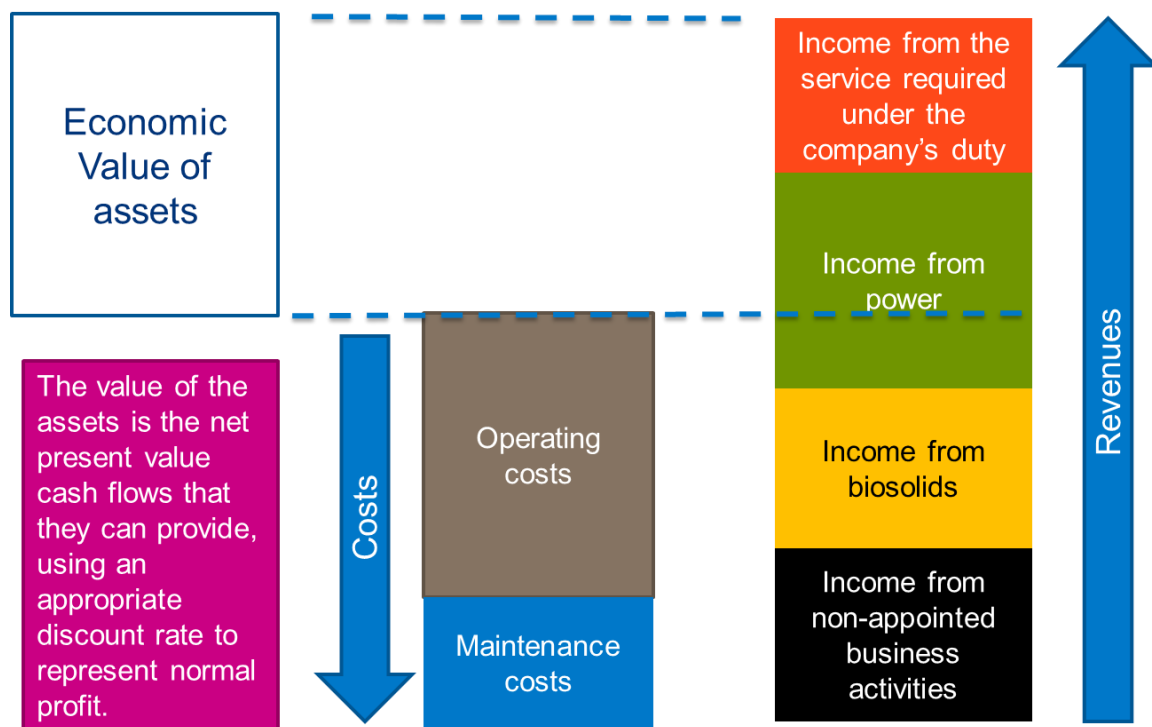
When	What
29th September 2017	WaSCs to submit bioresources valuation and RCV allocation and assurance information to Ofwat. This will allow us to give feedback and ultimately help WaSCs in providing a high quality business plan.
Late January 2018	Ofwat provide WaSCs with feedback on their valuation and proposed RCV allocation.
3 September 2018	WaSCs consider feedback from Ofwat and revise information as appropriate in their business plans. We will set out the requirements for companies alongside our methodology statement in December 2017 together with the other requirements for business plans.
July 2019	We will propose the allocation of the RCV to the bioresources control as part of our draft determination.
December 2019	We will confirm the allocation of the RCV to the bioresources control as part of our final determination.

