

11 July 2017

Trust in water

Delivering Water 2020: consultation on PR19 methodology Appendix 5: Water resources control

**Appendix to chapter 6:
Targeted controls,
markets and innovation:
wholesale controls**

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1 Summary

The 2019 price review (PR19) is the first time we will set a separate control for water resources. We propose that the control will be a total revenue control with an explicit within-period adjustment mechanism that depends on the scale of bilateral market entry. It will apply to the 17 largest incumbent water companies (incumbents) for whom we set separate controls for retail and wholesale activities. This appendix provides further detail on proposed form of the water resources control and our approach to access pricing for incumbents wholly or mainly in England (English incumbents) set out in chapter 6, ‘Targeted controls, markets and innovation: wholesale controls’.

The appendix is structured as follows:

- Section 2 provides the background to the water resources control
- Section 3 provides an overview of how the proposed control will work
- Section 4 provides more detail on our key elements of our proposals
- Annex 1 provides guidance on the calculation of the capacity measure for control

The table below summarises our decisions and proposals for the water resources control and provides references to where further detail on them can be found.

Table 1 – Summary of our decisions and proposals for the water resources control

Decisions		
Topic	Confirmed approach	Further detail
Future markets	To encourage markets for the provision of new water resources, covering the bidding and English bilateral market and direct procurement for customers. For the English bilateral market this will involve a new access-pricing framework for English incumbents to help third parties enter this market in the future, if they can provide new water resources as efficiently as incumbents.	Section 2.1
Separation of activities	To introduce a separate control for water resources activities.	Section 2.2
Length of control	Five years.	Section 2.3
Boundary of control	The focus of the water resources control will be abstraction licences and raw water abstraction activities.	Section 2.4
Inflation indexation	Annual adjustment to reflect any percentage change in the relevant inflation index.	See appendix 13, ‘Aligning risk and return’ for further details

Pre-2020 RCV allocation between water resources and water network plus	We will use an unfocused approach that allocates pre-2020 RCV value proportionally between network plus water and water resources.	Section 2.5
Our approach to pre-2020 RCV	Our price control framework at PR19 will provide the same type and degree of regulatory protection as at present for the RCV allocated to water resources at 31 March 2020.	Section 2.6
Post-2020 RCV and investment	From April 2020, new investments will retain a high degree of regulatory protection within the water resources control. Water companies and not customers will face utilisation risk from bilateral market entry, to the extent that third party entry defers or displaces the need for to invest to deliver future capacity. This will be introduced through an in-period adjustment mechanism. We consulted on whether incumbents should be exposed to some utilisation risk from market wide demand and our proposal for this is set out in in section 4.6.	Section 2.8 and 2.9
Proposals		
Topic	Proposed approach	Further detail
Calculation of water resources charges	Incumbents will develop and publish a charging structure for its water resources activities which is to be charged to retailers. Water resources would be seen as a supplier of raw water to retailers, and network plus water would provide treatment and distribution, to retailers (including the incumbents' own retail businesses).	Section 4.1
The links to access pricing for English incumbents	English incumbents will propose in their business plans the equalisation payments that would apply under the access pricing arrangements and demonstrate how these are consistent with their proposals for the water resources control and their forecast costs for post-2020 incremental water resource capacity. Once the control has been set, during 2020-25 if and when the market opens, incumbents would be responsible for updating and applying the equalisation payments.	Section 4.2
The capacity measure for the control	To use water resources yield which captures the average volume of water available from the environment, dependent on the service level and planning period, and constrained by assets in the water resources control.	Section 4.3
Our regulatory approach to post-2020 investment	Maintain a building block approach, rather than using a unit cost based revenue allowance for post-2020 investment with expenditure added to a post-2020 RCV. We welcome, in the context of future market development, stakeholder's views on the scope for setting future controls using a unit cost based revenue allowance.	Section 4.4
The implementation of the in-period adjustment mechanism for	The adjustment uses water resources yield which is our measure of capacity. It accounts for the level of bilateral market entry that wasn't forecast by the incumbent and whose post-2020 capacity is no longer required. The adjustment is based on the total forecast post-2020 capacity requirement (incumbent plus bilateral) as a ratio of	Section 4.5

English incumbents	the actual capacity supplied (forecast incumbent plus actual bilateral). It only accounts for bilateral entry risk and not market wide utilisation risk. The financial value of the adjustment reflects the costs of the post-2020 capacity funded through the control.	
Our approach to utilisation risks relating to market wide demand	There is no exposure to market-wide utilisation risk in the form of control; instead individual incumbents should take ownership of this issue We expect incumbents proposing significant investment in new water resources to also propose long-term risk sharing arrangements as part of their business plans for us to review.	Section 4.6

2 Background

In our May 2016 decision document '[Water 2020: Our regulatory approach for water and wastewater in England and Wales](#)', we set out our decision to introduce a separate control for water resources. We stated that the control would be a total revenue control with an explicit within-period adjustment mechanism that depends on the scale of bilateral market entry. This decision to have a separate control was confirmed by the licence change to condition B for the conditions of the appointment ('licence') of each of the 17 largest water companies (incumbents) in England and Wales.

We expect that, combined with a greater role for markets, the control will help deliver resilient water resources for customers and the environment in the long-term. To facilitate market development, the post-2020 RCV will be recovered as part of the water resource control and will not have the backstop protection of network plus revenues, as for the RCV allocated to water resources at 31 March 2020. Our proposed approach ensures that post-2020 investment is only exposed to targeted and proportionate risks, so efficiently incurred investment in new water resources can be recovered over the longer term.

This decision to introduce a separate control was based on detailed analysis and an impact assessment of our package of policy options, which showed for water resources the net benefits of our proposals were £802 million over 30 years (2015/16 prices). Readers of this document may find it helpful to also read:

- '[Appendix 3 Tackling water scarcity – further evidence and analysis](#)', May 2016
- '[Appendix 4 Enabling access to water networks – further evidence and analysis](#)', May 2016

Since we published our decision document in May 2016, we have continued to develop our approach through engagement with incumbents, third parties and wider stakeholders. We have engaged through formal consultation and discussions in the water resources working group meetings, this included a workshop on the form of control. Slides and minutes of the working group discussions are published on [our website](#).

In this section we provide background on:

- markets for new water resources (see section 2.1);
- the rationale for a separate control (see section 2.2);
- the licence change to enable a separate control (see section 2.3);
- the activities in the control (see section 2.4);

- the allocation of the pre-2020 RCV to water resources (see section 2.5);
- our approach to the pre-2020 RCV (see section 2.6);
- our approach to post-2020 RCV and investment in new water resources (see section 2.7); and
- consultation feedback on approach to post-2020 investment in new water resources (see section 2.8)

2.1 Markets for new water resources

Markets for water resources are targeted at new rather than existing water resources as the opportunities in water resources are greater for additional capacity than existing capacity.

In the bidding market third parties (who can be independent or out of area incumbents) submit bids to an incumbent to provide solutions to help it meet the future needs for water identified in the incumbent's water resources zones (WRZs). A WRZ is a supply area where all customers have the same level of supply risk and this is the basis that water resources are planned through the water resources management plan (WRMP) process. All appointed incumbents have a statutory obligation to prepare WRMPs, which show how the company will balance supply and demand over the longer term (25 year minimum planning period), every 5 years.

Third party options can be:

- Supply side: transfer of water between incumbents, a water trade with a non-water company
- Demand side: a water efficiency scheme provided by a third party, a leakage reduction scheme provided by a third party or provision by a third party of reclaimed water

The bidding market is being supported by market information requirements to increase transparency. These requirements will enable others to identify opportunities to offer services if they can provide them at a lower cost and/or of a better value than the existing incumbents. In addition we are introducing requirement for incumbents to produce a bid assessment framework to create more clarity and confidence to third parties that their supply and demand side options will be assessed fairly. Appendix 9, 'Company bid assessment frameworks: the principles' sets out for consultation the principles we expect incumbents to follow in preparing their frameworks which are centred on the need to provide transparency, ensure equal treatment, non-discrimination and a proportionate approach to procurement.

In the bilateral market, third parties (who can be independent or out of area incumbents) contract directly with independent retailers in the business market to supply them water resources. This will involve the payment of an access price to incumbents for use of their distribution system and, if needed, treatment facilities. In this appendix we use the term “retailers” to refer to water supply licensees who can use the networks of incumbents to supply water to eligible business customers. The bilateral market is not applicable for households.

The English bilateral market will not start until Defra bring into force the relevant provisions of the Water Act 2014 and we recognise that the timing for when the provisions might be implemented for those connected to the networks of English water companies remains uncertain. Our form of control is designed to be compatible with the development of the English bilateral market, if implemented during the 2020-25 period. The Welsh Government has decided not to expand business retail competition at this time, and there will be no Welsh bilateral market.

In the May 2016 decision document we set out that there will be two parts to the access prices that English incumbents will need to publish:

- a set of average cost-based charges for network plus water services; and
- if applicable, an equalisation (formerly compensation) payment which reflects the incumbent’s forward-looking incremental water resource costs.

The average cost-based charges will remunerate the incumbent for the costs of providing network plus water services (for example, water treatment, treated water distribution, back-up and balancing services). The equalisation payment will ensure that efficient third party entrants who are able to provide additional water resources at lower cost are able to compete against incumbents in the bilateral market. Further detail on this is provided in the box below.

Box 1: More detail on equalisation payments for English incumbents

For determining access prices for bilateral entry we are proposing to include an equalisation payment. The equalisation payment is a discount on the common access price to enable third parties to compete with incumbents on an equal footing. It would apply to third party alternative water providers making water available in WRZs where the incumbent is proposing to build new options.

The equalisation payment would be set to reflect the difference between the average price or charge of water resources and the cost of developing new water resources in each WRZ. In previous documents we used average cost as a proxy

for the price of water resources as the first part of this calculation. However, the setting of a separate control provides us a price for water resources (see section 4.1), which will reflect the average cost of water resources. This price will act as a constraint on the wholesale prices retailers face and that third parties will have to compete against and is a better measure to use in the calculation of equalisation payments.

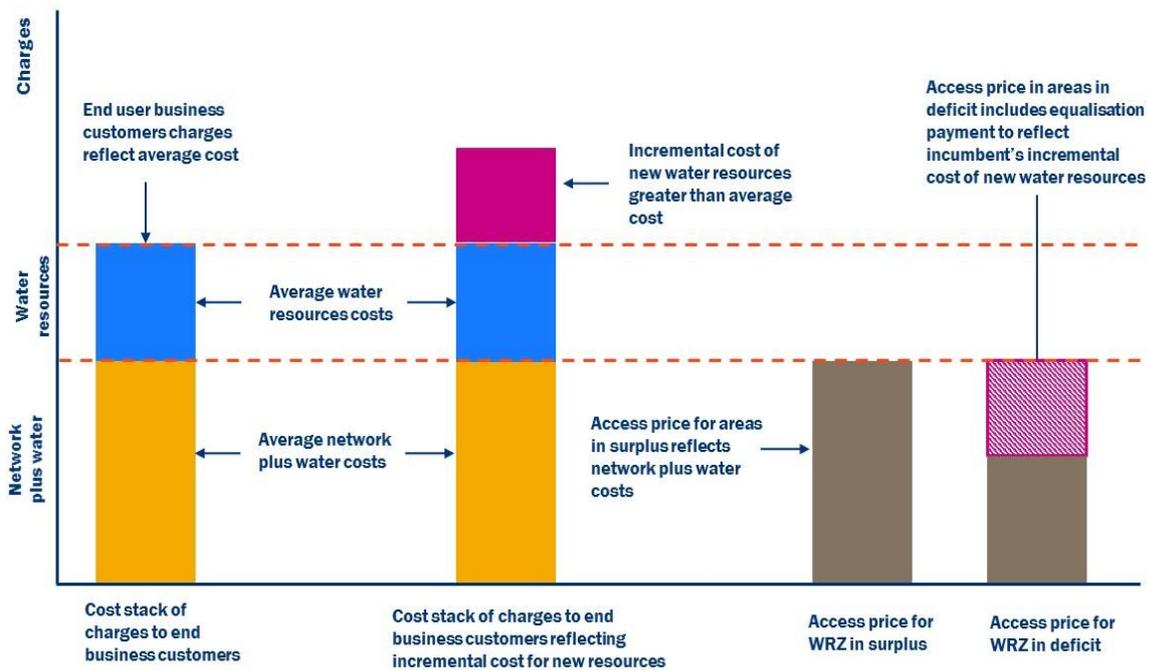
The payment is structured in this way as developing new water resources is typically considerably more costly than is suggested by the cost of existing water resources. In part this difference is due to the RCV privatisation discount and in part a natural consequence of incumbents developing the least cost water resource options first. In the absence of an equalisation payment it is unlikely that third party alternative providers would be able to offer retailers a commercially attractive proposition because, in order to match the incumbents wholesale rates, they would only be able to charge retailers the incumbent's price of water resources which would be insufficient to cover the higher cost of new water resources.

