Options for future treatment of the regulatory capital value

Upstream market reform

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Foreword from Severn Trent Water

Ofwat has invited companies to contribute to the debate on the future regulatory framework as they develop their plans to implement the reforms of the Water Act. As Ofwat looks to continue its journey of cost discovery and upstream market reform the question of future treatment of the regulatory capital value becomes very relevant. As the Regulatory Capital Value (RCV) has been the cornerstone of the regulated water framework in England & Wales we recognise this is an extremely sensitive issue for companies, customers and investors alike.

We have asked Oxera to consider the available options for treatment of the RCV in terms of cost recovery and remunerating new investment. While this work has been considered in isolation it is impossible to fully separate this from the work Oxera has also carried out on access pricing. One of the primary drivers to allocate the RCV may be to develop efficient access prices to promote competition.

It has been a useful exercise to revisit the origins and the purpose of the RCV. Too readily the RCV can be confused with the physical value of the assets of the water and sewerage companies. In reality the RCV has been a fantastically successful concept that has created investor confidence and kept bills low for customers.

The initial RCV was based on the average market capitalisation in the first 200 days following privatisation. The early share price of companies would have been much more heavily influenced by the revenue generation potential of the companies. The value of the RCV, therefore, is likely to have had a much closer relationship to historic taxation rates than the replacement cost of the assets. This is evident from the ratio of RCV to replacement costs of assets (Mean Equivalent Asset value or MEAV) being 5% at privatisation.

While the RCV has grown in the 20 years since privatisation through investment to improve water quality, the environment and service levels, the RCV still only reflects 15% of the MEAV. We can conclude from this that the RCV is still a long way from being reflective of the costs of the water industry.

The Oxera report explores in detail the unique nature of the water industry and why successful approaches undertaken in other regulated industries may not be appropriate in the water sector. It highlights the limitations of different allocation methodologies and the limited value in connection to cost discovery. Most interestingly it argues that RCV allocation is not required at all to enable the industry to set efficient access prices in the short term.

We welcome these findings; preserving confidence in the historic RCV benefits companies, customers and investors alike. If there is a need to separate investment for remuneration of greater disaggregation of activity we can see an opportunity to do this for future investment. Formal separation of the value stream can lead to higher costs to customers in the short term and less transparency (as seen in the energy sector). A gradual approach also enables the sector to develop the access pricing framework as the market develops without committing to an arbitrary allocation that could harm the stability of the sector or hinder upstream new entrants.

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Executive summary

One of the key concepts underlying the regulatory framework in the water sector is the regulatory capital value (RCV). There is an increasing desire in the sector to understand costs at a more disaggregated level, both to increase transparency and to drive efficiency, and also (potentially more importantly) to allow competition to develop in certain parts of the value chain. This may mean that the way in which the RCV is used to calculate prices will need to change.

As part of ongoing work by various stakeholders, including Ofwat and the industry, we understand that Severn Trent (SVT) is keen to contribute to the debate by providing practical options for the future treatment of the RCV. In this context, SVT has asked Oxera to consider these issues in more detail.

The RCV primarily acts as a tool to ensure the recovery of the invested capital, including an appropriate rate of return, to investors over the life of the assets. Effectively, it acts as a commitment device to ensure that the necessary capital investment takes place and that investors have confidence in the regulatory framework.

The RCV is a key anchor point used by Ofwat to set prices, and therefore implicitly provides an upper bound on the price trajectory going forward. This means that any potential disaggregation of the RCV that might be required to allow upstream competition to develop will be constrained by this bound.

However, the value of the RCV bears limited relation to the current replacement costs of assets in aggregate or for individual services (water and wastewater). Largely for historical reasons, the RCV is materially lower than the modern equivalent asset value (MEAV). The size of the RCV discount to the MEAV is profoundly more significant in the water sector than in other infrastructure sectors. This is due to both the way in which the initial RCV was set, and the much longer asset lives that prevail in the water sector. As a result, approaches that have been used in other sectors to allow disaggregation of activities may not be as appropriate in the water sector. It also means that the RCV provides very limited information on the true economic asset costs of the different parts of the value chain. In other words, any potential disaggregation of the RCV is unlikely to reveal useful cost information.

A key driver behind the debate about the future role of the RCV is the objective to promote competition in upstream parts of the value chain. First and foremost, to make upstream competition viable, it will be necessary to agree on an appropriate methodology for charging new entrants for access to those activities that are naturally monopolistic and which will continue to be provided by the incumbents.

As discussed in more detail in a separate Oxera report,[1] this will require an understanding of the relevant underlying economic costs of the different activities, and ensuring that any cost measure underpinning the access price complies with competition law and with Ofwat's objectives. Once the appropriate access pricing methodology is chosen, the issue of how asset values need to be allocated, if at all, becomes a function of this chosen methodology. In other words, any disaggregation of the RCV, if required, would simply be an outcome of the chosen access pricing methodology.

[1] Oxera (2015), 'Options for access pricing methodology', June.

In our work on access pricing, we have assumed that Ofwat's main objectives are likely to include the following.

- Ofwat's overriding objective is to promote efficient competition—which requires efficient entry. Efficiency, however, can be defined in many ways. We consider that Ofwat is likely to be concerned mainly with promoting longer-term efficiencies that the process of competition might deliver (i.e. the effect of widespread entry on the industry costs, sustainability, service levels and choice in the long run).
- Ofwat's other main objective is likely to be ensuring that customers experience benefits from the introduction of competition. In particular, if the focus is on longer-term efficiencies from competition, while in the long run competition could lead to lower costs (and subsequently lower prices), there may be some initial costs associated with making entry happen. It is likely that Ofwat's position will be that these costs should be borne primarily by the industry (i.e. investors) rather than customers.

