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Bioresources Market Development Support

Accounting for Energy and Overheads

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Contents

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01

Energy Cost and Revenue

1. Energy cost and revenue

1.1 Introduction

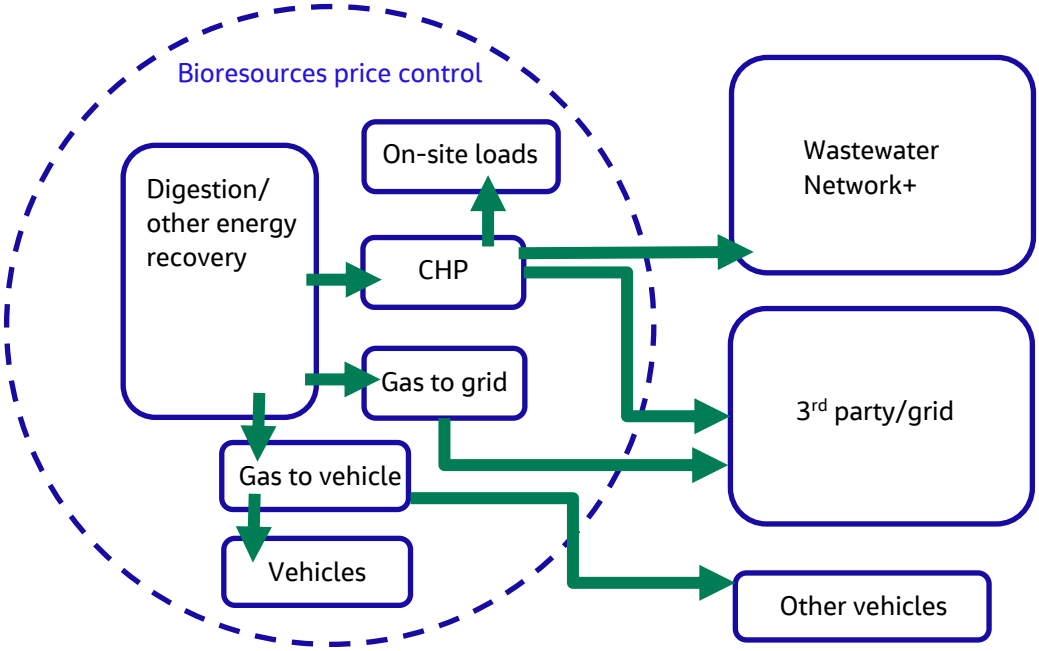
The Bioresources price control contains assets which generate energy. This is typically in the form of biogas which is often converted into electricity and heat by combined heat and power systems (CHPs), or upgraded to create biomethane which can be injected into the natural gas network. Biogas could also be upgraded to provide fuel for vehicles or in the future could be used to create hydrogen.

Energy generated by assets within the bioresources price control could be:

- **Used within the bioresources assets.** Bioresources assets use electricity, and many also use biogas or natural gas for boilers to produce hot water and steam. Some use other supplementary fuels, such as gas oil.
- **Exported to Wastewater Network+ assets.** Almost all bioresources facilities are co-located with sewage treatment works, which usually consume more energy than the bioresources treatment centre.
- **Exported to the grid.** Electricity or biomethane can be exported from the bioresources price control and the water company to the electricity network or natural gas network.
- **Exported via private supply.** Electricity, heat or biomethane could be provided via private supply to another user. Most likely this would be through a private wire agreement but could also be through some other arrangement such as gas to vehicle.

In addition to the above, there are instances where the non-appointed business may have assets which provide energy to the appointed business. For example, there may be an agreement under which the non-appointed business generates electricity which is then sold to the appointed business.

Figure 1: Types of energy generated and possible uses (simplified)



At present, there may be a lack of clarity on how to price and account for transfers of energy. This is evident in the different approaches that some of the water and sewerage companies have taken to accounting for costs and revenues from electricity generated within Bioresources and used in Wastewater Network+. As income from energy generation is a major driver of net cost within the Bioresources price control, this lack of clarity may make it difficult to assess efficiency.

1.2 Objectives

Consequently, this project has the following objectives:

- Identify how wastewater companies are currently valuing the energy generated within the bioresources control and the transfers of this to other appointee price controls.
- Provide comments on how the variations in valuing energy transfers and / or the impact of these variations can be minimised.
- Propose a methodology that can be used by wastewater companies to value bioresources-generated energy transferred to other appointee price controls.

1.3 Definitions

For the purposes of this report, we have adopted several definitions for terms which are in common use in the sector but are often interpreted differently.

Table 1: Definitions

Term	Definition
Energy consumption	Energy used in assets whether self-generated or purchased from an energy supplier. I.e. energy generated + energy imported – energy exported.
Bioresources energy imported	This is the energy purchased by Bioresources from a supplier and / or imported from another price control or an associated business / non-appointed business / other power purchase agreement.
Bioresources energy exported	This is a movement of energy from assets within the Bioresources price control to assets owned by any other entity or within another price control (including to Wastewater Network+).
Bioresources energy generated	This is the energy produced by processes within the Bioresources price control. It does not refer to energy which is generated on the same site by another price control / non-appointed business / associated business.

1.4 Approach to accounting for energy

1.4.1 Existing approaches

The figure below shows our survey response to our question around allocation of energy consumption, costs and revenues. The results show a variety of practices among the water companies.