For WRZs where there is no new capacity development beginning in a period, the equalisation payment would be zero. In all WRZs where an incumbent company is proposing to begin work on new option, whether or not the option will deliver new capacity in 2020-25, the equalisation payment would be set to reflect the difference between the incumbent's average water resource price and the average cost of incremental capacity in the specific WRZ.

The full mechanics of the equalisation payment are outside the scope of the methodology. In autumn 2017, we will publish a wholesale market architecture discussion paper which will consider this, among other issues, further.

The figure below presents a stylised overview of our approach to access pricing for the English bilateral market. We provide more detail on our approach to access pricing in section 4.2.

Figure 1 - Our approach to access pricing for the English bilateral market



Where applicable, these two routes to market reinforce each other. The potential ability for third party providers of water resources to use the English bilateral market model should help encourage incumbents to thoroughly explore offers made to them through bidding markets, while resource providers that have not been successful in bidding markets may find subsequent opportunities in bilateral markets.

Alongside these two markets we also propose to incentivise companies to use direct procurement for customers for high value capital projects, such as large new water resources. Direct procurement for customers takes place when an incumbent procures services, on behalf of customers, including the project's financing. This can generate savings from development, construction and operating costs and cheaper financing –, which can be shared with customers. It can also encourage companies to take a long-term view of projects, better aligning to longer term outcomes for customers and the environment. Further detail around direct procurement for customers is set out in chapter 7, 'Targeted controls, markets and innovation: direct procurement for customers' and Appendix 10, 'Direct procurement for customers'.

2.2 The rationale for a separate control

A separate control will help in developing better targeted regulatory incentives, and in increasing focus on the water resources element of the value chain (both within

incumbents and within Ofwat). It will also increase the accuracy and consistency of cost reporting for different wholesale activities because the regulatory reporting and cost allocations will become more important. This will also help where incumbents want to agree voluntary water trades between each other, as these trades will need to reflect information about the cost of water resources. This will ensure that an exporting incumbent's customers benefit from the transaction for example.

Taking a step back, it is also important to highlight two limitations of the single total revenue wholesale water control adopted for the 2014 price review (PR14) for water resource market development:

- It may provide opportunities for incumbents to engage in forms of cross-subsidy, which make it harder for third parties to compete against them for new water resources, an area that has the scope for markets. At the same time, incumbent providers could recover more revenue from parts of the value chain where their monopoly position was strongest (such as water distribution to existing customers).
- It can transfer the financial risks of markets away from the incumbents and towards customers, who effectively compensate incumbents financially for losses in market share. Therefore, as water resource markets develop, customers could fail to receive the benefits or even be worse off.

These two issues above are particularly important in light of the potential opening of the English bilateral market.

A separate control is a targeted and proportionate response to these issues. It allows the regulatory framework to be adapted to realise the greater opportunities from markets in this part of the value chain, while maintaining the existing framework for the other parts of the wholesale value chain where there is less scope for markets at present. This is supported by the example of business retail competition in the water industry. At PR14 we adapted our regulatory framework to separate retail from wholesale controls, where retail controls operate differently and are more compatible with market development.

2.3 The licence change to enable a separate control

All 17 incumbents agreed to the modification to introduce a separate control and we have implemented the changes. The provision for a separate control is structured in a broadly similar way to that for the pre-existing retail price control which was introduced at PR14. The licence does not specify the detailed form of the control, but rather allows us to work with stakeholders to develop and refine the more detailed

aspects of the control as we develop our price review methodology, and to confirm the form of controls in our final determinations. We adopted this approach as we want to avoid constraining what we or incumbents can reasonably do, to the detriment of customers.

The licence allows Ofwat to determine:

- the appropriate nature, form and level of the control (subject to the constraints set out below); and
- how the incumbent shall demonstrate compliance with the control.

The constraints set in the licence are that:

- Ofwat can only set one single control for water resources activities;
- the duration of the control is five years; and
- there is a requirement for an annual adjustment to reflect any percentage change in the relevant index

In the first year of the control allowed revenues will be determined that meet the company's revenue requirement. A company will be allowed to increase revenues every year by the change in the relevant index and an adjustment factor known as K. The K factor is set such that annual allowed revenues meet the annual revenue requirements.

The licence also defines the activities that can be covered by the separate control. This is discussed below.

2.4 The activities in the control

In order to provide certainty and transparency Condition B sets out an 'envelope' of activities that Ofwat may designate as water resources activities for the purposes of the separate control. This envelope covers activities connected with "abstraction licences", "raw water abstractions", "raw water transport" and "raw water storage" and ancillary activities. "Water treatment" and "treated water distribution" are the list of activities which cannot be designated by Ofwat as water resources activities and are therefore definitely excluded from the scope of the water resources control.

The terms used in the lists of activities above that can and cannot be designated have the meanings assigned to them in '[Regulatory Accounting Guideline \(RAG\) 4.06 - Guideline for the table definitions in the annual performance report](#)', August 2016. Future changes to the RAGs will not change either the activities already

designated for the purpose of the control or the activities that could be designated for the purposes of a future control. To change this would require a further licence modification.

The focus of the water resources control will be abstraction licences and raw water abstractions. At a high level where an asset or an incurred cost provides a quantity of water available for transport and ultimately treatment then they will sit within water resources. Many new schemes are likely to consist of investment across water resources and network plus water activities. A new raw water reservoir (water resources) will need to be connected to the water treatment works for example. Here the connecting pipework element of the scheme will fall under raw water transport (network plus water).

Recognising this point we included the possibility of designating, at the margins, raw water transport or storage activities as our work on the regulatory accounts has shown that the boundary between these activities has not always been clear or consistently applied. Having this safeguard in place reduces the risk of inadvertently having set the boundary in the wrong place which, if it was the case, would mean that the benefits from a separate control would not be fully realised. Companies should prepare business plans on the basis that these boundaries will not change from the detailed definitions in RAG 4.06.

We shall set out the final designations of these activities between the water resources and the network plus water control as part of the final determination process. This approach makes it easier for us to address any practical issues or ambiguities that arise with the definition of the boundary. It will allow us to reflect any material new information that we find in the annual performance report (APR) companies provide in July 2017, consultation responses to the 2017-18 RAGs and business plans.

2.5 The allocation of the pre-2020 RCV to water resources

The RCV is used to assess the revenues that are required to provide a return on the capital invested in incumbents. In order to calculate the revenue allowance for the water resources control there needs to be an explicit allocation of the pre-2020 wholesale water RCV to the control.

In our May 2016 decision document, we explained that we will allocate a proportion of the RCV to the control on an unfocused basis. This is on the basis of the proportion of the assets employed for water resources activities relative to the total assets of employed across wholesale water (water resources and network plus

water). We gave each incumbent ownership and responsibility for how, using an unfocused approach, its legacy pre-2020 RCV will be allocated between water resources and network plus water. Incumbent ownership of allocation will also help to avoid unintended and unnecessary impacts on wholesale tariffs and strengthens incumbents' ownership of their wholesale tariff structure. We stated this would be supported by Ofwat guidance.

In January 2017 we published technical guidance on water resources pre-2020 RCV allocation at PR19. The technical guidance set out a number of approaches that incumbents could consider and a range of issues to consider in arriving at their RCV allocation approach. Following publication of the technical guidance we discussed the technical guidance at the water resources and the RAG working groups. As the issues faced were company specific, we have also held a series of individual meetings with incumbents in April and May 2017.

We will be collecting company proposed RCV allocations in January 2018 and will publish the proposals as part of our feedback in April 2018. Our requirements for the January submission are set out fully in appendix 8, 'Water resources legacy RCV allocation: initial submission'. We will confirm the allocation of RCV to the water resources control and network plus water control (the remainder) when we publish our PR19 final determinations.

2.6 Our approach to the pre-2020 RCV

We stated in the May 2016 decision document that our price control framework for PR19 will provide the same type and degree of regulatory protection as at present for the RCV allocated to water resources at 31 March 2020. This approach fits with our view that the opportunities in water resources are greater for additional water resources than existing water resources.

We set out that, given the focus on new water resources, we do not need an explicit and mechanistic RCV 'true-up' mechanism as part of the overall RCV protection in water resources. Any mechanism would also complicate the new regulatory arrangements for water resources and could lead to market distortions and other unintended consequences. As an additional safeguard, incumbents will be able to propose revisions to the allocation of the RCV between network plus water and water resources at the next price review, if the allocation at PR19 does not provide an appropriate allocation between the controls. We expect any changes to be the exception rather than the rule and would only be accepted if there are compelling reasons to change or evidence of misallocation at PR19.

Going forward the water resources pre-2020 RCV will be declining as the RCV is depreciated. No water resources expenditure will be added on to the existing pre-2020 RCV. This will avoid distorting incumbent decision making as if we were to provide funding for assets on a different basis (depending on when assets happen to have been built), it would give incumbents different incentives to maintain pre- or post-2020 assets. It also reflects that the RCV is not directly linked to physical assets, but is a regulatory tool for ensuring sufficient financing is provided for incumbents' businesses.

Expenditure to maintain pre-2020 capacity will have the same level of protection as the pre-2020 RCV run off, as it will not be exposed to any additional utilisation risk, either bilateral or market wide, during 2020-25. The control for water resources will include revenue to enable incumbents to recover the efficient costs of maintaining their pre-2020 capacity.

2.7 Our approach to post-2020 RCV and investment in new water resources

We stated in our May 2016 decision document that the post-2020 RCV for new water resources will not have the same type and degree of regulatory protection as the pre-2020 RCV. Our building block approach to setting the water resources revenue control means that new investments will still retain a high degree of regulatory protection.

We identified two potential sources of utilisation risk affecting investment decisions in new water resource capacity:

- Utilisation risks from the bilateral market entry for English incumbents. If there is greater bilateral market entry than anticipated this could mean that the level of capacity required from the incumbent is less than it expected and there may be lower utilisation of any additional capacity developed by the incumbent. Conversely, a lower level of bilateral market entry than anticipated could mean that the new capacity the incumbent planned to develop is insufficient. As set out in section 2.1 bilateral entry will only be available to meet business demand and will only be introduced for English incumbents.
- Utilisation risks relating to market-wide demand. There is inherent uncertainty about the level of future demand from the customers, both household and business, supplied by incumbents. This reflects uncertainty about a range of factors including: population growth; per capita and per household consumption; changes in industrial demand; and climate and weather patterns.

For the first type of utilisation risk we stated in the May 2016 decision document that customers should not provide financial protection to incumbents against this risk for post-2020 investment in new water resources. This is one reason for changing the form of control to include an in-period adjustment mechanism - where this mechanism ensures that incumbents and not customers face utilisation risk from bilateral market entry.

We opted for an in-period rather than end of period adjustment to promote transparency and reduce regulatory uncertainty and scope for disputes at the next price review. The in-period approach requires us to specify the adjustment mechanism upfront at the start of the PR19 and the development of it is an important part of the price control framework for water resources.

For the second type of utilisation risk we noted in the May 2016 decision document there were a range of options, from incumbents being fully exposed to fully protected. Our preference was for some degree of risk sharing in relation to post-2020 investment in new water resources. We asked for stakeholders views on our proposed approach to both these two types of risks and the responses are summarised below. Our proposed approach for the methodology is set out in section 4.6.

2.8 Consultation feedback on our approach to post-2020 investment in new water resources

In our May 2016 decision document we asked:

- Whether the water resources control should differentiate between utilisation risks relating to the English bilateral market and market-wide demand?
- Whether respondents agreed that the water resources control should, at least in some circumstances, expose an incumbent to some degree of market-wide demand risk?

In response to the first question, most respondents accepted the case for differentiating between the two types of utilisation risks. This was the case for incumbents and other stakeholders, including regulators and consumer groups.

In the responses there was agreement on the rationale and need to protect customers of English incumbents from bilateral market entry risk. The key challenges raised were about implementation of this policy. In particular interactions with the regulatory protection of the pre-2020 RCV and understanding how bilateral market entry would work in practice. There was also concerns expressed around potential

unintended consequences on incumbent incentives, for example whether it would mean incumbents would focus on the short rather than long term.