What this means *theoretically* is that, in the very long run, to ensure that the dynamic efficiencies of competition can indeed be realised, any estimate of the cost of the contestable activities in the sector has to reflect the MEAV of these parts of the value chain. At the same time, it would be unreasonable to ask customers to pay for all of the potential short-term costs of introducing competition.

The access pricing approach that appears to be most practical, but also compatible with these objectives of the regulator, is an approach where access prices are based on the difference between wholesale charges (which cover end-to-end provision of the service, with the exception of retail) and a sensible measure of long-run avoided costs. The long-run avoided cost would take some account of the MEAV of new assets; however, it would not necessarily require the full MEAV of all existing upstream assets to be taken into account. This would be reasonable in order to avoid instances of very low or even negative access charges for the network, as well to ensure that the costs of introducing competition (resulting from potential asset stranding) are not too significant.

Under such an approach to access pricing, it is not obvious that further separation of the RCV would be required in order to enable a more sustainable access pricing regime to be developed for upstream activities. However, assuming that some entry occurs in the medium term, it would still be important to assess the potential costs of asset stranding under plausible paths of upstream competition. It would also be reasonable to assess the relative benefits and costs of the different options for sharing the likely costs of introducing competition into the sector.

1 Introduction

Ofwat's approach to regulation is moving towards segregated price controls. PR14 witnessed the introduction of separate wholesale and retail price controls and, within wholesale, two binding price controls for water and wastewater.

The issue of understanding costs at a more disaggregated level, to both increase transparency and drive efficiency, as well as to potentially allow competition in certain parts of the value chain to develop, has been on the agenda for some time. Accounting separation has been gradually introduced into the sector, in part to allow for further disaggregation of the price controls.

One of the key concepts underlying the regulatory framework in the water sector is the regulatory capital value (RCV). All of the pre-April 2015 RCV currently sits entirely within the wholesale price control, with notional splits for water and wastewater. The future treatment of the RCV may be an issue if further disaggregation of the price controls is introduced and/or if more competition, in particular in upstream services, is to happen.

As part of ongoing work by various stakeholders, including Ofwat and the industry, we understand that Severn Trent (SVT) is keen to contribute to the debate by providing practical options for the future treatment of the RCV.

In this context, SVT has asked Oxera to consider these issues in more detail. The rest of this report is structured as follows:

- section 2 sets out the current role of the RCV in the industry;
- section 3 discusses the possible approaches that might be used in future;
- section 4 reviews regulatory precedent.

2 Current role of the RCV

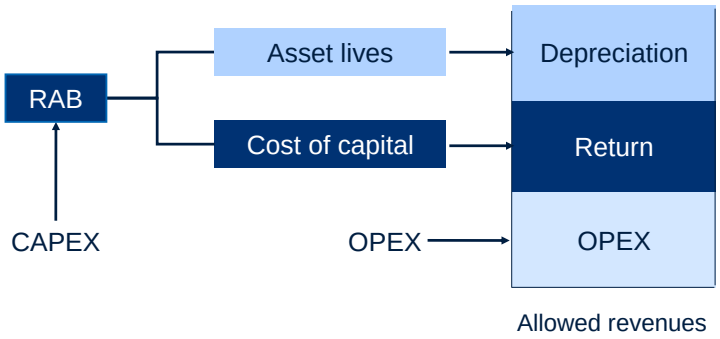
The regulatory framework in the water sector, as in the majority of other infrastructure sectors, is centred around the concept of a regulatory asset base (RAB) or, as it is called in the water sector, the regulatory capital value (RCV).

The RCV primarily acts as a tool to ensure the recovery of the invested capital, including an appropriate rate of return, to investors over the life of the assets. Effectively, it acts as a commitment device to ensure that the necessary capital investment takes place and that investors have confidence in the regulatory framework.

Typically, the RCV affects the following two key components of allowed revenues (Figure 2.1).

- **Return on capital**—this compensates investors for the risk of their investment. It is calculated as the RAB multiplied by the cost of capital.
- **Depreciation charges**—these allow for the recovery of previous investments. While the cash outlays for investment happen at the time of the investment, because capital expenditure is lumpy and because it benefits customers over a relatively long period, the cash invested is typically returned to investors (through allowed revenues) over the life of the asset. However, the depreciation policy in the water sector has historically been more complex than this (as explained further below).

Figure 2.1 The building blocks of a price control



Source: Oxera.

2.1 Initial RCV

At the time of privatisation, the replacement cost (modern equivalent asset, MEA) valuation of the companies' assets was £224bn, while the proceeds from privatisation of the water and sewerage companies (WASCs) were £9bn.[2] In other words, the price paid by investors was only about 5% of the estimated MEAV.

The initial RCV for the WASCs was calculated as the average of the market value of equity of each water and sewerage company for the first 200 days, plus the total value of debt at privatisation. For the water-only companies (WOCs) that were not privatised, a proxy for the initial market value was used. These initial values were taken as the opening value of the RCV for each company for 1990.

[2] Figures are quoted in 2010 prices. See Ofwat (2010), 'RD 04/10: Regulatory capital values 2010–15', 7 May, http://www.ofwat.gov.uk/publications/rdletters/ltr_rd0410rcv.