Figure 2: Questionnaire responses – accounting for energy consumption

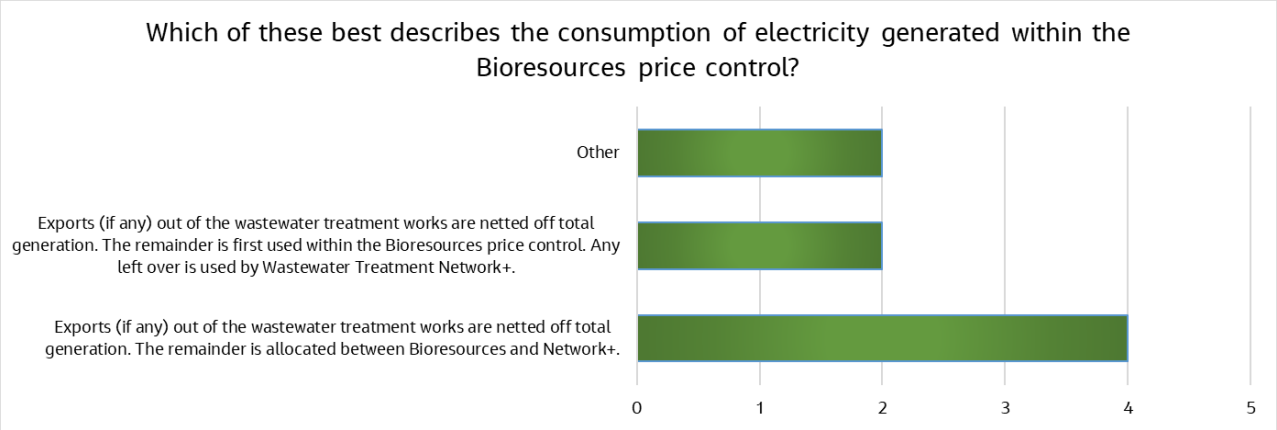


Figure 3 Questionnaire responses – accounting for electricity costs and revenues

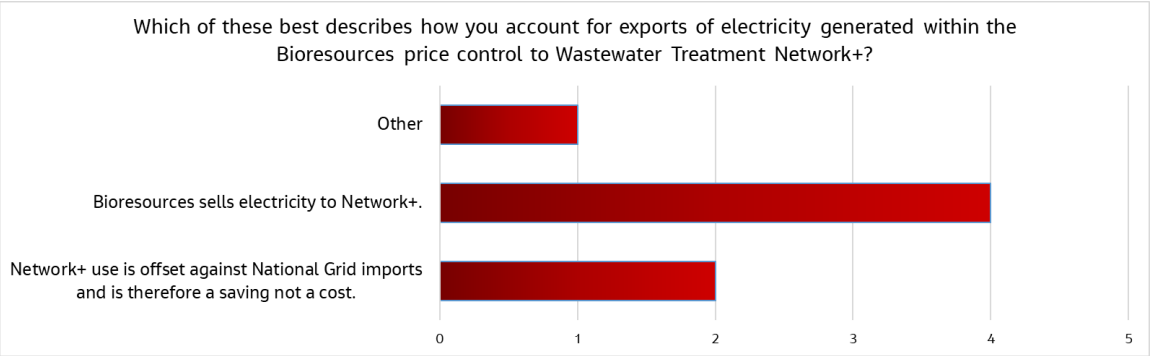
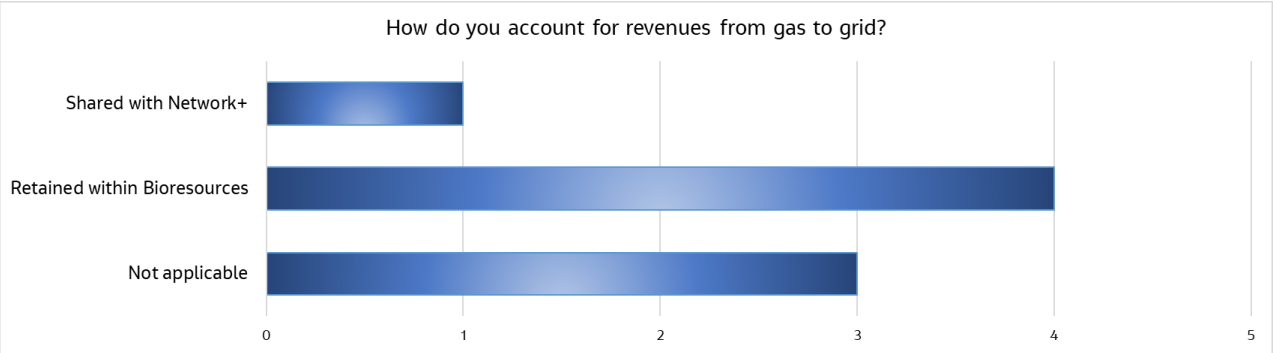


Figure 4 Questionnaire responses – accounting for gas to grid revenues



Specific practices described include the following three types of response:

1) An allocation of energy generation and revenues between price controls based upon a proportion of consumption. In this arrangement, both Bioresources and the Wastewater Network+ price control gets some of the benefit from generation (in one case, the generation incentive payment is also shared):

   "The allocation is based pro rata on the estimated proportions of electricity consumption between Bioresources and [Wastewater] Network+"

   "Generation and import are allocated using the same split for gross site consumption between the two price limits."

2) A measurement or assumption that the Bioresources price control first uses the energy with excess exported to the Wastewater Network+ price control:

"Generation is first used by Bioresources with excess exported to [Wastewater] Network+ minus any metered export."

"Normally energy generated supplies bioresources then network plus and a small amount may be exported to Grid. We try to achieve parity on the latter."

3) A statement that generation is owned by the non-appointed business.

1.4.2 Impact of different approaches on variation in accounting for energy

We consider that the two variations in methodology (1) and (2) will have a significant impact on the calculated efficiency of the respective Bioresources price controls. Sewage treatment works are large consumers of energy (larger than the associated sludge treatment). Where a generation benefit allocation is based upon consumption, this may disproportionately reduce the costs of running the sewage treatment works and conversely increase the costs of running the bioresources centre. We consider this method of accounting for energy to be incorrect as it does not reflect the costs which would be incurred by a market entrant / independent third party provider. It adds difficulty to the comparison of Bioresources price control efficiency between companies and market tested providers of solutions.

Given that Bioresources energy revenues for a typical large site may be £4 million per year, and sewage treatment works energy use may be up to 90% of total co-located site energy consumption, in the worst case this could have the effect of removing over £3 million of cost from Wastewater Network+ and the same amount of revenue from Bioresources per site.

In 2019-20, the average Bioresources site gave energy generation yields to the value of over £550,000[1], creating an average potential impact per year of about £0.5 million to each price control per energy generating site. The effect is cumulative across each company's sites. The average number of energy generating sites per company was 13.5, giving an average impact of up to approximately £7 million per company per year.

1.4.3 Proposed solution to minimize variation

We consider that the Bioresources price control should resemble, as closely as is possible, a new market entrant into the sludge treatment sector. For a new market entrant, any energy generated within a sludge treatment facility would first be utilised within the parasitic assets (in this case the sludge assets), with any additional energy exported to the most revenue beneficial customer (in this case usually the Wastewater Network+ price control or other private supply agreement as there are no transmission costs involved). However, this is not always the case, for example where subsidies are predicated on the export of energy, for example in some Biomethane to Grid installations.

Methodology Considerations

a) Energy generated and used within Bioresources should be considered avoided cost.
b) Energy exported to Wastewater Network+ should be considered "sold"
c) Incentives should be allocated to the price control generating the energy.
d) Allocation should be undertaken on a measured basis (ideally)
e) Allocation should be undertaken on a site by site basis

We recommend that:

- Energy consumed within the Bioresources price control should be considered "parasitic"[2]. Therefore, energy generated which is consumed within the Bioresources price control (offsetting imports) should be accounted for as avoided cost.

[1] Source: company reported figures including energy incentive payments, avoided cost to Bioresources and sales of energy to other entities. The price of energy used to calculate avoided cost and value of sales may vary between companies.
[2] This is similar to the principles of renewable energy incentives.