Welsh stakeholders did not provide comment on bilateral market entry as it will not be applicable to Welsh incumbents. In response to the second question, the majority of respondents disagreed that the new capacity should be exposed to some market-wide demand risk. The key challenges identified were:

- interactions with resilience – market-wide risk could conflict with an incumbents' duty to provide a secure supply of water and develop appropriate resilient solutions over the longer term.
- the potential for unintended consequences – introducing this risk could create perverse incentives for incumbents. For example, if poorly designed, it could encourage incumbents to allow increases in demand to reduce the risk of under recovery of post-2020 investment in new water resources.
- the potential impact on the cost of capital – demand side risk may not be fully diversifiable as it will be correlated with the wider market which could have an adverse impact on the cost of capital.

The respondents who supported the proposal noted the potential for environmental benefits and value of avoiding inefficient expenditure in oversized assets. It was also noted that this could also promote efficient resource allocation.

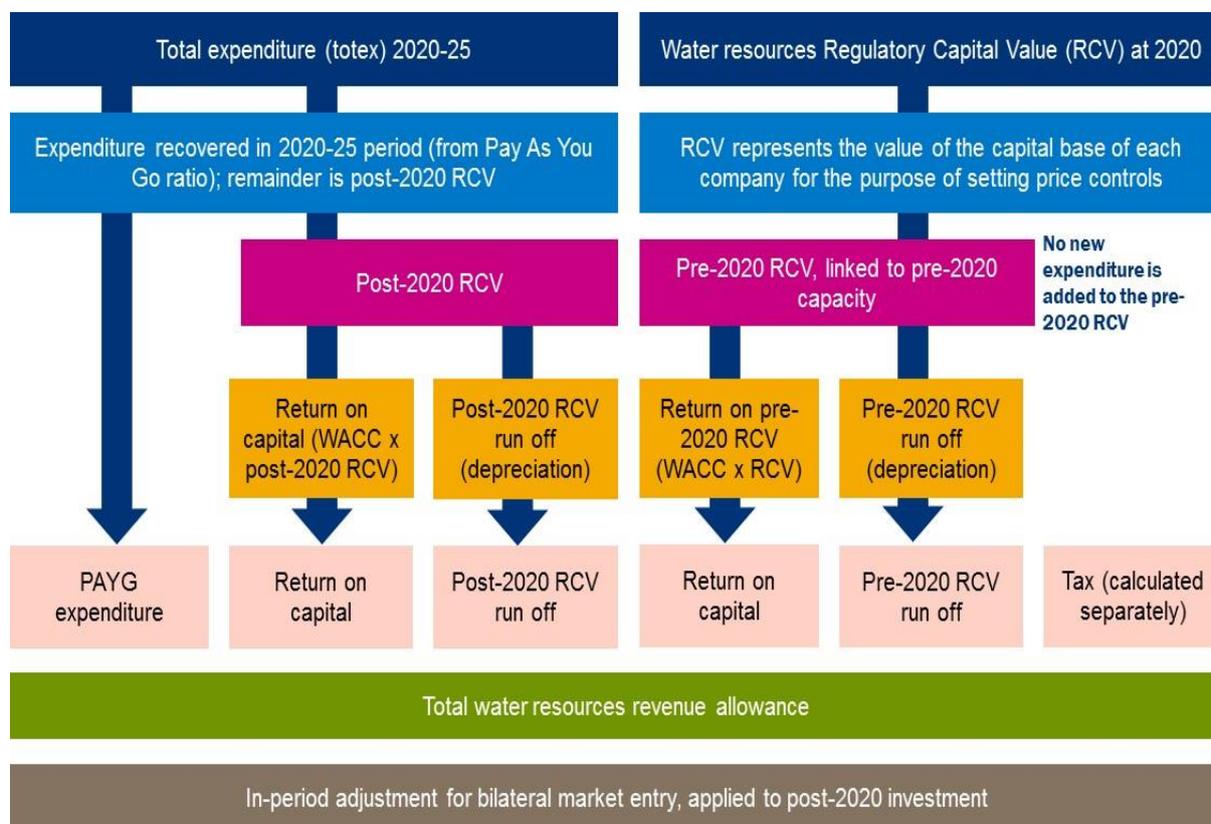
3 Overview of our proposals

In this section we provide an overview of our proposed water resources form of control. For six of our key proposals presented in this section the next chapter of this appendix sets out more detail on our choice of proposal and how it will work in practice. We signpost these areas in the discussion below.

Our proposed form of control is a total revenue control with an explicit within-period adjustment mechanism that depends on the scale of bilateral market entry. It will be set using a building block approach. The figure below illustrates these building blocks, which incorporate:

- returns and depreciation to the pre-2020 water resources RCV
- an assessment of:
 - efficient totex during the 2020-25 period;
 - funding expenditure to be recovered within the period (determined by the PAYG ratio); and
 - expenditure recovered in future periods (return and depreciation on post-2020 RCV); and
- a tax allowance.

Figure 2 - The building blocks of the water resources total revenue control



In the first year of the control allowed revenues will be determined that meet the company’s revenue requirement. A company will be allowed to increase revenues every year by the change in the relevant index and an adjustment factor known as K. The K factor is set such that annual allowed revenues meet the annual revenue requirements.

In this appendix we set out an overview of how the form of control will work, with a focus on implementation, for example of the in-period adjustment. The discussion of the wider building blocks outlined above, is covered in the following chapters of the methodology document.

- Chapter 9, ‘Securing cost efficiency’, sets out our approach to assessing the efficient costs for the wholesale controls.
- Chapter 10, ‘Aligning risk and return’, discusses how we will set an appropriate return for the wholesale controls, and our approach to tax.
- Chapter 11, ‘Aligning risk and return: financeability’, sets out our approach to recovering costs, which determines the PAYG rates and RCV run-off for the wholesale controls.

To show compliance with the separate binding control during 2020-25 incumbents will develop and publish a charging structure of water resources to network plus

water. Our considerations for how wholesale water revenues should be calculated is set out in section 4.1.

Consistent with our decision to adopt a binding control on total revenues, it is necessary to allow incumbents to true-up for under or over recovered revenues over 2020-25. This is to mitigate the risk of over or under recovery which could have adverse impacts on customers and incumbents. The adjustment mechanism for water resources will be the revenue forecasting incentive, consistent with the approach taken for network plus water and wastewater. Further details on this are provided in section 4.2 of appendix 7, 'Wholesale revenue incentives'.

The regulatory treatment of pre-2020 and post-2020 investment is different (see section 2.6 and 2.7), and we distinguish between the two by measuring pre-2020 capacity as of 31 March 2020, with new capacity after this date being identified as post-2020 capacity. Drawing this line allows us to look at future years and determine objectively the extent to which post-2020 capacity is used in light of potential entry in the bilateral market. The separate recording of pre-2020 capacity ensures that bilateral market utilisation risk does not apply to it.

Our proposed capacity measure is water resources yield. This captures the average volume of water available (dependent on the level of service and planning period) from the environment and constrained by water resources control assets. We set out more detail on this measure in section 4.3.

We will include an in-period revenue adjustment mechanism to accommodate the development of the bilateral market if introduced in the 2020-25 period. This ensures that incumbents and not customers face utilisation risk from entry into the bilateral market. The adjustment reflects the costs of the post-2020 capacity funded through the water resources control that underutilised due to bilateral market entry. This only applies to English incumbents as the Welsh Government has decided not to expand business retail competition at this time, and there will be no Welsh bilateral market. The implementation of the in-period adjustment is discussed in section 4.5

For the bilateral market to operate we need to develop a set of access pricing arrangements, our work in the May 2016 decision document summarised above set out some of the key features of our proposed approach. At PR19 English incumbents will propose in their business plans the equalisation payments that would apply under the bilateral market access pricing arrangements. Incumbents will also need to demonstrate how these are consistent with their proposals for the water resources control and their forecast costs for post-2020 incremental water resource capacity. Once the control has been set, during 2020-25 if and when the market opens,

incumbents would be responsible for updating and applying the equalisation payments. Our approach here is set out in section 4.2.

For post-2020 investment in new water resources we are maintaining the traditional building blocks approach, with a post-2020 RCV. We did consider an alternative approach: setting a unit cost based revenue allowance for new post-2020 water resource capacity. This allowance would be intended to cover development, maintenance, operational and financing costs and would be paid when the capacity is delivered. However, while this may be better aligned with market outcomes we consider this would introduce less certainty about revenue and be disproportionate at this stage of the market development. We set out our considerations of this issue in section 4.4.

We do not propose to introduce market wide utilisation risk into the form of control. However, our view is that, for significant post-2020 investment in new water resources, there is a strong case for incumbents to take a long-term approach that considers the real option value of its decisions, and the long-term risks associated with them relating to market-wide utilisation risk. This means making sure incumbents bear an appropriate balance of risk over the long term to align their interests and the interests of customers. We expect incumbent companies proposing significant new investment in water resources to also propose long-term risk sharing arrangements as part of their business plans for us to review. This is a targeted and proportionate approach and allows the arrangements to be tied to the nature of the investment over the long-term. This approach should also help enhance the legitimacy of company business plans, as it ensures that companies have an interest in efficient utilisation of resources and assets. Our full considerations of this issue are set out in section 4.6.

4 More detail on our proposals

For each area this section sets out the issues that we are seeking to address, the options that we have considered, the reasons for our proposed approach and more detail on how it will work in practice. We cover the:

- calculation of water resources charges (see section 4.1)
- links to access pricing for English incumbents (see section 4.2)
- capacity measure for the control (see section 4.3)
- regulatory approach to post-2020 investment in new water resources (see section 4.4)
- implementation of the in-period adjustment for English incumbents (see section 4.5)
- approach to market wide demand risk (see section 4.6)

4.1 Calculation of water resources charges

4.1.1 The issue we are seeking to address

PR19 is the first time we set separate binding controls for water resources and network plus water. To monitor compliance and to calculate over- or under-recovery as part of the revenue correction mechanism (see discussion in section 4.2 of appendix 7, 'Wholesale revenue incentives') each incumbent will need to identify revenues from both water resources and network plus water. This can then be compared with the revenue allowed under each of the controls.

To do this each incumbent's wholesale charging structure will need to identify a unit charge or price for its forecast raw water supply at the regulatory boundary between water resources and network plus water. The way incumbents calculate these prices will also have interactions with our bilateral market access pricing arrangements for English incumbents. These links are explored further in the section 4.2.

4.1.2 What options have been considered

We have identified two options for the attribution of wholesale water revenues to water resources, which represent two different levels of unbundling of charges.

Option 1: Charging of water resources to network plus water

Under this option an incumbent would develop and publish a charging structure for its water resources activities which is to be charged to network plus water. Water resources would be seen as a supplier of raw water to network plus water, and network plus water would then supply a bundled wholesale service, covering water abstraction, treatment, distribution, to retailers (including the incumbents' own retail businesses).

The revenue attributed to water resources would be calculated by reference to the charging structure and the output of the incumbent's water resources activities. The charging structure for supply of raw water to network plus water could be on a volumetric (e.g. per cubic metre) or capacity basis (e.g. dry year annual average requirement in mega litres a day (Ml/d)).

Option 2: Charging of water resources to retailers

Under this option an incumbent would develop and publish a notional charging structure for its water resources activities which is to be charged to retailers (including the incumbents' own retail businesses). The water resources control would define the price for raw water at regulatory boundary between water resources and network plus water and the network plus water control would define the prices for the various network plus water services (which could be either bundled together or further decomposed).

The revenue attributed to water resources would be calculated by reference to the charging structure and the output of the incumbent's water resources activities. For consistency the charges would need to be linked to the metrics on which wholesale charges for individual premises are based (e.g. water consumption or rateable value).

4.1.3 Our assessment of the potential options

Our preferred approach is for incumbent's to develop and publish unbundled charges for its water resources activities, to be charged to retailers. The key advantage of this approach is transparency – it will provide retailers a clear understanding of the composition of charges, in particular the water resources element. This aligns with our market based approach for water resources and will be more compatible with the development of the bilateral market, if implemented, in 2020-25. In contrast, under

option 1, there would only be transparency at the wholesaler level, rather than for retailers.

A potential downside of our preferred option is that has higher implementation risks than option 1, as it represents a more significant change to the current charging framework. However, we consider that the benefits of transparency outweighs this and that our approach will strengthen incumbent’s ownership of their wholesale tariff structures.