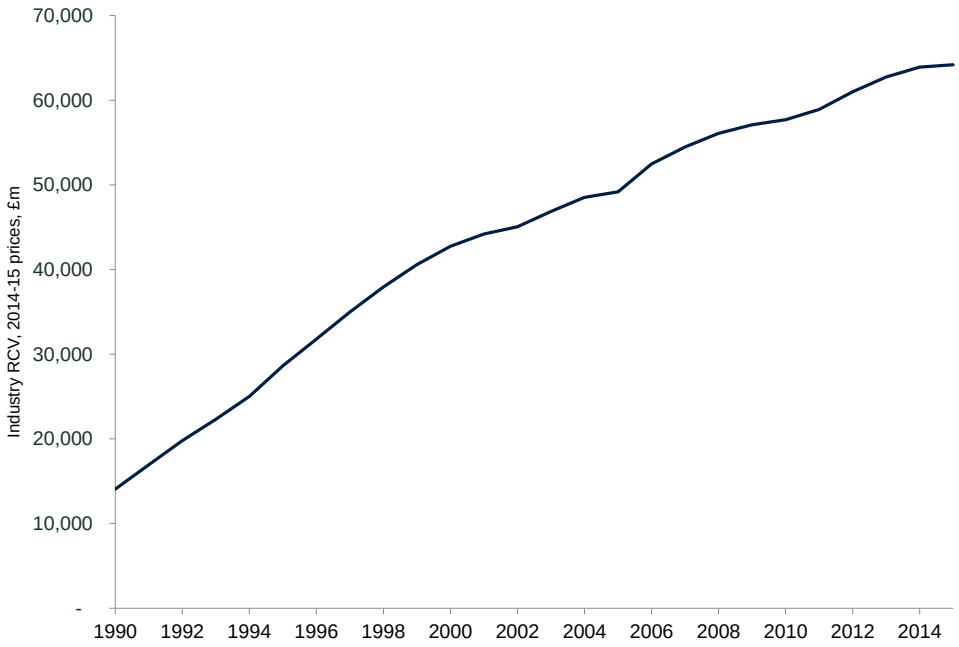
A likely explanation of the heavy discount paid by investors relative to the MEAV is the fact that customer bills are a direct function of the RCV. An RCV anywhere close to the true MEAV would have implied a huge increase in bills. Investors are likely to have factored this into the price they were prepared to pay for the shares of the companies.

To a large extent, the historical profile of water rates (which were mainly a function of government tax policy and had no relationship to the underlying costs of providing the service) has had a material impact on the size of the gap between the initial RCVs and MEAVs. A discount of this magnitude was not seen in any of the other privatised infrastructure sectors (as discussed in section 4).

2.2 Evolution of the RCV over time

Over time, the RCV is updated to include new investment undertaken in a given year, and decreased by the amount of depreciation included in customer bills for that year. The RCV is also uprated with inflation as a way of ensuring that investors are compensated for inflation. Figure 2.2 shows the real growth in the industry RCV since privatisation.

Figure 2.2 Growth in the RCV since privatisation



Source: Ofwat, Datastream, and Oxera analysis.

The depreciation (or capital charges) prior to the start of the most recent price control on 1 April 2015 consisted of the following two components.

- Infrastructure renewals charge (IRC)—this represented the cost of maintaining underground (infrastructure) assets at a constant level of functionality. Ofwat calculated the IRC with reference to average infrastructure renewals expenditure (IRE) over a 15-year period.
- Current cost depreciation (CCD)—this represented the depreciation charged on above-ground (non-infrastructure) assets, in line with accounting rules. However, most of the assets to which the CCD related were assets transferred to the water companies at privatisation. The RCV of these assets

was set at a substantial discount to their current replacement cost. Ofwat calculated the CCD such that it was broadly representative of the current levels of expenditure required to maintain and replace the assets at a constant level of service. In other words, the CCD was not a function of the RCV—rather, it is a function of the component of maintenance expenditure known as expenditure for maintenance non-infrastructure (MNI).

In simple terms, assuming that the level of service provided stays constant over time, the RCV also stays constant in real terms over time, with regulatory charges (IRC + CCD) broadly equal to the maintenance capital expenditure that is added to the RCV. The table below shows an example of RCV roll-forward.

Table 2.1 RCV roll-forward example

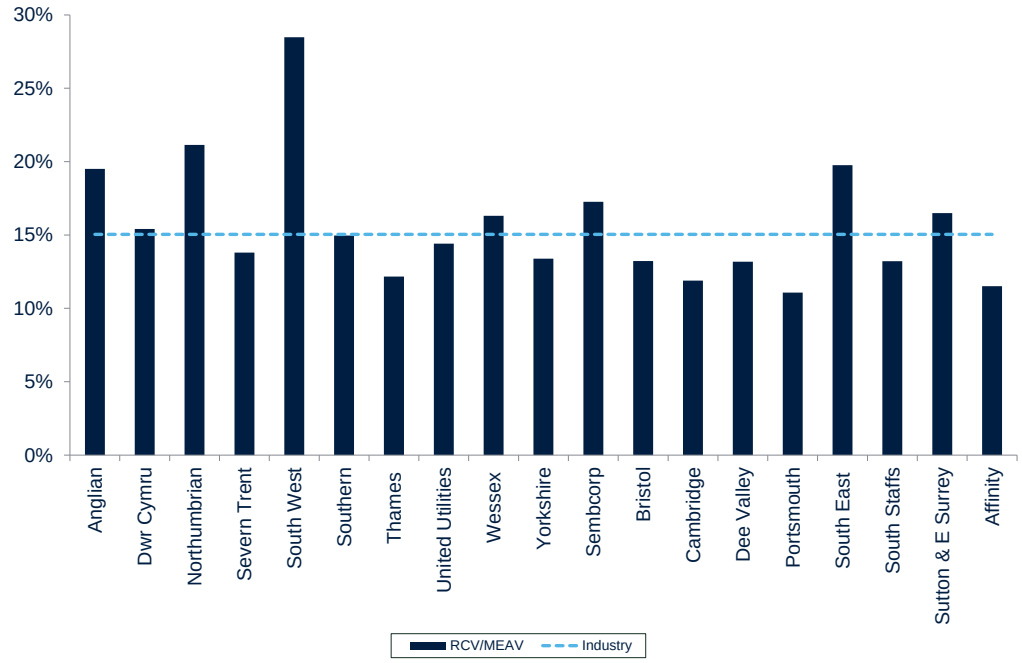
	In real terms	Assumptions
Opening RCV	5,000	Illustration
+ IRE	250	Illustration
+ MNI	250	Illustration
Enhancement CAPEX (to enhance service levels)	0	Constant level of service, assumed to be zero
- IRC	- 250	IRC = IRE over the long run
- CCD	- 250	CCD = MNI over the long term
Closing RCV	5,000	**Sum of the above**