- Energy exported to Wastewater Network+ should be considered energy "sold" within the Bioresources price control and energy "purchased" within the Wastewater Network+ price control. Therefore, this energy should have a cost transaction associated with it.[3]
- Incentive payments should be allocated to price control which has generated the energy (in this case, Bioresources).
- It is within the water company's gift to decide how much energy is used within the Bioresources price control and how much is exported to Wastewater Network+ (or others) to optimise its business. However, in order to be fair to market entrants this should be undertaken on an "as measured" basis, rather than a retrospective generic allocation (see Section 1.5 on measurement).
- Accounting for energy generation should be done for each site, then summed. It should not be amalgamated at portfolio level. Portfolio level allocation of generation and consumption whereby non energy generating sites could receive an allocation of generated energy would not be fair to market entrants or reflective of actual costs.

1.5 Approach to measurement

1.5.1 Existing approaches to measurement

To account for energy based upon measurement there are several considerations to be made.

- Measurement of generation is generally easy as this is usually a single metering point, data from which is required to fulfil reporting needs for subsidy claims.
- Measurement of imports and exports to and from the overall sewage treatment works are relatively simple. There will typically be separate import and export meters on most energy types.
- Measurement of the energy consumption of Bioresources assets (and how much of that is self-generated) is typically problematic. This is because:
  - Bioresources assets do not have a single electricity feed for imported electricity (see Figure 5). This means that there is typically a requirement for a lot of sub-metering to measure consumption. This is not necessarily cost-beneficial. Much energy consumption within the Bioresources price control is still estimated.
  - There is not necessarily an alignment in the method for measuring energy generation data and energy consumption data, and both may change in real time. This makes it difficult to synchronise data on what has been consumed in Bioresources with what has been generated. Without this synchronisation it is difficult to calculate what has been exported to Wastewater Network+ from Bioresources, what has been consumed within Bioresources and what has been imported into Bioresources.
  - Respondents have stated to us that measurement of useful heat exported is not a feature generally offered by CHP manufacturers, and constraints around the pipework for CHPs mean it is not straightforward to retrofit.

[3] The avoided cost of energy used within Bioresources and the price of energy exports to Network+ or elsewhere need not be the same. Avoided cost will always be at the grid import rate that Bioresources has. We consider the options in Section 1.6.

Figure 5: Electricity supply response

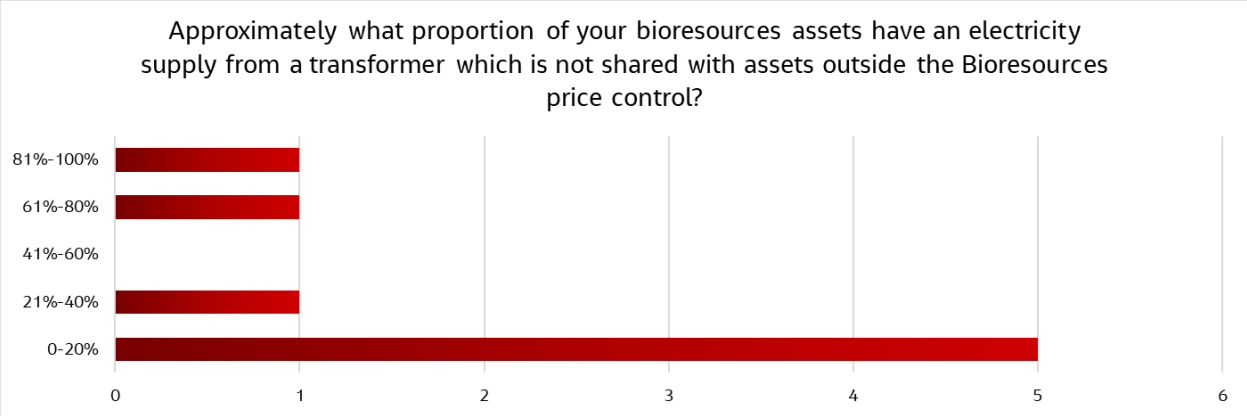
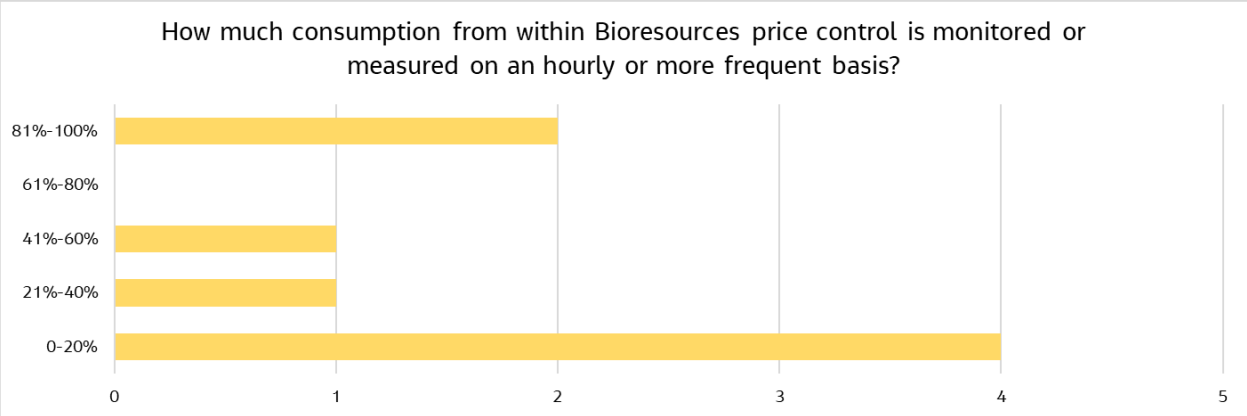


Figure 6: Measurement response



Specific practices described include the following types of response:

1) Estimated consumption:

"Electricity consumption within the Bioresources price control is not separately metered. The wider site boundary in which Bioresources exists, i.e. the wastewater treatment works is half-hourly metered for electricity. An estimate of the proportion of wastewater treatment works electricity consumption attributable to Bioresources assets can be made."

"All bioresources assets exist on combined waste water and bioresources sites, drawing power from the same grid connection. In order to allocate that total energy use between bioresources and sewage treatment assets it is necessary to estimate consumption by each asset on the site. We do this through a site survey process".

2) Measured consumption:

"All our energy consumption on bio resources assets are metered. These are mostly logged half hourly."

"We have installed sub-metering at our largest co-located Bioresources operation and are proposing to install sub-metering at our digestion sites. Where sub-metering data is not available the electricity consumption is based on engineering estimates."

