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YTL GROUP

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Dear Ynon

Wessex Water response to PR19 Cost Assessment consultation

Thank you for the opportunity to respond to this consultation. We strongly approve of your open and transparent approach to sharing your initial findings. It can only improve the confidence in the final models and resulting efficiency targets at PR19.

We also commend you for the overall modelling approach to modelling you have taken – it is a significant step forward to the approaches taken at previous price reviews.

We agree that a balance needs to be struck between economic theory/expert knowledge and statistical validity. We counsel, that for both wholesale and retail residential modelling, that the economic theory and expert knowledge is the critical factor when determining the success of a model. Ultimately, a model may have good statistical properties but if it does not pass robust engineering and economic scrutiny it can have no logical purpose. A minor realignment towards placing greater emphasis on economic and engineering theory and expert knowledge would improve your models. We discuss this in more detail later.

It is also important that models use variables that drive future costs as well as historical costs. For example, 'miles of pipe replaced or relined' considers only historical expenditure that (by its very nature) is almost certain to be different future expenditure. Whilst it does appear to make the models more statistically robust, it makes no sense that such a variable be included in the modelling. This particular variable is fully within management control and we have no way of predicting its level in the future.

An additional general point of note for all modelling is that the assessment of efficiency benchmarks should be made at an aggregate level. Setting different benchmarks at service sub-levels using different companies is incorrect. Model results should be aggregated to the water or sewerage service level and then a single appropriate benchmark chosen. An extreme example would be a company building a water treatment works next to every household. Resources and treatment costs would be enormous but distribution costs would

be close to zero. It would not make sense to challenge all companies to achieve this level of distribution costs.

We also expect that your wider cost assessment framework will need to make clear how it has taken differential existing levels of service into account when setting expenditure benchmarks.

We provide full responses to your wholesale and residential retail modelling approaches in the following sections and attach the completed pro-forma in conjunction with this response. We draw your attention to specific key areas below:

Concerning the wholesale models:

- The key drivers of costs need to be included in all model specifications. Other cost drivers should be covered by considering an appropriate suite of models. For example, we have shown, through our engagement with the CAWG that density and economies of scale drive unit costs much more than treatment complexity and so should be included in all models.
- Modelling of enhancement expenditure, with a direct impact on service should be carefully considered and in our opinion, should be avoided without also including explicit reference to service levels provided.

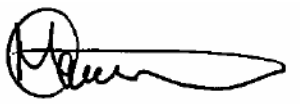
Concerning the residential retail models:

- The models would benefit from a reassessment of valid cost drivers. For example, many of the bad debt and totex models omit key variables that explain bad debt such as wholesale bill size and population transience.
- The approach to modelling deprivation is flawed – the use of a “probability of default” variable is inappropriate to use in cost modelling as it is within management control.
- The modelling approach using unit costs and a wider range of explanatory variables should be reconsidered to better take account of the scale and scope issues in retail.
- Your modelling approach in retail appears to be heavily influenced by the United Utilities/Reckon work. Other companies’ submissions have demonstrated that robust modelling of non-bad debt and totex is very possible. We suggest you have regard to this in your future work.

We anticipate the next stages of your work to assess robust efficiency challenges at PR19 and we look forward playing our part assisting you in the process.

If we can assist in any way please do not hesitate to contact us.

Yours sincerely



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Detailed response to wholesale modelling approach

General approach to wholesale modelling

The modelling approach proposed here represents a real step forwards from the one undertaken at PR14.

We wholeheartedly agree with the principles in your proposed approach, and are pleased to see the outcomes of our discussions with you over the last year at the cost assessment working group (CAWG) reflected in your proposals.

- Engineering, asset management and economic theory must be central to the choice of variables and are key in assessing the models' strength and relevance by considering the sign and magnitude of any estimated coefficients.
- Statistical significance of the coefficients and statistical tests, although important and not to be completely ignored, should have less importance compared to engineering and economic judgement as we could expect to see some reduction in the power of such tests, particularly where we are working with limited data sets such as in modelling wastewater expenditure.
- Statistical significance does not imply economic significance. Nor does it imply that variables should be included in the model.