Source: Oxera.

This shows that the post-privatisation real growth in the RCV will be driven primarily by the levels of enhancement CAPEX, while the discount applied to the underlying value of the assets that existed at privatisation will remain as a feature of the RCV (unless there are significant changes to the MEAV of the existing assets). This means that the difference between the MEAV and the RCV will be eroded very slowly over time and may never fully disappear.

For example, as can be seen in Figure 2.3, the current ratio of the total industry RCV to MEAV is around 15%—i.e. more than 20 years since privatisation, only 10% of the gap between the RCV and MEAV has been closed. The size of the discount also varies significantly between companies.

Figure 2.3 RCV/MEAV by company discount to MEAV by company



Source: Ofwat June Return 2011 and Oxera analysis.

From the current price control period (2015–20), the way expenditure is remunerated by the regulator is changing. Companies now have some flexibility in proposing what proportion of total expenditure (TOTEX) should be remunerated as pay-as-you-go (PAYG)—i.e. recovered from customers in the year it is incurred; and what proportion should be added to the RCV—i.e. recovered from customers over an assumed asset life. Companies also have some flexibility to propose how fast the existing pre-March 2015 RCV and new additions to the RCV after March 2015 should be depreciated.

These changes in the calculation of capital charges and the additional flexibility to amend the profile of RCV growth may affect the speed of convergence between the RCV and MEAV, all else being equal. However, it is still likely to be many years, assuming the regulatory regime stays broadly the same, before the RCV resembles anything close to MEAV.

Further, these changes introduce a break from the accounting treatment of assets. Historically, infrastructure expenditure was not depreciated in both the regulatory framework and statutory accounts.[3] Going forward, not depreciating assets is no longer possible from an accounting point of view, with the requirement for companies to adopt International Financial Reporting Standards (IFRS).[4] On the one hand, this makes the change in Ofwat's policy timely, but on the other hand there is no explicit link between the future path of the RCV and the accounting treatment of assets. This may also affect the discrepancy between the MEAV and the RCV in future.

These unique features of the RCV in the water sector will need to be considered before any further disaggregation of the price controls is introduced. Approaches to facilitate competition in certain elements of the value chain that are not

[3] Under infrastructure renewals accounting, which was historically possible under UK GAAP.
[4] IFRS does not include a renewals accounting concept.

necessarily reliant on a strict allocation of the RCV between different value chain elements might be more feasible.

2.3 Increased price control disaggregation

The first major step towards disaggregating price controls has been taken as part of the recently concluded price review (PR14). The current price control covering 2015–20 is the first period with separate controls for the wholesale and retail businesses, and binding wholesale controls for water and wastewater.

The creation of a separate retail price control raised the issue of allocating the existing RCV between wholesale and retail. In the end, Ofwat made a decision to allocate all of the RCV to the wholesale business:

> Companies and their investors will be concerned about the risks of asset stranding arising from split controls. They may also see themselves as asset managers. We are committed to leaving all of the existing RCV within the wholesale control. The RCV is a key measure for investors of the value of the existing assets that the companies hold.[5]

This represented a further break between the accounting MEAV and RCV. It is also worth noting Ofwat's emphasis on the RCV as a tool to ensure cost recovery for investors.

Considering that retail is a very asset-light business (less than 1% of all assets are retail assets), the questions around allocating the assets were potentially relatively straightforward. Retail assets also have relatively short asset lives, and most of the existing retail assets currently included in the wholesale control are likely to be fully depreciated before the start of the next price control. However, even in this instance, Ofwat was still keen to ensure that no stranding risk was introduced into the system.