1.5.2 Impact of different approaches on variation

We consider that the two variations in methodology (1) and (2) are likely to have a significant impact on the calculated energy revenues of the Bioresources price control, though not as large as the allocation issue above, and hence may materially affect reported Bioresources costs.

Estimating the consumption of the Bioresources price control means that the allocated import or export of energy that occurs within the price control does not reflect the physical import or export that is taking place. Monthly sub-metered consumption also does not reflect the physical import or export being undertaken. Consider that, on an hourly basis, the Bioresources price control (at a site level) could switch from generating sufficient energy to meet its needs, to importing all its energy due to a generation equipment outage. When the average is taken across a month, or if the generation data collection frequency does not match the consumption frequency, data will be incorrect.

We estimate that a variation of 50% either way from estimated to actual consumption on each site is reasonable. This would equate to an average of around £0.3 million per energy generating site per year. However, this may not be cumulative, because exports could be over-estimated or under-estimated. Therefore, the range of possible impacts across a company with ten average sites would be from zero to +/- £3 million per year.

1.5.3 Proposed solution to minimise variation

The Bioresources price control should aim to understand the physical energy imports and exports being undertaken to Wastewater Network+. Estimates of consumption on a monthly or annual basis may give an indication of what the facility is likely to consume, but will not be accurate and will not reflect the actual imports and export interactions which will occur in real time due to the reasons outlined above.

However, a move to better measurement should be beneficial and not overly burdensome on the water companies[4]. Improved measurement will enable better understanding of how assets are consuming energy and therefore better process management and better scheduling and control of energy generation. Therefore, we recommend that:

- Water companies should create systems of measurement which aim to record the actual consumption, import and export of energy occurring in the Bioresources price control (and, by inference, the Wastewater Network+ price control), for example through half-hourly submetering.
- Sub-metering should be used where it is practical and useful. It should not be used where there is no independent business case for the installation of metering (e.g. where assets are small consumers of energy), or where the collection of sub-metered data will not materially assist in achieving better understanding of Bioresources energy consumption (e.g. where it is difficult to align consumption and generation data to give an accurate picture of Bioresources exports and imports).
- To support the use of sub-metering of the right assets, there should be a size threshold for sub-metering based upon the rated power consumption, load factor and run time of assets (this information is typically already collected) or the estimated cost of their consumption. We recommend that companies should aim to meter at least

Methodology Considerations

a) Water companies should create systems of measurement which record the actual physical consumption, import and export of energy in the Bioresources price control.

b) Where possible this would be best done through the use of sub-metering at an appropriate frequency.

c) A size threshold for requirement for this measurement should be permitted to avoid having to sub-meter assets with insignificant consumption. The cumulative consumption of estimated supplies should not exceed 20% of the total bioresources price control consumption.

d) Where sub-metering is not a practical solution to achieving the above system of measurement, water companies should be permitted to take a sample-based approach.

e) Estimation should only be used where there is no generation and sites are small in consumption This could form a part of an exclusion threshold.

[4] We estimate that each meter would cost around £5k to purchase and install, with integration of meters into the existing site SCADA system costing around £10k per site. This would be significantly higher on sites which do not have an existing SCADA system which is linked to a central SCADA and has sufficient licencing and capacity for the metering. Difficulties with wiring such as lack of spare input/output ports on programmable logic controllers or requirements for new cable ducts to run meter cables would also increase the cost.

80% of their Bioresources energy consumption across their portfolio.[5]

- Where permanent sub-metering is not practical, water companies should use temporary portable meters instead.[6] These should be used over a sample period to determine the ratios of imports, exports and consumption within the Bioresources price control and the results should be normalised to account for temporal variations in loadings. We recommend that temporary measurement should be undertaken for at least 20% of the time. Again, a threshold should apply on size and generation sites should be prioritised. Temporary metering and the resulting estimates should count towards the 80% of consumption metered.
- Estimation may still be appropriate where sites do not generate energy and/or are small.
- Estimation may also be appropriate in the case of heat and other energy types which are technically challenging to accurately measure.

1.6 Approach to pricing

1.6.1 Existing approaches to pricing

Through our questionnaire, we have determined that for those companies dealing with energy exports to Wastewater Network+, prices are generally being dealt with by benchmarking them against the costs for imported energy at those sites. Responses received included:

- *"Current energy supply contract rate for the site."*
- *"Current import contract rate minus fixed costs."*

We consider both to be reasonable approaches.[7]

For three of the seven participants there was no apparent cost associated with the transfer of energy to Wastewater Network+ from Bioresources. This appears to be the same companies which did not account for Bioresources as "selling energy to Wastewater Network+" (see Figure 2). One company has all its energy generation within the non-appointed business and so answered differently.

1.6.2 Impact of different approaches on variation

Among the companies surveyed, there is little variation in the way that they are pricing energy exported (e.g. from Bioresources to Wastewater Network+), where those companies are accounting for such activity as a "sale" of energy. The larger variation is caused by the allocation problem discussed above. However, we can't be sure of every water company's approach to pricing due to two missing responses.

[5] Clearly, unless 100% of consumption is metered, it may be impossible to tell exactly which assets to meter to achieve the 80% threshold. Companies should make reasonable efforts to meet the threshold based on asset rated power consumption, load factor and run time. Once the initial programme of metering has been achieved, its success in meeting the threshold should be assessed, as the initial estimates on the consumption of those assets can be replaces with actual consumption, and metering should be extended further if needed.

[6] An example of where sub-metering may not be practical is where a group of assets within more than one price control is wired to the same motor control centre and the wiring configuration does not allow separate metering.

[7] A third approach, which none of the companies which responded to our survey appear to be taking at present, is based on actual cost of generation.

1.6.3 Proposed solution to minimise variation

In our opinion, for the efficiency of the Bioresources price control to be measured effectively and its efficiency understood, the Bioresources price control needs to treat energy in a similar manner to the way in which another market provider would treat energy.

The most representative price to base this on would be that charged by an independent third party which owned the generation assets on site and sold the energy to Wastewater Network+. This implies a competitive tender process, with multiple parties (including the Bioresources function) competing to supply using the generation assets. As the incumbent water company would presumably not undertake this exercise unless it genuinely intended to outsource the generation, thereby losing the use of the pricing information obtained, we don't see this as a practical option at this time. There may also be a lack of suppliers able to provide a direct supply to the site.

Methodology Considerations

f) Water companies should implement charging structures for sale of energy to Wastewater Network+ which reflect market prices.

g) These prices should be on a site by site basis.

h) Additional market testing (over and above comparison to energy import/export contracts) would be ideal but is currently impractical.

In the absence of pricing information from competitive tender, there are two obvious candidates for the market price for electricity specifically. These are the price that Wastewater Network+ pays to import electricity from the grid ('import rate'), and the price that Bioresources can achieve if it exports energy to the grid ('export rate'). We consider that either of these, or a blend, could be justified as a reasonable approach.

