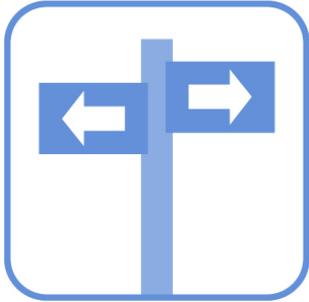




Wholesale cost assessment workshop

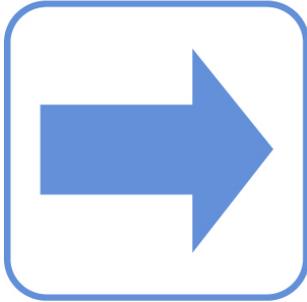
8 April 2014

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- 1 About this workshop
- 2 Introduction
- 3 Basic cost threshold
- 4 Advanced econometric models
- 5 Enhancement models
- 6 Forecast variables
- Break**
- 7 Cost assessment and the risk-based review
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About this workshop



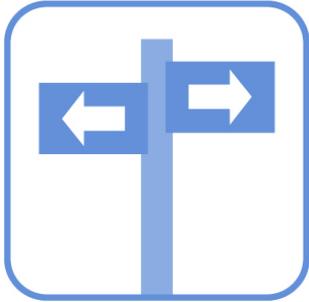
Following the announcement of the risk-based review results, we are holding a series of workshops across the elements of the business plan

The purpose of these sessions is to provide companies with the opportunity to raise questions with the Ofwat team. We are doing this in a workshop format to allow us, and companies, to use time effectively and efficiently

Our objective is to support companies to understand our approach and our requirements. We want to help companies to improve aspects of their plans, to address any gaps identified during the risk-based review, and to continue to take ownership and accountability of their plans

The workshop materials will be put on our website, along with the main points/questions and answers, without attribution. There will be no detailed meeting note

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Context (1)



In our final methodology (July 2013) we set our intention to develop an approach to wholesale cost assessment based for the risk-based review involving cost thresholds – with these thresholds based on benchmarking models and building on the published work of CEPA on totex modelling. Our final methodology also explained it would be for companies to provide evidence in business plans if they thought that their specific circumstances and plans might justify special treatment for cost assessment

We hope that the information published on 4 April – which we will summarise in the presentation today – brings this framework for the risk-based review to life

Context (2)



Nonetheless, today is not just about understanding the risk-based review but also about starting to lay the ground for draft determinations. The work in the risk-based review highlighted where companies need to provide more and better quality information to justify costs, and/or, reconsider their projections of totex. This presentation also highlights the minimum requirements for companies providing additional information ahead of draft determinations

Objectives



At the end of today's session companies should have:

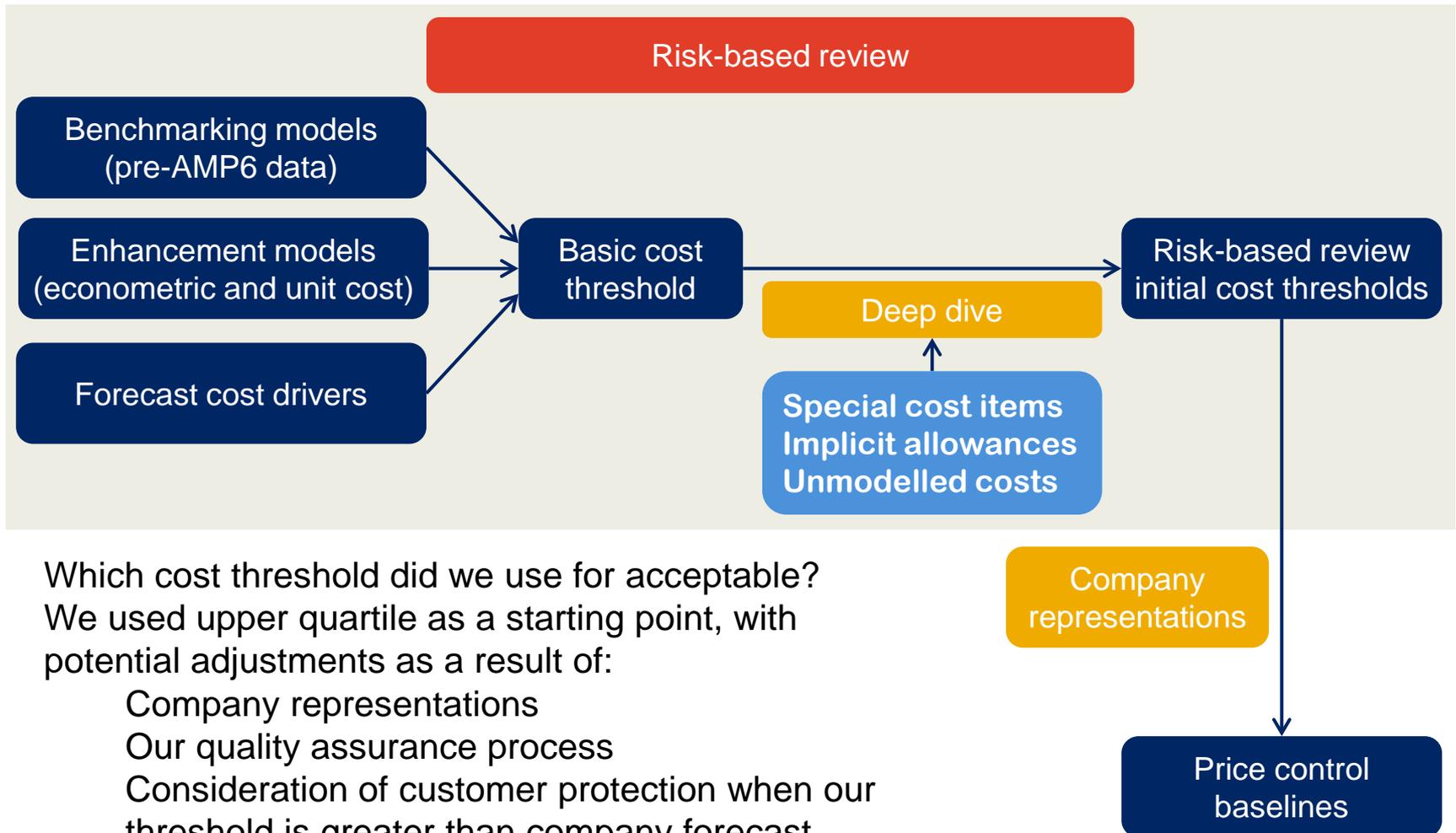
A good overview of our approach to wholesale cost assessment in the risk-based review

A clear understanding of the importance of the minimum information requirements for any further representations on wholesale costs as set out in the policy and information update document published on 4 April

Had the opportunity to ask questions on the above

The workshop on Thursday will provide an opportunity for further questions

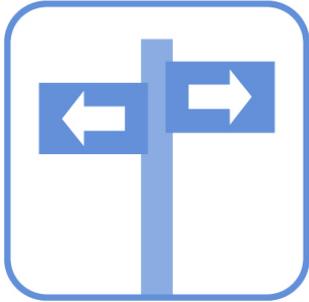
Overview of wholesale cost assessment



Which cost threshold did we use for acceptable?
We used upper quartile as a starting point, with potential adjustments as a result of:

- Company representations
- Our quality assurance process
- Consideration of customer protection when our threshold is greater than company forecast
- Technical adjustments (for example, pension deficit repair costs)

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Basic cost thresholds

What are they? The basic cost threshold is our independent **forecast of totex** for each company, developed before company business plans were submitted

What is their purpose? A starting point for cost assessment

During the risk-based review we adjusted the basic cost thresholds in the light of well evidenced company specific claims for cost that our models do not fully capture

The adjusted cost thresholds are called risk-based review initial cost thresholds. These were used to assess how closely company wholesale cost forecasts matched our view of costs

How did we estimate the BCTs? We used benchmarking models based on historical data in combination with our independent forecast of cost drivers for AMP6 activity