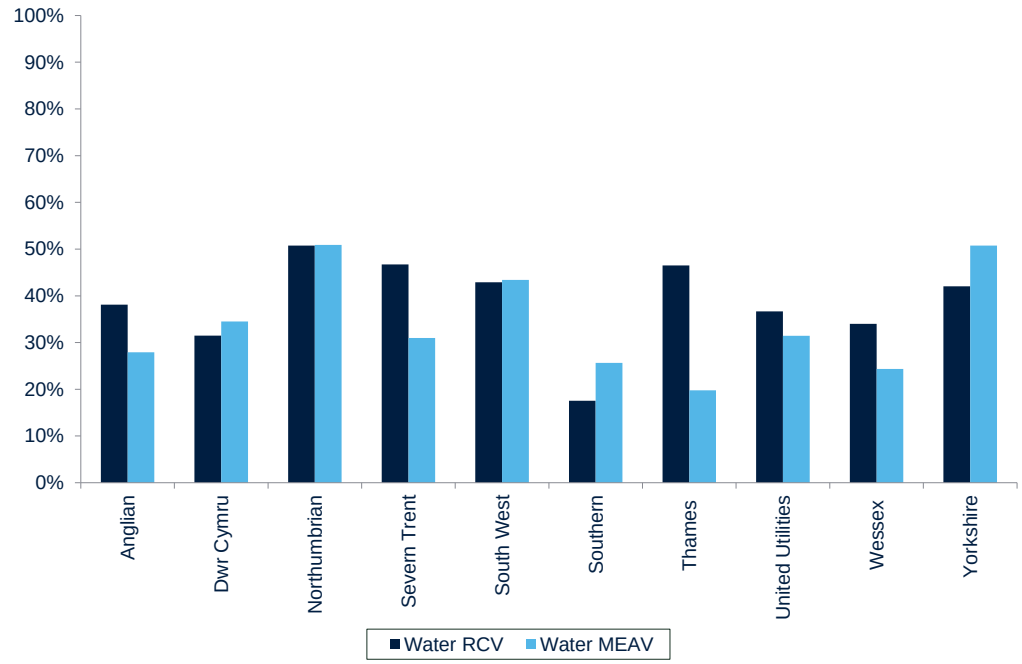
To ensure that customer bills do not increase overall as a result of the change, Ofwat made an adjustment to the rate of return applied to the wholesale RCV. In other words, Ofwat wanted to ensure revenue neutrality.

The issue of allocating the RCV was also relevant in the context of setting binding water and wastewater price controls. In the past, Ofwat set indicative price controls for water and wastewater. The asset values underpinning these controls reflected the original split of privatisation asset values between water and wastewater RCVs. As discussed during PR14, some of these splits may no longer be accurate.

Ofwat was of the view that companies should seek to move towards a more cost-reflective RCV split (i.e. reflective of the MEAV), but in the end also recognised that an immediate step change to an MEAV-based split could cause unintended incidence effects. Customers who are supplied by the same company for both water and wastewater would be unaffected by the change, but customers getting their water services from WOCs and their waste services from a WASC could be affected. Figure 2.4 shows that most companies have a slightly higher proportion of the RCV allocated to water than would be implied by the MEAV split. The value of the pre-privatisation assets was weighted more heavily towards wastewater. Since then, investment has been more evenly spread between the two services. If the RCV were allocated to water and wastewater today in proportion to the MEAV, a larger proportion would be allocated to wastewater.

[5] Ofwat (2012), 'Consultation on retail price controls for the 2014 price review', p. 19.

Figure 2.4 Water RCV and water MEAV as a proportion of total RCV and MEAV respectively, WASCs



Source: Company-specific appendices, PR14 Final determinations, Ofwat 2011 June Returns, and Oxera analysis.

The continued use of the original RCV splits introduces a further distortion to the RCV for each individual service, which will also need to be considered in assessing the options for the future treatment of the RCV.

2.4 Summary

In effect, the value of the RCV bears limited relation to the current replacement costs of assets in aggregate or for individual services (water and waste). However, it is a key anchor point used by Ofwat in setting prices, and therefore implicitly provides an upper bound to the price trajectory going forward. This means that any potential disaggregation of the RCV that may be required as a result of competition will be constrained by these factors.

3 Possible approaches going forward

The key driver behind the debate about the future role of the RCV is the objective to promote competition in certain parts of the value chain. First and foremost, to make upstream competition viable, it will be necessary to agree on an appropriate methodology for charging for access to those activities that are naturally monopolistic and which will continue to be provided by the incumbents.

As discussed in more detail in a separate Oxera report,[6] this will require an understanding of the relevant costs of the different activities, and ensuring that any cost measure underpinning the access price complies with competition law and with Ofwat's objectives. Once the appropriate access pricing methodology is chosen, the issue of how asset values need to be allocated, if at all, becomes a function of this chosen methodology.

A secondary potential reason for treating the RCV differently in the future is to provide a mechanism for cost discovery at different parts of the value chain. In this regard, it is important to bear in mind the role played by the RCV in the regulatory framework as primarily a commitment device, and the limited purity of the RCV at both an aggregated and a service level. The disaggregation of the RCV, if required, would primarily be an outcome of the access pricing methodology. In itself, the disaggregation of the RCV is unlikely to provide very meaningful information about the costs of different parts of the value chain.

As discussed in the previous section, the main purpose of the RCV is to act as a regulatory commitment device that provides certainty to investors about future cost recovery. However, at an aggregated level, the RCV bears limited resemblance to the MEAV and there is no asset-specific RCV. In other words, the RCV provides very limited information on the true asset costs of the different parts of the value chain.

With this context in mind, we first discuss the theory on which any future treatment of the RCV might be based, and what this would imply for the RCV (section 3.1). We then discuss potential transition options in light of our conclusions on the access pricing and our observations of the implications of a purely theoretical approach (section 3.2).

3.1 Theoretical considerations

In our work on access pricing, we have assumed that Ofwat's main objectives are likely to include the following.