A Bioresources function may choose to implement (or not) time of day charging systems which reflect the charging systems for purchase of grid electricity. This is potentially an area of variation between companies, though we do not have information on how material this may be. We recommend not enforcing consistency between companies at this time, to avoid the risks of restricting freedom to innovate and of distorting future energy market opportunities. Instead, we recommend that companies should choose the best option available to them based on their capabilities.[8]

Therefore, our recommendation to determine the price for energy is as follows.

- The price should be market tested.
- The market rate may be simplified (for example through not using time-of-day charging) where this is in customers' interests.

1.7 Energy measurement and accounting guidance recommendations

We recommend the implementation of guidance to the following effect.

1) Energy consumption, imports, exports and generation should be defined in accordance with the definitions given in Table 1.

2) Energy consumed within the Bioresources price control should be considered "parasitic". Therefore, energy generated which is consumed within the Bioresources price control (offsetting imports) should be accounted for as avoided cost.

3) Energy exported to Wastewater Network+ should be considered energy "sold" within the Bioresources price control and energy "purchased" within the Wastewater Network+ price control. Therefore, this energy should have a cost transaction associated with it.

[8] There is a risk in implementing time-of-day charging that Wastewater Network+ could be incentivised to use less energy during peak tariffs, causing Bioresources to flare or otherwise dump energy and hence causing inefficiency. Time-of-day charging is also more complex to manage than flat rate charging and the effort it requires may outweigh the benefits. Therefore, in practice we would generally expect companies to adopt flat rates.

4) Incentive payments should be allocated to price control which has generated the energy (in this case, Bioresources).

5) It is within the water company's gift to decide how much energy is used within the Bioresources price control and how much is exported to Wastewater Network+ (or others) to optimise its business. However, in order to be fair to market entrants this should be undertaken on an "as measured" basis, rather than as a retrospective generic allocation.

6) Accounting for energy generation should be done for each site, then summed. It should not be amalgamated at portfolio level. Portfolio level allocation of generation and consumption whereby non energy generating sites could receive an allocation of generated energy would not be fair to market entrants or reflective of actual costs.

7) Water companies should create systems of measurement which aim to record the actual consumption, import and export of energy occurring in the Bioresources price control (and, by inference, the Wastewater Network+ price control) , for example through half-hourly submetering.

8) Sub-metering should be used where it is practical and useful. It should not be used where there is no independent business case for the installation of metering (e.g. where assets are small consumers of energy), or where the collection of sub-metered data will not materially assist in achieving better understanding of Bioresources energy consumption (e.g. where it is difficult to align consumption and generation data to give an accurate picture of Bioresources exports and imports).

9) To support the use of sub-metering of the right assets, there should be a size threshold for sub-metering based upon the rated power consumption, load factor and run time of assets (this information is typically already collected) or the estimated cost of their consumption. We recommend that companies should aim to meter at least 80% of their Bioresources energy consumption across their portfolio.

10) Where permanent sub-metering is not practical, water companies should use temporary portable meters instead. These should be used over a sample period to determine the ratios of imports, exports and consumption within the Bioresources price control and the results should be normalised to account for temporal variations in loadings. We recommend that temporary measurement should be undertaken for at least 20% of the time. Again, a threshold should apply on size and generation sites should be prioritised. Temporary metering and the resulting estimates should count towards the 80% of consumption metered.

11) Estimation may still be appropriate where sites do not generate energy and/or are small.

12) Estimation may also be appropriate in the case of heat and other energy types which are technically challenging to accurately measure.

13) The price should be market tested.

14) The market rate may be simplified (for example through not using time-of-day charging) where this is in customers' interests.

02

Overheads Allocation

2. Overheads allocation

2.1 Introduction

Companies have significant latitude in how they allocate overheads between the Bioresources and Wastewater Network+ controls. Regulatory Accounting Guideline 2.08 (RAG 2.08) provides guidance on the allocation of overheads between retail and wholesale price controls and general principles for cost allocation. While it does not provide explicit guidance on allocation of overheads between wholesale business units, the retail / wholesale guidance gives an indication of cost drivers considered appropriate for allocating overhead costs. Feedback from the industry has suggested that companies have different approaches to allocating overheads, which may negatively impact Ofwat's cost modelling.

2.2 Approach

We have briefly surveyed how wastewater companies are currently allocating overheads between the Wastewater Network+ and Bioresources price controls. This report sets out key similarities, differences and the overall level of variation and likely impact on reported bioresources costs.

The term 'overheads' can be split into the following two categories:

- **Operational overheads** – indirect costs which are usually local to the price control but sometimes are allocated indirectly between price controls – for example, the costs of a regional manager responsible for sludge and sewage treatment works.
- **General and support (G&S) expenditure** – central support services (HR, Finance, facilities management etc) which are used by all price control units and allocated between them using appropriate cost drivers.

Both of these categories of overhead can be accounted for within capital expenditure and operating expenditure as discussed in sections 2.3 and 2.4 below.

We carried out a review of the companies' Accounting Separation Methodology Statements for 2019-20 to investigate the cost drivers used to allocate G&S expenditure and, where provided, the proportion of costs from each G&S category which is allocated to bioresources.

We sent a survey and received responses from all eleven water and sewerage companies providing details of their overheads relating to capital expenditure and operating expenditure, including allocation methods used and the proportion of bioresources costs which are allocated indirectly. Nine of the companies provided a breakdown of G&S expenditure by category.

We note that comparisons across companies' accounting separation policies can be unreliable because companies' structures impact where activities are undertaken, for example centrally or locally as part of the core activity, and companies interpret cost categories differently.

2.3 Capital overheads

From our survey we found that companies use the following methods to allocate indirect capital costs (including operational overheads and G&S) between price controls, including bioresources:

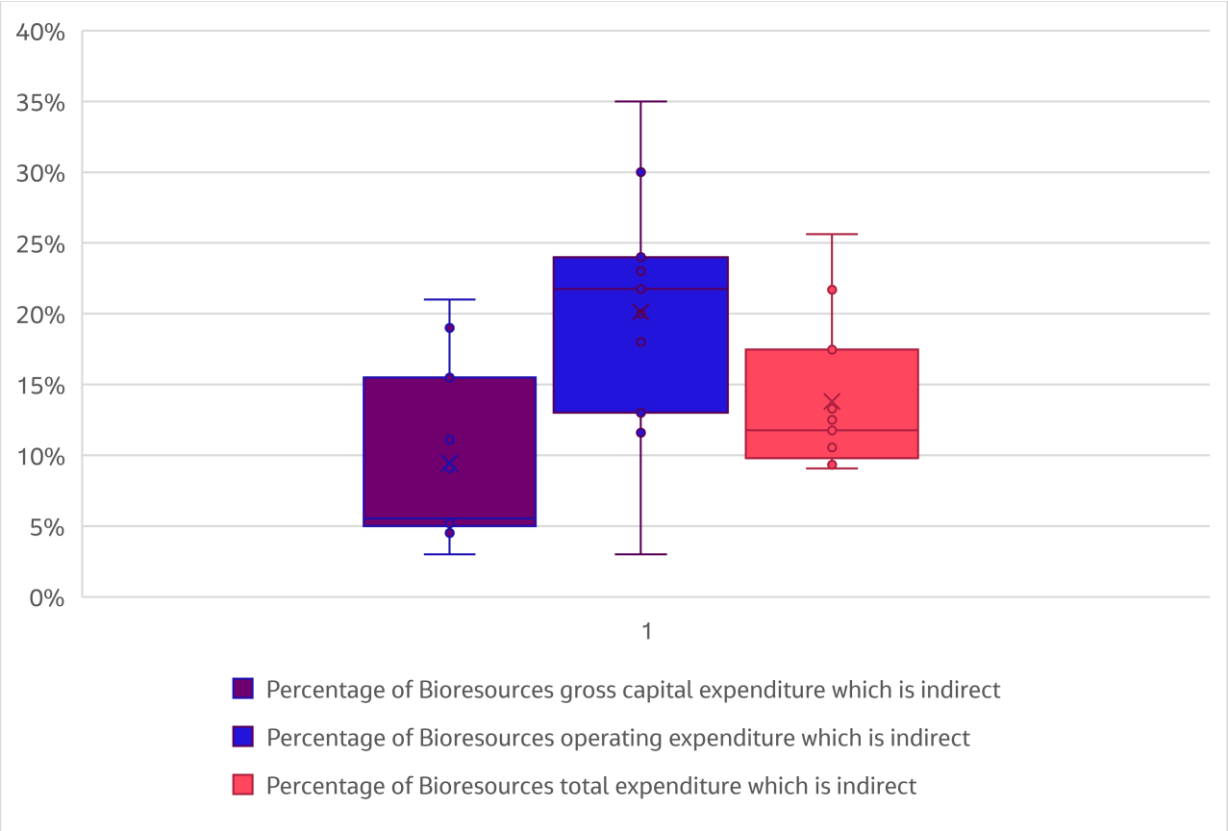
- Direct coding to capital projects which are coded to a specific price control (79% - 97% of overhead costs)
- Applying an overhead burden rate or recovery rate to all capital projects, which is a company-wide rate set for the AMP. The rates stated by companies ranged from 5% to 18%. The reasons for the level of variation in the rates applied by companies was not clear from the information provided.
- Including an uplift for overheads in the standard recharge rates for labour and materials.

- Allocating support services using cost drivers, which include full-time equivalent (FTE) employees, timesheets, management assessment and in proportion to direct capital costs.

The companies that responded to our survey applied a combination of these methods.

Figure 7 below shows the proportion of bioresources capital, operating and total expenditure that consisted of indirect cost allocations in 2019-20, according to the eleven companies surveyed.

Figure 7 Proportion of bioresources capital and operating expenditure costs that were indirectly allocated in 2019-20



For the companies that responded to our survey, between 3% and 21% of capital expenditure was indirectly allocated. This indicates that a high proportion of capital expenditure was directly allocated through specific capital projects and therefore had minimal risk of allocation to different price controls between companies.

Indirect capital expenditure was between 1% and 9% of total bioresources expenditure. This is capital expenditure where there is a higher risk that allocations could be made to different price controls between companies.

We note, however, that the percentage of indirect capital expenditure as a percent of capex is likely to change depending on the scale of capital investments that companies make in any given year.

2.4 Operating expenditure overheads

As shown in Figure 7, for the companies surveyed, the percentage of bioresources operating expenditure that was indirectly allocated in 2019-20 ranged from 3% to 35%. This represents from 2% to 18% of total bioresources expenditure. We look in more detail below at the allocation methods companies use for operational overheads and G&S expenditure and the proportions of costs that are allocated to bioresources.

2.4.1 Operational overheads

Five companies said that the vast majority of indirect costs are included within their central G&S allocations, which are detailed in section 2.4.2. Six of the companies stated that they allocate operational overheads between price controls, including wastewater network plus and bioresources. However, two of these companies stated that the vast majority of these costs were allocated directly between the price controls. The operational overhead categories specified in the companies' survey responses and the allocation methods used are detailed in Table 2 below.

Table 2 Categories and allocation methods for operational overheads

Category	Allocation method
Insurance	Employer's liability – FTE Uninsured provisions – claim history
Scientific services	Management assessment of sample numbers and other cost factors
Non-domestic rates	Primarily sewage treatment, recharged to bioresources based on rateable values. GMEAV
Dispatch	FTE
Mobile operators	Time recorded
Operational service contracts	Cost analysis
Operations support	Mobile staff time recorded
Quality regulation	Management assessment
Management & general indirect	Proportionate to total direct cost, management estimate

The categories listed were largely unique to individual companies, so we were not able to compare the consistency of the allocation methods used. The retail/wholesale cost allocation guidance in RAG 2.08 includes recommended cost drivers for insurance and rates, which are consistent with these methods, but there is no prescriptive guidance on how the other categories should be allocated.

Given that nearly half of companies stated that the majority of indirect costs are included within their central G&S allocations, and two other companies stated that the vast majority of operational overheads were allocated directly between price controls, we consider that local overheads allocated between wastewater network plus and bioresources are not likely to be material. Some of the categories above are also included in the G&S categories discussed in section 2.4.2 and would therefore be subject to any guidance recommended for G&S cost allocations.

