

United Utilities Water

A review of options for further market participation in bioresources

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Table of contents

Executive summary	3
1. Introduction	7
2. Alternative forms of competition	10
3. Barriers to innovation and competition	16
4. Criteria for evaluating actions	22
5. Analysis of options and alternative packages	25
6. Conclusions	33
Appendix one: Detail of evaluation	34

A review of options for further market participation in bioresources

Executive summary

The current competition framework

PR19 saw a number of steps to promote competition in the bioresources market, including a separate price control, separation and a reduction in the protection of the Regulatory Capital Value from 2020, and publication of market information. As yet the development of competition has been limited. Contributory factors to this are likely to include that:

- it will take time for competition opportunities to be assessed and plans implemented to take advantage of these;
- where companies have spare capacity available, it will often be more economic for them to use their own capacity than to use other providers, this in part stems from RAG5 compliance;
- the costs of transport mean that sludge trading is most likely where there are treatment works close to another company's sludge treatment centre; and
- current regulations make co-digestion of sewage sludge and other waste generally uneconomic, which is a major barrier to new entrants and limits opportunities for water companies to digest other organic waste.

These factors mean that it will take time for competitive activity to develop. However, the scope for further measures to be taken to develop markets and promote competition, for implementation at the next price review, or earlier, should be assessed. In this paper we have considered alternative packages of measures and assessed their relative merits against key outcome criteria.

Purpose of this paper

The changes to the operation of bioresources discussed below will require substantial engagement from all those involved in the operation and regulation if they are to work for all. In undertaking this review we are seeking to contribute to the discussions and thinking on the development of bioresources and competitive markets.

Alternative forms of competition

We have considered a number of potential routes for future competition which could lead to better outcomes:

- **Trading**
Increased cross-boundary trading between existing water and sewerage companies. This requires companies to investigate opportunities and consider if the best option is to undertake treatment themselves or buy that service from another incumbent company.
- **Direct procurement**
Competitively-tendered discrete projects, with entrants building and financing, and possibly operating, new assets. This potentially provides competition for a very wide range of activities within bioresources, but would generally only apply to new or substantially redeveloped assets, as is the case with DPC associated with other price controls.
- **Bilateral entry**
Access to sludge by third parties to take responsibility for sludge treatment and disposal, and to be paid for that activity. This process could enable other organic waste treatment centres that have spare capacity to fill that capacity.

A review of options for further market participation in bioresources

- **Bidding**
Third parties bid to provide specific bioresources activities for incumbents, similar to the bid assessment framework for Water Resources. This activity could be mandated so that all bioresources activity is market tested to some extent.
- **Gate pricing**
An extension of bidding, with greater clarity of separation creating competition for supply. The incumbent “Network Plus” provider disposes of sludge to a bioresources operator at the best available price, i.e. it deals at arm’s length with the incumbent Bioresources function.
- **Unbundling**
An extension to gate pricing, with the Bioresources function formally separated and a fully disaggregated supply chain.

Criteria for evaluating potential solutions

We have also identified a set of criteria which enable an evaluation of the potential routes above to develop the bioresources market:

- **Customers – impact on prices**
A key driver for developing competition is to deliver better value for customers. Competition has the potential to reduce prices, but it could increase prices if increased risk means companies require higher returns, or if it leads to inefficiencies stemming from underutilised, or stranded, assets.
- **Competition – delivers potential for effective competition**
Potential actions need to be evaluated to assess whether barriers to effective competition are removed. We would expect changes to improve access to related markets for both third parties and incumbent companies.
- **Resilience – ensuring sufficient future capacity**
It is essential that future capacity is sufficient to deal satisfactorily with future sludge volumes and increasing environmental standards. This could be affected if the balance between risk and return is changed to disincentivise investment in necessary capacity.
- **Environment – supporting delivery of net-zero carbon**
Bioresources has a key role to play to enable the water industry to meet its ambition to achieve net-zero carbon by 2030.
- **Investor confidence – commitment to investment**
Ofwat has committed to protect the pre-2020 Regulatory Capital Value. Future changes need to provide scope both to fulfil that commitment and give investors incentive and confidence to invest in post-2020 assets.
- **Level playing field – Fair access for market participants**
Actions need to ensure fair access to markets for both appointed companies and third party providers.
- **Innovation – Innovative solutions**
Proposals need to enable and incentivise the use of innovative solutions.

A review of options for further market participation in bioresources

Analysis of options and alternative packages

We have considered a number of actions to promote competition, developed alternative packages of measures, and evaluated these against the criteria:

- Package 1**
 No changes beyond those already planned. Incentives to engage with competitive markets remain in line with those at PR19, with the additional changes to better enable co-digestion.
- Package 2**
 Innovative incentives promote taking advantage of opportunities through competition. Developing further incentive to engage with competitive markets, whilst removing barriers.
- Package 3**
 Innovation plus new forms of competition. To develop further incentive to engage with competitive markets, whilst removing barriers. Additionally to create a bidding market alongside consideration of other forms of competition.
- Package 4**
 Focus on new markets. In addition to the creation of a new gate pricing model of competition to remove some further barriers to trading.

Measures included in the package	Package 1	Package 2	Package 3	Package 4
Co-digestion	✓	✓	✓	✓
Bidding			✓	
Consideration of DPC			✓	
Consideration of bilateral entry			✓	
Encouraging sludge trading engagement	✓	✓	✓	✓
Separate assessment of business plans		✓	✓	✓
Modify Regulatory Accounting Guidelines		✓	✓	✓
Introduce incentives for sludge trading		✓	✓	
Encourage alternative delivery mechanisms		✓	✓	
Faster depreciation of pre-2020 RCV				✓
Gate pricing				✓
Functional separation				✓

A review of options for further market participation in bioresources

The table below sets out our evaluation of the packages against our criteria:

Assessment against criteria	Package 1	Package 2	Package 3	Package 4
Impact on prices	●	●	●	●
Delivers potential for effective competition	●	●	●	●
Ensuring sufficient future capacity	●	●	●	●
Delivering net zero	●	●	●	●
Commitment to investment	●	●	●	●
Fair access for market participants	●	●	●	●
Innovative solutions	●	●	●	●

Conclusions

Having reviewed a number of options the conclusion we reached was that there is a good argument both for taking action beyond that undertaken at PR19 and a need to be cautious about the degree of disruption and uncertainty that package 4 including gate pricing could create, particularly in relation to investment in future capacity and prices.

We consider that packages 2 and 3 could both deliver on the assessment criteria. If competition is seen as the key means of developing the market, then in the long term we conclude that package 3 may be the best way forward. However a reasonable argument could be made that changes in package 2 could be implemented first with the additional changes set out in package 3 implemented over subsequent years. Package 3 appears to provide the greatest potential to promote competition, protect customers and encourage innovative delivery of bioresources. Given the extensive range of activity envisaged in the package, it may be beneficial to prioritise those areas which overlap with package 2 first, with a commitment to implement in full in subsequent years.

A review of options for further market participation in bioresources

1. Introduction

Background

Challenges such as climate change and population growth mean the water industry needs bold, creative and innovative action to ensure it continues to deliver the best possible benefits to customers, the environment and society.

Sewage sludge is a natural residual of the sewage treatment process and is viewed as an area where the further use of competitive markets could improve access to a resilient and affordable service in the future. As most sludge is transported by road, it is less reliant on ownership of or access to networks that often leads to greater barriers to competition in other parts of the value chain.

Traditionally water and sewerage companies (WaSCs) carry out both the treatment and disposal of their own sludge under the legal requirement placed upon WaSCs as Sewerage Undertakers under the Water Industry Act 1991, and “Sludge Use in Agriculture” regulations where companies are termed sludge producers.

Efforts have been made to develop a market for sludge treatment and disposal and more recently the market has been termed “bioresources” to reflect the opportunities it presents. Further penetration of the market via competition is intended as a means of promoting improved efficiency, enhanced resilience and to encourage innovation across the sector. In May 2016, ahead of PR19, Ofwat stated that ¹“Given the financial and environmental benefits, Ofwat wants to empower markets to unleash innovation and efficiencies, bring in third parties and promote the trading of bioresources” adding “where there’s muck, there’s brass”.

Objective

The objective of this paper is to consider wider competitive market solutions in the bioresources market, to identify what the market could look like post 2025 and what benefits this could bring. This includes identifying potential forms of competition that could be applied to bioresources in future, consideration of the alternative measures which could be implemented at PR24, or beyond, together with an overview of what could be considered an appropriate bundle of measures. In addition, the paper considers other steps that could be taken to enable more flexibility in the delivery of bioresources, including the potential for import of other organic waste into bioresources treatment and how additional capacity could be created.