In fact, we think these principles could be leveraged further in your final choice of models. Some of the choices of variables, particularly those proposed to capture treatment complexity seem arbitrary. We cover these in detail in the next section.

We accept that most variables are, to some extent under management control; particularly over the long term. However, this is a spectrum, and we are nervous about including cost drivers that are significantly under management control in the shorter term, such as the length of mains or sewers relined. There is a real danger here of creating perverse incentives and bias. This could potentially be of overall benefit to the modelling, as it can aid in controlling for observed variations in base expenditure relating to timing of investment allowing the exogenous drivers coefficients to be estimated more robustly. Ultimately though, this explains differences in costs and not necessarily efficiency, as more efficient companies may be finding ways to reduce the quantum of work required.

This is of particular concern when considering bioresources. This is an area where the opening of the market should be driving more innovation and commercial activity, and the risk of perverse incentives harming this development is even greater.

We are also pleased to see relatively parsimonious models being proposed. We have concerns with any model using too many variables since there are a limited number of independent observations. We should not be fooled into thinking we have more independent observations by utilising a longer time period of data.

We have found similar results arising from OLS and RE models, and have little preference for one over the other. Considering a suite of models including both estimation methods will adequately protect against any bias that does arise in either method. We see little evidence to proceed with more complex panel data techniques at the sacrifice of transparency due to the key test we apply to models: the sizes and signs of the estimated coefficients.

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One area where there may be scope to improve model specification is by looking at quadratic forms of density variables, as we have outlined in our separate note on modelling density. We feel that there are strong grounds, from an economic and engineering perspective, for using models that allow for a non-linear (e.g. U-shape) relationship between costs and measures of density, and feel that Ofwat's consultation models may be giving too much weight to statistical performance at the expense of the underlying economic logic. Due to the complexity of capturing the effects of geographic density we are also supportive of the approach to capture the effects using asset measures.

What expenditure to model

Base costs represent a sensible place to start modelling, and we agree with your list of proposed exclusions (with some caveats around enhancement) – these costs are outside of company control and so should be excluded.

We accept it may seem possible to include some enhancement expenditure in this modelling approach, specifically the repeatable expenditure not tied to regulatory outputs or lumpy capital investment.

However, this does add further issues; enhancement expenditure often relates directly to the service levels offered. Although we accept that service levels are not feasible to include as drivers, if these costs are included and no reference to service levels are made, the models will only fund performance at the industry average level of performance. This reduces the scope for companies to propose ambitious plans in these areas without going down the cost adjustment claim route. It is clear that it would be easy for a company to spend less money and reduce its level of service. As such, it is critical that you consider differential levels of service when setting expenditure benchmarks. For example, we think it is detrimental to the overall cost assessment process to include sewer flooding and STW growth costs as these activities are intrinsically linked to the services we offer to customers, rather than a function of the number of customers we have.

We note that you have not utilised smoothed capex in any of your base models. We think that it is reasonable to consider opex and IRE on an in-year basis. Non-infrastructure maintenance expenditure tends to be much more cyclical and lumpy in nature. Therefore, there is some merit in smoothing the MNI, either by utilising a longer time period (potentially by incorporating the PR14 data), or simply by considering an average of MNI over the data we have collected.

We have some issues with the economies of scale inferred from the coefficients of the main scale variables. If the main scale variable has a coefficient of 1.15 then a company 10 times the size of another would have a unit cost allowance that is 40% higher. This does not make sense and is more than just a theoretical problem.

Where the models estimate a coefficient on the scale variable much above 1, this could be being driven by the positive correlation (particularly on supply) between size and density, with some of the underlying effects of density on costs being misallocated to the scale variable. This is detrimental to the modelling. Density and scale are not perfectly correlated, and if density effects are being inadvertently captured as scale effects this would worsen the models' ability to adjust cost benchmarks for differences in density across companies.

Therefore, there is merit in additionally utilising unit cost models – this enforces complete returns to scale and in some cases can cause other relationships to be better picked up.

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Care needs to be given when considering at what level to aggregate model costs.

- At too aggregate a level you end up with too wide an array of cost drivers to fully explain costs, particularly when modelling distribution and treatment costs together. For example, the complexity of treatment could be a credible driver of treatment costs but would have no impact on distribution costs.
- At too disaggregated a level there are issues around cost allocation, and setting a false efficiency frontier taking the efficient company from each set rather than considering the performance of companies at a combined level (see earlier example).