Basic cost thresholds

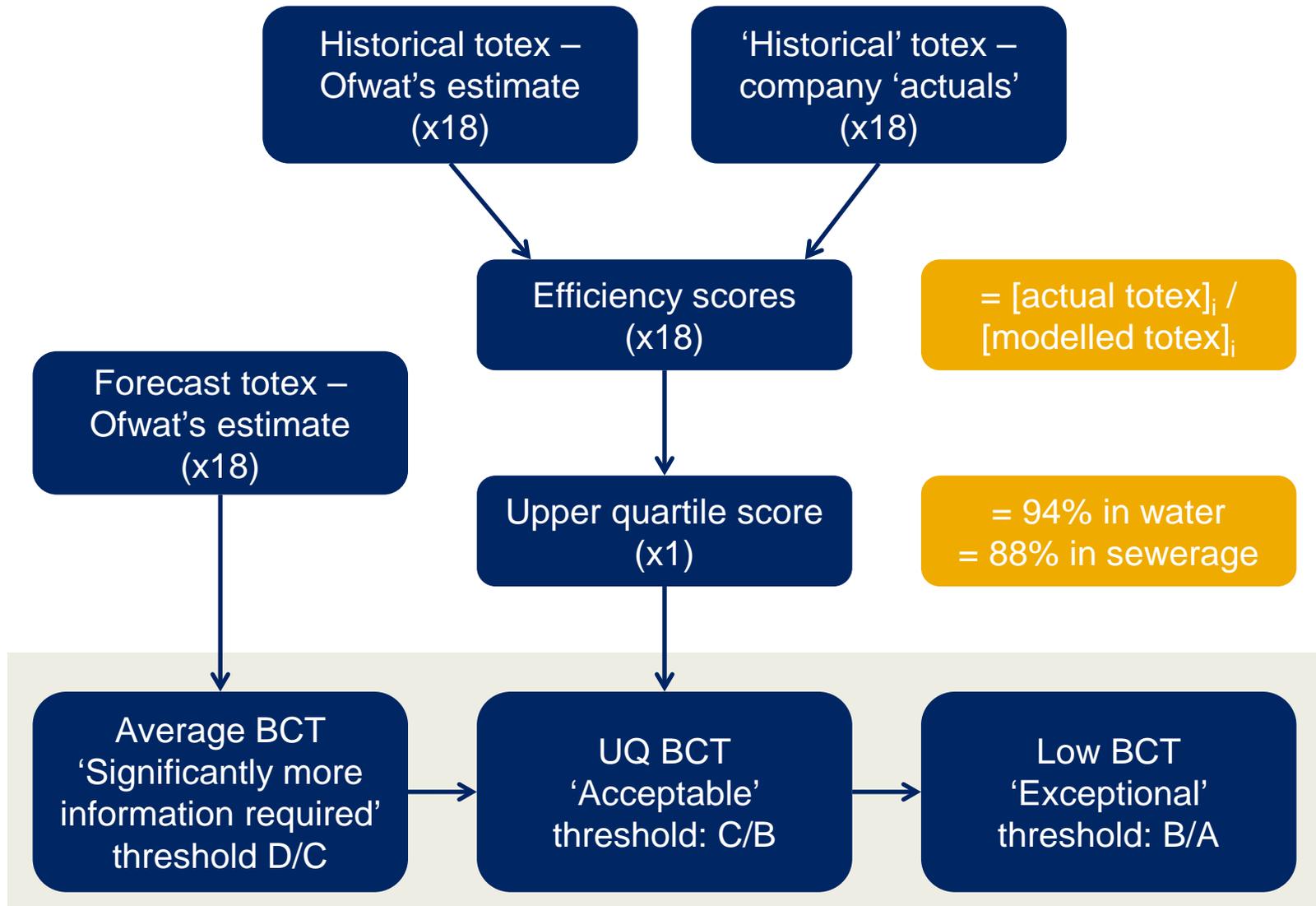
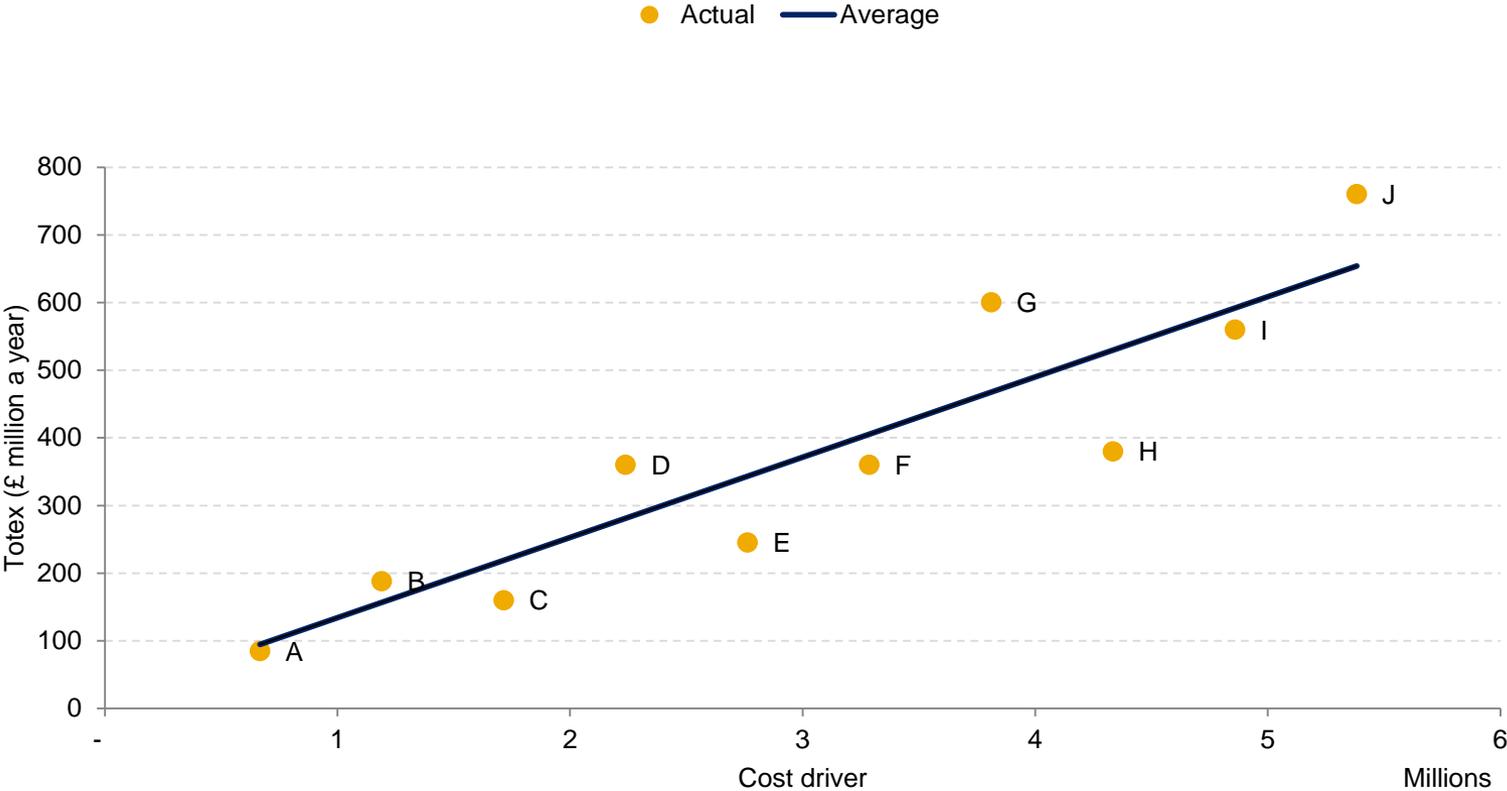


Illustration 1 of 4

Regression and efficiency scores

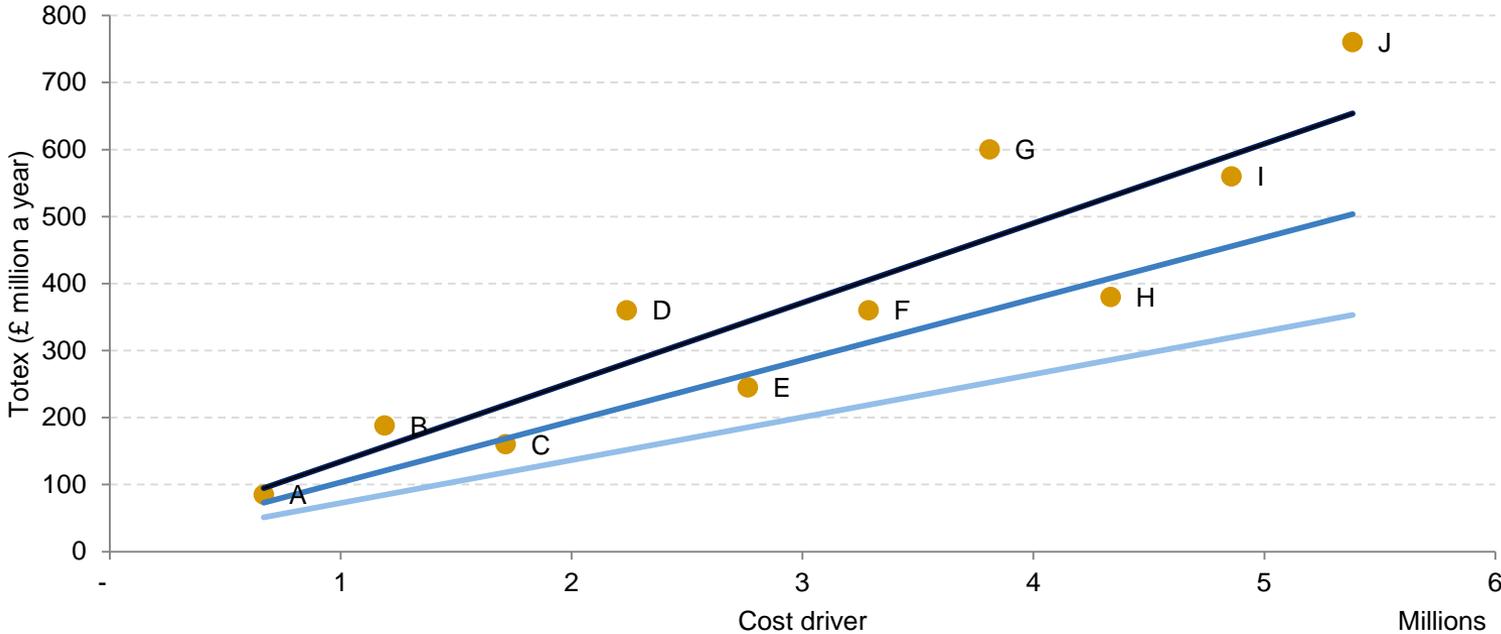


Company	E	H	C	F	A	I	J	B	D	G	
Efficiency score	0.71	0.72	0.73	0.89	0.90	0.95	1.16	1.20	1.28	1.28	
Upper quartile	0.77										

Illustration 2 of 4

The graph shows the three thresholds as lines against the actual expenditure points

● Actual — Average — Upper Quartile — Low BCT



Company	E	H	C	F	A	I	J	B	D	G
Efficiency score	0.71	0.72	0.73	0.89	0.90	0.95	1.16	1.20	1.28	1.28
Upper quartile	0.77									