The current regulatory framework

PR19 saw a number of steps taken to promote competition in the bioresources market, including a separate price control, separation and a reduction in the protection of the Regulatory Capital Value from 2020, and publication of market information. Prior to PR19 the introduction of totex rather than capex and opex has in our view been successful in removing the potential for bias towards capital projects over alternative solutions. As yet competition has been limited. Contributory factors to this are likely to include that:

¹ PN 08/16, Ofwat, 2016. <https://www.ofwat.gov.uk/pn-0816-ofwat-calls-on-companies-to-put-customers-first-as-it-backs-new-1-6bn-markets-in-bioresources-and-water-trading/>

A review of options for further market participation in bioresources

- it will take time for competition opportunities to be assessed and plans implemented to take advantage of these,
- where companies have spare capacity available, it will generally be more economic for them to use their own capacity than to use other providers. In addition where spare capacity exists in the short term, given an expectation of growth in the volume of sludge, companies may be reticent to agree to longer term contracts as they may expect to use that capacity in future,
- the costs of transport means that cross-boundary competition is most likely where there are treatment works close to another company's sludge treatment centre,
- current regulations make co-digestion of sewage sludge and other organic waste generally uneconomic, which is a major barrier to new entrants and limits opportunities for water companies to digest other waste; and
- uncertainty relating to ongoing changes in regulation and the potential for new challenges arising that change regulation is making long term decisions on investment more difficult.

Companies are making efforts to promote competition

Substantial efforts are being made by many companies to try to identify and establish trades between companies. A limited number of trades have been established.

Yorkshire Water² at PR19 invited and assessed the potential third party options for a substantial proportion of its bioresources activity, including elements of bioresources treatment. This action identified the potential for substantial savings over the next AMP.

In August 2020 United Utilities issued a notice inviting ideas for sludge collection, transport and treatment services in the north of its region. This included looking at alternative commercial options to provide “turn-key” solutions, which include provision of finance and operating services, alongside providing upfront design and build services. The notice included pre-treatment of sludge, collection and transportation for treatment, and treatment of sludge and management of products.

Despite these and other company initiatives to promote competition, alongside efforts to promote and identify trading opportunities, the overall level of competitive activity has been limited. It is natural, therefore, that as well as allowing more time for the changes already put in place to work, there should be assessment of the scope for further measures to be taken to develop markets and promote competition, for implementation at the next price review, or earlier.

Encouraging further bioresources competition

Ofwat's review of incumbent company support for effective markets³, published in August 2020, highlights a number of company initiatives to support bioresources markets and encourage trading.

² Wholesale markets information note, Ofwat, March 2019. <https://www.ofwat.gov.uk/wp-content/uploads/2019/03/Wholesale-markets-information-note.pdf>

³ Review of incumbent company support for effective markets, Ofwat, August 2020. <https://www.ofwat.gov.uk/regulated-companies/markets/review-of-incumbent-company-support-for-effective-markets/>

A review of options for further market participation in bioresources

Ofwat also sets out the intent to investigate how bioresources markets are currently operating, what barriers might exist and how Ofwat and the bioresources sector might work together to secure greater benefits for all. Following Ofwat's announcement⁴ in October 2020 of an in-depth review of the bioresources market it is hoped that this paper can provide some useful insights into that work.

It is clear that there is both the general desire for greater use of competition in the provision of bioresources and a large number of potential ways competition can be encouraged. To date the primary focus of competition in bioresources has been trading between incumbent parties. The potential for competition goes beyond trading and this paper looks to consider wider market involvement. In this paper we discuss different forms of competition, steps that can be taken to encourage further innovation, criteria against which any benefits could be measured and then assess the potential for those benefits from a range of different packages of options.

When reviewing the options considered below it should be clear that, even when conditions support further competition, it will take time to emerge. The solutions recommended within this paper are solutions for the next 5 to 10 years. All markets develop over time with maturity, changes in technology and legislation as well as changes in regulation. This will therefore not be the end of the evolution of the use of competition in providing bioresources services, but is likely to be part of an ongoing journey.

Document structure

The remainder of this paper is structured as follows:

- **Section 2 – Alternative forms of competition**
Setting out the different forms competition could take in relation to bioresources.
- **Section 3 – Barriers to innovation and competition**
Detailing the main barriers that may inhibit the success of competition in bioresources.
- **Section 4 – Criteria for evaluating actions**
Identifying a series of criteria that can be used to evaluate the different packages of options to expand competition for bioresources.
- **Section 5 – Analysis of options and alternative packages**
Consideration of the different options for expanding competition against the identified criteria to identify a preferred solution.
- **Section 6 – Conclusions**
A summary of the key conclusions that can be drawn from the review.

⁴ Bioresources market monitoring, Ofwat, October 2020. <https://www.ofwat.gov.uk/regulated-companies/markets/bioresources-market/bioresources-market-monitoring/>

2. Alternative forms of competition

The most commonly considered approach to competition, and the utilisation of competitive markets in bioresources, is the mechanism that applies competitive pressures, and opportunities, to incumbents by introducing the potential for alternative providers to undertake bioresources activity. The form of competition, level of control, level of separation and market segmentation mean that there are myriad versions of what competition could look like. However, there are some forms of competition which are more easily implemented than others.

A wider view of competition can also include the ability for incumbent companies to undertake non-appointed activity that can have benefits both for the efficiency of appointed activity and wider society. Efficiencies of co-location and co-digestion, alongside the potential to export sludge to other waste treatment providers, can have a significant impact on the efficient delivery of bioresources. Below we have identified a number of options for expanding, or introducing, competitive opportunities in appointed bioresources activity.

It should be noted that whilst we have tried to identify discrete activities the various forms, including trading, bidding, gate pricing and unbundling, can be seen as on the same spectrum, and there are inevitably some overlaps between the forms we have identified. We have considered a number of potential routes for future competition which could lead to better outcomes.

We have considered a number of potential routes for future competition which could lead to better outcomes. These are summarised in the table below, followed by further details of what would be involved.

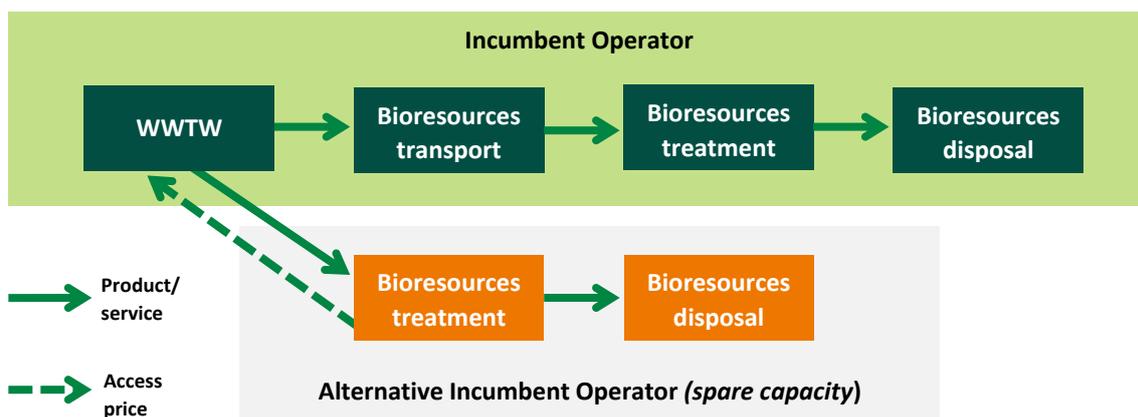
Competition route	Activities involved
Trading	Increased sludge treatment cross-boundary trading between existing water and sewerage companies.
Direct procurement	Competitively tendered discrete projects, with entrants building and financing, and possibly operating, new assets.
Bilateral entry	Access to sludge by authorised third parties which would assume responsibility for undertaking sludge treatment and disposal.
Bidding	A public process which would advertise for expressions of interest and invite bids for any bioresources activity from third parties – WASCs and other potential service providers. The incumbent would continue to optimise the costs of the company as a whole and Network+ and Bioresources functions would not be separated.
Gate pricing	The operation of a marketplace for treatment, facilitated by a central system, to enable allocation of work based on transparent factors, including price, demand, environmental impact and reliability of provider. The Bioresources function would be competing in this process having capacity reserved at an established price. To support this form of competition there would need to be clearer functional separation between Network+ and Bioresources
Unbundling	As for gate pricing, but with formal legal separation of Network+ and Bioresources activities. Investment protections will need to have been run down before separation.

A review of options for further market participation in bioresources

- **Trading**

Increased cross-boundary trading between existing water and sewerage companies. These trades can be short term, or long term. This approach is most appropriate when treatment works and sludge treatment centre are relatively close. The nature of the sludge being transported will impact the feasibility of longer distance sludge trades (for example the level of dewatering undertaken at the treatment works). The demographics of an area and quality of transport infrastructure will also greatly impact the distance over which sludge transportation may be viable. Where neighbouring companies have insufficient capacity, if there is spare capacity nearby, then trading can provide a more efficient solution. Opportunities for greater sharing of information on plans, requirements and spare capacity could be created to support the identification of potential trades. These opportunities could form part of an enhanced Drainage and Wastewater Management Plans (DWMP) process; a bioresources equivalent to the Regulators' Alliance for Progressing Infrastructure Development (RAPID); or some other information sharing platform. Often short term capacity needs stem from incidents or failures that reduce capacity. These are common given the composition of sludge and its variety of sources.