- Ofwat's overriding objective is to promote *efficient* competition—this requires *efficient* entry. Efficiency, however, can be defined in many ways. In particular, the key question is whether the focus should be on short-term efficiency (i.e. does limited entry reduce costs in the industry today?), or the longer-term efficiencies that the process of competition might deliver (i.e. does widespread entry reduce costs, improve sustainability, service levels and choice in the future?).
- Ofwat's other main objective is likely to be ensuring that customers experience benefits from the introduction of competition. In particular, if the focus is on longer-term dynamic efficiencies from competition, while in the long run competition may lead to lower costs (and subsequently lower prices), there may initially be some costs associated with the creation of appropriate

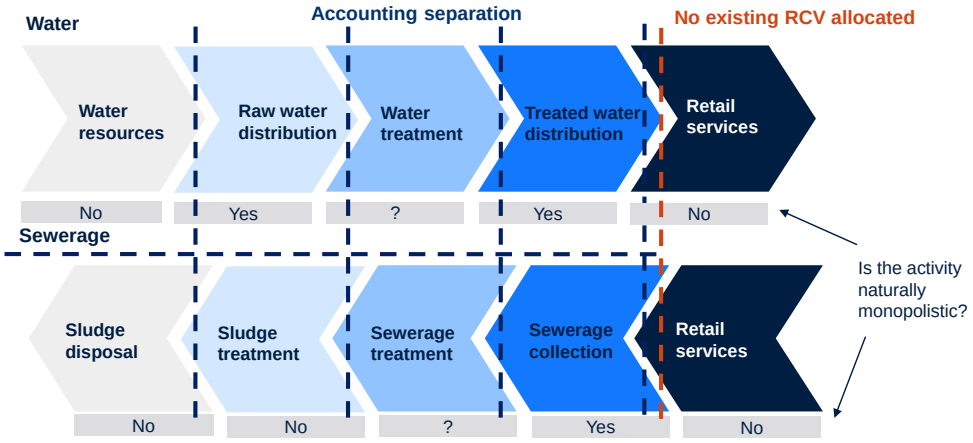
[6] Oxera (2015), 'Options for access pricing methodology', June.

conditions for entry. It is likely that Ofwat's position is that these costs should be borne by the industry rather than customers.

What this means *theoretically* is that in the very long run, to ensure that the dynamic efficiencies of competition can indeed be realised, any estimate of the cost of the contestable activities in the sector has to reflect the MEAV of these parts of the value chain. At the same time, it would be unreasonable to ask customers to pay for the potential short-term costs of introducing competition.

Companies are currently required to prepare segmental accounts that show the split of costs and assets (including MEAV) for eight different wholesale activities, as shown in Figure 3.1.

Figure 3.1 Current level of accounting disaggregation



Source: Oxera.

This financial information can be used as a starting point for any potential allocation of the RCV between the activities. In the example of Severn Trent, the RCV for 2010–11 was about £6.7bn (in prices of the day) and the MEAV was about £49bn—i.e. the RCV was 14% of the MEAV.

Table 3.1 below shows the potential implications of ensuring that the RCV of all potentially contestable activities (water resources and treatment, sewerage treatment, sludge treatment and disposal) is in line with their MEAV (a 'focused' approach to RCV allocation). The impacts are shown separately for water and wastewater.

Table 3.1 Impact of the 'focused' approach—Severn Trent

RCV allocations	Contestable activities valued at full MEAV (£bn)	Contestable activities valued at full MEAV (%)
Water		
Contestable activities (water)	1.8	59
Non-contestable activities (water)	1.3	41
Total water RCV	3.1	100
Total water MEAV	15.1	
Wastewater		
Contestable activities (wastewater)	2.1	58
Non-contestable activities (wastewater)	1.5	42
Total wastewater RCV	3.6	100
Total wastewater MEAV	33.5	
Totals		
Total RCV	6.7	
Total MEAV	48.6	

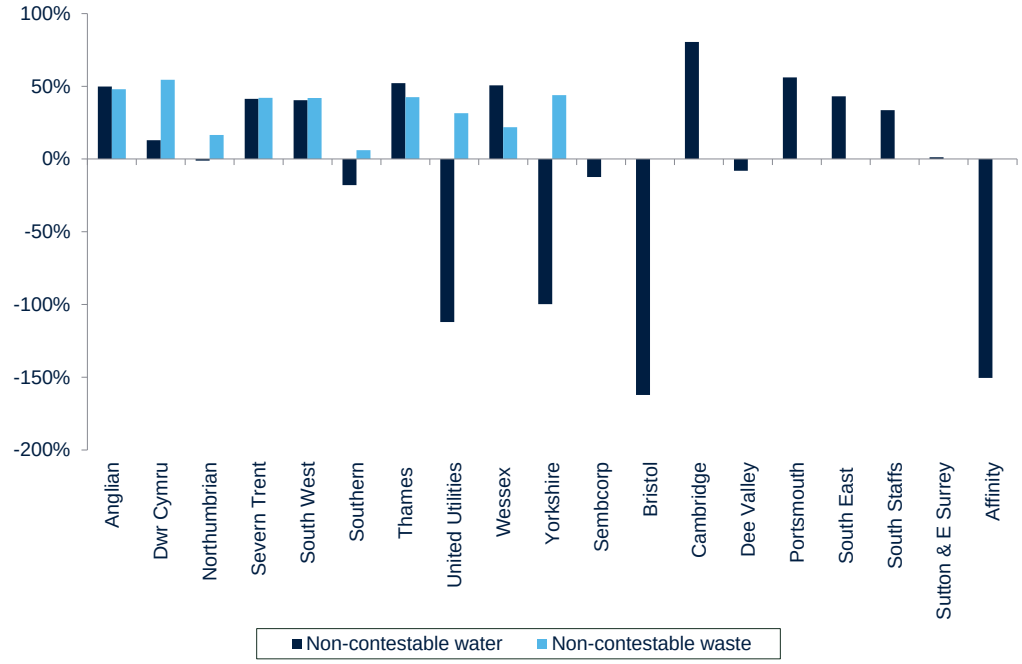
Source: Ofwat June Return 2011.

In this example, around 60% of the RCV represents the MEAV of the contestable activities for both the water and the wastewater services. If these values are taken to estimate the cost of upstream activities, to ensure that customers do not pay more, the allowed revenues for the network will need to be based on the remaining 40% of the RCV.