The latter risks are easier to mitigate by simply considering company level performance over all models when setting efficiency frontiers. We therefore favour a more disaggregated assessment, and combining areas where there are common cost drivers or material concerns over cost allocation, such as water resources and treatment, and in running "cross check" models at a more aggregate level.

Specific thoughts on Ofwat's proposed cost drivers

Sewage Treatment Complexity

We are struggling to understand the engineering principles governing the choice of variables to model sewage treatment complexity.

Considering the proportion of load with an ammonia consent of <1 mg/l, the technology required for this is not fundamentally different from that required to achieve a <3mg/l consent. Activated sludge plants will achieve both but with a longer retention time required to achieve less than 1 mg/l. This will drive a small increase in costs, but many of the increased costs will be borne by companies with only marginally weaker consents, i.e. in the range 1 to 3 mg/l.

In addition, it is not sufficient to use this as a proxy for other tight consents; tight ammonia consents are independent to other tight consents. For example, many companies have sites with extremely complex and costly treatment, such as methanol dosing, with less stringent ammonia consents.

In this light, we think that without clear justification it is unsatisfactory to purely model treatment complexity this way, and that a range of models should be used due to the difficulties in this area.

Water Treatment Complexity

We have similar issues with the cut off point for modelling water treatment complexity. As we outlined at the CAWG and in our submission to this consultation, we favour modelling water treatment complexity by considering ground and surface water.

Age of Assets

As with the cut off points assumed above, the cut off points used here seem arbitrary and, without clear engineering justification, should not be used. In particular, using different levels for supply and waste is unsatisfactory.

This is backed up by considering the magnitude of these coefficients. Moving from the industry average to the highest level of new assets in the industry gives rise to between 8% and 19% reduction in costs (see below table). These do not seem appropriate, particularly as

the variance increases when considering sewerage network plus models compared to just sewage collection models, where network costs represent a much smaller proportion of overall totex.

Area	% change in costs
Water distribution	-14%
Water network +	-10%
Wholesale water	-9%
Sewage collection	-8%
Sewerage network +	-19%
Wholesale sewerage	-15%

Additionally, we have some concerns around the data quality in this area; the confidence grades for a number of companies are C – representing poorer data quality than used elsewhere in the modelling.

Thus, we see no place for these measures in the final suite of models.

Conclusions

We agree with many of the principles you discuss in your consultation, and accept that there are some areas where there is no clear “right” answer as to how to model costs.

Most of our concerns can be mitigated by using a sensible suite of models and a robust triangulation process. We also fully support covering differences in estimation technique, smoothing of capital expenditure and levels of aggregation through these means.

Our detailed thoughts on specific models are available in the proforma submitted alongside this letter. In an overall suite of models used for cost assessment we accept that some models will not be perfect – therefore, an amber ranking does not mean it has no place in the overall cost assessment. By considering an appropriate range of models, minor concerns can be mitigated.

Some areas where we think care should be given, or more thought is required are:

- Ensuring that the principles outlined are followed through in full, and sacrifices are not made to the underlying physical relationships to create models that appear more statistically robust.
- Key drivers of costs need to be included in all model specifications. Other cost drivers we are comfortable covering by considering an appropriate suite of models. For example, we have shown, through our engagement with the CAWG that density and economies of scale drive unit costs much more than treatment complexity and so should be included in all models.
- Modelling of enhancement expenditure, with a direct impact on service should be carefully considered and, in our opinion, should be avoided without also including explicit reference to service levels provided.
- Efficiency challenges need to be set at a suitably aggregate level, and should not be considered in isolation at a model level.

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Detailed response to residential retail modelling approach

Your models are a definite improvement to previous attempts at retail efficiency assessment. The contributions from Ofwat and companies demonstrate that econometric cost assessment for the residential retail price control is appropriate.

Our response is prepared in the spirit of achieving the most robust and accurate assessment of residential retail efficiency at PR19. This will ensure there is the greatest confidence in the resulting efficiency challenges over 2020-25.