Illustration 3 of 4

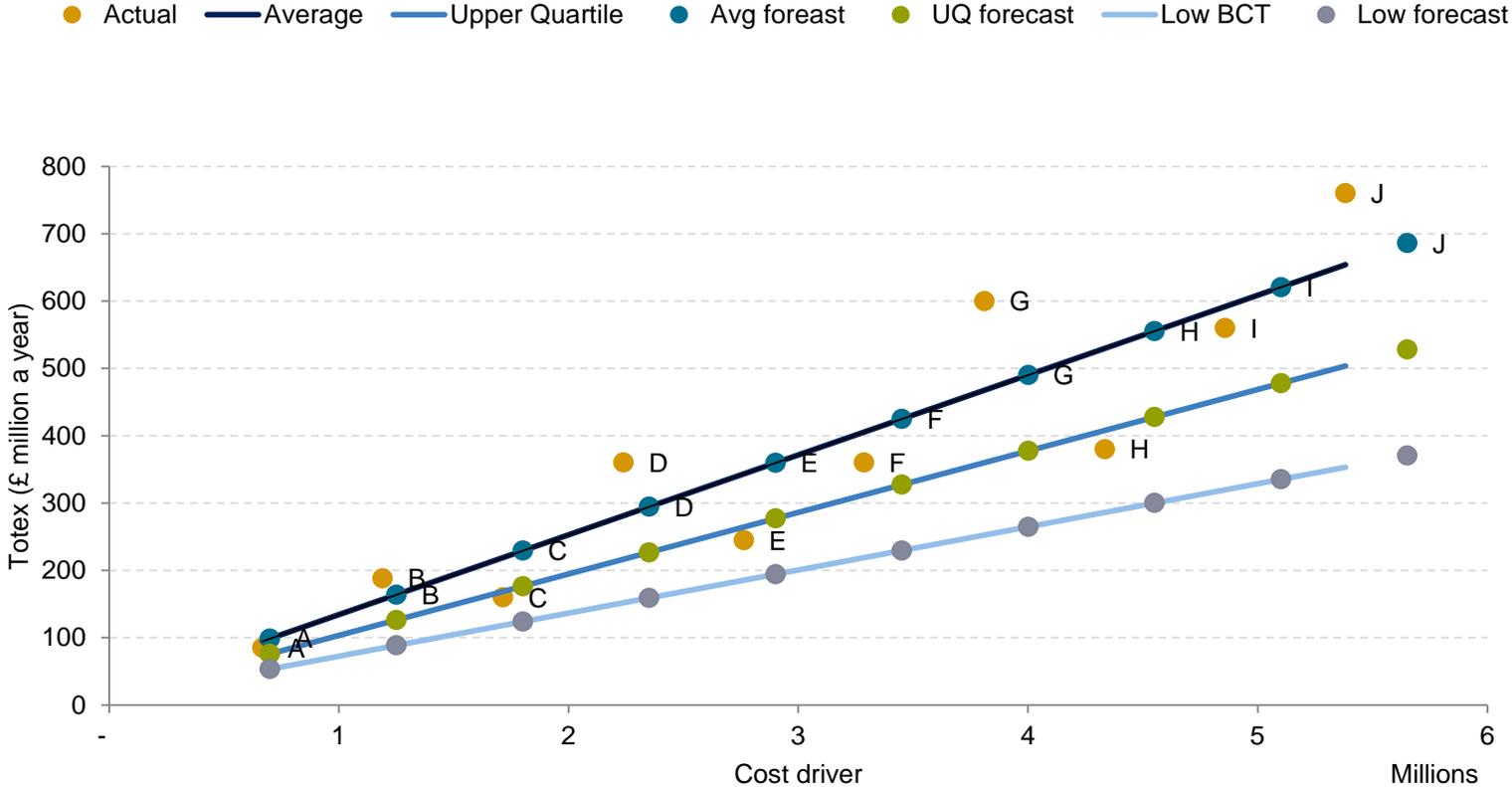
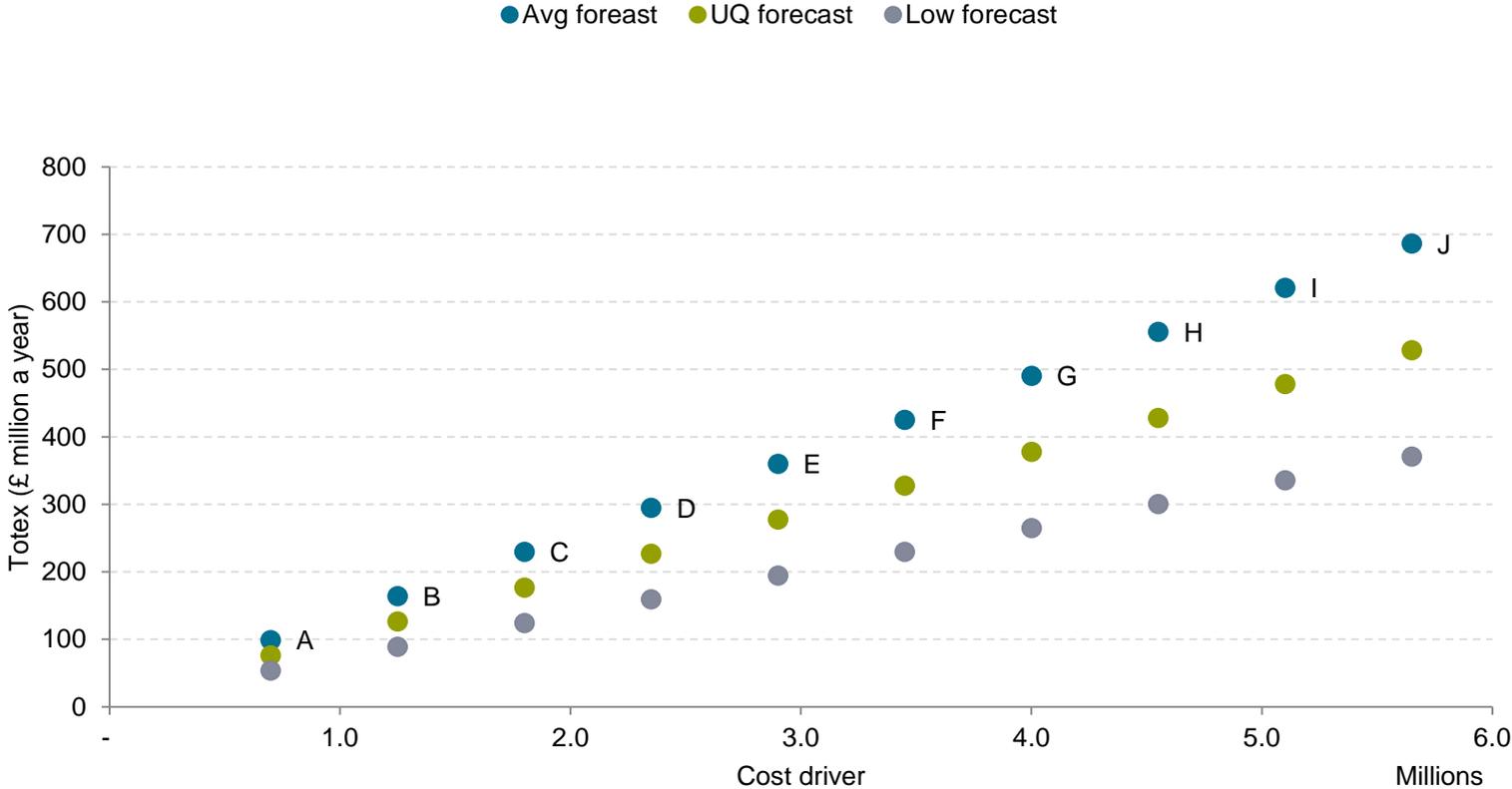
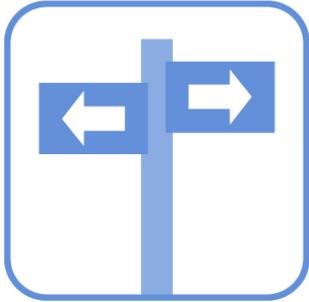


Illustration 4 of 4



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Data used in modelling

We used the following data to model costs:

1. Historical data from June return and August 2013 submission that was considered of good quality and submitted in a consistent manner
2. All based on historical actuals (up to 2012-13) for all companies
3. Some adjustments were made to reported data to reflect mergers, exclude non-controllable costs, etc

Deciding on the final dataset:

1. We used a different panel length for water and sewerage – ensures higher robustness associated with a larger number of observations since we only have 10 companies in sewerage
2. Capex is smoothed over a five-year period (length of price control) to mitigate the effect of capex lumpiness. Unsmoothed capex also tested but models were not as robust

Service	No of companies	No of year	Observations
Water	18	5	90
Sewerage	10	7	70



1. All models account for regional price differences through the **regional wage variable** on the right-hand side, so no ex-post adjustments are required
2. Regional wages and BCIS (capital cost proxy) move in the same way (highly correlated) and lead to multicollinearity if both included in model. Not including the BCIS does not change the predictive power of the models (it is captured by regional wages)



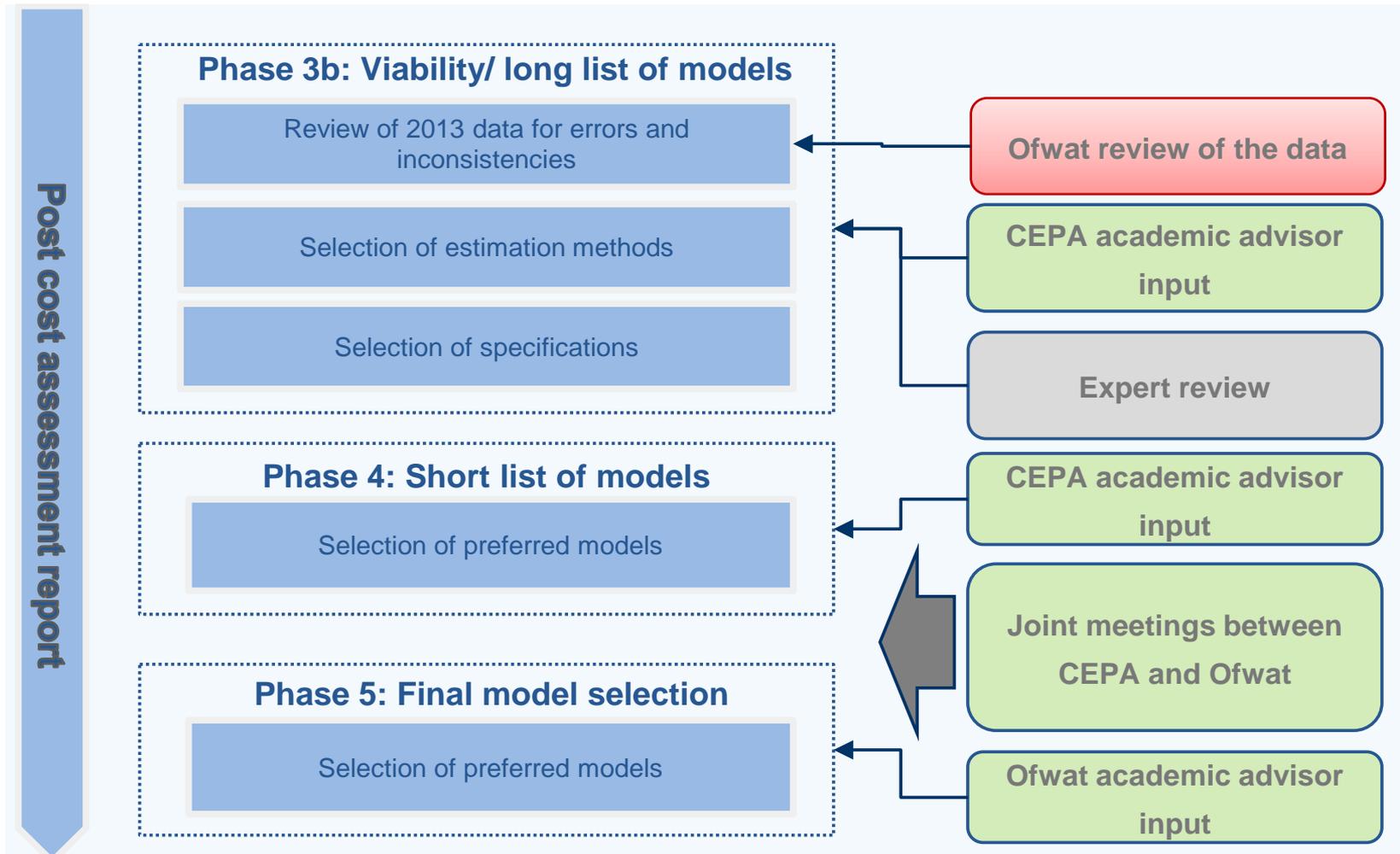
3. We used an approach to regional wages which is new to Ofwat:

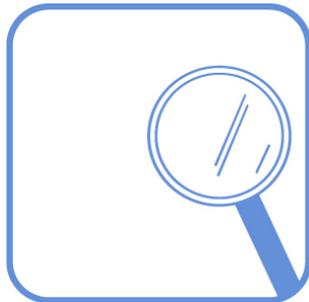
Hourly data excluding overtime to eliminate differences that could be attributed to inefficiency or company policy (this is within the ASHE sample, not among water companies)

Derived from ONS ASHE wage data by occupation and weighted by the allocation of the company's area to the eight regions based on Ofwat's method for allocated areas to companies

4. Different values for water and sewerage because services cover different geographical areas

Process of selecting final models





Functional form

In previous price controls Ofwat used constant elasticity models (Cobb-Douglas) and made adjustments for size ex-post. In PR14, the models already take into account scale variables through their functional form

Translog (varying elasticities per company) versus Cobb-Douglas (constant elasticity but varying marginal costs) – our statistical testing and theoretical rationale led to translog preference. This allows companies of different sizes to have different coefficients



Estimation technique

Random effect (GLS) versus ordinary least squares (OLS) – random effect models use panel data which is in line with the Competition Commission’s recommendations from the Bristol Water review. OLS allows for efficiency to vary across companies and across time in an unrestrained way. Random effects assumes efficiency for each company is constant across the period modelled. As these efficiencies are only used in model selection and not in setting the efficiency challenge in AMP6, the only difference is the estimation method of GLS versus OLS which differ in the weight that is placed on the variation within company variables over time