By contrast, if the RCV is allocated proportionately to the MEAV of each activity (sometimes referred to as the 'unfocused' approach) then 92% of the RCV would be allocated to the network and only 8% to the contestable activities.

These effects are likely to vary significantly by company due to differences in the initial privatisation discount and subsequent CAPEX profile, as shown in Figure 3.2. For some companies, the immediate application of such an approach would imply a negative RCV for the non-contestable parts of either the water or the wastewater service, giving rise to the possibility of extremely low, or negative, charges for the use of the distribution network.

Figure 3.2 Proportion of the RCV allocated to non-contestable activities under the 'focused' approach



Source: Ofwat June Returns 2011, Ofwat's financial performance reports, and Oxera analysis.

If companies continue to recover the total costs of both upstream and network elements going forward, then in principle the fact that the network RCV becomes relatively small is not necessarily an issue. However, to the extent that one of the results of competition may be that some of the existing upstream assets of the incumbent are no longer used and the proportion of costs not yet recovered on these assets cannot be recouped from customers, this creates stranding risk.

In particular, given the large proportion of the RCV that would become contestable, if such a change were implemented immediately, this may have a material impact on investor perceptions and potentially the costs of financing, which could be disruptive to the industry. A hypothetical stand-alone network business with a very small asset base would potentially be unfinanceable, and there would also be other costs resulting from the restructuring of the existing financing arrangements.[7]

One option could be to leave all of the RCV in the network business—but, to avoid a material impact on customer bills, the allowed revenue would still need to be reduced (in a similar way to what Ofwat has done in retail, except that the adjustment would be much larger). The overall outcome would be similar to the scenario described above where the adjustments would have to exceed the total allowed return for some companies. In other words, it would create an unsustainable outcome.

In addition, when deliberating potential changes to the regulatory framework for PR14, Ofwat has provided assurance that the existing RCV prior to the start of the current price control is protected:

> The RCV has been an important tool in assuring investors in the water and sewerage sectors that past investment will be remunerated through price limits.

[7] This might be a particular issue for highly geared companies where RCV plays a key part in debt covenants, and any change to the definition of the RCV might require companies to re-finance and re-negotiate all of their debt financing.

> We have committed to protecting the RCV as at March 2015, the end of the current price control.[8]

This raises an important question how Ofwat can balance the desire to promote competition in the long run without an increased cost to customers.

What all of this suggests is that any allocation of the RCV may be disruptive, and give rise to very different access prices across the industry and across the licenced areas. Limiting any changes to the treatment of the RCV to those changes required to provide the necessary underpinning to the chosen access pricing regime seems appropriate.

These considerations have influenced our conclusions on access pricing.[9] Consistent with these conclusions, the following section discusses the potential practical options for the future treatment of the RCV.

3.2 Possible options for the future treatment of the RCV

A reasonable starting point for allowing greater entry to happen upstream without the need to introduce greater separation throughout the value chain would be to adapt the existing wholesale-minus approach to pricing by providing greater clarity about the application of the approach in practice and ensuring that the 'minus' component reflects a meaningful measure of avoided costs.

Given the nature of the water industry, as discussed in the other Oxera report,[10] the 'minus' component could reflect a long-run avoided cost (LRAC) measure. This measure would capture more costs than the long-run marginal cost (LRMC), but would initially be below the true long-run incremental cost (LRIC) which captures the full build and operating costs of the entire network (or a particular segment, such as a reservoir), optimised to current technology and demand. In other words, the LRAC would resemble a LRIC-type approach to pricing, but the time horizon captured in the LRIC model would be based on some intermediate time horizon (such as 10 or 20 years), rather the actual asset life of the system. Alternatively, the LRAC could be based on some form of a net present value approach. For example, some form of an annualised equivalent of the expected present value of future avoided costs over the asset life may be in option. This would take into account the fact that avoided costs are likely to be small initially but over the longer-term would converge to the full LRIC over the asset life horizon.

In calculating the LRAC, capital costs will need to be considered separately for each water resource zone (WRZ). Information on the MEAV of new assets (new capacity) could be relevant to these calculations, but the calculation would not necessarily take into account the full MEAV of all existing upstream assets. This would be reasonable so as to avoid instances of very low or even negative access charges for the network, as well to ensure that the costs of introducing competition (resulting from potential asset stranding) are not too significant.

Such an approach would not require a formal separation or allocation of the RCV, at least in the short to medium term. One price control covering all of the wholesale activities could continue to be in place to govern the overall wholesale revenue that the incumbents are allowed to recover.

[8] Ofwat (2011), 'Future price limits – a consultation on the framework, Appendix 7: Cost assessment, cost recovery and the RCV', p. 16.
[9] Oxera (2015), 'Options for access pricing methodology', June.
[10] Oxera (2015), 'Options for access pricing methodology', June.

However, assuming that some entry occurs in the medium term, it is still important to consider the potential implications for asset stranding and who will bear the costs of this, even under the proposed LRAC approach.

To illustrate, assume that the total wholesale revenue that an incumbent is allowed to recover through the price control over the period is 10,000. For simplicity, assume that the total number of customers is 100 and each customer pays the same wholesale charge of 100. Assume also that 25% of wholesale revenue is recovered from non-household customers—i.e. 25 out of 100 customers are non-household.

Suppose that 5% of the revenue is displaced by new entrants over the period (20% of all non-household customers, or five non-household customers). The entrants provide resources, treatment and retail (or contracts with another retailer through the bilateral trading model) and pay an access charge of 30 to the incumbent for access to the network.

If the entrants displace a relatively large proportion of total revenue (in this case 5% of the total—equivalent to 20% of non-household revenue), it is plausible that this could permanently reduce the utilisation of the incumbent's existing assets by 5%. It is also plausible that the access charge based on LRAC might not capture the full life cost of this capacity if it sits somewhere between LRMC and true LRIC.