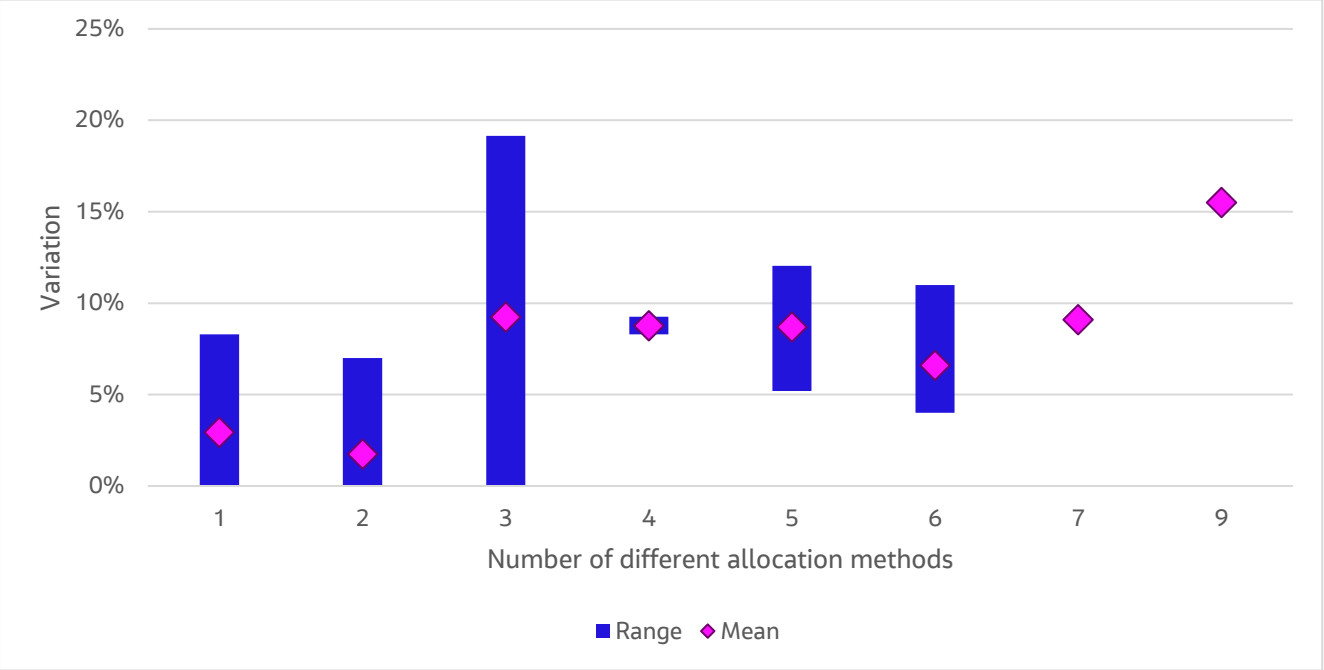
2.4.2 General and support expenditure

G&S expenditure includes central support services, such as HR, Finance and facilities management which are used by all price control units and allocated across them using appropriate cost drivers.

We have summarised the cost drivers used by the 11 water and sewerage companies for different categories of G&S expenditure, according to their Methodology Statements for 2019-20, in Table 3. The guidance provided in RAG 2.08 on appropriate cost drivers for allocating each cost category between retail and wholesale is also noted in the table. The table includes all of the G&S categories included in RAG 2.08 and the sub-categories specified in companies' methodology statements. Note that the categories used by companies do not perfectly align to each other or to the categories specified in RAG 2.08 but we have grouped them together to aid comparison.

There is variation across companies in how G&S costs are categorised and the allocation methods used. The cost drivers used are consistent with RAG 2.08 guidance for some companies in some areas, notably where the guidance calls for allocation by FTE. One notable exception is that the preferred approach often stated in RAG 2.08 is the use of timesheets, which is not a method widely used by companies for allocating operating expenditure. Two companies stated that they use timesheets to allocate indirect capital expenditure costs.

Figure 8 Effect of increased allocation methods on range of values reported to bioresources for G&S categories



This graph shows the number of different allocation methods reported across all companies for different G&S categories and the range of the percentage of costs that were allocated to bioresources. For example, where there were 5 different allocation methods reported across the industry, the variation in the costs for each category allocated to bioresources varied by from 5% to 12% across companies. The fact that the variation in allocation broadly increases as the number of allocation methods increases supports the conclusion that a significant amount of the variation in overheads reporting within G&S categories is due to variations in allocation methods. However, it should be noted that this variation is not necessarily wrong if it reflects real differences in bioresources activities and costs between companies.

Table 3 G&S allocation methods from company accounting methodology statements

Category	RAG 2.08 guidance	Sub-category	A	B	C	D	E	F	G	H	I	J	K
Directors' renumeration	In order of preference: 1. Time (based on timesheets) 2. Management estimate (with supporting commentary)	Board renumeration	Company revenues, Chief operating officer - wholesale revenues			Management estimate			FTE	FTE			Direct, FTE
		Finance Director	Company revenues		Based on finance team activity split		Manpower - timesheet non-manpower - direct, FTE						
		Chief operating officer	Wholesale revenues	FTE	Average of other Directors' splits								
		Reward & pension	FTE in DB scheme			No. of pension members			FTE				
Finance, HR, payroll, general management	In order of preference: 1. Time (based on timesheets) 2. FTEs	Finance	FTE, company revenues	FTE	FTE	Direct, FTE, mgt estimate Treasury & tax - RC spend	FTE (inc. contractors)	FTE (inc. contractors)	FTE	FTE	FTE		Direct to water and waste, then FTE.
		General management / other central costs				Direct, FTE		FTE (inc. contractors)		FTE			FTE
		Business assurance	Management estimate										
		Human resources	Company FTEs and management assessments	FTE	FTE	FTE Learning & development	FTE (excl. contractors)	Headcount	FTE	Direct, FTE	FTE	FTE	FTE

Category	RAG 2.08 guidance	Sub-category	A	B	C	D	E	F	G	H	I	J	K
						- mgt estimate							
Insurance	FTEs for employers/ employees liability or more appropriate cost driver for other types of insurance	Insurance	MEAV, FTEs and claim history		FTE, asset value, claim history	Direct, cost driver reflective of basis of insurance charge (e.g. asset values used for property insurance)	Direct, FTE		Direct, FTE, vehicle numbers	Direct, FTE			Relevant cost driver for each premium
IT costs	In order of preference: 1. An appropriate cost driver depending on the nature of IT costs. 2. Number of computers and mobile devices (where there is not an appropriate cost driver)	IT		Analysis of internal charges for management accounts	FTE		FTE (inc. contractors), central IS costs allocated in proportion to costs assigned to business units.	Headcount (Inc. office based contractors and 50% of non-office as they share IT equipment)	Direct, FTE or users		Direct, FTE, G&S IS allocated in proportion to costs in each business unit		Direct, FTE
		Digital / Business Information Services	Company revenues							Direct, FTE			
Facilities, buildings/ grounds maintenance	In order of preference:1. Floor space2. FTEs	Facilities management	Site based headcount	Analysis of internal charges for management accounts	Floorspace	Floor space occupancy	Site occupation	FTE	Floorspace	Direct, FTE	Transactional analysis by site		Split by location, then FTE between departments
		Head office									Occupancy		

Category	RAG 2.08 guidance	Sub-category	A	B	C	D	E	F	G	H	I	J	K
		portfolio management					Split of title ownership by business unit				Split of title ownership by business unit		
		Grounds maintenance				Direct, pro rata to employment costs							
Local authority rates and cumulo rates	See footnote[9]	LA rates (office)							Floorspace	Desk occupancy, FTE			
		Site rates (non-head office)			GMEAV - costs for shared ST and sludge sites split based on RV			GMEAV		Direct			
Motor vehicles	Number of motor vehicles	Fleet / transport			Vehicle costs	Direct, servicing cost breakdown	Direct, FTE			Pro rata to cost centre allocation		Direct, based on usage	

[9] Where there is a separate local authority rates bill for buildings with both retail and wholesale activities (such as offices), then in order of preference:
1. Floor space
2. FTEs

The cumulo rates bill is then coded to wholesale.
Where there is no separate billing arrangement, e.g. where a single cumulo rates bill applies to all company operations, then as a first step a notional rate for the jointly used assets (typically office buildings) should be established with reference to MEAV. Then the retail / wholesale allocation of this cost should be calculated using the methodology set out above.