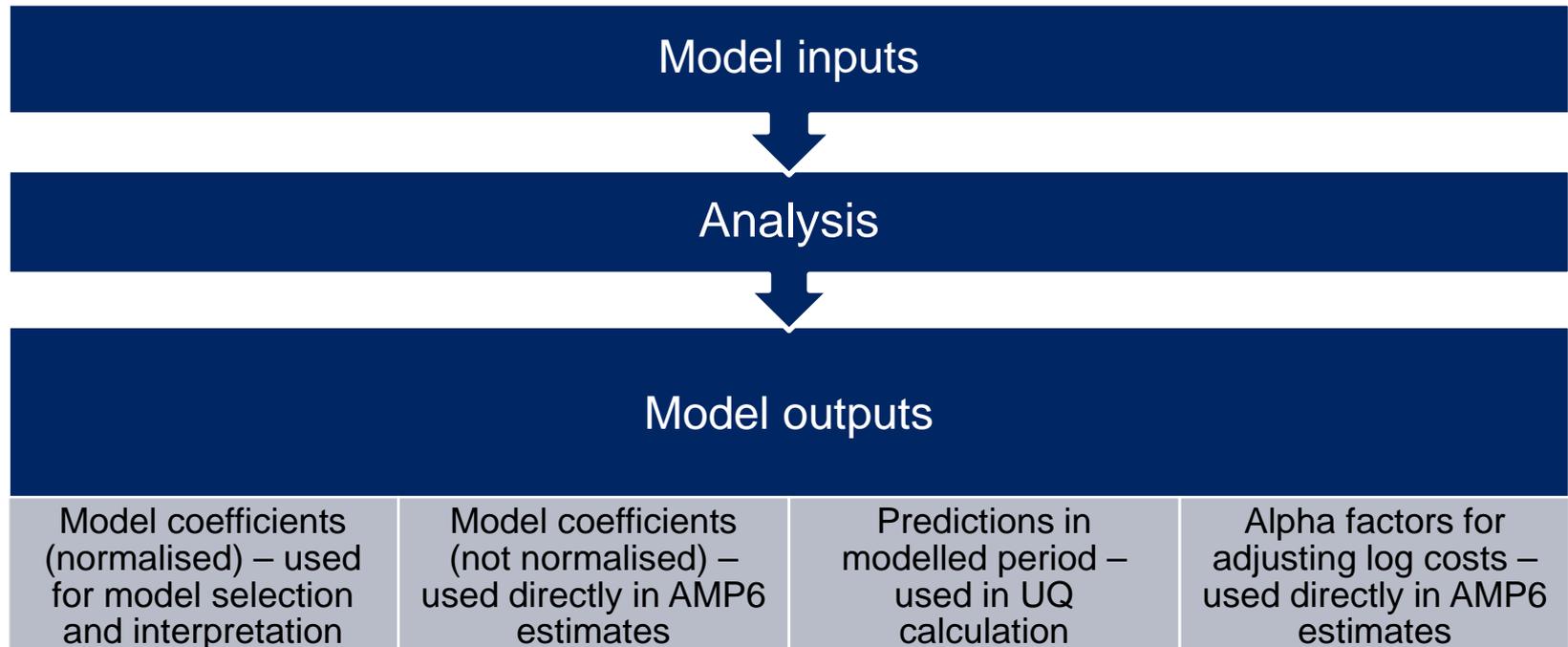
The final set of models (5 for water and 5 for sewerage) uses a balance of random effect and OLS models

Selection of final model variables

We tested a wide range of variables and cost splits in both water and sewerage

1. We started with a full range of drivers available from the June return over at least the last five years
2. We identified key cost drivers that were of good data quality
3. We had discussions with an UKWIR steering group
4. We tested correlations between drivers to see which drivers consistently moved in the same way in the sample – if we included both it would lead to their coefficients partially offsetting each other
5. We tested moving from full model down to refined (done for every model tested) by:
 - Dropping least significant variables and non-core variables one by one
 - Testing the coefficient results for each driver against engineering and economic expectations
 - Robustness testing and testing the sensitivity of the model to dropping variables
 - Regular discussions between Ofwat and CEPA
6. We had expert review by an external panel + academic adviser input

Model outputs

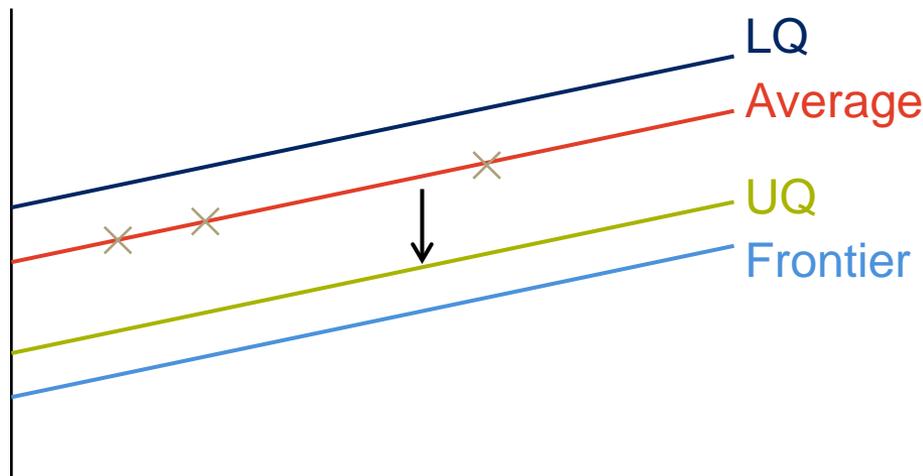


Normalised vs. non-normalised coefficients – there are two sets of coefficients for each model that uses the translog functional form. The normalised are only used for easy interpretation as they are given at the sample average – those are reported in the templates in CEPA’s report. The non-normalised coefficients are the ones used to estimate expenditure in AMP6 and feature in Ofwat’s models

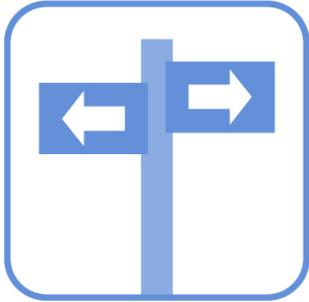
Efficiency challenge

We applied the efficiency challenge in a different way from the last price review (PR09)

1. The efficiency challenge is applied to the **modelled costs not to the companies' submissions** (this differs from Ofwat's approach in the past)
2. Modelled costs all lie on a line that represents the industry average
3. In reality companies' business plan costs may be different distances away from the average line, so by applying a % shift to the line itself will result in different companies having different challenges based on their current position



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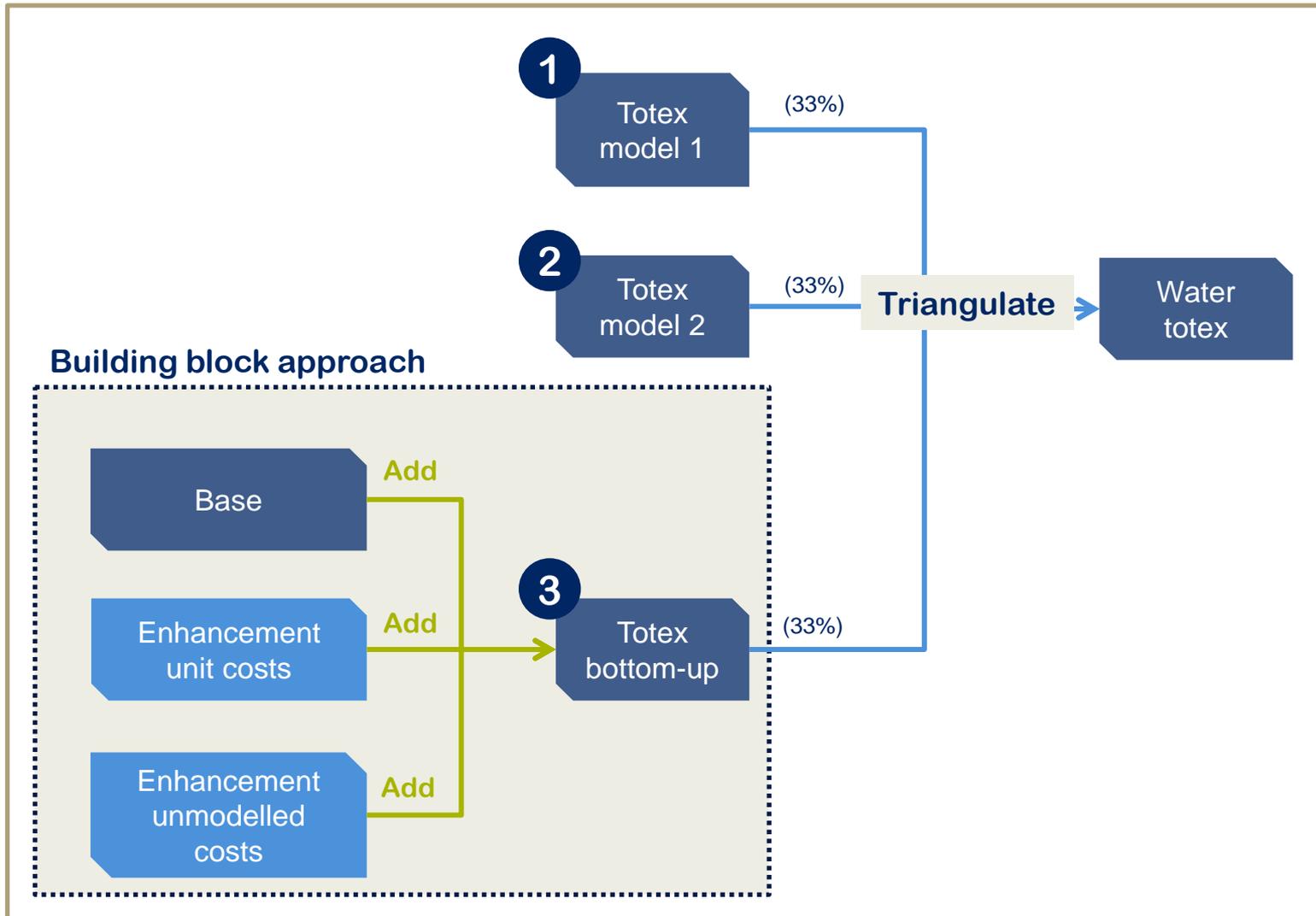
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Enhancement models

