Anglian Water

8B. VIVID ECONOMICS: ENHANCEMENT COST COST ASSESSMENT MODELLING FOR PR19

Draft Determination Representation, August 2019

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Enhancement cost assessment modelling for PR19 – Draft Determination update

Introduction

This note considers ways in which the modelling of enhancement costs at the PR19 Draft Determinations (DD) differs from the Initial Assessment of Plans (IAP), updating the findings of a previous report published in March 2019, *Enhancement cost assessment modelling for the PR19 Initial Assessment of Plans* and a supplementary note, *Adjusting log-log predictions for IAP enhancement models*. While the earlier reports reviewed in full the use of econometric models in cost assessment at the IAP in full and provided detailed recommendations on how they could be developed, this much briefer note revisits recommendations from the earlier work and considers how they shift in light of changes to Ofwat's approach.

By far the most significant change to Ofwat's methodology at the DD is the use of 'botex+' modelling for growth costs, which this note does not examine in depth. A further report submitted alongside this, *Enhancement growth cost assessment at PR19*, reviews the 'botex+' approach in detail and sets out recommendations on how it can be improved upon for Final Determinations.

This note and the reports cited above were funded by Anglian Water. The views set out in them are those of independent experts at Vivid Economics.

Overarching approach

Ofwat has made a number of significant changes to enhancement cost modelling at DD, many of which are aligned with recommendations in the March 2019 report. Nonetheless, as Table 1 shows, some critical overarching issues remain unaddressed, while some changes introduce new problems.

Table 1 Summary of overarching changes to the approach

Area	Key changes	Assessment and updated recommendations
Enhancement opex	Included in all enhancement models. Implicit allowance netted from enhancement models to avoid double-counting through botex+ models	Addresses key concern relating to having capex only models at IAP
Hafren Dyfrdwy	Discarded as a distinct data point	Addresses key concerns
Efficiency challenge	'In the round' efficiency challenge applied to WINEP wastewater line	A move towards a more aggregated efficiency challenge can reduce risks , but it is not clear why this was applied to a select group of lines and not elsewhere Recommendation for more clearly justified challenge based on a closer analysis of company efficiency scores and modelled shortfalls still stands. Recommendation for change to approach to shallow dive efficiency challenge still stands

Log-log adjustments	'Standardisation' adjustment made to all wastewater log-log models	An adjustment is consistent with earlier recommendations. However, the 'conditional mean' or 'smearing' adjustments have greater theoretical validity. No adjustment is made in water log-log models or botex+. Recommendation for an adjustment in these areas still stands
Botex+ modelling	Adopted for growth	Strong recommendation for a new approach to growth cost assessment based on deep dives. See separate report

Source: Vivid Economics analysis

Individual model specifications

Table 2 summarises key changes to individual model specifications implemented at the DD. As with the overarching issues reviewed above, there are a number of important changes, many are consistent with earlier recommendations, but some key problems remain unresolved. Not noted in the table below is the fact that all models rely on forecast data (except first-time sewerage) and use totex rather than capex in the dependent variables: this cross-cutting change follows from the shift in the treatment of enhancement opex covered in Table 1. The assessment in the table below does not consider Ofwat's execution of the changes described: this work has not attempted to quality assure Ofwat's derivation of allowances from modelling in the DD.

Table 2 Line-by-line review of Draft Determinations enhancement model areas

Area	Expenditure line	Key changes	Assessment and updated recommendations
Growth	Wastewater	Botex+ approach implemented	Recognition of lack of robustness of the IAP models. See separate report for full assessment informing strong recommendation for a new approach based on deep dives.
	Water		
	First-time sewerage	No changes	Recommendation to use deep dive still stands Historical model seems inappropriate as enhancement opex data is not available historically
Waste quality	P-removal	Linear complexity model added with 0.5mg/l as threshold for more complex schemes	Use of models that cover economies of scale and complexity supported in general Recommendation to use 1mg/l as the complexity threshold still stands. This is the level supported by engineering narratives, with strong variation across the sector

	Chemical removal	Four models with volume drivers replaced by a single model including quality drivers	Addresses key structural concerns. Recommend check coefficient values against engineering narratives
	Event duration monitoring	Adds separate median unit cost models for installations and permits	Recommendations to address problematic data still stands, with implausible variation in unit costs observed between companies
	Flow monitoring	Distinct approaches for new schemes, investigations (both median unit costs), other schemes (deep dives).	
	Flow to full treatment	Adoption of new models: linear and log specifications with two explanatory variables.	Recommendation to drop IAP models addressed. Process to arrive at new models not assessed.
	Sanitary parameters	Unintuitive power and exponential models replaced by log specifications, with scale, economies of scale, and quality drivers.	New specifications generally more transparent and more clearly motivated by engineering logic. Recommend reconsider the use of the quality driver (PE subject to consents of 3mg/l NH3), which is very strongly correlated with load for 7/10 companies (corr = 0.996).
	Spill frequency	Linear model adopted in place of log specification.	Recommend to reconsider log-log specification, given concerns around outliers: wide span between high and low volume companies (variation between YKY and SRN equals a factor of 25). Consider inclusion of economies of scale driver, which has strong narrative support and is borderline statistically significant.
	Storm tanks	Change in triangulation weights from 75:25 to 50:50	Recommendation to use only single model that includes economies of scale still stands, as this dominates the alternative.
Water quality	Meeting lead standards	WTW enhancement removed from dependent variable, shallow dive applied Number of lead communications pipes no longer used as explanatory variable Log and median unit cost models adopted	Changes to dependent and explanatory variables represent improvement, consistent with earlier recommendations Broader recommendation to justify model choice and triangulation weights remains, as unclear how median unit cost model arrived at
Supply-demand	Metering	No changes	Recommendation to investigate effect of meter penetration still stands
	Leakage	ODI rates and ESK data points removed	Key concerns in earlier report addressed

		Company unit costs used instead of median, with shallow-dive efficiency challenge where company costs exceed minimum	Use of shallow-dive efficiency challenge subject to recommendation in Table 1
	2020-25 schemes	No changes	Recommendation for shallow or deep dive stands

Source: Vivid Economics analysis