This approach is also consistent with our decisions on wholesale charging set out in ‘[New wholesale charging rules: decision document](#)’, November 2016. The rules outlined here look to ensure that:

- ‘retailers and associated retail companies of existing water companies are clear what they are paying for;
- a level playing field is created for retailers and that, where applicable, the effective use of markets are realised; and
- wholesalers better understand their costs and cost drivers and this understanding better informs their charging.’

Table 2 - Assessment of approaches to water resource charges

	Option 1 Charging of water resources to network plus water	Option 2 Charging of water resources to retailers Preferred option
Achieving our objectives	Consistent with a separate binding control in having separate water resource charges but not full scale of unbundling ✓	Consistent with a separate binding control and will represent full scale implementation of unbundling ✓✓
How our objectives are achieved	Will provide transparency at the wholesaler level on water resources and network plus water charges (but not transparency at the retailer level) ✓	Approach is pro-market, will provide retailers full transparency on water resources and network plus water charges ✓✓
Practicality	Represents an incremental change to the current framework and will not disrupt the existing wholesale charging structure ✓✓	Represents a more significant change to the current charging framework which may cause implementation issues ✓

4.1.4 How our proposed approach will work in practice

To implement this proposal for 2020-25 incumbents will develop and publish a charging structure for their water resources activities which is to be charged to retailers. To be consistent with our form of control, this will take the form of a price for their raw water capacity. Where capacity is measured by water resources yield (see section 4.3). This is also captured in the business plan table 'Wr8 Water resources forecast charging and equalisation payments'.

The price for water resources capacity should be compatible with the maximum revenue allowed under the water resources control, based on capacity forecasts. In any one year it should reflect the building blocks of the control such as PAYG, RCV run-off and the allowed cost of capital across all capacity.

It would be a charging decision for incumbents whether this price would be the same across the area of appointment. We note that some already apply different wholesale tariffs in different parts of their areas of appointment for example.

4.2 The links to access pricing for English incumbents

4.2.1 The issue are we seeking to address

In the bilateral market third parties (who can be independent or out of area incumbents) contract directly with independent retailers in the business market to supply them water resources. This will involve the payment of an access price to incumbents for use of their distribution system and, if needed, treatment facilities. As set out in our May 2016 decision document, the development of a new access pricing regime for English incumbents is required under the changes made by the Water Act 2014.

There are links between how we set and implement the water resource control and how access prices function. As noted above our proposed approach to calculating water resources revenues will see incumbents set a charge for raw water capacity. This charge will act as a constraint on the wholesale prices imposed on retailers and will be a component of the calculation of the equalisation payment.

In turn, the access price will have an impact on the degree of bilateral entry: the higher an incumbent's cost of incremental water resources the lower the net access price and the greater the scope for entry. Bilateral entry will also affect the incumbent's revenues through the in-period adjustment mechanism discussed in

section 4.5. It will also provide a financial incentive for incumbents to anticipate bilateral market entry, and to adjust their own plans for water resource capacity in light of the capacity available from other parties.

We have considered how these interactions influence the water resources control and future access prices. In particular we have considered, whether and to what strength, there should be a link between the control and access prices. This decision itself then defines our data requirements for access pricing and our approach for assessing how company business plans may influence the future English bilateral market.

Detailed design questions on access pricing are outside of the scope of the methodology. The aim of our approach to access pricing is to ensure the water resources control is compatible with the development of the English bilateral water resource market, if implemented during the 2020-25 period.

4.2.2 What options have been considered

We have considered three options for the links between access pricing and the form of control, the options range from a formal structural link to no link at all.

Option 1: Structural link

Under this option, there would be a mechanistic and direct link between the water resources control allowances provided in respect of the incumbents post-2020 capacity and the calculation of the equalisation payments under the access pricing arrangements. Our assessment of the appropriate cost allowances for post-2020 capacity, drawing on incumbent business plans, would feed directly through to the equalisation payments. Any increase in the control allowances for post-2020 capacity would feed through to higher equalisation payments, and vice versa automatically.

Option 2: Indirect link

Under this option incumbents would propose in their business plans the equalisation payments that would apply under the access pricing arrangements in each WRZ. The incumbent would also demonstrate how these are consistent with their proposals for the water resources control and their forecast costs for post-2020 incremental water resource capacity for each WRZ. Once the control has been set, during 2020-25 if and when the market opens, incumbents would be responsible for updating and applying the equalisation payments as there would not be an automatic

link like under option 1. This updating would take into account of the level of the water resources control and the allowances determined for post-2020 capacity.

Option 3: No link

Under this option equalisation payments would not be linked mechanistically to the water resources control allowances (option 1) nor would they feature in incumbents' business plans (option 2). Equalisation payments would instead be calculated through a separate process and no information about them would be collected at PR19.

4.2.3 Our assessment of the potential options

Our proposal is to establish an indirect link between PR19 and access pricing. A key advantage of this approach is that it is flexible and can allow us to adapt our approach in light of market developments. This is important as the English bilateral market is not expected to open until later in 2020-25 and during this period it is expected to be small and nascent.

The indirect link will incentivise good quality information in business plans for the costs of incremental capacity. This could form part of our considerations when setting totex allowances and improve the information used to calculate equalisation payments. Under this option an incumbent may also have a financial incentive to avoid over-estimating the costs of its incremental capacity as higher estimates would tend to increase opportunities for bilateral entry. Likewise it may have a financial incentive to avoid seeking unduly low equalisation payments for new entrants as this could feed through to lower control allowances for its own incremental capacity.

We recognise that the benefits listed above would be more effectively captured by a structural link, as this would provide less scope for discrepancy between the cost allowances for new capacity and equalisation payments. However, as noted above it does not seem proportionate to introduce such a large change at this stage of market development.

In contrast these advantages would be lost with no link. This option would also be likely to undermine the level playing field for third party providers, as it would result in significantly less transparency than having a link between access pricing and the control. It would also introduce greater uncertainty for incumbents on how they would recover their costs from the bilateral market.

Consequently we consider that an indirect link strikes the right balance between providing certainty around the level and effect of access prices and retaining sufficient flexibility to accommodate different market outcomes.

Table 3 - Assessment of approaches to the link between access pricing and the control

	Option 1 Structural link	Option 2 Indirect link Preferred option	Option 3 No link
Achieving our objectives	Provides clarity to all parties and provides strong incentives for incumbents to submit accurate information ✓✓	Will provide assurance about protection of a level-playing-field for third parties and certainty around cost recovery for incumbents – though not as effective as option 1. ✓	Risks undermining confidence, both for incumbent and third parties ✗
How our objectives are achieved	Will prove to be onerous on both incumbents and Ofwat to develop and implement ahead of PR19 ✓	Leverage information gathered for WRMPs and minimises the burden on incumbents in the lead up to submitting business plans. ✓✓	Lowest burden but could mean incumbents do not plan for the bilateral market at PR19 ✓
Practicality	A structural link would be complex to implement in practice. ✗	An informal link through the business plan is relatively simple to implement ✓✓	Least onerous option but may result in issues coming to light later which could impede market development ✓✓

4.2.4 How our proposed approach will work in practice

To implement this proposal as part of their business plans we expect incumbents to propose in business plan table 'Wr8 Water resources forecast charging and equalisation payments':

- a price or set of prices for their supply of raw water; and

- indicative equalisation payments at a WRZ level, which reflect the raw water price and the average costs of their incremental water resource capacity.

The price for raw water capacity will be consistent with the calculation of water resources revenues. The incumbent will need to show that the price is compatible with their forecast maximum revenue allowed under the water resources control, based on forecasts of capacity. It would be up to incumbents whether this price would be the same across the area of appointment.

The purpose of the equalisation payment is to make an adjustment to take account of the difference between

- the raw water charge set by the incumbent (which reflects its average costs across all its pre-2020 and post-2020 capacity) and available to retailers who use the incumbent rather than an entrant for raw water; and
- the incumbent's costs of supply from post-2020 incremental capacity.

The indicative equalisation payments should be based on the difference between the incumbent's raw water charge (defined by the water resources control) and its forward-looking incremental cost of new water resources. The payment is indicative as the exact mechanics of the equalisation payment are outside the scope of the methodology. For example there may be circumstances where the equalisation payment could reduce, where more post-2020 water resource capacity available than is needed to meet forecast demand.

To assess the indicative equalisation payments we will require information, at a WRZ level, on the unit costs of additional water resources which are being funded (even if not completed) through the water resources control in the next control period. This information will also be used in the calculation of the bilateral entry adjustment mechanism which is discussed in section 4.5. To avoid a double counting of the equalisation payment and the bilateral entry adjustment, we are proposing that the equalisation payment is recovered on a cost pass through basis. An alternative approach would be to incorporate this into the in-period adjustment so it is netted off.

The data requirements for cost information are captured in business plan table 'Wr7 New water resources capacity ~ forecast cost of options beginning in 2020-25'. The data table builds on the approach taken in WRMPs for reporting the cost of feasible options with adjustments to capture the move away from the average incremental cost (AIC) approach used for water resources planning. In particular we are asking incumbents to separate out the costs so they align with our price control units and report the capacity on a consistent basis with our form of control (water resources yield).

At this stage we are not prescribing a detailed calculation method for the unit cost of additional water resources over what is presented in the data tables. Our view is that this should reflect a measure of the annualised costs of forecast post-2020 capacity divided by the assumed capacity provided. The annualised costs of post-2020 capacity would reflect the sum of:

- an annualisation of capital costs (e.g. using the PMT function in Excel and drawing on estimates of upfront capital expenditure, assumed asset lives and the cost of capital including allowance for corporation tax); and
- average annual operating and maintenance costs (covering maintenance required before end of assumed asset lives).

Where post-2020 capacity will comprise multiple options, these should all be covered in the costs and capacity measures used for the unit cost calculation. Annualised capital costs may need to be built up separately from figures for different assets rather than calculated directly at the aggregate or scheme level, due to factors such as differences in asset lives and commissioning dates.

We are keen to hear company views on how the calculation of annualised unit costs should be approached, in particular on how to ensure consistency with water resources planning where possible, and whether a more guidance is required for the final methodology.

As noted above the exact mechanics of a number of elements of access pricing, including the equalisation payment and network plus charges, are outside the scope of the methodology. In autumn 2017, we will publish a wholesale market architecture discussion paper which will consider these issues further.

4.3 The capacity measure for the control

4.3.1 The issue are we seeking to address

Our price control framework PR19 will provide the same type and degree of regulatory protection as at present for the RCV allocated to water resources at 31 March 2020. However, investment in new water resources from 1 April 2020 will not receive the same regulatory protection and revenues will need to be recovered on a standalone basis from water resource activities. A key design issue, is how we adapt the regulatory framework for water resources to accommodate this distinction.

In our May 2016 decision document, we set out that to implement this we would introduce an element to the control framework which will make the financial remuneration to the incumbent for post-2020 investment dependent on the extent to which that investment is used or needed. This element is capacity.

Our approach works by drawing a clean line between the capacity available from existing assets as at 31 March 2020 and any subsequent capacity developed from 1 April 2020, including new capacity developed to replace pre-2020 capacity. We can then look at outturn demand in any subsequent year and determine objectively the extent to which the new post-2020 incremental capacity is used or needed. This approach means that additional risk will only apply to post-2020 investment and the capacity it represents.

In order for this approach to be implemented at 2020, we need to define the capacity measure that will be used to calculate pre- and post-2020 capacity and track this through time. This is a new requirement for the 2020-25 period.

4.3.2 What options have been considered

We identified three potential capacity measures based on the components of the supply-demand balance (SDB) calculation used by incumbents for water resources planning. The SDB calculation is based on all the elements of forecast supply, and then compares this to the likely demand. The supply forecast accounts for any reductions in the supply (e.g. climate change) and the application of constraints both hard (e.g. asset capacity) and soft (e.g. abstraction licence conditions). It is used to define the problem in terms of maintaining long term supplies.

A simplified example of the SDB calculation is shown in the figure below. The assets at each stage of the calculation are mapped between water resources and network plus in line with RAG 4.06. Our three potential options are highlighted in red boxes and explained in more detail below.