Figure one. Diagram setting out how trading operates:



- **Direct procurement**

Competitively-tendered discrete projects, with entrants building and financing, and possibly operating, new assets. This potentially could include bioresources, but would generally only apply to new or substantially redeveloped assets. This approach is best suited for large-scale enhancement projects and has potential to enable an increased range of financing providers to invest in the water industry. Direct procurement is likely to require some element of guaranteed return on investment which may impede efforts to increase trading and bidding.

- **Bilateral entry**

Access to sludge by authorised licensees, allowing those licensees to receive sludge from a water company's assets, and assume responsibility for undertaking sludge treatment and disposal. This would involve the incumbent receiving a fee for use of its network, common carriage, from the licensee. The licensee would apply for an authorisation to be able to remove a volume of sludge from a particular point in the network and be paid for the treatment and disposal of that sludge. The legislation sets out scenarios, both with, and without, a customer being identified, and benefiting. The Water Act 2014 Section 4 created, but has yet to have implemented, provisions to allow for authorisations for upstream competition. This would allow licensed providers to undertake elements of both water and wastewater provision. Discussion

A review of options for further market participation in bioresources

is underway in relation to the commencement of entry into the water resources activity, but as yet little has been published in relation to bilateral entry for bioresources. It is likely that the potential in this activity relates to parties who have spare capacity, be it water resources or bioresources treatment, and could make use of that capacity to take over the activity from the existing provider. The variation in quality of sludge creates an issue for the implementation of this form of competition. As there is no direct link between the waste produced by a particular customer and the sludge removed from the incumbents network detailed monitoring of the quality would be need undertaken to enable accurate charging. A barrier to the success of this system would be not having equivalent disposal restrictions. If in processing sewage sludge an entire waste stream were to become more difficult, and potentially costly to dispose of, it is unlikely that entry would occur.

- **Bidding**

To introduce requirements for facilitating bids for bioresources activity – this would involve a public process for inviting bids, but the incumbent would still be making its decisions on the basis of costs for the wastewater service as a whole. At present water companies can choose which elements of bioresources activity they put out to tender, rather than providing the service in-house. Many companies have undertaken extensive third-party tenders to provide specific bioresources activities for incumbents e.g. transport or treatment. This does not necessarily lead to increased levels of third party provision, which is dependent on how successful alternative options are. Following on from the development of the Bid Assessment Framework (BAF) for water resources at PR19, a similar process could be established for bioresources. The form of this mechanism could vary greatly, depending on the level of control and/or level of centralisation of decision making. As with trading there would be a benefit to greater exposure of opportunities that could stem from more information on plans, requirements and spare capacity being made available. In addition, the scope of activity included and how that would be packaged up would determine the impact this form of competition would have. It would be possible that on a periodic basis nearly all bioresources activity could be market tested to some extent. This approach provides greater levels of transparency and clarity when compared to trading.

- **Gate pricing**

The incumbent “Network Plus” provider disposes of sludge to a bioresources operator at the best available price, i.e. it deals at arm’s length with the incumbent bioresources function. This is an extension of the idea of a bidding market, where it is assumed that the full bioresources activity would be open for bids. This would operate as a marketplace for treatment, facilitated by a central system, which enables allocation of work and establishing a price. The price would be established dependent on supply and demand. To enable this process co-digestion, both for import and export, may be necessary to ensure there was competition for bioresources activity. The Bioresources function would be competing in the process having capacity reserved at an established price. Once awarded, it would then be up to the successful bidder to take responsibility for the function and decide its approach to the different elements of the bioresources process (either at the whole company level or specific geographic areas). The mechanism for comparing offerings would greatly affect the outcomes. Issues such as resilience of provision and environmental sustainability would need to be factored into any process, alongside the price. Rather than a dynamic market operating a short term decision making process the requirement for capital investment would almost certainly create a need for longer term contracts.

A review of options for further market participation in bioresources

- **Unbundling**

An extension to gate pricing, with the Bioresources function formally separated. The formal functional, regulatory and potential legal separation of bioresources activity from other incumbent activity would help clarify operational interactions and provide greater confidence for alternative providers of services. It is expected that unbundling will only be practicable once pre 2020 RCV protection had expired. Given an assumption that a need for a supplier of last resort would remain, unbundling would be more complicated. Unbundling would require a party to maintain an obligation to deliver bioresources services for an area.

Given that the scope of opportunity to which some of the forms of competition can apply is limited, we do not expect the development of competition to be in just one form. It is likely that a number of different competitive options will be developed concurrently. We have therefore included the development of multiple forms of competition in the packages identified.

All markets develop and change over time. Any forms of competition not introduced at this time may be considered appropriate at a later stage. Once a form of competition has been introduced it can be difficult to unwind those activities and therefore great consideration should be given to the impacts and the ability to modify decisions.

Competition in wider waste treatment markets

When considering the introduction of competition it is not just the potential for third parties, or other water companies, to undertake appointed bioresources activity that should be the limit of thinking. Incumbents providing non-appointed activity can generate benefits, not just for water companies but also for customers:

- **Co-location**

The siting of appointed and non-appointed waste treatment facilities on the same site, enabling the sharing of some facilities, however not mixing the waste streams. This sharing of assets can be more efficient, reducing costs for customers.

- **Co-digestion – refers to the treating together of sewage sludge and other organic waste**

At present the regulations on the treatment and disposal of sewage sludge and other wastes inhibit the ability of co-treatment. Changes to regulations are underway to enable these different wastes to be digested together, i.e. co-digestion. The Environment Agency in their policy paper (Environment Agency strategy for safe and sustainable sludge use as of 15 July 2020⁵) set out some of the key drivers behind co-digestion. The EA believes that removing barriers to co-digestion will enable greater innovation, improve gas production, and enable greater use of commercial opportunities.

⁵ Environment Agency strategy for safe and sustainable sludge use, Environment Agency.
<https://www.gov.uk/government/publications/environment-agency-strategy-for-safe-and-sustainable-sludge-use/environment-agency-strategy-for-safe-and-sustainable-sludge-use>

A review of options for further market participation in bioresources

- **Utilising spare capacity through trading**

Bioresources trading refers to different appointed companies identifying opportunities where, stemming from spare capacity, one company buys sludge treatment from another company. This allows the importing company to fill spare capacity, improving efficiency. It would also be possible for companies to create additional capacity utilising non-appointed investment to enable import opportunities.

- **Incumbent utilisation of third parties to deliver appointed activity**

At present the level of third party engagement in Bioresources may be underestimated. When incumbent companies choose to utilise third party delivery for an element of the bioresources activity, rather than an entire element such as disposal, this is not always reflected in reporting. Incumbent providers of bioresources outsource many of the activities undertaken, bringing in third parties via competitive tender. This is particularly the case in relation to capital works, which are normally outsourced through competitive tender.

Creating incentives and removing barriers to innovation

The creation of competitive markets increases the options for incumbent companies in how they meet their obligations in relation to bioresources. Alongside the opening up and expansion of competitive markets, removal of barriers to enable innovative, flexible solutions to emerge will be key to improving bioresources delivery.

Packages of activity

To help facilitate consideration and comparison of the forms of competition we have identified the options above. In general, we consider that the options are best considered in packages of activity whereby different measures complement and reinforce each other for greatest effect. In the next section of this paper we have collected together into packages a number of actions, including forms of competition, which enables a clearer comparison between packages to be made. It should be noted that power to introduce such packages rests across many bodies, including Ofwat, the Environment Agency and Defra, requiring cross regulatory and governmental support.

The packages of activity encompass:

- **Package 1 – Continuity of current structure**

Embedding and energising the potential for competition that was developed by the steps taken at PR19, approaching PR24 along the same lines as PR19. This package of activities includes some proposals to evolve gradually some elements of bioresources activity. Some of the barriers to greater levels of competitive activity are currently in the process of being addressed with the inclusion of greater clarity of information, greater focus on outsourcing of activity and alignment of environmental regulations allowing co-digestion. There were a number of changes made at PR19, including having a separate price control and separation and a reduction in the protection of RCV from 2020. This package of actions see these changes being allowed more time to further develop and mature. Companies are anticipating a need to demonstrate their efforts to engage competitive markets in future and this, alongside the other steps, provides a substantial increased incentive to engage. It is assumed that under this package, should the measures be ineffective at encouraging greater levels of engagement with competitive markets and innovation, further action would follow.