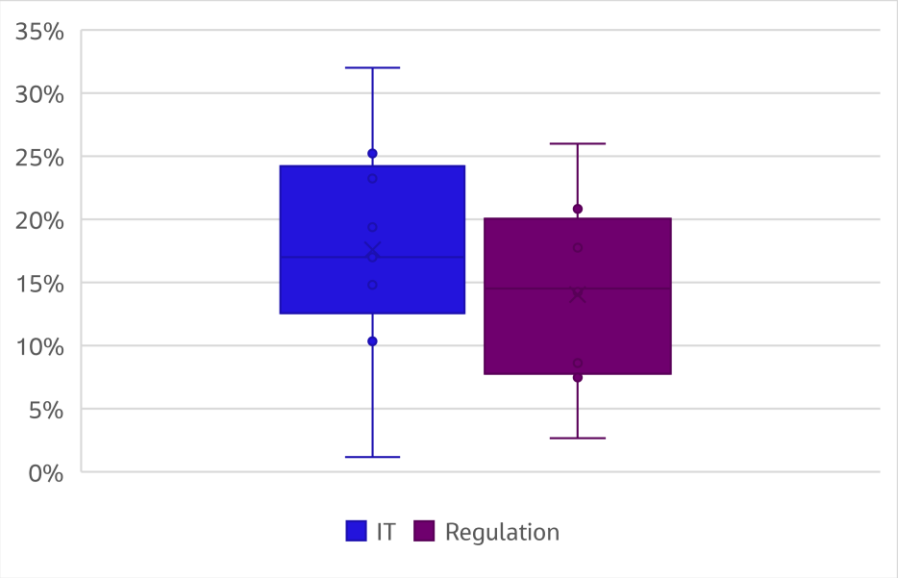
Category	RAG 2.08 guidance	Sub-category	A	B	C	D	E	F	G	H	I	J	K
Other business activities (regulation costs)	1/9th to retail for water and sewerage companies	Strategy & regulation	economic reg - 2/9 to bioresources charges - by company revenues		1/9th		Manpower - 1/9th Non-manpower - direct		FTE	4/9 to waste then FTE to bioresources MOSL - 50% to waste, FTE to business units	1/9th		1/9 to each business unit
Other general and support costs	In order of preference: 1. Time (based on timesheets). 2. Appropriate cost driver (based on nature of cost) 3. FTEs (where there is not an appropriate cost driver)	Innovation				Assessment of project portfolio							
		Legal & secretarial	Management estimate	FTE	FTE	Direct, FTE			FTE	Direct, FTE			FTE
		General counsel	Company revenues				FTE (inc. contractors)				FTE		
		Company secretary	Company revenues										
		Communications /corporate affairs	Management estimate			FTE	FTE (inc. contractors)		FTE	Direct, FTE			By project, FTE
		Commercial /supply chain / procurement	Company revenues		FTE	Pro rata to total direct costs	Timesheets		Apportioned to direct costs	No. of PO's, % of time, FTE	Timesheets		FTE
		Health & safety	Management estimate			Direct, FTE			FTE	Building/desk usage, FTE	Management estimate		FTE
		Asset management								Direct, management estimate, FTE			1/9 to each business unit
		Environment	Management estimate										FTE
		Operational services	Management estimate										
		Energy team	power costs										
		Stores					Volume of store issues				Volume of store issues		

We analysed the proportion of G&S costs that were allocated to bioresources in 2019-20. Five companies provide a breakdown of this by G&S category and three companies provide an overall percentage allocation in their Methodology Statements for 2019-20. At our request, nine companies confidentially provided details of the value of G&S costs by category and the proportion allocated to bioresources.

The overall proportion of G&S costs allocated to bioresources ranged from 5% to 13%, based on the information from nine companies.

The biggest categories of G&S costs in bioresources tended to be IT and Regulation costs. IT made up between 1% and 32% of bioresources G&S and regulation costs made up between 3% and 26% of bioresources costs. This is illustrated in Figure 7 below.

Figure 9 Category as a percentage of total Bioresources G&S



The proportion of regulation costs allocated to bioresources ranged from 11% to 25% across the companies. The guidance in RAG 2.08 states that companies should allocate 1/9th of regulation costs to retail and it is implicitly understood by companies that 1/9th of regulation costs should be allocated to each historical business unit. Bioresources consists of the former sludge treatment and sludge disposal business units and therefore some companies allocate 2/9ths (22%) of regulation costs to bioresources. Other companies allocate 1/9th of regulation costs to bioresources, and some apply an allocation based on full-time equivalent employees (FTE). This is an area where the RAG 2.08 guidance has become unclear and may be no longer relevant to the current price control structure.

The proportion of IT costs allocated to bioresources ranged from 2% to 13% across companies. As shown in Table 2, the methods used to allocate IT costs across price controls vary and include:

- Direct allocation
- FTE
- Analysis of internal charges
- Proportionate to other costs
- Headcount
- Number of users

These methods are consistent with RAG 2.08 guidance which says costs should be allocated between retail and wholesale using an appropriate cost driver depending on the nature of the IT costs. Different approaches may be appropriate for different IT costs. For example, IT software used only in the bioresources control

could be allocated directly, while a central contract for IT desktops could be allocated based on headcount in each price control.

Other categories which accounted for 10% or more of bioresources G&S expenditure for some companies included HR, wholesale/operational services, asset management, environment, PR, and Directors.

2.5 Conclusions

We conclude that:

- Operational overhead allocations are not a material source of unjustified variation between companies.
- Overhead burden rates on capital expenditure are a potentially material source of variation between companies. Further investigation would be necessary to understand the reasons for the range in burden rates applied across the industry and the materiality of this for bioresources capital expenditure.
- Differences in G&S expenditure allocation cause material variation in overhead allocation to Bioresources. This is driven by different accounting categories and allocation methods.
- It would be appropriate to align G&S allocation methods between companies by specifying categories and preferred methods for them, and requiring companies to demonstrate that any alternative method used is the most appropriate for their costs.

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