There are a number of areas where your models could be improved.

- The models would benefit from a reassessment of valid cost drivers.
- Your approach would greatly benefit from a revised approach to model selection that places a greater weight on intuition and less on statistical validity.
- Many of the bad debt and totex models omit key variables that explain bad debt such as wholesale bill size and population transience.
- The approach to modelling deprivation is flawed – the use of a "probability of default" variable is inappropriate to use in cost modelling as it is within management control.
- The modelling approach using unit costs and a wider range of explanatory variables should be reconsidered to better take account of the scale and scope issues in retail.

We note that your modelling approach has drawn significantly from the work produced by United Utilities and Reckon. We believe that other companies' submissions (including the work we have completed with Bristol Water and Economic Insight) produce more robust modelling approaches and we hope they are taken into account in your future work.

We also note that the resulting efficiency challenges must be set at an aggregate level using a single company and that individual frontiers are not set in isolation using different companies as the efficient benchmarks.

Method and model selection

The approach taken to model selection has resulted in the utilisation of very few explanatory variables. While we cannot know the exact approach to model selection, a number of intuitively sound cost drivers that we have shown to be valid have been omitted, such as:

- wholesale bill size and population transience in the bad debt models, and
- density measures and traffic speed for non-bad debt and totex models.

We advocate a model selection process that places less emphasis on statistical validity and greater consideration of a more diverse and intuitive range of cost drivers.

Omission of variables to explain scale and scope economies

Due to the scale effects in retail businesses, the way in which customer numbers are incorporated into the modelling can materially alter the efficiency position. Your approach across all models is to model costs on a unit basis per customer. For a small number of models, the additional variable "% of dual service customers" is used to account for scope economies.

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The work we have completed with Bristol Water and Economic Insight trialled different approaches to account of the scale and scope issues in retail and concluded that there needed to be a process of triangulation between them. We are therefore concerned that you have not fully considered the range of possible modelling approaches and the implications of selecting a single approach to modelling the issues of economies of scope and scale.

Explaining differences in bad debt

Cost drivers explaining differences in deprivation

The use of a "propensity of default" explanatory variable is flawed. While the probability of default does drive bad debt costs, the propensity to default is:

- at least partly under management control and is influenceable by company behaviour, and
- variances in default rates across different areas may reflect differences in the mix of products for which customers are taking out credit, rather than socio-economic differentials.

Explanatory variables in econometric modelling should be striving to measure the underlying characteristics of a company's customer base that influence the probability of default, not the actual probability of default. We therefore have significant reservations with the use of the Equifax variable "% of households with default" and see no reason why it is a valid cost driver for use in econometric cost assessment.

We suggest you use cost drivers that only seek to explain the underlying socio-economic differences in your modelling.

We also note that your full totex models only utilise the "% of households with default" variable as an explanation for deprivation. This is the least defensible measure of those being considered for inclusion.

Omission of valid cost drivers

Our work with Bristol Water and Economic Insight has demonstrated that there are a number of additional valid cost drivers that warrant inclusion in the models:

- Wholesale bill size is a valid driver of retail costs as the larger the wholesale bill the larger the default - this is clearly outside management control.
- Population transience is another valid driver of retail costs as gone away debt is a key component of uncollected debt.

A model selection process that results in less narrowly specified models should include these measures.

Modelling Totex less bad debt

We are concerned that the totex less bad debt models are not robust. We have demonstrated in our work with Bristol Water and Economic Insight that it is possible to model totex less bad debt costs robustly. We are concerned that:

- The use of dummy variables is not a robust modelling approach

- The overly narrow selection of explanatory variables that excludes other valid cost drivers, such as:
    - Meter penetration
    - Customer numbers
    - Meter density

Moving away from a unit cost modelling approach may solve some of the issues you are experiencing.

We recommend a wider review of intuitively sound cost drivers and greater weight on this, rather than a greater weight on statistical significance.

Modelling Totex

Our concerns for the totex less bad debt models are also apparent for the totex models.

- The use of dummy variables is not a robust approach.
- A wider selection of explanatory variables should be considered that explain both bad debt and non-bad debt costs.
- The modelling approach based unit costs and the existence of scale and scope economies should be reconsidered.

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