A review of options for further market participation in bioresources

- **Package 2 – Creating incentives to innovate and engage in competitive markets**
Building on the actions identified within package 1, the actions set out in package 2 look to improve incentives to innovate and engage with competitive markets. This includes creating incentives for trading, both for importing and exporting, and reviewing the RAG to encourage trading. This package would, within PR24, look to create incentives by allowing fast track of bioresources control, including market engagement as a factor in the assessment. Strengthening the focus on innovation and engagement with competitive markets in Ofwat's PR24 assessment would provide an incentive towards greater utilisation of competitive markets.
- **Package 3 – Creating incentives and new forms of competition**
Building on the actions identified within package 2, further forms of competition are proposed including a formalisation of bidding activity, to require companies to consider alternative solutions to meet obligations in line with the bid assessment framework. In addition the potential for DPC and bilateral entry are to be considered and if appropriate introduced.
- **Package 4 – Maximising exposure to competition**
Focusing on a new competitive market going beyond the proposals within package 3 in terms of form of competition. Rather than considering the development of bidding, DPC and bilateral entry, this package would develop disruptive change in the form of the creation of a transparent fully open competitive market. The proposals would separate bioresources activities from the rest of the appointed business more than at present through more radical changes such as increased functional separation and the introduction of gate pricing.

3. Barriers to innovation and competition

There are a number of factors which can inhibit the utilisation of innovation and competitive markets. Understanding what these barriers are and how they might impact market development is crucial to developing an effective approach for the future. Many of these barriers could potentially be addressed or reduced through implementation of proposals set out within this paper.

- **Co-digestion**

- Co-digestion is the digestion of sewage sludge mixed with other organic waste. At present the regulations relating to the treatment and disposal of sewage sludge and other organic waste differ. These differences in regulation create a barrier by requiring higher standards, and associated costs, to be met when treating and disposing of different waste streams together. Environmental regulations are already changing to enable co-digestion. Changes to interpretation will in future require more onerous standards for sewage sludge anaerobic digestion processes, moving to an equivalence to other organic waste anaerobic digestion facilities. This alignment removes a barrier to co-digestion, but does not eliminate all barriers.
- Further work is needed to align regulations relating to the disposal of sewage sludge which at present do not align with disposal of digestates from other organic waste. Work is progressing to address the barrier created by differing standards for biosolids disposal to agriculture. If the form new regulations relating to disposal take places substantially greater restrictions on biosolids from sewage in comparison to other organic waste this could act as a barrier limiting the potential for co-digestion, as mixing wastes could become uneconomical. Both of these changes are likely to introduce significant additional cost to bioresources provision, but should remove barriers that currently make co-digestion difficult. We anticipate that there could be significant benefits from opportunities relating to co-digestion, but these are dependent upon successful resolution of regulatory requirements and incentives.
- Ongoing uncertainty both with the form and timing of new regulations may inhibit companies' ability to take advantage of opportunities including co-digestion. It is unclear what a replacement to the Sludge Use in Agriculture regulations will look like, leading to cost uncertainty and business risk that market entrants may not want to take at this time. Whilst currently it is hoped that both changes will be ready by 2023, the ultimate timing remains uncertain and may frustrate efforts to allow co-digestion to be a significant part of PR24 business plans.
- The restrictions applied to disposal of biosolids from wastewater, in comparison to digestate from other organic waste, may act as a barrier to third-party entry through bilateral competition or bidding. If alternative bioresources treatment facilities, that primarily serve the treatment of other organic waste, have less restrictive standards for disposal of digestate, but on accepting biosolids from wastewater treatment these standards may become more onerous for the entire waste-stream. This could make most potential competition through third party entry uneconomic.

A review of options for further market participation in bioresources

- **Sludge related environmental regulations**

- Putting the opportunity of co-digestion to one side, there are some sludge specific environmental regulatory barriers to competition. The introduction of competition will increase the disaggregation of sludge services across the end to end production line covering transport, treatment and disposal. Companies will need the correct permits and meet permit conditions in order to enable the activities within the production line to be completed by different companies. This will increase the administrative activities to ensure that compliance with regulations is secured and the duty of care for waste management is effectively transferred from one party to the next within the chain of activity. Any situation where there is no permit or differences between permits will act as a barrier to trading between those parties.
- Although the industry is moving to comply with IED for the biological treatment of sludge, there are different clauses within the regulations that apply in different circumstances. This results in similar treatment sites with similar environmental impact being regulated differently, depending on where the sludge could go once it leaves site. For example, sludge treatment sites with disposal as an outlet, such as sewage sludge incineration, can only receive thickened or dewatered sludge from sites with Industrial Emissions Directive installation permits for sludge thickening and dewatering activity, termed “physico-chemical treatment of sludge”. This has implications for sludge trading as the whole end to end production line would need to have aligned permits in place across multiple companies to function freely. The time to obtain the appropriate permit would prohibit short term trades and the cost to obtain a permit and the obligations it imposes would be a barrier.

- **Information and awareness**

- Across many markets competition is often inhibited by asymmetric access to information, or general lack of published information, meaning that the opportunities to undertake activity may be difficult to identify. Until recently a lack of information may have created a barrier to the development of competition. However, over the past few years availability of information in relation to Bioresources provision has improved, taking a further step forward with the introduction of a centrally held dataset of both wastewater treatment works and sludge treatment centres⁶. The creation of this resource should ensure that a lack of information should not be a major barrier to alternative providers and neighbouring wholesalers identifying opportunities. It will take time to see if the information provided effectively supports greater utilisation of competitive markets.
- Visibility of both spare capacity and future shortfalls in capacity may need to develop further to highlight potential opportunities. However the dynamic nature of capacity make this a challenge to provide useable information. Opportunities for greater sharing of information on plans, requirements and spare capacity could be created to support the

⁶ Bioresources market information, Ofwat, Oct 2020. <https://www.ofwat.gov.uk/regulated-companies/markets/bioresources-market/bioresources-market-information/>

A review of options for further market participation in bioresources

identification of both trading and bidding opportunities. These opportunities could form part of an enhanced DWMP process; a bioresources equivalent to RAPID; or some other information sharing platform.

- **Costing of long-term trades**

- Recent changes to RAG5 have changed the approach to costing for short term sludge trades so that prices are closer to marginal costs incurred, rather than a full cost inclusive of asset investment. These changes open up greater potential for short term trades between companies, but do not address issues of longer-term trades. Dependent on the particular circumstances, the potential for longer-term cross border trades may be hindered by a cautious approach to prices calculated through the process set out within RAG5. Steps could be taken to incentivise further long-term cross-border trades by making changes, within RAG5, that enable companies to cost closer to marginal cost for long term trades, particularly where there are additional benefits from an import for the customer.

- **Lack of standardised process for sludge trading**

- There appears to be considerable variation in the way that companies seek to contract for cross-border trading. The creation of a standardised approach could help facilitate further trades.
- There is potential for sludge trading between different countries within the United Kingdom. As companies operating within Scotland, Wales and England operate in different regulatory environments these differences have the potential to impede sludge trading.

- **Understanding of functional separation and interoperability**

- The operation of wastewater sites has developed over many years, to create highly integrated and interdependent operations where the dividing lines between functions are difficult to clearly define. Defining and reporting on a more disaggregated range of services and activities has been a widespread feature of regulatory remedies for many years. Given the degree of integration in this case, moves to introduce a high degree of separation would need to carefully weigh the potential benefits of such an approach against the potential costs.

- **Timing of spare capacity and need for capacity for trading**

- One of the most impactful barriers to greater levels of intercompany trading is the timing of opportunities. There needs to be an exporter having a need for additional capacity at the same time an importer has sufficient spare capacity (or is planning to invest in its Bioresources assets, which may generate spare capacity). This is a dynamic situation as sludge growth gradually fills existing headroom, reducing the capacity available for receiving long term trades. In addition, the two locations need to be reasonably close to make the trade economically viable.

A review of options for further market participation in bioresources

- **Measurement of sludge quality**
 - Sludge is not homogenous. Because of the different inputs to and processes involved in wastewater treatment in different locations and environments, sludge varies in characteristics such as the level of solids, nutrient content and calorific value. To enable greater sludge trading, including treatment alongside other organic waste, further work is required to develop a reflective pricing regime for sludge. The factors that impact the treatability of a sludge are many. This treatability effectively points to the value of a sludge with factors including concentration and calorific value being important, but also characteristics such as plasticity, amount of grit, or the presence of foreign objects impacting greatly. There are a number of factors that affect treatability, and alongside those factors each sludge treatment centre has different characteristics that impact the cost of treating sludge. The creation of a pricing formula that accurately reflects the cost of treating sludge, whilst very difficult, would help enable trades.
- **Sludge liquor recharge**
 - Work is underway, led by Ofwat, and supported by trading parties, to consider how treatment of sludge liquors is recharged. A key driver of this work being moving towards consistency of methodology between companies. Without a level playing field there is the potential for any inconsistency to create a barrier to trading. However wider considerations, including the need for greater monitoring and the potential for significant variation in pricing in relation to Ammonia, make achieving a fair and consistent approach more problematic.
- **Risk associated with options for sludge disposal**
 - The Environment Agency strategy for safe and sustainable sludge use⁷ states “*Modern sludge practices may harm the environment. To maintain industry and consumer confidence, we need to demonstrate that any new hazards are controlled*”. This means that if hazards such as anti-microbial resistance, or micro-plastics, were in future assessed as requiring significant additional controls the costs of some routes for sludge disposal may become prohibitive. The potential for substantial changes in the costs associated with sludge disposal could discourage third parties from entering a market for sludge treatment and disposal. Previous changes, such as those brought about by the Urban Wastewater Treatment Directive that banned sludge disposal to sea from 1998, could happen in future. Current disposal options, including sludge use in agriculture and incineration, could be restricted or require additional expenditure to continue to be acceptable. With that uncertainty, even opportunities that are currently viable may seem unappealing to investors and alternative operators.