Appendix 1

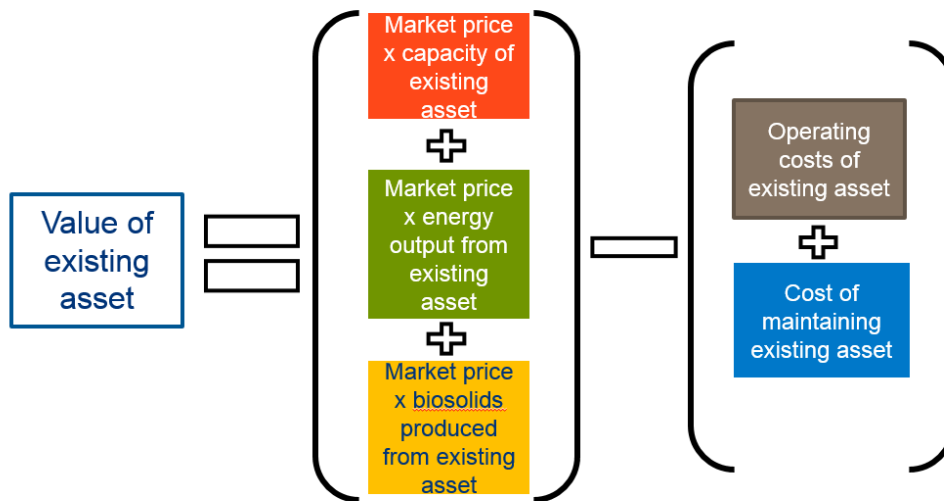
A1.1 Economic Value

The economic value of an asset can be derived from the income less costs (net income) that an asset generates over time. This is a forward looking concept that fits well with the development of markets. If we adjust the net income by the return that an investor would require to provide capital, we can calculate the present value of future net cash flows. This is a useful measurement of asset value.

Figure A1 Economic value of assets



We can also express this in the following way.

Figure A2 Equation for the economic value of assets

While it is a useful concept, it is difficult to apply in practice, unless market values are known. In the case of the income that is controlled by the price control this is circular as we want to understand asset value in order to set the price control. However, we can calculate the minimum price that a new entrant would be willing to accept to build assets and use this, which has a number of advantages.

- It removes the circularity between this valuation method and the price control.
- Reduces the reliance on estimating other market prices.
- It should lead to an allocation of the RCV that will help to provide a level playing field for a new entrant to build new assets to deliver future services in this market.

We consider that this approach will provide an appropriate context for all WaSCs to develop a consistent valuation through the following approach.

1. Estimate the cost of the hypothetical new assets that will deliver the same capacity as actual assets on each site (Gross MEAV).
2. Adjust this value to take account of any difference in the remaining economic life between the hypothetical new assets and actual assets.
3. Adjust this value to take account of any difference in present value terms of any running costs between the old and the new assets over the actual asset life.
4. Adjust this value to take account of any difference in present value terms of any income, other than income directly controlled by the price control, between the old and the new assets over the actual asset life.
5. The result is the net MEAV that reflects the economic value of the actual asset.

This process requires WaSCs to identify the assets a hypothetical new entrant would need to provide the same regulated service at the site on 31 March 2020. We consider that any efficient WaSC would understand the assets required to deliver efficient levels of service and the merits of alternatives approaches. This information could be available from a WaSC's sludge strategy and forward plan.

The most practicable approach is that WaSCs consider a valuation for the bioresources assets at each sludge treatment centre that has bioresources assets. This will enable the income at the site level to be considered in determining economic value. At some sites, such as intermediate thickening sites, it may be unlikely that any additional income would be earned. Therefore the only income that would be generated at this site is the income from providing the intermediate sludge processing service. This assumes a new entrant would build and operate just to provide the service on behalf of the WaSC.

The approach described above is similar to an approach included in [RAG 1.05](#). Appendix 3 of Reckon's report sets out alternative approaches to valuation.

The next section sets out step by step why this approach is equivalent to directly calculating the economic value of actual assets from the present value of the net cash flows.

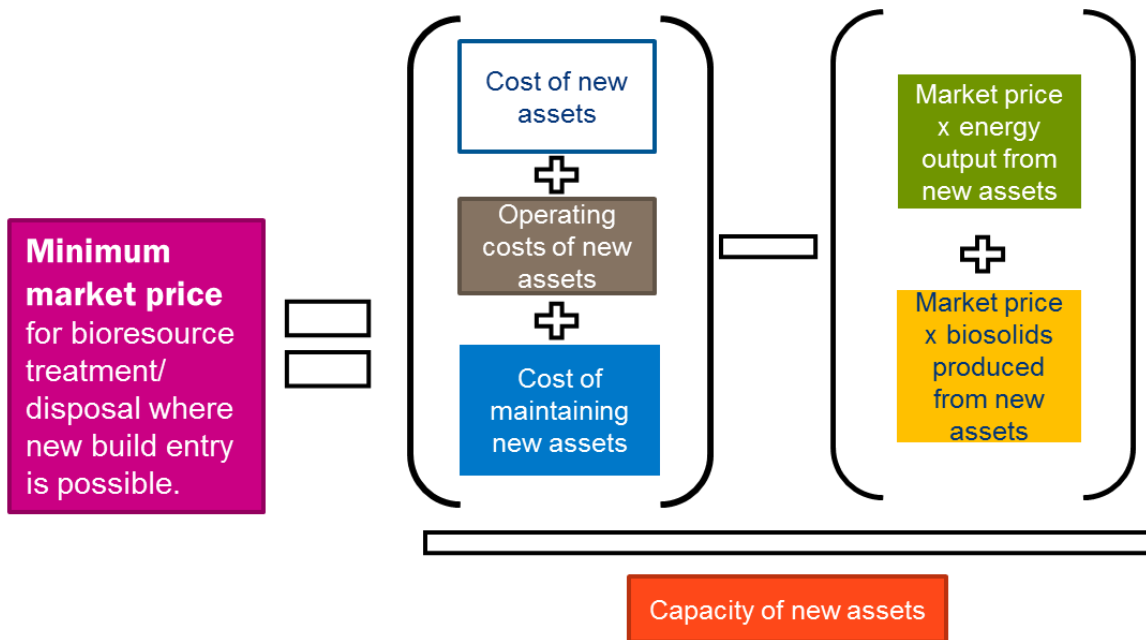
A1.2 Reconciliation between our approach and a direct calculation of economic value