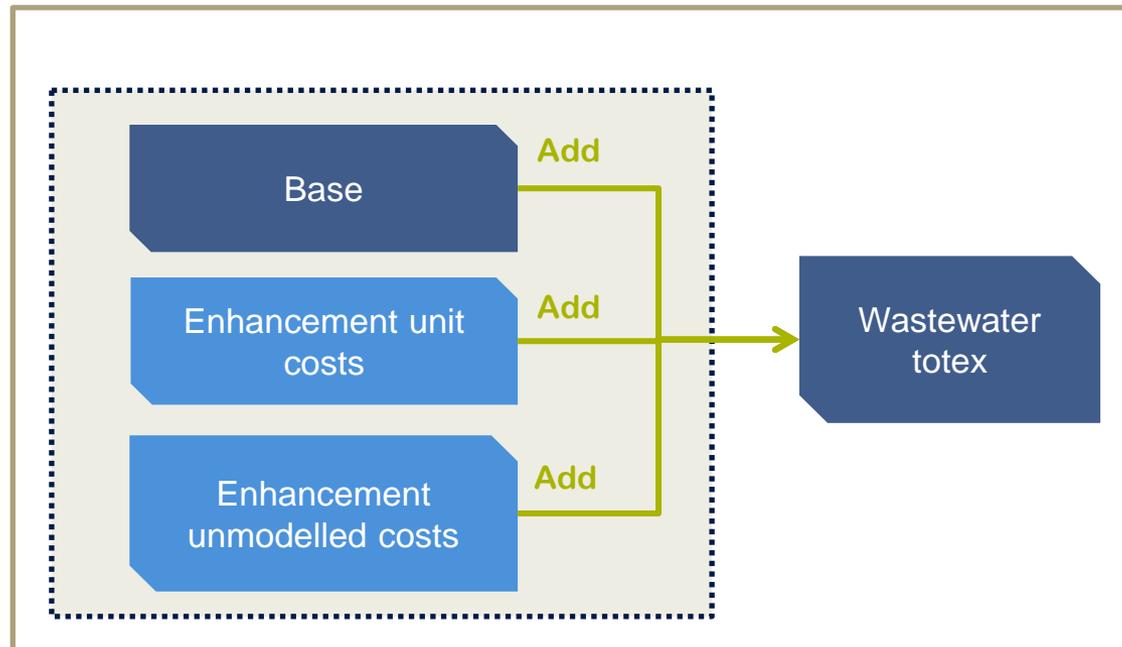


1. Enhancement unit cost models
2. Enhancement unmodelled allowance

Enhancement approach in water – where does it fit in?



Enhancements approach in wastewater – where does it fit in?

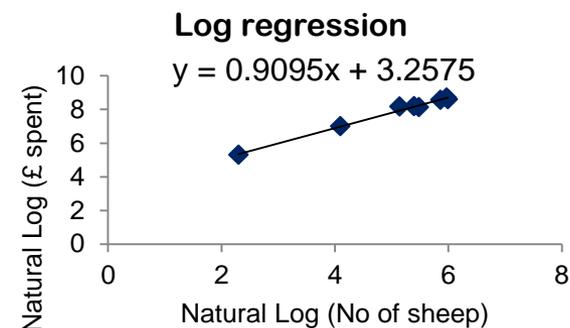
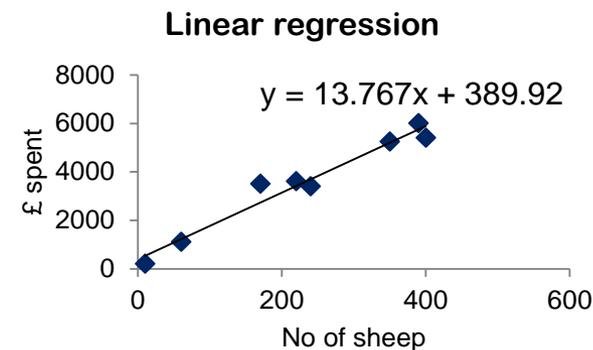




1. We used August 2013 data submission, June return and regulatory account information
2. We regionally adjusted costs using BCIS index
3. We related costs to appropriate activity drivers
4. We calculated unit costs £/volume in four ways:
 - i. Weighted average unit cost
 - ii. Un-weighted average unit cost
 - iii. Linear regression – slope and intercept
 - iv. Log regression – slope and intercept
5. We then used our forecast of drivers to estimate enhancement capex for 2015-20: £ million/volume x volume = £ million, using 0.25 of the answer from each of the unit cost approaches in 4 above

Unit cost worked example: sheep shearing

Farm	Number of sheep	Total £	Company unit cost	Weighted unit cost		
	(V)	(M)	(M/V)	(sumM/sumV)	nat log V	nat log M
A	10	200	20.00		2.303	5.298
B	400	5400	13.50		5.991	8.594
C	350	5250	15.00		5.858	8.566
D	60	1100	18.33		4.094	7.003
E	240	3400	14.17		5.481	8.132
F	390	6000	15.38		5.966	8.700
G	170	3500	20.59		5.136	8.161
H	220	3600	16.36		5.394	8.189
Total	1840	28450		15.46		
Mean			16.67			



Unweighted unit cost	16.67	£/sheep
Weighted unit cost	15.46	£/sheep
Linear regression variable cost	13.8	£/sheep
Linear regression fixed cost	390	£
Log regression variable cost	0.91	
Log regression fixed cost	3.26	

Farm E forecast no of sheep for future period =	300
£ from unweighted	£5000.1
£ from weighted	£4638.6
£ from linear regression	£4530.0
£ from log regression	£4677.1
Cost assumed for farm E = average of 4 above	£4711.5

List of the unit cost models

Wastewater

Ref	Cost model
S1	First time sewerage
S2	Sludge enhancements
S3	Event duration monitoring
S4	Storage at intermittent discharge sites
S5	Groundwater schemes
S6	Phosphorus removal at filter works
S7	Reduction in sanitary determinands
S8	UV disinfection
S9	Odour
S10	Sewage treatment growth
S11	Sewer flooding
S12	Private sewers – pipes

Water

Ref	Cost model
W1	Enhancements to supply demand balance
W2	Lead reduction
W3	New development

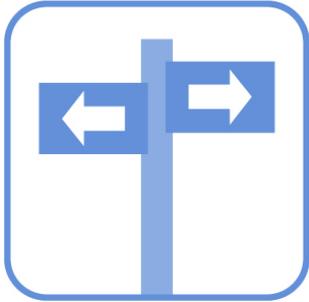


1. There were some enhancement categories in the August data cost table we could not find good explanatory drivers for
2. We classified these remaining enhancement categories as either 'non-recurring' (eg, NEP drivers that no longer apply) or 'un-modellable'
3. We added up all the expenditure for all the un-modellable categories at an industry level for AMP5
4. We calculated a total of modelled expenditure at an industry level for AMP5
5. We then calculated the total un-modelled expenditure in 3 above as a percentage of the modelled expenditure in 4 above. This gives us the percentage uplift for the un-modelled allowance at an industry level
6. We added on this calculated percentage uplift to the AMP6 modelled amount in the enhancements building block of the BCT. (3.95% for wastewater, 8.40% for water)

Any questions at this stage?



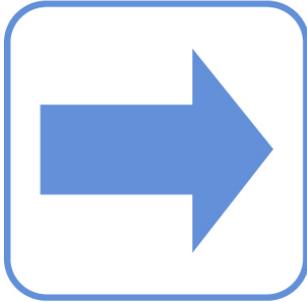
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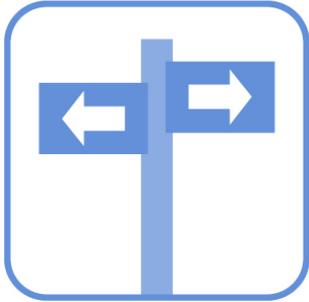
- A. Model costs based on historical data
- B. Make assumptions on efficiency and roll costs forward using projections of exogenous variables
- C. Our approach to these projections needs to be consistent with the philosophy of the risk-based review: To create an objective baseline to help determine whether further assessment of business plans was required
 - This was a non-trivial problem – 27 variables relating to water and 27 variables relating to wastewater
 - Clearly a detailed assessment of business plans and volumes was not consistent with the risk-based review approach
 - Jacobs/Ofwat projections are based primarily on historical trends and averages, supplemented where necessary by assessment of dWRMPs, NEP information, etc
 - It is a relatively simple approach designed to facilitate the calibration of cost thresholds in the risk-based review
- D. Jacob's report is on the Ofwat website, published on 4 April



In general representations on modelling will need to satisfy the following minimum requirements

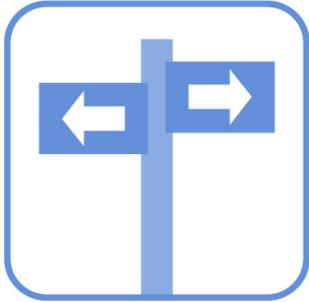
- i. Compelling evidence that any new proposals would be superior to the existing approach, and, would reflect no more than upper quartile efficient costs and/or efficient levels of activity
- ii. Evidence that the existing approach creates systematic bias – for instance, representations in respect of the forecasts of exogenous variables need to demonstrate that there is systematic bias in the forecasts not simply that the forecast of a small number of variables might not best reflect the circumstances of an individual company (in addition to demonstrating that proposed activity levels are no more than the efficient level, as noted above)