⁷ Environment Agency strategy for safe and sustainable sludge use, Environment Agency.
<https://www.gov.uk/government/publications/environment-agency-strategy-for-safe-and-sustainable-sludge-use/environment-agency-strategy-for-safe-and-sustainable-sludge-use>

A review of options for further market participation in bioresources

- **DPC/Bilateral entry will require time to develop and may be of lesser priority than other changes**
 - In developing both DPC and bilateral entry a number of new structures and process would need to be developed that will involve significant efforts. Whilst the level of work should not act as a barrier to the introduction of these mechanisms, consideration will need to be given as to where focus rests. Given the scale of change and number of changes that may be introduced in combination, it might be difficult to undertake multiple transformative actions in concert. Given that the potential scope for DPC and bilateral entry would probably be assessed as lesser than that for other actions, DPC and bilateral entry could be seen as of lesser priority. Conversely, promotion of a variety of approaches to extending competitive influence including trading, DPC and bilateral entry, could deliver wider benefits than available by solely focusing on increasing trading. Another factor that could delay the introduction of these forms of competition would be a need to address unanticipated outcomes from other activity. The establishment of new markets (for example, non-household retail, new appointments and variations and self-lay) has had to develop over time as issues become apparent. It should be expected that competition in bioresources will not be any different, therefore a barrier to the development of DPC and bilateral entry may be the need to further refine other mechanisms.
- **Characteristics of DPC/DBFOM that may inhibit effective introduction**
 - At PR19 DPC was introduced in other price controls, but not for Bioresources. The challenges and characteristics of bioresources are different than other controls and DPC would need to address those differences.
 - It is probable in our view that sludge treatment would be the most likely element of bioresources activity where direct procurement could apply. The reasoning being that sludge treatment is the element of bioresources that involves the most capital investment. Building on the processes currently being developed for procurement under DPC following PR19 this option could be developed for bioresources. There are a number of factors that mean DPC may be difficult to mould to suit bioresources activity:
 - Investment in bioresources treatment often tends to be focussed on established sites requiring incremental expansion of capacity or change to meet new requirements. This focus on incremental change means that separation of assets is more difficult making the clarity of the investment more complicated.
 - The DPC approach, where investors value the certainty of return, is at odds with a bioresources market where there is no surety of return on investment. However this may be acceptable given that DPC would be itself the result of a competitive process.
 - The potential for future competition replacing activity undertaken by DPC infrastructure would mean that it would be difficult for long term contracts to be established or honoured.

A review of options for further market participation in bioresources

- It may be that for DPC to work in relation to bioresources activity that particular circumstances may be necessary:
 - Protection of return on investment, providing a guarantee.
 - That DPC as an option is likely to only apply in particular circumstances where investment can be seen as separable for other assets.
 - Opportunities for DPC to apply to bioresources may be limited as there is a requirement for substantial discrete investment, often based on a need to substantially increase capacity, and within bioresources activity these circumstances may be limited.
 - DPC has potential to deliver benefits for Bioresources delivery, however it looks like a decision to implement DPC within bioresources may inhibit the expansion of a trading market, and vice versa. The decision that may have to be taken is which form of competition, or mixture of forms of competition, will deliver most for all stakeholders.
- **Access to permitted development rights**
 - Incumbent companies hold certain permitted development rights on operational land that can reduce the extent of planning requirements. If a development was expected to include both substantial levels of appointed and non-appointed activity it would be expected that the planning requirements may be greater. This may add additional cost on companies looking to develop co-location or co-digestion centres and therefore make it look less attractive. This may also be the case if an alternative provider, other than the incumbent, were looking to develop a sludge treatment centre irrespective of it being appointed, or non-appointed activity.

4. Criteria for evaluating actions

In order to evaluate the relative merits of the different packages a series of criteria is required.

Ref	Goal	Primary criteria
1	Customers	Impact on prices
2	Competition	Delivers potential for effective competition
3	Resilience	Ensuring sufficient future capacity
4	Environment	Delivering net zero
5	Investor confidence	Commitment to investment
6	Level playing field	Fair access for market participants
7	Innovation	Innovative solutions

- **Customers – impact on prices**

- A key driver for developing competition is to deliver better value for customers. Competition has the potential to reduce prices through the competitive pressure to reduce costs and pressure to innovate. It could, however, increase prices if increased risk means companies require higher returns, and this is not wholly offset by lower costs, or through inefficient utilisation of assets. The different options need to be assessed to ensure that customers benefit from the proposed changes in the long term.
- Establishing and operating markets involves significant costs which can impact customer bills. It is therefore important to ensure that the design of future arrangements is proportionate to the scale of benefits that may be realised.

- **Competition – delivers potential for effective competition**

- Potential packages need to be evaluated, taking into account the economics of bioresources activities, to assess whether barriers to competition are removed. Changes should improve access, and amount of competition, to related markets for both third parties and incumbent companies.

- **Resilience – ensuring sufficient future capacity**

- It is essential that future capacity is sufficient to deal satisfactorily with future sludge volumes. Insufficient capacity could lead to adverse environmental impacts or higher bills for customers. This could be affected if the balance between risk and return changes as a result of competition, such that companies consider that additional investment is not worthwhile because returns are too low.
- In addition, compliance with relevant regulation and legislation across the end to end production line is a necessity for any sustainable bioresources market. This includes compliance with existing and new safety and environmental legislation.

A review of options for further market participation in bioresources

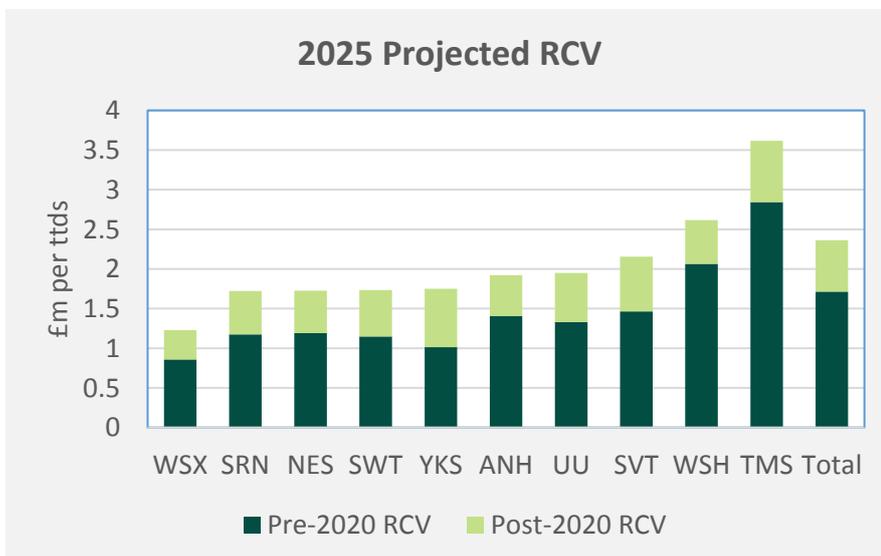
- **Environment – delivering net zero**

- One element that needs to be key in relation to the consideration of any potential development of bioresources activity is the ambition for the water industry to achieve net zero carbon by 2030. To achieve this, the potential contribution of advanced anaerobic digestion to generate renewable energy and reduce process emissions needs to be supported and encouraged. This consideration may require substantial capital investment to replace carbon-intensive processes with low carbon technology. Regulatory mechanisms need to encourage this activity. In addition, the reduction of transport related emissions needs to be factored into the consideration of any evaluation.