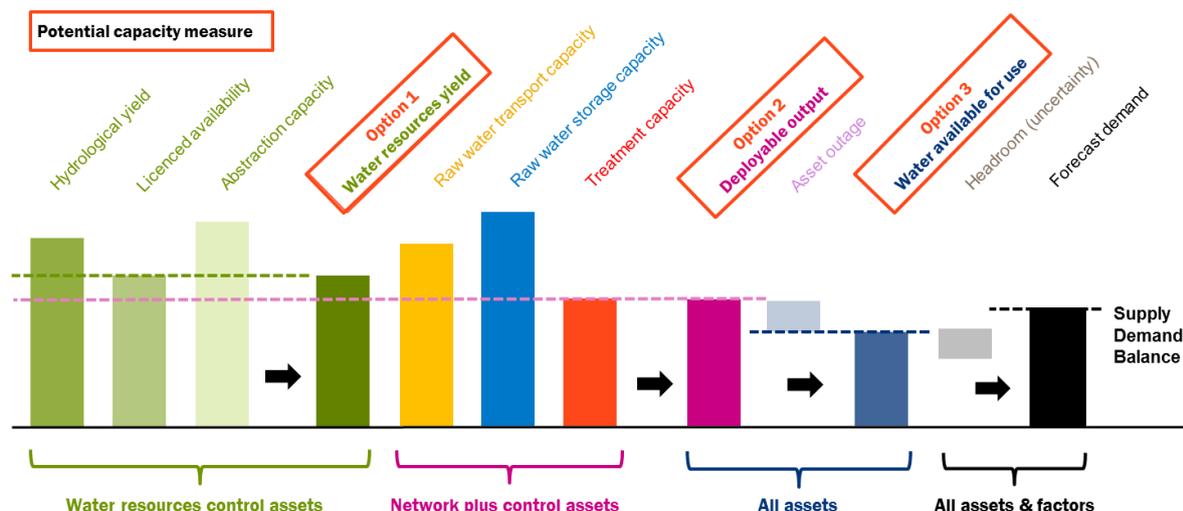


Figure 3 - A simplified representation of the SDB calculation

Option 1: Water resources yield

This captures the average volume of water available (dependent on the level of service and planning period) from the environment and constrained by water resources control assets. The water resources yield will be constrained by the limiting component within the water resources control – in the example above this is the quantity available from the abstraction licence.

Water resources yield is defined by water resources control assets, sources and associated assumptions only, and it also only these components that will cause the measure to vary over time.

Option 2: Deployable output

This is a measure of the amount of available water (dependent on the level of service and planning period) from all assets and sources used between and including the point of first abstraction and the point at which the water first enters the distribution network. This includes the water resources yield elements and network plus water asset constraints in the raw water transport, water treatment and parts of the distribution system. This is a well-established water resources planning metric used by incumbents and is calculated and reported as part of their WRMP submissions. The deployable output is essentially the overall supply element of the SDB calculation. In the example above the deployable output is constrained by the treatment capacity component.

Deployable output is defined by water resources and network plus assets including all factors incorporated into water resources yield, and it will be the same water resources and network plus water components that cause the measure to vary over time.

Option 3: Water available for use

This is the best estimate of how much water is available on average (dependent on the level of service and planning period) from all available assets and sources for input into the distribution network and represents the whole supply element of the SDB, excluding any uncertainty (headroom). The difference between deployable output and water available for use is that this includes the allocation for outage to account for assets not always being available for abstraction and treatment for example. This is also a well-established water resources planning metric used by water companies and is calculated and reported as part of their WRMPs. In the example above, the water available for use is constrained by the deployable output and the outage allowance that is deducted from it.

Water available for use is defined by water resources and network plus water assets including all factors incorporated into the deployable output measurement, and it will be the same water resources and network plus water components that cause the measure to vary over time.

4.3.3 Our assessment of the potential options

Our preferred option for the capacity measure is water resources yield. The key advantage of this option is that it only captures capacity provided by assets and sources which are within the envelope of the separate water resources control. In contrast, in a number of scenarios, deployable output and water available for use are likely to be constrained by assets performing activities outside the new water resources control. For example, in a WRZ which is constrained by treatment works capacity, capacity would increase when this is upgraded, even with the underlying water resources remaining the same. This would see the 'new' capacity being recorded as post-2020 and facing a different risk profile. This is not in line with our policy commitments for water resources and network plus.

Although it is a sub-component of the SDB calculation, there is no established methodology for the calculation of water resources yield. In contrast, the other two options are well established metrics. However, given the importance of avoiding the regulatory distortion noted above, we consider there is a clear case to develop water

resources yield as a bespoke metric for the control. In developing our policy on capacity we have shared our thinking with the Environment Agency and Natural Resources Wales to ensure our approach is consistent with water resource planning.

We have also engaged extensively with wider stakeholders throughout the development of our policy in this area. We discussed our approach to capacity with the water resources working group and provided an overview of our options and preferred approach at the water resources form of control workshop. Stakeholder feedback has been incorporated into both our assessment of options and annex 1, which provides guidance of how water resources yield should be calculated.

Table 4 - Assessment of capacity measurement options

	Option 1 Water resources yield Preferred option	Option 2 Deployable output	Option 3 Water available for use
Achieving our objectives	Only captures capacity provided by assets (and sources) which will be within the envelope of the separate water resources control ✓✓	Includes elements of network plus control (e.g. water treatment) in its calculation ✗	Includes elements of network plus control in its calculation (e.g. water treatment) plus asset outage allowance ✗
How our objectives are achieved	Targeted at water resources and ensures we can meet our policy commitments ✓✓	Not targeted at water resources and could result in unintended consequences in certain scenarios ✓	Not targeted at water resources and could result in unintended consequences in certain scenarios ✓
Practicality	Although a component of the SDB calculation, this will require separate calculation and reporting ✓	Deployable output is commonly calculated and understood. It is reported in WRMPs and WRMP annual reviews ✓✓	Water available for use is commonly calculated and understood reported in WRMPs and WRMP annual reviews ✓✓

4.3.4 How our proposed approach will work in practice

To implement this proposal, as part of company business plans, we will require incumbents to calculate and report on capacity in terms of water resources yield. In

line with water resource planning, capacity should be calculated on a WRZ level and for the planning scenarios used for WRMP19. For each WRZ and scenario, incumbents should provide the:

- level of capacity available from existing water resources assets as of 31 March 2020 and a forecast of this over 25 years, consistent with minimum planning period for water resource planning; and
- forecast of additional capacity that will be provided post-2020 investment in new incremental water resources funded through the water resources control. As above this is required over 25 years.

Going forwards, capacity will be tracked through the annual performance review (APR) submissions. Our full reporting requirements for capacity are set out in the business plan table “Wr6 Water resources capacity forecasts’. Annex 1 provides further guidance on how water resources yield should be calculated.

4.4 Our regulatory approach to post-2020 investment in new water resources

4.4.1 What issue are we seeking to address

Investment in new water resources from 1 April 2020 will not receive the same regulatory protection as the pre-2020 water resources RCV and network plus water going forwards. In particular in our May 2016 decision document we explained that post-2020 investment in new water resources will face utilisation risk from bilateral market entry, and potentially utilisation risk relating to market-wide demand.

These risks cannot be introduced by just making a financial distinction between pre- and post-2020 investment and expenditure. For example if an incumbent has a large water resource scheme approved in 2020-25, the efficient costs for it would be funded. However, if it is later found out that the scheme is not required, for example due to bilateral market entry, customers remaining with the incumbent will face the full costs of the scheme. Compounding this as some customers shift to the entrant, the prices to the customers left with the incumbent will increase. This highlights the need to change the regulatory framework of the control to transfer some utilisation risk for post-2020 investment from customers to incumbents.

The change only applies to post-2020 investment in new water resources which is linked to post-2020 capacity. The approach to pre-2020 capacity and the pre-2020

RCV is consistent with our traditional building blocks approach to regulation and there is no change to the level of regulatory protection, see section 2.6.

4.4.2 What options have been considered

We identified two potential options for our regulatory approach to post-2020 investment in new water resources, option 1 is closest to our traditional approach to regulation while option 2 would see a step change in the treatment of post-2020 investment.

Option 1: Building blocks with adjustment mechanism

Under this option we would retain a building blocks approach to post-2020 investment in new water resources capacity. The building blocks include an allowance for PAYG expenditure, return on capital, tax and previous investments represented by the RCV – see Figure 2. The costs not recovered during 2020-25 would be added to a post-2020 RCV, representing the store of capital invested in the business and these would be recovered in future periods. This would operate in a similar way to the pre-2020 RCV but with exposure to capacity utilisation adjustment mechanism.

In order to capture changes in utilisation, the approach would include a financial adjustment mechanism that would reflect the extent to which the post-2020 capacity is needed. This would make a downward adjustment to an incumbent's maximum allowed revenue for water resources in the future, for example, where, as a result of bilateral market entry, the incumbent's post-2020 capacity is under-utilised.

Exposure to some market wide demand risk could either be implemented in the form of control or through long-term incentive sharing arrangements set through the Outcome Delivery Incentive (ODI) framework.

Option 2: Unit cost allowance

For post-2020 investment, and the capacity it represents, we would move away from a building blocks approach and allow cost recovery through a unit cost allowance. This would not derive allowed revenues from a calculation drawing on post-2020 RCV. Instead there would be a link between the remuneration of the incumbent's post-2020 capacity in each year to the deemed utilisation of post-2020 capacity in that year.

The cost allowance per unit of post-2020 capacity would represent the annualised lifetime costs of water resources and would be intended to cover development, maintenance, operational and financing costs of the scheme. This would be consistent with the equalisation payment paid to alternative providers through the access pricing framework. It would be paid when the capacity is delivered.

Going forward the unit cost allowance would vary according to the total supply of post-2020 capacity, across both incumbent and bilateral market entrants, relative to the required level of post-2020 capacity. In its simplest form this option would expose incumbents to market wide utilisation risk, which could impact on cost of capital and allowed returns. Reflecting this we could also look to include a true-up mechanism to protect incumbents against wider market demand risk and limit demand variance to bilateral market entry only. This would mean that incumbents faced similar risk under both approaches and allow incumbents the option to tailor the risks for market wide demand through the ODI framework.

4.4.3 Our assessment of the potential options

On balance our preferred option to post-2020 investment is to maintain a building blocks approach combined with an adjustment mechanism. The key advantage of this approach is that it is in line with the existing approach for remuneration of pre-2020 capacity. This is a well understood approach and provides regulatory predictability to incumbents. In contrast a unit cost allowance would see a significant change to the control framework for PR19. This is unlikely to be proportionate as the English bilateral market is not expected to open until later in the 2020-25 period and during this period it is also expected to be small and nascent, but could be appropriate in the longer-term.

The change in the control framework would however be more pro-market. Incumbents would not be funded upfront for schemes, for example. Instead they would only be remunerated when capacity is provided. The financial flows to incumbents would more closely resemble the flow of revenues to third party providers which is likely to better realise the benefits of the bilateral market. In contrast under option 1 implementation is reliant on the future financial adjustment/incentives to “undo” the building blocks allowances in the event of bilateral entry for example.

Across both approaches there are potential issues over the longer term. For example implementing financial adjustments in later control periods that relate to long lived assets when the investment was made in 2020-25. Similarly for option 2 there is the

question as to how protection from market wide demand utilisation risk can be sustained over the long-term.

Table 5 - Assessment of approaches to post-2020 investment

	Option 1 Building blocks with adjustment mechanism Preferred option	Option 2 Unit cost allowance
Achieving our objectives	This approach introduces bilateral market utilisation risk to post-2020 investment while maintaining a familiar price control framework, it also ensures customers are not made worse off through market development ✓ ✓	This approach introduces bilateral market utilisation risk to post-2020 investment while maintaining a familiar price control framework. It also ensures customers are not made worse off through market development ✓ ✓
How our objectives are achieved	The approach uses existing regulatory tools but does not achieve a full level playing field, instead there is a reliance on adjustments after entry has occurred ✓	This is the most pro-market approach, would provide a more level playing field for incumbents and bilateral entrants, which could help realise significant market benefits ✓ ✓
Practicality	Building blocks is a well understood approach. Some complexity introduced through the need to define the adjustment factor and apply it over the longer term. Approach is proportionate to the expected scope of the market during PR19 ✓	Significant change in regulatory approach, with potential disproportionate increase in uncertainty at early stage of market development. ✗

4.4.4 How our proposed approach will work in practice

To implement this proposal post-2020 investment will be remunerated through a fixed allowed revenue for remuneration for any additional capacity required from 1 April 2020. This will also be calculated on a building blocks basis, with a post-2020 RCV. This will be combined with a mechanistic, in-period, adjustment factor that depends on the scale of bilateral market entry. This adjustment will only apply to the allowed revenue for post-2020 investment and will transfer under-utilisation risk attributed to bilateral entry from customers to incumbents. This will be combined with a mechanistic, in-period, adjustment factor that depends on the scale of bilateral market entry. This adjustment will only apply to the allowed revenue for post-2020 investment and will transfer under-utilisation risk attributed to bilateral entry from customers to incumbents.