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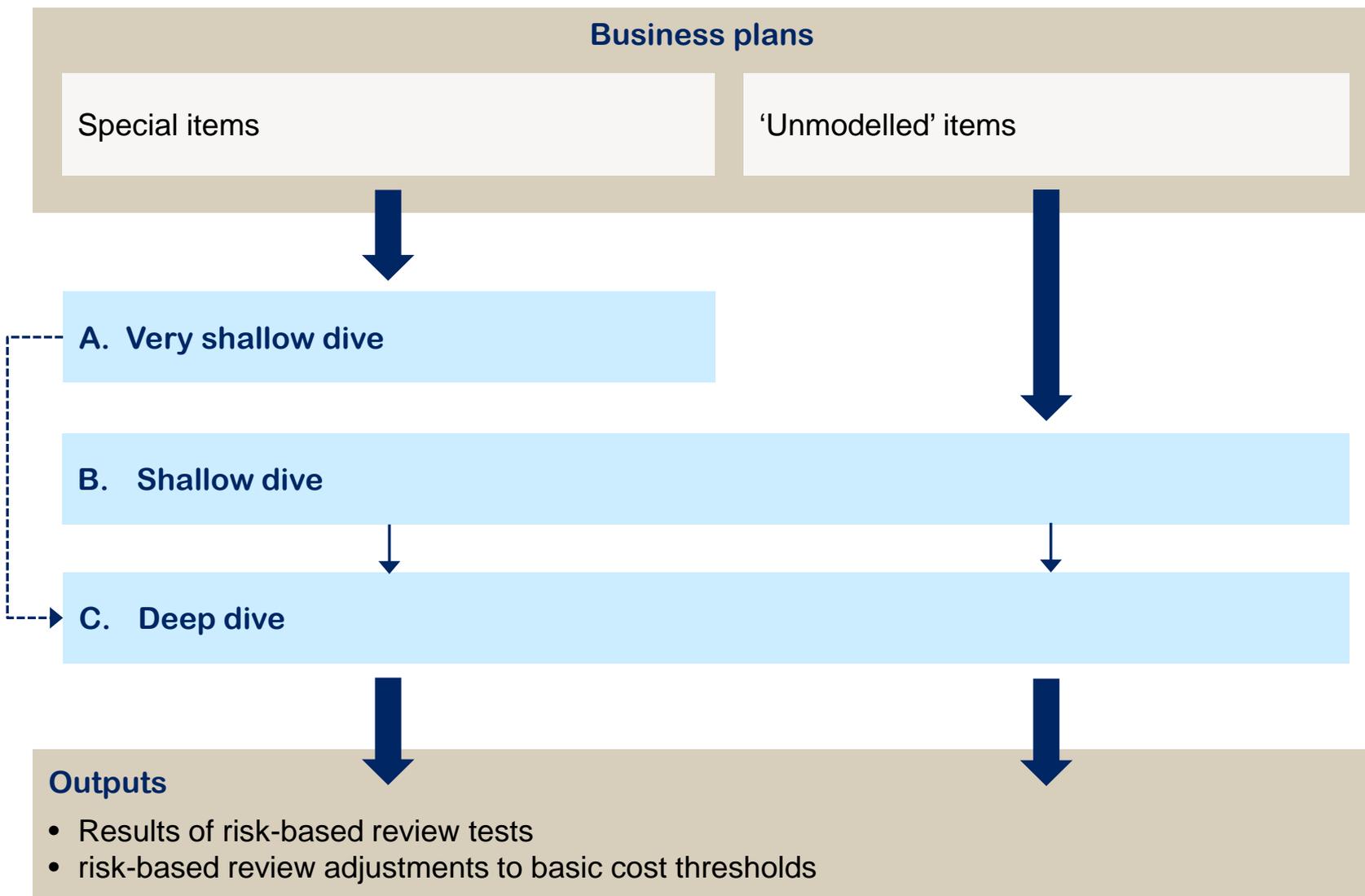
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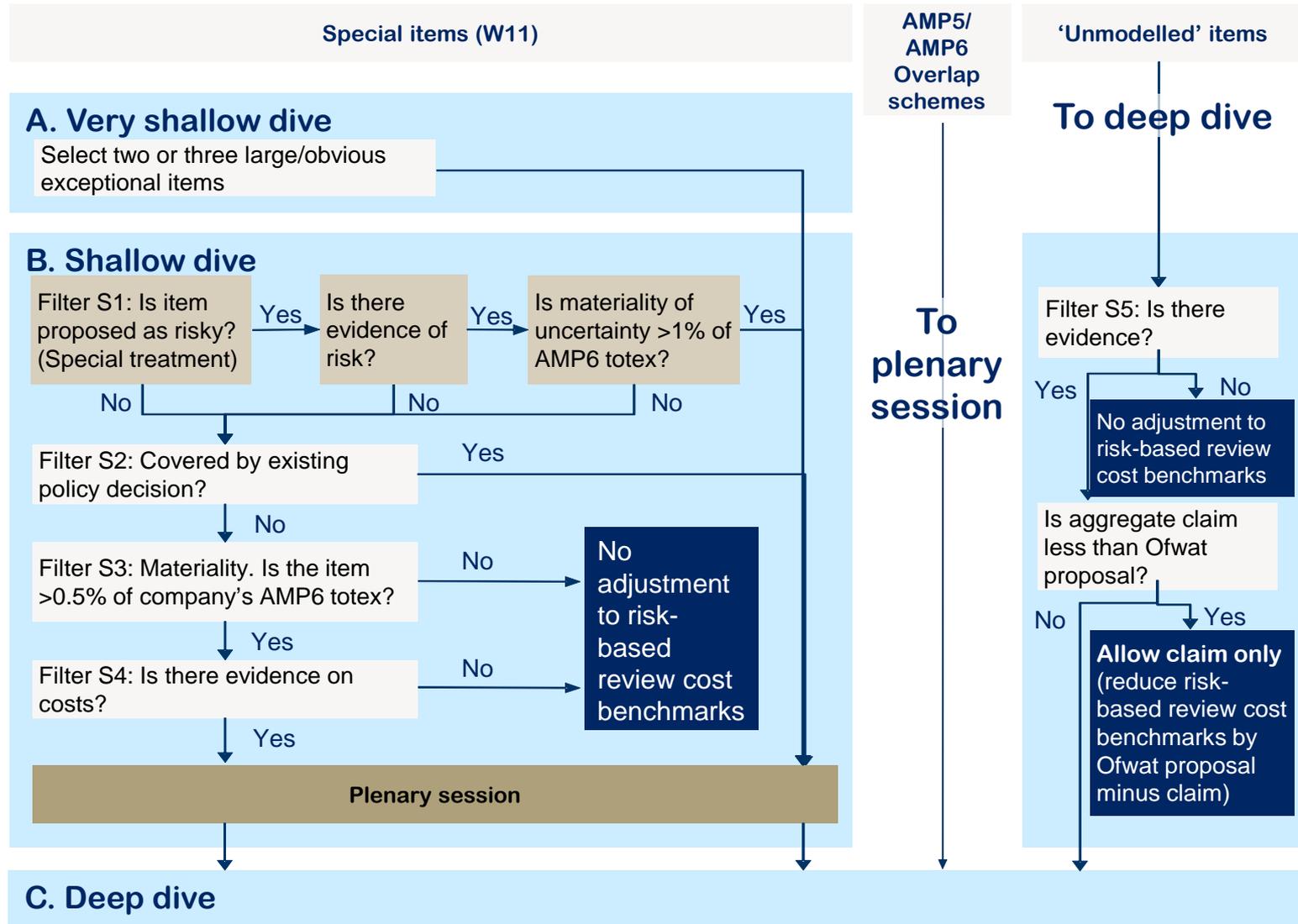


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From basic cost thresholds to risk-based review thresholds – overview



Cost assessment process – shallow dives



Cost assessment process – deep dives

Special items

'Unmodelled' items

C. Deep dive

Filter D1: Specific or Generic?
Can the special item be grouped/assessed alongside other similar items?

Filter D2: Implicit allowance in modelling
Is the special item (partially) covered within Ofwat's cost modelling?

YES: Fully covered

UNSURE or
NO (ie, not fully
covered)

Partially covered

Difference not
material

Materiality test on difference

Difference is material

Insufficient
evidence

Filter D3: Review of evidence
How good is the evidence on expenditure need and cost drivers?

Sufficient evidence

Preliminary adjustment
to baseline (£ million)

Filter D5: Are companies' proposals
fully, partially or not accepted?

Final adjustment to basic cost threshold (£ million)

'Policy' items



We used a standard approach across all companies either due to our own policy decision or to enable us to model a specific cost for the following items:

Defined benefit pension deficit recovery costs

Business rates

Market opening costs

Third party costs

Connection and infrastructure charges

Plenary sessions



Each plenary session was a forum for making a final decision on shallow and deep dives, and the overall company service wholesale cost assessment score.

Attendance at each plenary was:

Accountable lead (chair)

Shallow and deep dive team leaders

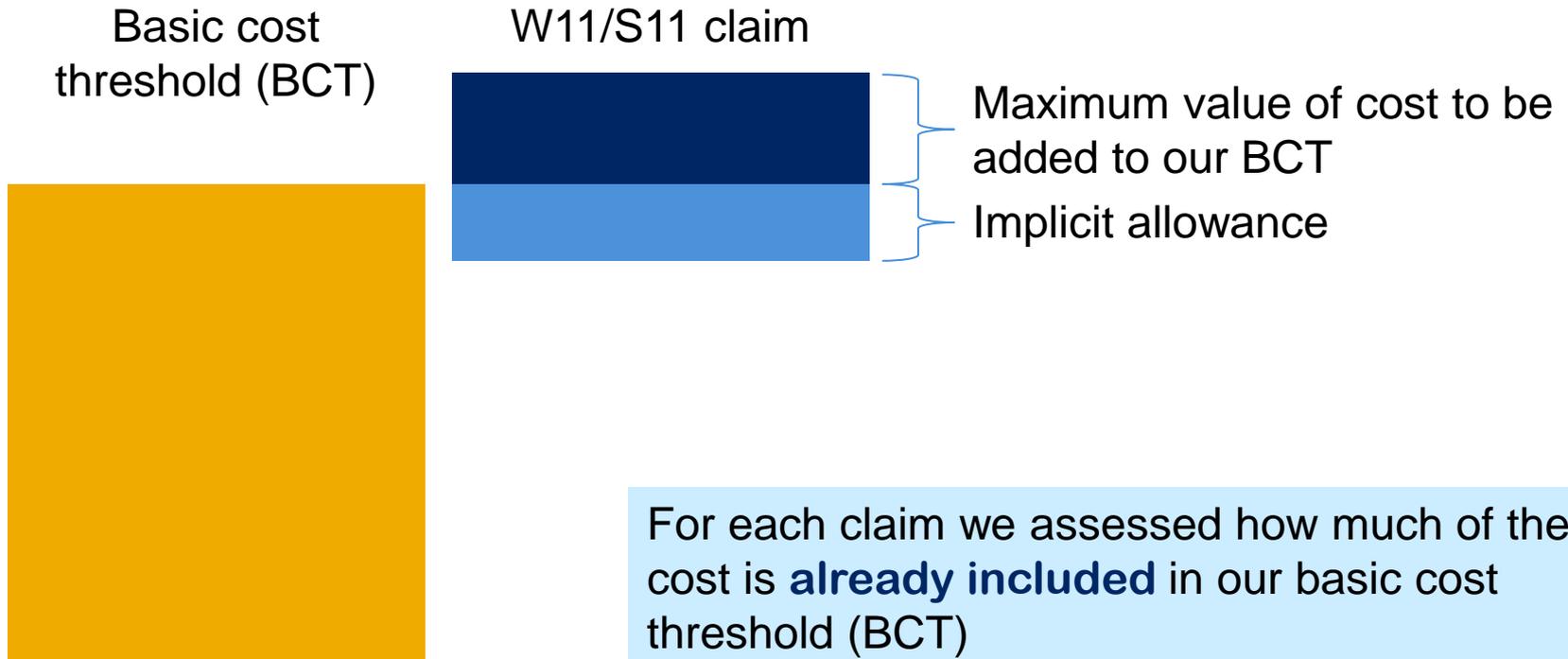
Individual shallow and deep divers for each deep dive item

Portfolio leads and managers



1. What is an implicit allowance?
2. How did we calculate it?
3. What is an unmodelled implicit allowance?

Implicit allowances



For each claim we assessed how much of the cost is **already included** in our basic cost threshold (BCT)

This is our implicit allowance (shaded light blue)

The remainder of the claim (shaded dark blue) is the maximum amount we add to the BCT



How we calculated them

Step 1 – decide whether claim is fully covered by our BCT

The claim will be fully covered in our BCT where:

It is for an activity which has been carried out at a similar level by a number of companies over the period covered by our models

It **does not** need to have been carried out by the company making the claim because our models use historical data from all companies to derive the coefficients

If it is fully covered, the implicit allowance equals the full value of the claim. We did not add anything more to our BCT

This does not mean we have excluded the cost for the claim, but that we believe our BCT already includes the appropriate level of cost for the claim



How we calculated them

Step 2 – calculate value of IA when it is not fully covered by BCT

The claim will not be fully covered in our BCT where:

- It is related to a totally new requirement (or one that was not relevant in AMP5) and is therefore not included in the industry's historical modelled costs

- The costs incurred are materially different to those the rest of the industry has incurred historically

- It is a significant change from the past that has not been captured in our AMP6 explanatory variables forecasts

If the evidence shows it is a new requirement that is not included in our modelling suite then our implicit allowance is zero