- **Investor confidence – commitment to investment**

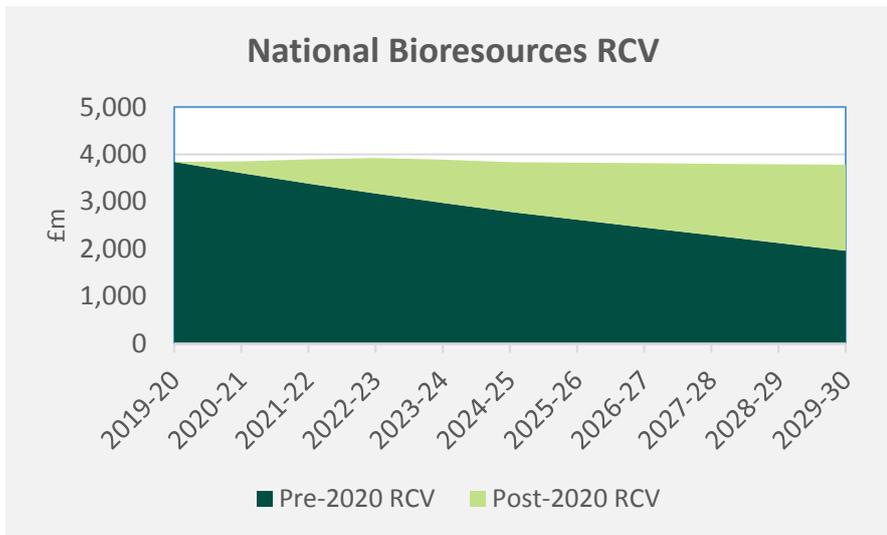
- Ofwat has committed to protect the pre-2020 Regulatory Capital Value. Future changes need to provide scope both to fulfil that commitment and give investors adequate incentives and confidence to invest in post-2020 assets.
- At PR19 Ofwat committed not to expose investment made prior to 2020 to new risk from opening bioresources markets. This was on the basis that such an approach benefits companies and investors by enhancing predictability of regulation and so will help maintain a low cost of capital, benefiting customers, even as elements of the value chain are opened to markets.
- Ofwat’s reasoning for RCV protection will continue to be pertinent into PR24 as protection of pre-2020 RCV still helps to provide confidence in consistency of regulation and maintains a lower cost of capital. This protection is expected to continue to apply to the Bioresources control, as pre-2020 RCV will still be over 70% of total RCV by 2025 and over 50% by 2030. The graphs below show the changing proportion of post-2020 RCV over time, and that pre-2020 RCV remains a significant proportion of the total for all companies. Unlike water resources, individual sites generally contain both pre-2020 and post-2020 investment, so it is very difficult to determine specific sites or activities which do not require protection.

Figure two. Pre-2020 RCV Versus Post-2020 RCV by trading party:



A review of options for further market participation in bioresources

Figure three. Pre-2020 RCV Versus Post-2020 RCV over time. Source PR19 company business plan financial models:



- **Level playing field**

- **Fair access for market participants.** Actions need to ensure fair access to markets for both appointed companies and third party providers. Packages will be evaluated in terms of whether they provide fair competition between incumbent bioresources companies, and provide fair access to potential new entrants.

- **Innovation**

- **Innovative solutions.** The packages should be evaluated against their ability to better enable and incentivise the use of innovative solutions.

5. Analysis of options and alternative packages

We have considered a number of actions to promote competition, developed alternative packages of measures, and evaluated these against the criteria set out above. These potential actions are described below, followed by a table setting out the alternative packages and which actions are included in each package.

Timeline for introduction of measures:

Measures included in the package	2020-2025	PR24 2025	2025-2030	2030+
Co-digestion				
Bidding				
Consideration of DPC				
Consideration of bilateral entry				
Encouraging sludge trading engagement				
Separate assessment of business plans				
Modify Regulatory Accounting Guidelines				
Introduce incentives for sludge trading				
Encourage alternative delivery mechanisms				
Faster depreciation of pre-2020 RCV				
Gate pricing				
Functional separation				

It is not possible to implement every option set out below within the next five years. There are a number of steps that would be required before implementation, the timeline above provides a view as to when the different options could be implemented. The light green represents either the potential for partial implementation, or that there is potential to implement earlier, however there are significant challenges that would need to be overcome.

Co-digestion

One of the key enablers of wider competitive market development within the bioresources sector is the ability to co-digest waste. Co-digestion has long been considered key to enabling greater competition and innovation in the provision of bioresources services. In March 2020 the Environment Agency set out a strategy to better enable co-digestion, co-treatment as they describe it, and it is anticipated that these changes will be enacted by 2023. Hopefully by this time the final major barrier to co-digestion, the reform of the sludge use in agriculture regulations, will be removed. The EA is proposing changes seeing an end to the sludge use in agriculture regulations and a move to Environmental Permitting Regulations (EPR). Environmental regulations are already changing to enable co-digestion. Water companies will soon have to follow the Industrial Emissions Directive, requiring all sewage sludge anaerobic digestion processes to be permitted to an equivalent standard to waste anaerobic digestion facilities.

A review of options for further market participation in bioresources

Timeline for removal of principle barrier to co-digestion:

Barrier	Date	Step
IED	July 2019	Water companies received a letter from the EA where they confirmed their position that IED applies to the biological treatment of sewage sludge
IED	Aug 2022	Compliance date for IED
IED	Aug 2022 to 2025?	It is anticipated that Permit Improvement Conditions, Local Derogations, or Local Enforcement Positions, will be created to allow water companies to deliver high-cost interventions beyond the August 2022 regulatory date
IED	2025?	Create consistent IED that ensures there is no prevention of trading due to differences between IED
EPR	2023	EA sludge strategy considering the change in sludge to land regulations is due for Parliamentary consideration
EPR	2025?	The commencement of the new regulatory requirements for sludge to land has yet to be decided
Co-digestion	2025-2030	Primary barriers to co-digestion could be removed by this point. Dependent on the solution agreed for disposal regulations a significant barrier could remain, limiting the ability of co-digestion with other organic waste treatment sites

These regulatory changes should encourage co-digestion by reducing or removing economic barriers to treatment and disposal, through greater standardisation of the regulatory regimes for different waste streams. The EA believe that by removing barriers to co-digestion this will enable greater innovation, improve gas production, and enable greater use of commercial opportunities. In addition, they state that third party non-water company operators are also showing increased interest in the sludge market.

Requiring adherence to the Industrial Emissions Directive (IED) is likely to drive a requirement for significant investment need in bioresources. The changes to disposal regulations may also drive additional costs in the provision of bioresources. At present, given that these changes are still being processed, it is unclear what the impact that both the removal of barriers to co-digestion and the costs associated with this action will be. Given the costs and potential scope for benefit from this opportunity, it would seem sensible to give careful consideration how best to deliver benefits for end customers. That consideration needs to include parity of access to market both into sludge and other organic wastes. The considerable investment needed to meet the obligations stemming from the regulatory changes to enable co-digestion could mean that there is an initially asymmetry of access, that has the potential to inhibit efficient provision of services in restricting access between markets. If co-digestion leads to a market where sludge and other organic waste can be both imported and exported between treatment centres, without significant regulatory barriers, then this can help deliver for customers, resilience, innovation and competition. Without the ability to co-digest without significant barriers to operation many of the other actions set out in this paper are unlikely to produce the hoped for benefits.

A review of options for further market participation in bioresources

Activities to encourage alternative delivery mechanisms

Further work should be undertaken to understand how best to enable alternative delivery methods such as co-location, co-digestion or import of sewage sludge from other companies. Part of this work would include consideration of how to encourage capital investment in building capacity both by incumbent water companies and other organic waste treatment providers. Without long term surety of return, long term investment is more expensive as the risk is factored in. In addition a lack of long term surety would discourage entry. The ability to lock in long term contracts could be given if incumbent providers can demonstrate the inclusion of third parties and/or that this solution is the most economically advantageous. Given that it would be expected that there is potentially a substantial capital investment relating to bioresources treatment the contract would probably need to run to 25 years to be effective. A 25 year term would mirror expectations that would be in place within a normal commercial environment.

Bidding

Incumbents could be required to invite third party providers to 'compete' by submitting bids to provide solutions to help meet their future needs (e.g. additional sludge treatment capacity or other activities such as dewatering). The scope of activity open to competition and how that would be packaged up would impact the form competition would have. As seen in forms of outsourcing already employed in the market (e.g. sludge transportation), control over the nature of the activity is afforded to the incumbent as the service is vertically integrated. Indeed, any potential market could work in a similar way to the current Bid Assessment Framework for Water Resources.

Consideration of DPC/DBFOM

DPC, or Design, Build, Finance, Operate, Maintain (DBFOM) (or variations of this model) mean incumbent companies competitively let investment projects that are classed as discrete. Under such a scenario, market participants compete and depending upon the circumstances the successful bidder could build and finance, and possibly operate and maintain, new assets. It is not clear if it would be appropriate to introduce DPC to this control. This activity is to take forward work to consider if there is a form of DPC suitable for the Bioresources control, and only then introduce if it is appropriate.

PR19 saw the Direct Procurement for Customers (DPC) approach proposed and, where appropriate, schemes have been considered under this model of procurement. Within this approach incumbent companies competitively tender for a third party (a competitively appointed provider, or CAP) to design, build, finance, operate and maintain infrastructure. This methodology could be adapted and adopted for appropriately discrete investment schemes in the bioresources market.

There are factors that could mean that the application of a DPC approach may need to differ, and potentially be less desirable, when applied to bioresources activity. Should further competitive markets be developed for bioresources provision they may depend upon new investment being at risk. Competitive markets that are fully open to alternative provision would run contrary to the necessity for long term surety of return on investment relating to DPC or similar PFI provision. It would be possible to protect DPC related investment, or alternatively accept that the development of competitive markets, within which there is entry and exit, may not be possible for the elements of provision undertaken through a version of DPC. Whilst the RCV protection relating to pre-2020 investment has already started running down any new protection on DPC investment would run long into the future.