We recognise that in the long-run, as the English bilateral market develops and becomes more significant, it may be more appropriate to move to a unit cost allowance. We would like to hear stakeholder views on this approach, in particular whether we should develop a shadow unit cost allowance to learn how this control could operate in PR19. This would inform the scope for setting future controls on this basis.

4.5 The implementation of the in-period adjustment for English incumbents

4.5.1 What issue are we seeking to address

The purpose of the in-period adjustment is to protect customers from paying higher charges for raw water from the incumbent where bilateral market entry occurs that reduces the utilisation of post-2020 capacity. This meets our policy decision to transfer under-utilisation risk attributed to bilateral entry from customers to incumbents. This also provides a financial incentive for incumbents to anticipate bilateral market entry, and to adjust their own plans for water resource capacity in light of the capacity available from other parties. It only applies to English incumbents as the Welsh Government has decided not to expand business retail competition at this time, and there will be no Welsh bilateral market.

The revenue adjustment will reflect an approximation of the costs of the displaced post-2020 capacity funded through the water resources control. It is an approximation as we are adopting a building block approach.

Implementing our in-period adjustment requires a measure of the extent (if any) to which there is under-utilisation of the incumbent's post-2020 capacity that is attributed to bilateral market entry. Bilateral market entry can only displace capacity required by business customers. This measure is required at the WRZ level as, to be consistent with water resources planning, water resource capacity needs to be measured separately for each WRZ. For incumbents that operate across more than one WRZ, any adjustments at the level of WRZs will be aggregated to provide an incumbent-level adjustment.

The measure also needs to distinguish between utilisation risks relating to bilateral market entry and market wide demand and only capture the former. Otherwise the in-period adjustment could introduce unintentionally additional utilisation risk to the control.

What options have been considered

We have identified two approaches to the measures used for the adjustment for bilateral market entry. The first option is linked to the share of business demand supplied by bilateral market entrants, the second to the capacity supplied by them. The choice of measure will influence how the revenue adjustment is implemented.

Option 1: demand displacement

This approach measures the extent to which bilateral market entry displaces the forecast market share of demand volume supplied by the incumbent. To implement this approach requires forecasts and outturn information on the business market demand for the water supplied by the incumbent and bilateral market entrants (in aggregate). It will also require information on peaking factors and headroom to move between capacity measure, used for water resources planning, and volume/demand measures used in the market.

Option 2: capacity measure

This approach would be based on measures of the water resources capacity provided by the incumbent and by bilateral market entrants. To implement this approach requires forecasts and outturn information on the capacity supplied by the incumbent and bilateral market entrants (in aggregate). The capacity supplied by third parties will reflect their commercial success and contribution to the capacity needed to meet peaks in demand for water, a requirement for the equalisation

payment. To be consistent with the control, capacity would be measured as water resources yield across both third parties and incumbents.

4.5.2 Our assessment of the potential options

Our preferred option on balance is the capacity measure approach. A key advantage of this approach is that it is consistent with water resources planning, alongside our approach to capacity for the water resources control. To plan for the long term, incumbents will need to know what capacity is available (and is planned to be available) from other parties in a WRZ which this approach requires for example. Long term planning is also carried out on a physical capacity basis rather than prevailing contracts and supply.

That said, the approach does have some drawbacks. It is not as strongly pro-market as the demand displacement approach which will have a direct link between remuneration and the success of third parties in marketing and supplying to business retailers. It will also require the firmness of supply to be transparent and comparable across sources. The approach to the payment of the equalisation payment is one potential avenue where this can be secured.

In contrast, there is good availability of data on volume supplied and to implement the bilateral market there will need to be clear measures of the volume of water supplied. Similarly there is also a prevalence of volumetric charges in existing incumbent tariff structures. However, the requirement of moving between demand and capacity, will require information on peaking factors, which introduces some complexity.

The demand displacement approach also has some potential unintended consequences. For example in a scenario where the total annual demand increases above what was forecast, with the extra demand supplied by the entrant, the incumbent could face an adjustment, even though there is not excess supply. Similarly, where demand is lower than forecast but there is no entry, the incumbent would not face an adjustment. This reflects more broadly the point that using the demand displacement approach it is more difficult to disentangle market-wide demand effects from the impact of bilateral entry which is the focus of the adjustment.

Table 6 - Assessment of approaches to the measure used for adjustment

	Option 1 Demand displacement	Option 2 Capacity measure Preferred option
Achieving our objectives	Will allow us to measure bilateral market entry but could unintentionally expose incumbent to market wide utilisation risk from changes in the size of the market ✓	Will allow us to measure bilateral market entry and does not introduce market wide utilisation risk into form of control ✓ ✓
How our objectives are achieved	Pro market, aligned with nature of the market (volume supplied) and existing tariff structures ✓ ✓	Aligned with our form of control and long term water resources planning, but not fully aligned with the nature of the market ✓ ✓
Practicality	Demand data is readily available and understood and will be aligned with the market, but additional information on peaking factors not readily available ✓	Aligned with requirements for water resource planning and our delineation of pre- and post-2020 investment, potential risk on comparability of data between market participants on capacity ✓

4.5.3 How our proposed approach will work in practice

The in-period adjustment will affect the remuneration of the post-2020 capacity of the incumbent taking account of total capacity (incumbent and bilateral entry) available, measured by water resources yield, relative to forecast bilateral entry capacity. To implement the bilateral entry adjustment for any year (t) the following formula will be used:

$$BEA_t = ICC_t \times AUC_t \times BEU_t$$

Where:

- BEA Bilateral entry adjustment.** The bilateral entry in-period adjustment for a WRZ in any defined year.
- ICC Incumbent cumulative capacity.** The incumbent's cumulative post-2020 forecast capacity as funded through the water resources control in any defined year
- AUC Annualised unit cost.** The annualised unit cost of cumulative post-2020 capacity in any defined year
- BEU Bilateral entry under-utilisation factor.** The bilateral entry under-utilisation factor in any defined year. This is calculated as the difference between actual bilateral entry capacity compared to that forecast as a proportion of total forecast (funded) post-2020 capacity (see equation below)

For incumbents that operate across more than one WRZ, any adjustments at the level of WRZs will be aggregated to provide an incumbent-level adjustment. The bilateral under-utilisation factor for year t , captures the extent to which forecast capacity is met by third parties in the bilateral market, rather than incumbents. This is calculated as:

$$BEU_t = \left(\frac{TCC_t}{ICC_t + BCC_t} \right) - 1$$

Where:

- TCC Total cumulative capacity.** The total forecast cumulative post-2020 capacity in any defined year. This can include forecast bilateral entry capacity where applicable. This will reflect the demand forecasts, headroom and a number of other factors.
- BCC Bilateral cumulative capacity.** Actual cumulative capacity supplied in the bilateral market by third party providers in any defined year. This will be linked to the payment of the equalisation payment, as there will only be an adjustment made when the entrant contributes to the supply demand balance and has contracted capacity in the market.

The bilateral entry under-utilisation factor would be capped at 0 (i.e. it would be zero or a negative financial adjustment). This prevents the adjustment from providing additional revenue to the incumbent in circumstances where the total capacity provided is less than what was assumed to be required. For the purposes of this

adjustment, the incumbent's post-2020 capacity would be recognised and measured once it has become operational. We did consider allocating bilateral market utilisation risk to capacity that was being constructed, but not yet operational through a notional capacity measure. However, we felt this would create undue additional complexity and implementation risks. We also have other checks and balances during construction. For example as part of financeability, we expect companies to set out, and supply evidence supporting, the 'natural' rates for PAYG and run-off for each of the wholesale controls.

Further as an additional safeguard we recognise that a separate adjustment may be needed at PR24 and future reviews for cases where the incumbent delivers a different level of post-2020 capacity as forecast (funded). This incumbent capacity adjustment would for example capture where an incumbent under-delivers planned capacity (perhaps as a response to entry or for other reasons such as issues with delivery or uncertainties in scheme benefit forecasting), to ensure that the control does not remunerate the incumbent for capacity that it does not deliver. This is because the adjustment mechanism set out above also takes as given that the incumbent delivers the capacity that it forecast and was funded for under the water resources control.

The nature of the separate adjustment would need to take account of whether under-delivery reflects the cancellation or scaling back of a project or a short-term delay. An adjustment for cancelled capacity could, for example, be implemented through an adjustment at the next price review to deduct the totex funding that we had allowed in respect of the cancelled or undelivered capacity. The change to the capacity funded through the control would then need to be reflected in the term above for the incumbent's total cumulative post-2020 incremental capacity. This would have links to and need to be consistent with, our approach to setting cost allowances and ODIs to address risk of non-delivery of new schemes.

The data requirements to implement this adjustment during 2020-25 are set out in data table 'Wr6 Water resources capacity forecasts' and 'Wr7 New water resources capacity ~ forecast cost of options beginning in 2020-25', Going forwards incumbents funded capacity by year and actual capacity by third parties will be tracked through the APR.

A worked example of the in-period adjustment mechanism is provided below.

Box 2 - In-period adjustment for bilateral entry (BEA) – worked example

Scenario assumed

An incumbent has a single WRZ in its area of appointment and plans capacity in that zone on a dry year annual average basis. All capacity figures below are made on a dry year annual average basis.

As part of its PR19 business plan, the incumbent forecasts a total requirement for an additional 10MI/d of post-2020 capacity in 2023/24 and 2024/25 (TCC). It proposes to meet the whole of this requirement through expansion of its own capacity (ICC). Ofwat sets the PR19 water resources control on this basis.

The annualised unit cost (AUC) of the incumbent's additional post-2020 capacity is calculated at £60,000 per MI/d (this figure is consistent with the totex allowances for post-2020 capacity in the control). For this adjustment it is assumed that the incumbent then delivers its capacity as planned from the start of 2023/24.

In 2024/25 a bilateral entrant reaches agreement to supply a retailer operating in the same WRZ and provides 2MI/d of capacity in that year (BCC).

Calculations of adjustment for bilateral market entry

The bilateral entry under-utilisation factor (BEU) for year t is calculated using the formula set out above (and capped at zero):

$$BEU_t = \left(\frac{TCC_t}{ICC_t + BCC_t} \right) - 1$$

The under-utilisation factor for 2023/24 is $[10/(10+0)]-1 = 0$

The under-utilisation factor for 2024/25 is $[10/(10+2)]-1 = -0.1667$

The in-period financial adjustment for bilateral entry (BEA) in year t is calculated as:

$$BEA_t = ICC_t \times AUC_t \times BEU_t$$

The in-period financial adjustment for bilateral entry (BEA) in 2023/24 will therefore be $[10 \times £60,000 \times 0] = 0$.

The in-period financial adjustment for bilateral entry (BEA) in 2024/25 will therefore be $[10 \times £60,000 \times (-0.1667)] = -£100,000$.

While our focus in this document is the control for 2020-25, we would expect these arrangements to be carried forward into subsequent control periods. The use of the incumbent's cumulative post-2020 incremental capacity in the formulae above means that the adjustment is defined in a way that can take account of any under-utilisation in the incumbent's post-2020 capacity that was developed in a previous control period (insofar as attributed to bilateral market entry). This could allow, for example, for an in-period adjustment in 2025-30 for any under-utilisation of capacity built by an incumbent during 2020-25.

These issues would be part of our considerations for the next price review.

4.6 Our approach to utilisation risks relating to market wide demand

4.6.1 What issue are we seeking to address

Our May 2016 decision document highlighted the fact that customers bear much of the risk around whether incumbents' investment plans to meet future water demand will deliver secure, sustainable, efficient, and resilient outcomes in the longer term. Large-scale under- or over-investment could have significant consequences for customers. This could be driven by changes in population growth, consumption, climate and weather patterns. Similarly, focusing on the five-yearly regulatory cycle may delay investment decisions while increasing the long-term cost to customers. We consulted on whether customers continue to bear almost all of those risks or whether a proportion of risk should be shared by the incumbents.

As set out in section 2.8 the majority of stakeholders were opposed to being exposed to some market-wide demand risk. The key challenges identified include interactions with resilience, the potential for unintended consequences and the potential adverse impact on the cost of capital.

We have considered the responses alongside the development of our wider methodology – including the reflection of utilisation risks from bilateral market entry in the form of control through the in-period adjustment mechanism. This mechanism is targeted at risks of bilateral entry and does not expose incumbents to utilisation risks relating to market wide demand.