For all other claims we calculated the value of the IA for each model the claim covered



For enhancement costs covered by a unit cost model we can directly calculate the IA by using the results of our models

Enhancement unit cost example

Claim is for £100 million to replace lead pipes

Our lead unit cost model forecasts UQ costs of £30 million which are already included in our BCT

So our implicit allowance is £30 million and we assessed the case made for the claim to see if we would add the remaining £70 million to our BCT

Implicit allowances

For base expenditure, we calculated the proportion of historical modelled totex (water) or 'botex' (sewerage) in each cost category at an industry level. We assumed the same percentages are in base costs in the BCT. (Botex = base capex plus base opex and excludes enhancements)

Modelled water totex	
IRE	17%
MNI	21%
Opex	41%
(Enhancements	21%)

Modelled sewerage botex	
IRE	12%
MNI	39%
Opex	49%

1. We allocate the claim to one of the base cost categories (if it falls across multiple categories we allocate it across the relevant categories and calculate the IA for each one, or calculate it at a total base level)
2. We multiply the BCT by the percentage allocated to that cost category
3. We compare that with the total company business plan expenditure for that cost category, to give us the percentage of that cost category already in our BCT
4. We then multiply the value of the claim by this percentage to calculate our IA



Base example (water)

Company is proposing IRE spend of £200 million in total, including a table W11 claim for £50 million mains replacement
Our BCT is £800 million

We assume that 17% of the BCT is expenditure for IRE activity,
 $= 800 * 17\% = £136$ million

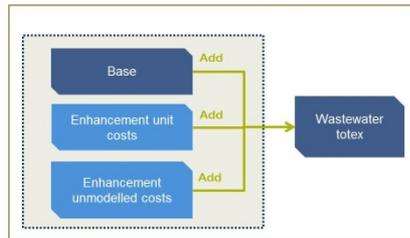
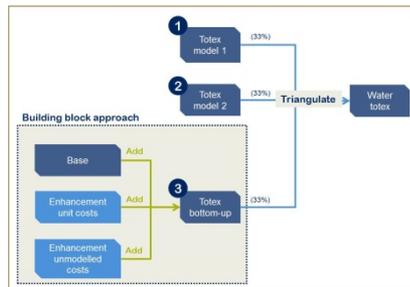
This means that our BCT includes $136/200 = 68\%$ of the company's business plan forecast IRE expenditure

We assume this percentage is applied equally across all IRE expenditure, therefore we are assuming that the BCT already includes 68% of the £50 million claim

So the implicit allowance for the claim is $£50 \text{ million} * 0.68 = £34$ million

If the claim were well evidenced we would add $£50 - 34$ million = £16 million to the cost threshold

Changes to unmodelled allowance in the risk-based review



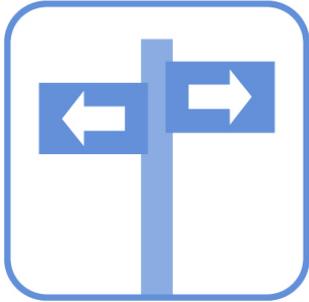
1. After reallocating to modellable lines where appropriate, we compared the total £ million that companies had in their plans for the unmodellable categories with our £ million allowance
2. If company plan total was less than our allowance we took the company numbers instead of our allowance, thus adjusted downwards from our basic cost threshold. ('unmodelled delta')
3. If company total was more than our allowance we conducted "mini deep dives" of most material categories of unmodelled, and adjusted our allowance upwards if there was sufficient evidence to do so
4. **Note:** In water because of triangulation of the models we only made an adjustment of 1/3 of the difference between our unmodelled allowance and the company numbers (up or down). In wastewater we made the total adjustment

Implicit allowances for unmodelled costs

	A	B	C	D	E	F	G	H	I
1	Company totex, £ million		500						
2	Total unmodelled allowance, £ million		30						
	Line description	AMP5 weights	Initial allocation of unmodelled allowance	Company business plan	Amount in plan over allowance	Materiality of difference	Deep dive?	Using business plan for implicit allowance	Calculated IA for deep dive items
			£ million	£ million	£ million	%		£ million	£ million
4	Ecological improvements	6%	1.8	10.0	8.2	1.6%	Yes		2.40
5	Improving taste/odour/colour	10%	3.0	1.0	-2.0	-0.4%	No	1.0	
6	Raw water deterioration	30%	9.0	7.0	-2.0	-0.4%	No	7.0	
7	Resilience	25%	7.5	8.0	0.5	0.1%	No	8.0	
8	Other	29%	8.7	14.0	5.3	1.1%	Yes		11.60
9	Total	100%		40.0	10.0			16.0	14.0
10	Total implicit allowance		30.0						30.0

Sufficient evidence on ecological improvements. Insufficient evidence on 'other'. Add £10-£2.4 million = £7.6 million to cost threshold

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- A. Draft determinations and baselines for enhanced companies at the end of April
- B. Revised business plan information from other companies either at the start of May 2014 or July 2014
- C. **Minimum requirements** with respect to revised business plan information published on 4 April 2014
- D. Importance of companies providing **high-quality evidence** in support of any representations on wholesale costs

Minimum requirements for revised business plans

Companies providing revised information on wholesale costs should ensure that this includes an overview document setting out and clearly referencing the following information:

1. A list of any new or revised claims for special treatment in the cost thresholds published on 10 March and updated on the 4 April
2. A summary of any changes (including underlying reasons) to the overall level of totex from the December plan, consistent with the revised wholesale cost business plan tables
3. Taking full account of the January risk and reward guidance, a summary of any claims for the special treatment of specified wholesale cost items with respect to uncertainty mechanisms and/or cost sharing incentives
4. Any more general representations on our approach to modelling, or the treatment of generic items across companies (for example, pension deficit recovery costs, business rates, third party costs, net/gross adjustments, competition costs)



For each claim under 1 above, the company should comply with the following

- i. For new claims, explain why the claim was not included or highlighted in the December 2013 business plan
- ii. Explain and fully justify changes from business plan cost levels and differences in its supporting evidence. Without compelling information to the contrary, any increases in costs will be taken as prima facie evidence of a failure to provide robust and reliable information and the claim will not be considered further
- iii. Explain and demonstrate why costs are not allowed for in the models that support the initial cost thresholds, and, include a quantified estimate of any partial allowances
- iv. Demonstrate that the cost estimates are robust and efficient

Further requirements



Claims for programmes of spending will normally be required to clearly demonstrate compelling evidence of each of the following:

Need

CBA/optionseering – which should encompass compelling evidence that the lowest cost project (where appropriate taking account of whole life costs and wider costs and benefits) is being proposed, or, why the option under consideration is the only plausible option

Cost estimate are robust and represent no more than efficient levels (if companies have third party or other evidence in support of programme costs they should provide this information)

Customers are properly protected from non or under delivery (for example, by appropriately calibrated ODIs)



For each claim under 3 above, the company must provide an explanation of how it is consistent with the principles set out in the January risk and reward guidance and provide compelling evidence to support the claim, including:

- i. Demonstrating that management have little or no control over the cost item or category
- ii. Justifying the central estimate and P10 and P90 estimates of costs
- iii. Explaining how any proposed arrangements for special treatment with respect to cost sharing/uncertainty would be consistent with fully protecting the interests of customers



- For each claim under 4 above, the company must provide:
- i. Compelling evidence that any new proposals would be superior to the existing approach, and, would reflect no more than upper quartile efficient costs and/or efficient levels of activity
 - ii. Evidence that the existing approach creates systematic bias – for instance, representations in respect of the forecasts of exogenous variables need to demonstrate that there is systematic bias in the forecasts not simply that the forecast of a small number of variables might not best reflect the circumstances of an individual company (in addition to demonstrating that proposed activity levels are no more than the efficient level, as noted above)

Business plan tables

We have re-issued the business plan tables and guidance to companies receiving a draft determination in June or August. We carried out a similar exercise for pre-qualification companies' submissions on 17 March

The revised tables resolve some identified errors and provide for greater validation of the data submitted by companies

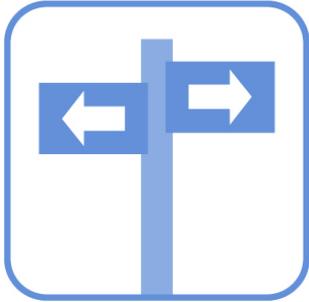
There are some tables that we do not need any new information from any companies because we either no longer need data, or know that data will not change

There is also a small number of new tables

Companies should submit the complete suite of tables; but the extent to which the data will need to change relative to previous submissions will depend on how we assessed their business plans against the tests for the risk-based review and each company's management judgement

Further information on the business plan tables and associated guidance can be found on our website

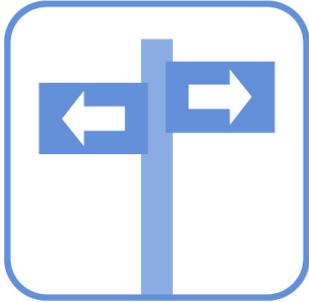
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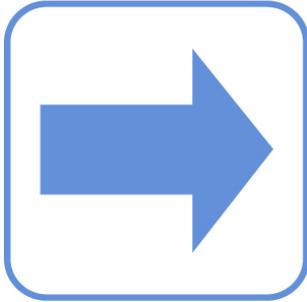


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Next steps



As noted earlier, today's workshop materials will be put on our website, along with the main points/questions and answers, without attribution. There will be no detailed meeting note.

Companies wishing to receive an early draft determination in June now need to prepare a 'gap analysis' by 17 April – see 'Setting price controls for 2015-20 – policy and information update'. We are keen to ensure that companies are in the best possible position to complete their gap analyses so we are open to having further working-level meetings to discuss issues related to the gap analysis, if that would be helpful for companies. Once we have received the gap analysis, we will meet with all companies as part of the draft determination process

Please continue to liaise with your portfolio lead if there are further queries after today

Thank you for attending

Questions and answers on wholesale costs

Summary

This workshop followed on from the session held on 8 April where an overview of the wholesale cost process was discussed its aim was to answer companies' generic questions relating to wholesale costs.

The questions were split into five different categories:

- basic cost threshold;
- advanced econometric models;
- enhancement models;
- cost assessment and risk-based review; and
- beyond the risk-based review

Under each category below we present the question and a short summary of the answer.

Basic cost threshold

Q1. Please can you explain how the historical efficiency of each company is determined?

Our approach is set out on slide 10. To summarise, the main relevance of historic efficiency is to determine the upper quartile as:

- we built models using each company's actual historical data as an input;
- models produce an averagely efficient cost line;
- we then join together results of all models, reflecting weights used; and
- we then compare each company across all models, to give a view of historical efficiency.

Q2. Please can you explain which other options were evaluated and rejected when deciding your overall approach to total expenditure (totex) modelling?

Our approach to deciding our overall approach to totex modelling is set out on slides 18 to 22 and in more detail in '[Appendix B Cost assessment – advanced econometric models](#)' prepared by CEPA. CEPA looked at a wide range of modelling

options and carried out a process of elimination to come to its final set of model recommendations. This process was collaborative between CEPA and Ofwat and the final selection was informed by expert review and academic adviser input.