A review of options for further market participation in bioresources

Consideration of bilateral entry

Access to sludge by authorised third parties allowing licensees to take, from a water company's assets, responsibility and payment for undertaking sludge treatment and disposal. It is not clear if it would be appropriate to introduce bilateral entry to this control. This activity is to take forward work to consider if there is a form of bilateral entry suitable for the bioresources control, and only then introduce is appropriate.

Encouraging sludge trading engagement

As part of business plans, companies must show that provision of additional capacity has considered the use of neighbouring WASC facilities. This potentially includes the development of standardised processes and pricing framework.

Separate assessment of business plans

At PR19, Ofwat provided for fast-track companies to receive an additional 0.1% return on regulated equity, in addition to the benefit from earlier decisions on some aspects of their plans. Ofwat said that "to avoid distorting competition in the bioresources market, we will not allocate any of this incentive payment to Bioresources RCV or revenue". However, such a distortion would only apply in a market with gate pricing based on recovery of average costs (because the incentive payment might affect pricing). Where competition is based on marginal cost pricing (short or long-run marginal cost) then the incentive payment would have no effect on prices. A separate assessment of the Bioresources business plan would, therefore, be a feasible option for some forms of competition, including the competition framework which applies in AMP7.

Applying a fast-track status solely to Bioresources could significantly increase the incentive to engage in competition. A notional regulated equity for Bioresources could be applied, based on Bioresources RCV as a proportion of total RCV, and the same 0.1% return incentive used. A key criterion for achieving this status would be how well the company has developed plans to engage with markets, take advantage of innovation and develop competition, and what progress it has made to date. It would seem reasonable that a company that is successful at engaging with third parties should benefit from that action.

Modification of Regulatory Accounting Guidelines

Building on previous steps to support the potential for short term sludge trades, set out within RAG5.07, further work could be undertaken to further refine the guidelines in relation to short-term trades, and clarify the position in relation to longer-term sludge trades. Changes to the RAG5.07 to support efforts to establish short term trades have yet to bear fruit, however this may take time for appropriate opportunities to become available. Greater flexibility in pricing, relaxing the requirements on average-cost pricing for long-term trades, could increase the scope for trade between companies where there is long-term spare capacity available. Amending the RAGs could support the development of consistent processes relating to sludge trading and a clear pricing framework.

The Regulatory Accounting Guidelines could be modified to create clearer separation between the Bioresources and Wastewater Network+ activities. The guidelines currently provide for how costs should be allocated between activities. This could be extended to require prices to be published, so

A review of options for further market participation in bioresources

that it is clear at what price bioresources services are being provided to Wastewater Network+. This would make it clearer to potential entrants whether they are in a position to compete effectively. It could be reasonably expected that removing barriers to co-digestion could lead to alternative forms of delivery mechanism such as co-location, joint ventures and non-appointed and non-regulated investment in additional capacity. This activity could lead to additional requirements for potentially complex transfer pricing requirements between companies. A review of the RAGs to help facilitate this flexibility would help this development.

Incentives for sludge trading

For water resources, exporters can retain 50% of the profits from trades and importers can benefit from an incentive set at 5% of the costs of the import. A similar approach could be applied to bioresources, with both importers and exporters incentivised to trade. Such incentives may be needed in the early stages of market development, to overcome any inertia and ensure that economically beneficial trades take place. Incentive rates can be set to ensure that customers of both the importing and the exporting company, and both companies, all benefit from the trade.

Faster depreciation of pre-2020 RCV

If the pre-2020 RCV could be accelerated, then it would bring forward the point at which RCV protection would be completed and enable further options for competition to be considered. However, a rapid acceleration of depreciation would have an adverse impact on prices and distort the bioresources market. Run-off of all the bioresources pre-2020 RCV would add about 40% to bioresources prices in AMP8 (2025-30) and artificially reduce prices thereafter. This reduction in prices would be a consequence of the still operational assets no longer needing to earn a return. Faster depreciation could be considered, but it would probably have to be spread over a period greater than five years.

As the proportion of RCV that is protected reduces, the impact of RCV protection on the viability of different forms of competition decreases. The presence of RCV protection does not prevent greater bioresources competition. As new assets are not subject to the same protection it is likely that it may be those assets that would initially be more open to different forms of competition.

Gate pricing

The operation of a marketplace for treatment facilitated by a central system, which can allocate work based on price, whilst also factoring in quality issues such as environmental impact and reliability of provider, the Bioresources function would be competing in this process. Gate pricing would involve a clearer separation of Bioresources and Wastewater Network+ functions. The Bioresources function would need to set prices which enabled it to cover its costs. Wastewater Network+ would consider prices available for dealing with its sludge and take the best price, either from the company's own provider or another provider. This approach has greater potential to lead to stranded, or underutilised, assets than a bid assessment framework. This potential introduces greater levels of uncertainty that in turn may stifle investment. Rather than a dynamic market operating a short-term decision-making process, the requirement for capital investment would almost certainly necessitate the need for longer term contracts. Instead of splitting activity up into a large number of different elements, it is likely that the most appropriate solution would be for an individual party to become responsible for the entire bioresources activity for a period at a particular site, or groups of sites. To establish this market a significant amount of effort and investment would be required, including the development of a central market system. It would also

A review of options for further market participation in bioresources

take time to development and refine the market codes. Therefore it would be unlikely that gate pricing could be delivered significantly before 2030.

Functional separation of Bioresources and Network Plus

This option would be likely to be an extension of gate pricing and would involve clearer separation of accounting and decision-making to ensure that the incumbent was treating its own Bioresources operation and other providers even-handedly. It could ultimately lead to legal separation and to change of ownership. The protection of capital investment would require careful consideration before this option could be progressed. In addition how separation and the provision of a supplier of last resort obligation, which appear to be in conflict, could be addressed appears unclear.

Packages of activities

We have combined the options set out above into four packages of options. The table below shows which options each package includes.

Measures included in the package	Package 1	Package 2	Package 3	Package 4
Co-digestion	✓	✓	✓	✓
Bidding			✓	
Consideration of DPC			✓	
Consideration of bilateral entry			✓	
Encouraging sludge trading engagement	✓	✓	✓	✓
Separate assessment of business plans		✓	✓	✓
Modify Regulatory Accounting Guidelines		✓	✓	✓
Introduce incentives for sludge trading		✓	✓	
Activities to encourage alternative delivery mechanisms		✓	✓	
Faster depreciation of pre-2020 RCV				✓
Gate pricing				✓
Functional separation				✓

A review of options for further market participation in bioresources

Evaluation of packages

The table below sets out our evaluation of the packages against our criteria.

We consider that, as shown in the table below, further steps, beyond business as usual, are necessary to drive increased use of competitive markets. However, we do not consider it necessary to go as far as gate pricing to achieve the potential of bioresources and moving too quickly to this form of competition would likely be counterproductive. A gradual evolutionary approach would be sufficient for there to be significantly increased potential for competition. We expect that the removal of barriers relating to co-digestion, alongside other changes already made, will significantly increase the likelihood of competition in the provision of bioresources activity. Packages 2 and 3 go beyond the facilitation of changes already complete, or in train, to suggest the introduction of competitive elements that would support competitive entry.

There are a number of factors that, when considering a gate pricing approach, raise concerns:

- **Potential increase in prices**

If a portion of bioresources treatment activity were to transfer away from an incumbent, and this leads to stranded or underutilised assets, there is potential to increase the overall cost of undertaking bioresources activity. Within appendix 2 of its Water 2020 publications⁸ Ofwat state *“We would not expect that any sludge trades will be entered into if these result in customers being worse off. This means that we expect that appointees will consider the benefits (cost reduction and savings) for customers as well as the costs to customers from any trade. The costs of a trade will include the returns on pre-2020 RCV which may become underutilised as a result of the trade.”* The stranding or underutilisation of assets is particularly unwelcome from an overall system efficiency perspective. We therefore support the rationale for Ofwat’s position, i.e. that trading should not leave customers worse off overall – therefore this would only support trades that are, including the costs associated with the underutilised assets, more efficient. This approach may limit the scope for competitive entry, but to the benefit of customers. However any move away from this approach to extend the potential scope for competition (despite the impact on customers) would require a mechanism to fulfil the expectation that the pre-2020 RCV will be protected. At most sites, there is no clear way to divide operations between pre-2020 and post-2020 assets. Therefore a compensation mechanism might have to apply in most cases of competitive entry.

- **Creating uncertainty about future capacity requirements and commitment to investment**

Unless long-term contracts were to be put in place, which would limit competition development, the uncertainty created around return on investment and commitment to historic investment may lead to new capacity not being created.

These difficulties indicate that a gate pricing approach would not be appropriate for AMP8, though it could be reconsidered for future periods. The other three packages would not create these problems. We consider that package one would not, however, provide sufficient stimulus for competition.