Our approach relies on calculating the minimum price that a new entrant would require to invest in a new asset and assuming that this can be constant in real terms. In the long term this is a reasonable assumption as the benefit of an efficiently operating market is that it should have sufficient market pressure to lead to this minimum price. A new entrant would only invest if the revenues generated less the future costs incurred, or net revenue, will at least equal the cost of the asset taking into account a suitable rate of return.

$$\text{Minimum income required} = \text{cost of asset} + \text{running costs of asset} - \text{other income}$$

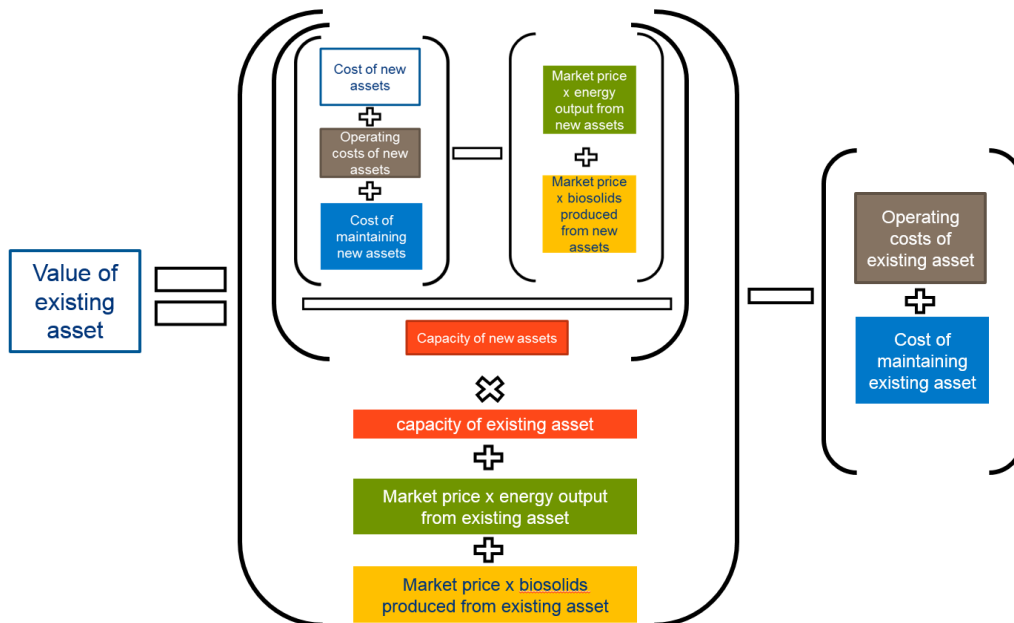
In the case of bioresources the main other income not directly controlled by the price limit is likely to be energy generation and from selling the resulting biosolids. Rearranging the formula and inserting income and costs specific to the bioresources control allow us to identify what the market price would need to be for the regulated service to allow new build entry.

Figure A3 Equation for the minimum market price that will support new build entry into the bioresources market for the regulated service



This can be substituted directly in the formula set out in figure 3.2 for the market price for the statutory service.

Figure A4 Equation for economic value of assets that does not require the market price for the regulated service



However, if the capacity of the new and the actual assets are the same then these terms cancel.

Figure A5 Equation for economic value of assets that does not require the market price for the regulated service if the new and existing assets have the same capacity