Our view is that, for significant post-2020 investment in new water resources, there is a strong case for incumbents to take a long-term approach that considers the real option value of its decisions, and the long-term risks associated with them relating to market-wide utilisation risk. This means making sure incumbents bear an appropriate balance of risk over the long term. This should encourage a focus on the delivery of long-term outcomes and align their interests and the interests of customers. This approach can also enhance the legitimacy and credibility of new investment proposals in the eyes of customers and therefore make a positive contribution towards the acceptability of proposals and longer term resilience.

4.6.2 What options have been considered

We have considered three options, ranging from a prospective approach across the whole industry (Option 3), to more targeted intervention, either incumbent led (Option 1) or Ofwat led (Option 2).

Option 1: Incumbent proposed risk sharing arrangements where significant investment in new water resources is planned

Under this option we would require incumbents to propose a risk sharing approach for significant new water resource investments. This approach should look to share some risk of the market wide forecasts being materially incorrect, both down and upside, with their customers. This could for example take the form of a multi-period ODI, in which there are financial adjustments introduced at later reviews once utilisation is able to be assessed.

An incumbent -based approach means the risks introduced can be tied to the nature of the investment. Where incumbents are not proposing any significant investment in water resources, we would not expect them to propose risk sharing arrangements.

The incumbent specific approaches proposed would be assessed as part of PR19.

Option 2: Ofwat applied risk sharing arrangements where significant investment in new water resources is planned

Under this option we would define an appropriate form of risk sharing arrangements for significant new water resource investments. This approach would share some risk of the market wide forecasts being materially incorrect, both down and upside, between incumbents and their customers. This would see financial adjustments introduced at later reviews once utilisation is able to be assessed, this could for example take form of tracking capacity utilisation through time. As with option 1 this could be applied through a multi-period ODI.

The approach would be applied consistently across incumbents that meet a set threshold, either the level of total capacity added or total spend in water resources. Where incumbents are not proposing any significant investment in water resources, risk sharing arrangements would not apply.

Option 3: Ofwat applied risk sharing arrangements across all incumbent water companies

Under this option we would set out an approach that would be applied across all incumbents through an adjustment in the form of control.

This could involve a long term forecasting incentive linked to WRMPs for example, as WRMP forecasts are used to justify new water resources investments. Going forwards these long term forecasts can be checked against actual reported values (e.g. during the WRMP annual review or an Ofwat specific route) and judgements made on the reliability and appropriateness of the forecasts.

The components of the supply-demand balance that could be used in this incentive include elements of demand forecasting such as leakage and per capita consumption, and elements of the supply forecast, such as environmental reductions and outage.

4.6.3 Our assessment of the potential options

Our preferred option is to introduce a requirement for incumbents to develop their own risk-sharing arrangements where they are planning significant investment in new water resources. This is a targeted and proportionate approach and allows the arrangements to be tied to the nature of the investment. This approach also avoids introducing further risk to the control and potential unintended consequences - a key concern in the consultation responses.

An incumbent owned approach also provides a strong signal that the interests of the incumbent should be aligned with the interests of customers. It also offers flexibility to tailor the arrangements and the freedom to innovate in its implementation. This should minimise the risks highlighted by stakeholders, most notably the interactions with resilience and unintended consequences of an industry wide approach. It should also help enhance the legitimacy of company business plans, as it ensures that companies have an interest in efficient utilisation of resources and assets.

This flexibility is a key advantage of the incumbent led approach over option 2, under which we would mandate an approach. While this would introduce consistency across incumbents, it would mean that the risks are unlikely to be aligned with the risk profile of the individual incumbent schemes and programmes. For example a large new reservoir and a reservoir extension, both of which would have spending under the water resources control, are likely to have different risk profiles, for

example the reservoir extension is likely to be have lower risk in construction and greater certainty on yields than a large new reservoir.

Option 3 in contrast has a number of key disadvantages. It is not targeted, as it would introduce market wide demand risk across the industry, rather than to incumbents who are planning large investments in new water resources. It is also not a proportionate response to the problem we are trying to solve and could significantly change the risk profile for post-2020 investment. It would also remove incumbent ownership and is out of alignment with our wider policy commitments, for example to encourage resilience.

In terms of practicality, we recognise that developing these proposals to share market wide demand risk is likely to be challenging. This is due to the long term nature of these risks and the need to be able to clearly define utilisation, while avoiding unintended consequences. Option 3, in addition to the issues identified above, would have the highest barrier to implementation. Options 1 and 2 are more targeted and have lower barriers, but safeguards would be required to ensure that any future financial adjustments are based on appropriately assured data.

Table 7 - Assessment of options for market wide demand risk

	Option 1 Incumbent specific approach Preferred option	Option 2 Ofwat mandated approach	Option 3 Long term incentive linked to WRMP forecasts
Achieving our objectives	Targeted at incumbents proposing large schemes ✓ ✓	Targeted at companies proposing large schemes ✓ ✓	Applied across all incumbents, even those without significant new water resources investment ✓
How our objectives are achieved	Company led approach allows innovation and alignment to the risk profile of scheme ✓ ✓	Ofwat led approach, will be consistent across incumbents but does not allow risk sharing to be tailored to schemes ✓	Ofwat led approach, will be consistent across all incumbents but not aligned to investment needs or schemes ✓

Practicality	<p>Information requirements will be specified by company, assurance will be required and proposals assessed for suitability at PR19</p> <p>✓</p>	<p>Information requirements would be specified by Ofwat, assurance will be required</p> <p>✓</p>	<p>High information requirements, will require tracking of key data through time across the sector</p> <p>✗</p>
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4.6.4 How our proposed approach will work in practice

To implement this proposal as part of business plans, where significant investment in new water resources is planned, we will require incumbents to submit their own long-term risk-sharing arrangements. As part of the initial assessment of business plans we will review the proposed risk-sharing arrangements to assess their suitability and alignment with customers interests.

In designing their risk-sharing arrangements incumbents should take into account the guidance around ODIs discussed in chapter 4, ‘Delivering outcomes for customers’. The arrangements should also be consistent with the following principles:

- The risk sharing arrangements should be simple and easy to understand. In particular this should use inputs and measures which are aligned with our form of control and water resources planning.
- The complexity of the arrangements and the size of incentives should be proportionate and be reflective of the scale of new investments and uncertainties of utilisation over time.
- The arrangements should provide good deal for customers, such that the scope for any outperformance (to be funded by customers) is proportionate to the risk that the incumbent bears from under-performance.
- The arrangements should be aligned with other incentive policies to avoid potential distortion of incentives or duplication of penalties, for example bilateral market utilisation risk should be excluded.
- The arrangements should not distort the incentives to meet stretching performance targets in terms of supply efficiency and demand management, it should also be in balance with the resilience objective.

As part of their business plans incumbents should provide details of how their incentive approach will work, including how it is measured, recorded, the scale of incentives linked to it and reporting requirements. How it achieves the objectives set out above should also be clearly explained. Information on any proposed cost of capital increment would also need to be provided, and as noted in chapter 10, 'Aligning risk and return' we would expect very compelling evidence to accept this increment.

A1 Guidance on the calculation of water resources yield

The PR19 business plan tables will be the first time that incumbents will need to report their water resources capacity, both pre- and post-2020, across all their WRZs. Going forwards, this will also need to be tracked through the APR submissions. Our proposed measure for capacity is water resources yield. While this measure is a sub-component of existing supply-demand balance calculation, there is no pre-defined methodology that incumbents can follow to calculate it. This annex aims to address this issue.

We set out in this annex our expectations for how incumbents should measure and forecast water resources yield to ensure consistency across incumbents. An overarching principle of our approach is that the calculation and tracking of water resources yield should, wherever possible, be consistent with the approach adopted for water resources planning. Incumbents will benefit from this by way of reduced regulatory burden, as they can utilise methods and modelling they have already used and provided assurance on.

We have engaged extensively with stakeholders throughout the development of our policy in this area. We discussed our approach to capacity with the water resources working group and provided an overview of our options and preferred approach at the water resources form of control workshop. Stakeholder feedback has been incorporated into this annex. In particular, we have provided more detail on our approach to more complex capacity issues.

This annex provides an overview of the:

- definition of water resources yield
- calculation of pre-2020 capacity in a simple WRZ
- calculation of post-2020 capacity in a simple WRZ
- forecasting and tracking of water resources yield over time
- approach to more complex capacity issues
- assurance requirements

A1.1 The definition of water resources yield

Water resources yield will capture the average volume of water available from the environment (dependent on the level of service and planning period) and constrained by water resources control assets. These will be the assets which provide water for raw water transport and/or treatment and will typically include boreholes, reservoirs and river abstraction assets (as defined by the example assets and activities

envelope in RAG 4.06). Assets that sit outside of the water resources control assets boundary like, for example, the water treatment capacity of the WRZ, will not influence the reporting of water resources yield.

The water resources yield from an asset will be defined by both the planning assumptions of the incumbent and the capabilities of the asset itself. The water resources planning assumptions (level of service and planning period) are usually defined first which then influence the source yield and licenced availability. The abstraction asset capacities are fixed values regardless of the assumptions made. Therefore, water resources yield is constrained by:

- the incumbents agreed level of service (the return period of drought resilience and frequency of restriction implementation)
- the incumbents agreed planning period (the period over which the amount of water available is measured e.g. dry year annual average)
- the baseline hydrological/hydrogeological (source) yield
- the abstraction licence availability
- the raw water abstraction asset capacities (e.g. abstraction pumps)

For a very simple WRZ (few assets, own sources and no transfers) where there is one raw water source, one abstraction licence, and one abstraction asset – the water resources yield, and therefore capacity, will be the lowest of the flow rates (volume per unit time) that can be achieved across each of those three components using the company's level of service and planning period scenario(s) (i.e. the lower of, source yield - the amount available from the natural environment, the limit set in the abstraction licence or the physical capacity of the asset used for abstraction).

Where multiple sources, licences and abstraction assets contribute to the water resources yield of a WRZ, companies have various methods to calculate the capacity. This could range from a simple summation of individual water resource yields to a complex water resources optimisation model (ensuring that the resulting capacity is not influenced by network plus water constraints).

Whatever approach is chosen the calculation of water resources yield should be consistent with guidance used to calculate deployable output and the assumptions made in those calculations for the incumbent's latest WRMP. The UKWIR Handbook of source yield methodologies 2014, and latest water resources planning guidance should be referred to where relevant. However, the key difference is that the constraints that are included in the deployable output calculation that are influenced by network plus water assets (e.g. treatment capacity) will need to be excluded.

A1.2 Calculation of pre-2020 capacity in a simple WRZ

The figure below shows a simple WRZ as of 31 March 2020. This shows the current situation before any planned investment. The capacity figures provided are for the incumbents given level of service and its planning period which in this instance dry year annual average. The estimates are consistent with the incumbent's WRMP19 assumptions. The assets have been mapped to our price control units defined in RAG 4.06

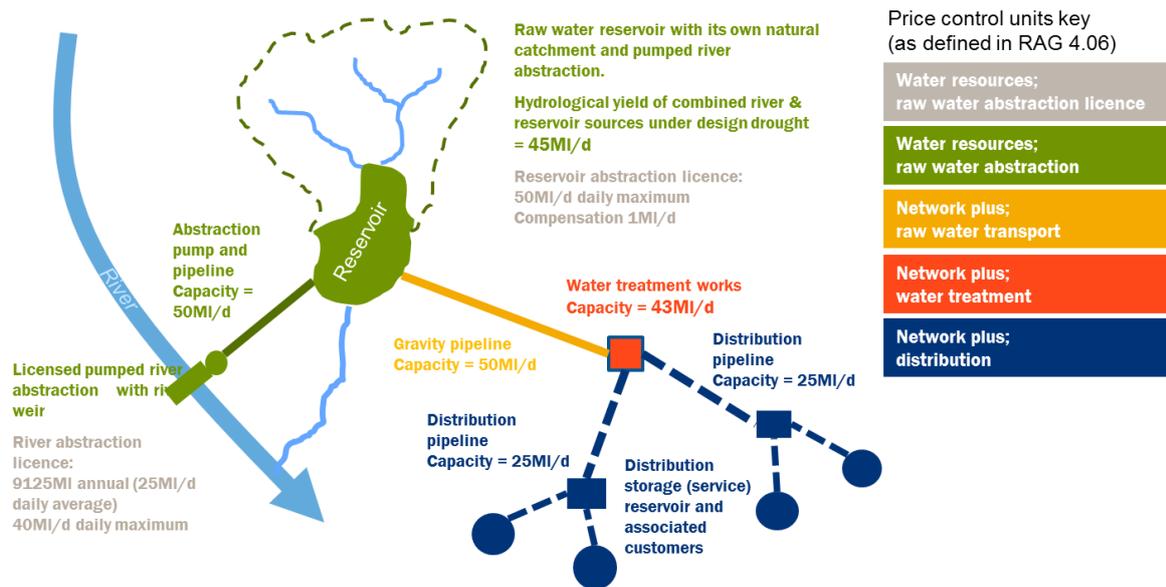


Figure 4 - Applying water resources yield in a simple WRZ

The capacity for the simple WRZ above would be based on the lowest component of the building blocks of water resources yield; hydrological yield (combined yield of river and reservoir sources = 45MI/d), abstraction availability (combined river and reservoir licence quantity = 75MI/d), and abstraction asset capacity (abstraction pump and pipeline = 50MI/d).