⁸ Water 2020: Water 2020: Our regulatory approach for water and wastewater services in England and Wales. Appendix 2 Moving beyond waste – further evidence and analysis, Ofwat, May 2016. https://www.ofwat.gov.uk/wp-content/uploads/2015/12/pap_tec20150525w2020app2.pdf

A review of options for further market participation in bioresources

Package 2 has the potential to increase engagement in competitive markets and increase the potential for competition. This approach builds on recent, and in-train, changes and delivers on many of the assessment criteria, however it is unclear if any increase in use of competitive markets would be sufficient and enable entry of some other market participants. There is little difference in potential output between packages 2 and 3, a reasonable argument could be made that changes in package 2 could be implemented first with the additional changes set out in package 3 implemented over subsequent years.

Our package 3 would give significant potential for further competition without creating the problems that would arise with gate pricing. The business plan assessment and trading incentives would encourage companies to compete with each other and to facilitate competition through market entry.

Assessment against criteria	Package 1	Package 2	Package 3	Package 4
Impact on prices				
Delivers potential for effective competition				
Ensuring sufficient future capacity				
Delivering net zero				
Commitment to investment				
Fair access for market participants				
Innovative solutions				

Appendix 1 gives further details on the rationale for our assessment of the packages.

6. Conclusions

Package 1 would not be sufficient to significantly increase the potential for competition. Although an approach of making minor developments to the *status quo* has potential benefits, and time is needed to see changes play out, it seems unlikely that the envisioned energised active market will develop without further help.

The impact of co-digestion is as yet unclear but expectations are high. A key element of the change needed for PR24 is to help facilitate the potential benefits stemming from co-digestion. Part of this facilitation of benefits stemming from co-digestion includes symmetry of access, with incumbents being able to both import from and export into the market for other organic waste. There will also be increased potential for other waste companies to deliver bioresources activity.

With gate pricing, as in package 4, it is not clear how RCV protection can be provided without an unacceptable impact on prices for customers. Increased uncertainty with gate pricing could jeopardise investment in future capacity. Whilst protections relating to Pre 2020 RCV will become less impactful over time, any new DPC arrangement would likely lead to further (implicit) protections, and therefore this issue would persist.

There is little difference in potential output between packages 2 and 3, a reasonable argument could be made that changes in package 2 could be implemented first with the additional changes set out in package 3 implemented over subsequent years.

Therefore we conclude that our package 3 is the best way forward, in the long term, for bioresources competition. This includes a package of measures to promote competition, including incentives for trading, and encouraging bidding for bioresources activities, with incentives built into the PR24 process.

Appendix one: Detail of evaluation

Assessment against criteria	Package 1	Package 2	Package 3	Package 4
Impact on prices				
Delivers potential for effective competition				
Ensuring sufficient future capacity				
Delivering net zero				
Commitment to investment				
Fair access for market participants				
Innovative solutions				

Definition of assessment outcomes:

Outcomes	Definition
	Package of work expected to have a negative impact on the outcomes for this criterion
	It is unclear but this package of work may have a negative impact on the outcomes for this criterion
	The impact of this package of work on this particular criterion is poorly understood, unknown or unknowable
	Package of work has the potential to have a positive impact, however it is unclear if this impact would materialise
	Package of work is expected to have a positive impact on the outcomes for this criterion

Note: The enablement of co-digestion will likely require significant additional investment both in terms of alignment of IED and new disposal regulations. These costs have not been included when considering the assessment of each package, as these changes are already being delivered.

A review of options for further market participation in bioresources

Rationale for assessment of package 1:

Assessment against criteria	Package 1	Rationale
Impact on prices		This package avoids the additional costs of developing significant changes to innovation and competition and the potential impact on prices associated with gate pricing. However, it also misses out on potential efficiencies relating to greater competition and innovation.
Delivers potential for effective competition		The introduction of co-digestion and continuation of sludge trading may create additional competitive opportunities, however without steps taken to support the activity these opportunities may be missed.
Ensuring sufficient future capacity		This package enables a continuation of the current mechanisms for supporting investment. Although the split of the RCV affects the certainty of the return on future capital investment, the competition framework in place would limit that risk. Therefore there would still be sufficient incentive to invest in new capacity.
Delivering net zero		Water companies driving asset construction are conscious of this ambition and are likely to drive this forward.
Commitment to investment		Issues relating to certainty of return on new investment remain. However, historic investment protection provides confidence to investors and the framework would limit uncertainty on future returns.
Fair access for market participants		Fair access with this package depends on companies identifying and engaging with market opportunities.
Innovative solutions		Despite significant effort by companies to innovate, there is little evidence of innovative solutions having been successfully delivered. Without barriers to flexibility being removed and greater incentive to innovate, little may change.

A review of options for further market participation in bioresources

Rationale for assessment of package 2:

Assessment against criteria	Package 2	Rationale
Impact on prices	●	This package avoids the additional costs of developing significant changes to innovation and competition and the potential impact on prices associated with gate pricing. The greater steps to encourage competition, compared with Package 1, mean that there is scope for gains from increased efficiency and innovation.
Delivers potential for effective competition	●	Greater incentives may encourage widespread engagement with competitive markets. However, there remains the potential, for those companies who do not commit to this engagement, that they miss out on the opportunities to increase competition.
Ensuring sufficient future capacity	●	This package enables a continuation of the current mechanisms for supporting investment. Although the split of the RCV affects the certainty of the return on future capital investment, the competition framework in place would limit that risk. Therefore there would still be sufficient incentive to invest in new capacity.
Delivering net zero	●	Water companies driving asset construction are conscious of this ambition and are likely to drive this forward.
Commitment to investment	●	Issues relating to certainty of return on new investment remain. However, historic investment protection provides confidence to investors and the framework would limit uncertainty on future returns.
Fair access for market participants	●	Fair access with this package would be encouraged by the additional measures which incentivise companies to create opportunities for competitive entry. There remains some limitation on the scope for access if companies do not fully pursue the opportunities.
Innovative solutions	●	The increased potential for competitive entry would encourage innovative solutions to a greater extent than in Package 1. However, there may still be scope for further encouragement of innovation.

A review of options for further market participation in bioresources

Rationale for assessment of package 3:

Assessment against criteria	Package 3	Rationale
Impact on prices	●	This package avoids the additional costs of developing significant changes to innovation and competition and the potential impact on prices associated with gate pricing. The greater steps to encourage competition, compared with Packages 1 and 2, mean that there is scope for gains from increased efficiency and innovation, with benefits to customers from lower prices.
Delivers potential for effective competition	●	Greater incentives may encourage widespread engagement with competitive markets. The additional measures of increased bidding for contracts, and the potential for direct procurement and bilateral entry, increases the likelihood of competition compared with Package 2.
Ensuring sufficient future capacity	●	This package enables a continuation of the current mechanisms for supporting investment. Although the split of the RCV affects the certainty of the return on future capital investment, the competition framework in place would limit that risk. Therefore there would probably still be sufficient incentive to invest in new capacity. However, the potential for bilateral entry could create some uncertainty about whether increased capacity would be utilised.
Delivering net zero	●	Water companies driving asset construction are conscious of this ambition and are likely to drive this forward.
Commitment to investment	●	Issues relating to certainty of return on new investment remain. However, historic investment protection provides confidence to investors and the framework would provide some limit on uncertainty about future returns. The potential for bilateral entry would create greater uncertainty than for Packages 1 and 2.
Fair access for market participants	●	Fair access with this package would be encouraged by the additional measures which incentivise companies to create opportunities for competitive entry. Additional actions to ensure entry is possible would provide greater certainty on creating fair access than for Packages 1 and 2.
Innovative solutions	●	The increased potential for competitive entry would provide greater encouragement for innovative solutions than would exist with Packages 1 and 2.

A review of options for further market participation in bioresources

Rationale for assessment of package 4:

Assessment against criteria	Package 4	Rationale
Impact on prices		Prices could be increased by increased risk requiring higher returns than for other packages, and by the need to meet the commitment to protect the pre-2020 RCV within a competitive market. In addition the system development necessary would add substantial cost for implementation.
Delivers potential for effective competition		This package probably has the greatest potential for competitive entry, although entry could be deterred by greater uncertainty about future returns than would apply to the other packages.
Ensuring sufficient future capacity		Uncertainty about whether future capacity would be utilised could deter investment, this could be overcome through higher returns to encourage investment. However this then leads to higher prices.
Delivering net zero		The necessary investment to deliver net zero could be jeopardised by uncertainty about future returns.
Commitment to investment		Historic investment protection provides confidence to investors, although there would be some uncertainty about how this could be applied within this package. There would be greater uncertainty about returns on future investment than for the other packages.
Fair access for market participants		Fair access with this package would be created by the gate pricing approach which would create clear opportunities for access to the market for all participants.
Innovative solutions		The increased potential for competitive entry could provide greater encouragement for innovative solutions. However, uncertainty about future returns could discourage innovation where the benefits are longer term.

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