Q3. For the totex and base expenditure full and refined econometric models, please can Ofwat provide further information on its approach to quantifying the extent to which proposed cost assessment exclusions were accounted for under any 'implicit allowance' – and the approach Ofwat followed for unit cost models?

Our approach to implicit allowances is set out on slides 42 to 50. Most cost exclusions proposed in W11/S11 were enhancement proposals, meaning they are usually covered by unit cost models or the unmodelled uplift. We could work out from our cost models how much we had already included in our basic cost threshold, which is the implicit allowance. If sufficient evidence was provided for the cost exclusion, we added on the full difference between the implicit allowance and the value of the cost claim.

A base example in water is provided in slide 48 and 49.

Q4. Please can Ofwat confirm whether it followed CEPA's recommendation of using a ratio-based efficiency adjustment using historical costs as the numerator? If so, over what period did this cover?

Yes, we can confirm we followed CEPA's recommendation as set out in slide 10. This is the upper quartile adjustment. The period of time used for the numerator varied according to the model:

- for the enhancement/unit cost models it matched the time period used to build the model – these are set out in the data sets in '[Basic cost threshold model: Appendix A model datasets](#)' (typically 2010-15 but there were exceptions); and
- for the advanced econometric models it was the five years actual data 2008-09 to 2012-13 for both water and sewerage.

Advanced econometric models

Q5. Please explain what assumptions have been made about future changes in regional wages.

We asked Jacobs to forecast future changes in regional wages, but, as set out in appendix C of '[Appendix D Forecast of exogenous variables](#)', it was unable to find

any robust sources for this. So in the models we use 2012-13 regional cost data and roll this forward

Q6. Please can Ofwat confirm how real price effects (RPEs) have been modelled, in particular where these are not otherwise excluded items, such as power costs?

Consistent with our historical approach, we have not modelled RPEs, other than using time trends in the models. As set out in '[Appendix B Cost assessment – advanced econometric models](#)' the time trend is close to 2% a year in wastewater and less than 1% in water. We also note that power costs are a key component of RPI, which means changes in energy prices will be reflected in RPI, providing inbuilt protection.

Q7. Why are the values for some model coefficients inputted into the excel model different from those quoted in the CEPA report?

There are two sets of coefficients, normalised and non-normalised, for each model, which uses the translog functional form. There is no difference between the results of the models using normalised or non-normalised variables. The normalised are only used for ease of interpretation as they are given at the sample average – those are reported in the templates in '[Appendix B Cost assessment – advanced econometric models](#)' (annex 4 and 5). The non-normalised coefficients (reported in annex 8) are the ones used to estimate expenditure in AMP6 and feature in Ofwat's models.

Q8. Please explain how the supply demand balance (SDB) was calculated and the rationale behind metering and leakage enhancement being included in the SDB model?

There is an SDB unit cost model and there are SDB variables in the totex models.

- The SDB unit cost model is based on the draft water resource management plans (dWRMP) deficit.
- One of the full totex model uses metering and leakage (and both have negative signs in the final model):
 - metering – metered properties should have lower consumption and thus lower pumping and volume costs; and
 - leakage – this works as a quality variable. If leakage is reduced we assume that money has been spent to reduce it.

These variables were selected after robust testing of appropriate variables that explain expenditure trends in the round, as set out in slide 20 and more detail in '[Appendix B Cost assessment – advanced econometric models](#)'. '[Appendix D](#)

[Forecast of exogenous variables](#) explains the forecast variables and [Appendix B Cost assessment – advanced econometric models](#) sets out the different approaches we have taken for forecasting metering and leakage for companies with a dWRMP deficit and those that have a zero deficit.

Q9. Please can Ofwat confirm how the weighted logged regression model on new development is calculated?

This unit cost model is the same as all of the others and is made up of four calculation methods which each have equal weighting:

- weighted average unit cost;
- un-weighted average unit cost;
- linear regression – slope and intercept; and
- log regression – slope and intercept (natural log regionally neutralised capex/natural log volume).

It is possible that some companies will have zero if:

- a. they have no planned activity (that is, no new connections); or
- b. in the linear regression model, if they have low planned activity.

This is because the linear regression model includes a fixed cost, which in this case is negative. This means that very low levels of activity would not offset the negative fixed cost and therefore generate a negative result. We made a policy decision that we would not allow negative results so if the answer would have been negative we have set it to zero.

Q10. Where customers have requested an increase in service which they are willing to pay for, how has this been modelled by Ofwat?

The historical level of enhanced service expenditure for the industry is in our totex models so each company is getting some allowance for it. But it would be open to companies that expected significant service enhancement to flag these issues for special treatment in cost assessment – as it is not likely to be typical historical expenditure for the company and possibly not for the industry either.

Cost assessment and risk-based review

Q11. Please explain the basis for the private pumping station assumptions that are not the result of a specified unit cost model, but have been reported in the commentary.

Our basic cost threshold did not have costs included for private pumping stations that companies will take over by 2016. Instead, we used the unit cost approach we had used to develop relationships between actual expenditure in the past (see slide 27 and 28) and applied it to company business plan proposals for AMP6 expenditure on private pumping stations. We found the best relationship was between totex and the number of pumping stations. So we used the same four methods and came to an industry average model, which is what we added on to our basic cost threshold to form the risk-based review initial cost threshold.

Q12. Please explain how Ofwat has calculated the uplift adjustments and what costs have been included/excluded.

The proportions for the unmodelled allowance are based on historical data and are as follows.

Ref	Wastewater	Proportion of unmodelled allowance
S3004	NEP – conservation drivers	0.121
S3007	NEP – monitoring of pass forward flows at CSOs	0.002
S3011	NEP – investigations	0.069
S3013	NEP – nutrients (P removal at activated sludge STWs)	0.354
S3022	Resilience	0.018
BC31785	Capex: security and emergency measures direction	0.038
	Total additional freeform lines	0.397

Ref	Water	Proportion of unmodelled allowance
W3001	Ecological improvements	0.058
W3002	Addressing low pressure	0.013
W3003	Improving taste/odour/colour	0.131
W3010	Raw water deterioration	0.273
W3011	Resilience	0.227
W3012	SEMD	0.297
W3013	NEP – flow monitoring	0.00
W3014	NEP – protected areas	0.00
W3AXX	Total additional freeform lines	0.001

Q13. Updates to tables W3a/S3a/S7 can still provide valuable information for Ofwat’s assessment of totex baselines – what is the implication of removing the requirement for them in the May/June submission?

There are no implications from removing them from the May/June submission as we do not intend to use this data for the purposes of draft determinations.

Q14. Please explain how Ofwat has used tables W1/S1 and W11/S11. If companies completed these tables incorrectly, will there be an opportunity to submit revised versions?

The W1/S1 tables were only used partially in wholesale cost assessment as a useful cross check with W3/S3. The W11/S11 tables are very important, as any claims for the special treatment of cost items should be made in them. There is an opportunity to submit these again – see slide 58 and the [business plan guidance](#) published on our website.

Q15. Why were cost refurbishment and water treatment works identified for special analysis and how were these treated in the analysis?

These items were not typically included in W11, but are common items across the industry and were highlighted in our ‘shallow dive’ process as potentially lumpy expenditure items. We then followed the same assessment process as all other areas (for example, to look for clear evidence of need, CBA/optioneering, robust and efficient costs and whether arrangements protect customers).

Q16. Please explain how pension deficits have been managed in the analysis.

We set out our approach in '[IN 13/17: Treatment of companies' pension deficit repair costs at the 2014 price review](#)'. If companies' numbers were different to our view this was usually due to:

- no adjustment being made for PR09 efficiency;
- deficit not being allocated between wholesale and retail; or
- allocations between wholesale water/wholesale sewerage/retail household/retail non-household being different from those in IN 13/17.

Q17. If we disagree with the decision that Ofwat has made, can we provide further evidence to support our analysis?

Yes, it is possible for a company to provide further evidence to support its analysis. An outline of the process and the expectations for further evidence are set out in slides 53 to 57. Further information is also provided in appendix 3 of '[Setting price controls for 2015-20 – policy and information update](#)'.

Q18. Can companies submit new special factor claims now that the models have been published?

Yes – with the same expectations for supporting evidence as set summarised in response to question 17.

Q19. Has Ofwat performed any sensitivity analysis relating to the deep dive items included in the model?

In general we did not carry out sensitivity analysis in relation to deep dive items, but assessed on the basis of clear evidence of need, CBA/optioneering, robust and efficient costs and whether arrangements protect customers.

Q20. Is the cost exclusion materiality threshold creating a bias in favour of large capital projects?

No, in that we also considered programmes of work which are made up of lots of individual schemes (such as sewer flooding programmes) as well as large individual schemes.

Q21. Can cost exclusions accepted by Ofwat be considered as fixed or are these still subject to withdrawal?

We do not expect to withdraw any accepted cost exclusions, but note that implicit allowances may be subject to change.

Q22. Please can Ofwat provide additional detail on how it arrived at its assumptions for the proportion of expenditure on new connections that is covered by grants and contributions?

We calculated the proportion of new connections expenditure that has historically (2008-09 to 2012-13) been recovered through grants and contributions (including infrastructure charges). We used these proportions to ensure the new connections unit cost models were net and therefore comparable with all other models:

- in water the proportion covered by grants and contributions is 86% (on an unweighted basis) and 79% (on a weighted basis); and
- in wastewater it was slightly over 100% and therefore we did not need a wastewater new connections model for net totex.

Q23. How is the net versus gross adjustment figure calculated?

The net versus gross adjustment is set out in '[Risk-based review cost assessment summary – user guide](#)' (page 7). The intention of adjustment is to neutralise the different accounting treatment by companies of an element of receipts from infrastructure and connection charges, in order to treat companies consistently.

To summarise:

- our models are built using historical data, where predominant treatment was to net off capex; and
- several companies now adopt a gross approach to part of these receipts, treating as revenue rather than netting off capex. So, to make our thresholds comparable with business plans, for those companies that treat part of infrastructure and connection charges receipts as revenue we grossed up our baseline (increased by the amount that companies treated as revenue and did not net off capex in W3/S3).

Beyond the risk-based review

Q24. PR14 plan v3.0 suggests that Ofwat will publish a draft baseline and menu on 30 April. Please confirm that this remains the intention given:

- Ofwat will not be able to reflect revised information that we will be submitting on 2 May; and
- we will be unable to reflect the implications of this information in our 2 May submission.

If it is the intention to publish on 30 April how does Ofwat expect companies seeking a June draft determination to react or respond to the information?

We published our enhanced menus in appendix 5 of [‘Setting price controls for 2015-20 – decisions on enhanced companies and next steps’](#) and our non-enhanced menus in appendix 5 of [‘Setting price controls for 2015-20 – policy and information update’](#).

We will publish draft determinations for enhanced companies on 30 April and this will include details on the baselines for enhanced companies. This will include consideration of how best to protect customers in setting menu and price control baselines for those companies where the cost threshold is significantly greater than the company forecast of totex. We will publish baselines for other companies in draft determinations at the end of June and August.

Given the transparency associated with cost thresholds in our 4 April publications then taken together all the above should mean companies can submit revised business plan information at the start of May if they wish to do so. They can also make separate representations on the 30 April enhanced baseline publication at a later date if they decide it is appropriate to do so.