In this scenario the water resources yield would be 45MI/d and constrained by the environmental availability of water from the sources (river and reservoir combined) within the water resources control. This pre-2020 capacity would be reported separately to any post-2020 capacity.

If for example the river abstraction assets (pump and pipes) were 20 MI/d rather than the 50MI/d for example, then 20 MI/d would be the water resources yield of the system.

By way of comparison, if treatment capacity was included in the capacity measure definition, as it would be for deployable output, then the resulting capacity for the simple example zone would be 43MI/d, equal to the maximum water treatment works capacity. The treatment works capacity and asset outage do not however affect water resources yield as these assets are accounted for in the network plus water control and not the separate water resources control.

A1.3 Calculation of post-2020 capacity in a simple WRZ

Post-2020 capacity captures the incremental water resources yield funded through the water resources control after 1 April 2020. For example this could be the construction of a new borehole, a new river offtake or a reservoir expansion.

When an asset is proposed and constructed, its water resources yield will need to be calculated just as it would for water resource planning and reporting. In the simple WRZ example above, the planning period deficit for the zone is to be resolved with leakage reduction and demand management (both network plus) but also the construction of two borehole sources in the 2020-25 period (not shown in diagram). The capacity from this post-2020 investment is based on the water resources yield of each borehole using the same assumptions as the pre-2020 capacity. Both boreholes are funded and fully commissioned within the 2020-25 period therefore reported in post-2020 capacity. In this instance borehole A provides 2 MI/d in 2022, and borehole B provides 1 MI/d in 2023. The reporting of post-2020 capacity should be an aggregate of all schemes available at that point and is reported separately to the pre-2020 capacity (in the example this would be 0MI/d in 2020 and 2021, 2MI/d in 2022, and 3MI/d in 2023 and 2024).

Post-2020 capacity will not capture scenarios when pre-2020 capacity has been maintained through investment in current sources and assets. For example, were the river pumps deteriorate or fail meaning that their capacity was reduced to 20MI/d they will become the constraining factor of overall capacity, and any investment to get them back up to the original pre-2020 level of 50MI/d is considered maintenance and not associated with post-2020 capacity.

However, post-2020 capacity will include situations where sources/assets have been upgraded to increase capacity beyond that reported at 31 March 2020. Post-2020 investment on a pre-existing reservoir (as of 31 March 2020) to improve its source yield, such as raising the dam, would be considered as investment to increase the pre-2020 capacity.

A1.4 Forecasting and tracking of water resources yield over time

Both pre- and post-2020 capacity will change through time and are not fixed. In the above example the WRZs water resources yield as of 31 March 2020 is 45MI/d, however, as this is constrained by the amount available in the environment (source yield) this may reduce over time due to environmental factors such as climate change and changes to licensing of water resource abstraction.

The forecast impact of climate change on capacity should be consistent with the approach taken for deployable output reductions for WRMP19. Most incumbents' WRMP climate reductions make use of factors and scalars from the latest climate change projections (UK Climate Projections 2009 - UKCP09) and the water resources planning guidance which are then applied to the deployable output. Therefore, for this example, climatic reductions to the water resources yield means that by 2025 the capacity for the WRZ and therefore the reported pre-2020 capacity for that year would be 43MI/d.

Alongside climate change, water resources yield can also change due to:

- water quality impacts on source yield
- abstraction licence changes (under the current framework)
- future abstraction reform impacts
- changes to the actual asset/source base providing the supplies

Any changes in pre-2020 capacity (e.g. due to climate change impacts) will be calculated and forecast beyond 1 March 2020 over 25 years (consistent with the minimum planning period used for water resources planning). The changes to post-2020 capacity over time should also be forecast from the point in time that the capacity is commissioned as it is likely to be impacted by the same factors as the pre-2020 capacity. These forecast lengths reflect the long term nature of water resource schemes which ensures that the measure looks beyond 2020-25.

From 2020 onwards we expect incumbents to report their capacity, both pre- and post-2020 on an annual basis in the APR submissions (financial year reporting is consistent with WRMP19 tables and WRMP annual review returns).

A1.5 Approach to more complex capacity issues

The additional issues covered in this section include:

- Allocation of capacity between pre- and post-2020
- Water trades with other incumbents
- Water trades with other third parties
- Reporting planning scenarios
- Capacity re-assessment frequency

A1.5.1 Allocation of capacity between pre- and post-2020

Pre-2020 capacity will include all existing commissioned assets (consistent with those assets included in the deployable output calculation for WRMP19) and any assets that are fully funded but yet to be commissioned as of 31 March 2020. To avoid additional complexity in allocating capacity, we are not proposing to allow any transition expenditure (i.e. spending in the last year of PR14 for PR19 deliverables) in water resources. Post-2020 capacity only includes new or upgraded capacity commissioned and available after 1 April 2020. This post-2020 capacity can include situations where sources/assets have been upgraded to provide more capacity than their original design capacity (as of 31 March 2020) but does not include maintenance of existing capacity.

A1.5.2 Capacity and water trading

Water trading will be reported consistently with the RAG 4.06 activity envelope, meaning that trades that affect water resources yield volumes and therefore capacity will be for raw water only. Treated water trades where incumbents provide treated water to another incumbent, whether this is to another incumbents treatment works, distribution system or directly to their customers, are not included in capacity. These are network plus related activities. The water resources yield (raw water) associated with the treated water trade will be part of the exporter's total capacity.

A1.5.3 Raw water trades with other incumbents

A raw water trade is where the other incumbent still owns the assets and/or the rights to the raw water which is providing the additional capacity. If assets or water rights are purchased by one incumbent from another, then this is not considered a trade but rather represents own source capacity.

Pre-2020 raw water traded capacity (from other incumbents) should be included in the capacity assessment and forecast of the incumbent benefitting from the capacity (importer). An example of a current raw water trade between incumbents is the

transfer of raw water to Severn Trent Water from Welsh Water from the Elan Valley reservoirs. In this instance Welsh Water (exporter) would not include the water resources yield provided to Severn Trent Water in their own capacity. Severn Trent Water (importer) would include the traded raw water in their calculation of capacity. There should be no double counting of traded capacity. This is similar to the deployable output assessment as used for WRMP where imports and exports are used to generate the supply-demand balance. The calculation of traded capacity should mirror the method used for own source capacity as discussed above.

A renewal of a raw water trade agreement would be equivalent to maintenance of pre-2020 capacity and therefore not represent new capacity. Where a renewed trade is for an additional volume of raw water and therefore increases the capacity, the incremental capacity component only would be considered as post-2020 capacity.

Capacity provided by raw water trades with other incumbents should be reported as part of the total capacity (own source added to traded capacity) – for both pre- and post-2020 capacity.

A1.5.4 Raw water trades with other third parties

A water trade can also be with other third parties (who are not incumbents) that have their own access and rights to raw water. As with trades with other incumbents, a water trade is only considered in this instance where the third party retains ownership of the assets/water rights and agrees to trade water via a contract with the incumbent.

Pre-2020 traded capacity (from other third parties) should be included in the capacity assessment and forecast of the company benefitting from the capacity (importer). An example of a current raw water trade between an incumbent and other third party is the water trade from Canal & River Trust to Bristol Water from the Gloucester & Sharpness Canal. This capacity would be reported by Bristol Water in its pre-2020 capacity and its future contribution forecast going forwards. As above, a renewal of a water trade agreement would be equivalent to maintenance of pre-2020 capacity and therefore not new capacity.

Capacity provided by raw water trades with other third parties should be reported as part of the total capacity– for both pre- and post-2020 capacity.

A1.5.5 Planning scenario reporting

The planning period is the length of time over which the quantity of water available (supply) and quantity of water required (demand) is measured and will be a key driver of water resources yield. There are two common planning periods that are used for WRMPs, these are:

- Average supply available in a dry year period (dry year annual average)
- Average supply available during a dry year peak demand critical period (dry year critical period)

For each WRZ, incumbents will have decided what planning period scenario(s) to use for the latest WRMP based on what the system is critical to. For the purposes of capacity, all the planning period scenarios as presented in the WRMP19 data tables should be reported. Consistent with water resource planning this may be just the one scenario (dry year annual average is compulsory) or both. This will reflect what the system is sensitive to and should not create any additional work to develop scenarios that are unnecessary for that zone. For consistency between pre-and post-2020 capacity, the incremental capacity that an incumbent proposes to develop in any price control period will also be defined using the same planning scenarios.

If there is a change in planning scenario for WRMP24 for which the pre-2020 capacity and its forecast was not calculated, then if this is material, the incumbent will be required to back-calculate the pre-2020 capacity as it would have been for that planning scenario.

A1.5.6 Capacity re-assessment frequency

The capacity as defined by water resources yield can change over time due to forecast changes (as would have been known as of 31 March 2020). However, as is the case for the assumptions made for water resource planning, which also forecasts over a long time period, assumptions can change and new data can become available.

There are components which could cause future change to the capacity as reported for 31 March 2020 which are not forecasted for (e.g. change in level of service, baseline source yields, abstraction asset capabilities) and which will only arise as a result of re-assessment of those elements. Under water resource planning, these components are fully assessed every 5 years with the submission of new WRMPs. There is also an option to publish updated data and forecasts as part of the WRMP annual review to reflect changes. A significant change in circumstances (resulting in

changes to investment or impacts on the environment) would result in the re-submission of the WRMP within the 5 year period (historically this has never happened).

The following components of capacity could be updated as part of a re-assessment of assumptions and available data:

- change in agreed level of service (a system in a worse drought will yield less water)
- change in agreed planning period
- re-assessment of climate change impacts on source yield
- re-assessment of water quality impacts on source yield
- re-assessment of abstraction licence changes (under current framework)
- re-assessment of future abstraction reform impacts (including new unforeseen requirements)
- re-assessment of source yields
- re-assessment of raw water abstraction asset capacities
- re-assessment of WRZ integrity

The re-assessment of pre-2020 capacity will be considered on the same basis as for WRMPs, which will be every 5 years unless there is material change and a WRMP re-submission. This can be considered on a limited re-assessment approach. No re-assessment and annual re-assessment were considered options but consistency with the WRMP process was considered important.

The baseline assumption for post-2020 capacity should be the same as pre-2020, namely a 5 yearly re-assessment frequency in line with WRMP reporting. However, post-2020 capacity will be small and uncertain in nature and there is greater importance of ensuring that what is reported is as close to reality as possible. Therefore, post-2020 capacity can be updated more frequently (with justification) so that updated forecasts and actual post-2020 capacity is reliable. This more frequent reporting of post-2020 based on scheme delivery does make this element closer to asset specific contributions than the more aggregate pre-2020 capacity approach.

The post-2020 capacity assessment should also match the bilateral entry reporting whereby forecasts and actual capacity from bilateral entrants can be updated more frequently to ensure they accurately reflect the market. Incumbents should report year on year forecasts per WRZ per planning period scenario for pre-2020 capacity, post-2020 capacity, and post-2020 bilateral entry capacity.

A1.6 Assurance requirements

The details of the calculation and forecasting of capacity including the assumptions made (which should be consistent with WRMPs) are to be submitted with business plans. We will cross-check this with the supply-demand forecasts presented in incumbents WRMP19 reports and data tables and we would expect an explanation and justification to be provided where there are inconsistencies.

We expect incumbents to provide information which has been subject to good assurance processes to ensure it is consistent and accurate. It is for the incumbents and their Boards to determine how best to provide this assurance, including the role of external assurance. If incumbents provide a lack of assurance about the information they are providing this may attract monitoring under the company monitoring framework which may impact on the assessment of their business plans at PR19 or subsequent price reviews.