Table 3.2 below shows the implications for the cost recovery for the incumbent under two options in this scenario—Option A, where any stranded cost is borne by the company, and Option B, where the stranded cost is passed through to customers.

Table 3.2 Illustration of asset stranding costs

Description	Status quo (no entry)	Option A	Option B	Assumptions
Allowed wholesale revenue	10,000	10,000	10,000	Illustration
Number of customers	100	95	95	Illustration
Wholesale price	100	100	101.6	Assume that each customer pays the same price (under Option B, the price goes up to compensate the company)
Number of non-household customers	25	20	20	Five non-household customers lost to entrants
Revenue from access charges	–	350	350	a = 70 (100 minus LRAC of 30)
Avoided costs	–	–	–	Assume that costs cannot be reduced in practice
Revenue actually recovered	10,000	9,850	10,000	Number of customers * wholesale price + revenue from access charges
Cost under-recovery	–	-150	–	

Source: Oxera.

Under Option A, the incumbent would lose 1.5% of revenue, which is equivalent to about 0.3% of the RCV. Under Option B, customer prices have to go up by about 1.6%, which is equivalent to around £6 (based on the average combined water and wastewater household bill of £400[11]).

To put this example into context, on average just under 25% of revenue is accounted for by non-households across the industry.[12] Since the retail market opening in Scotland in April 2008, we understand that about 15% of non-household wholesale revenue comes from new entrants as of late 2014, although this share was only about 2% until mid-2013.[13]

This suggests that, even if we assume that upstream entry could lead to more switching at the retail level, an assumption that 20% of all non-household customers switch in one price control period would represent an unlikely outcome. Given that upstream entry is closely linked to retail market developments (through bilateral trading), this means that, at least initially, the potential costs associated with asset stranding might be relatively modest. However, if retail competition picks up over time as intended, stranding costs would be expected to increase and may become non-trivial in the medium term.

If the overall objective is to ensure that customers do not pay more, even in the short run, in exchange for potential benefits of competition in the future, these costs could be borne by the company. However, if this could lead to an increase in the perceived risk and potentially the cost of capital, it could still be more cost-effective, from the customer's point of view, to share this cost with customers. In the example used above, the cost of capital to the industry would need to increase by more than 0.3% in order to conclude that customers are better placed to bear this cost.

The example above is for illustration only. This type of cost–benefit analysis could be useful to determine the appropriate glide-path for sharing potential costs of introducing competition.

3.3 Summary

In summary, it is not obvious that further separation of the RCV is required in order to enable a more sustainable access pricing regime to be developed for upstream activities. Any potential costs of asset stranding should be carefully assessed under plausible paths of upstream competition. It would also be reasonable to assess the relative benefits and costs of the different options for sharing the likely costs of introducing competition into the sector.

[11] See Ofwat, 'PN 09/14: Water bills held down', http://www.ofwat.gov.uk/mediacentre/pressnotices2008/prs_pn20141212finaldet.
[12] Ofwat June Return 2011.
[13] Professor Gordon Hughes, Chairman of Water Industry Commission for Scotland (2014), 'Response to: What are the prospects for a competitive water market?', Beesley Lecture presentation, 30 October.

4 Regulatory precedent

The issue of RAB vs MEAV is much more significant in the water sector than other sectors. This is due to both how the initial RCV was set and the much longer asset lives.

Nonetheless, this section reviews how the concept of the RAB evolved in the gas, electricity and telecoms sectors, particularly when vertically integrated businesses were unbundled and the RAB had to be allocated between the different business units.

The issue of allocating the RAB between different business units was most pronounced in the gas industry, when the transportation and storage assets of British Gas had to be assigned specific values. The initial RAB for the whole business reflected a discount to the current replacement cost of assets of 60%. After deliberations by various regulatory authorities and stakeholders, the Monopolies and Merger Commission (MMC) spread this discount evenly across the businesses. In other words, the historical discount to MEAV was retained in both the monopoly (transportation) and eventually the contestable (storage) asset values.

4.1 GB gas

The privatisation of the British Gas Corporation began with the introduction of the Gas Act of 1986. With the subsequent privatisation, the decision was to use the initial market values established at flotation as the opening RAB for the entire business. The market-to-assets ratio (MAR), which is the ratio of the market value to the current cost accounting (CCA) based value, was around 40% at the date of privatisation.[14]

During the 1990s, following numerous regulatory and competition agency reviews, British Gas underwent a number of unbundling exercises, whereby separate business units containing the different elements of the value chain were created. British Gas was also required to produce separate accounts for the storage and the transport and supply business units under the 1993 MMC inquiry, although these business units remained subject to an overall price cap.

4.1.1 Separation of gas transmission and storage

Under the 1993 MMC inquiry, it was decided that the starting RAB for transmission and storage for the 1992 transmission price control review (TPCR1) should be based on the ratio of British Gas's MAR as at the end of 1991, which was around 60% at the time.

During subsequent periods, whenever the need to determine the individual values of British Gas's business units arose, the same approach was used as that used during TPCR1. That is, all of British Gas's business units were assumed to have a market ratio of 60% to the CCA values. This approach is sometimes referred to as the 'unfocused' approach.

Using the 'unfocused' approach to value the business units of British Gas became an issue when Ofgem was examining the appropriate value to allocate between the gas transport network and the storage elements of the value chain. Ofgem was of the opinion that the focused approach was more appropriate, and informed MMC of its recommendation. Under the 'focused' methodology, the entire privatisation discount would be allocated to the transmission business and

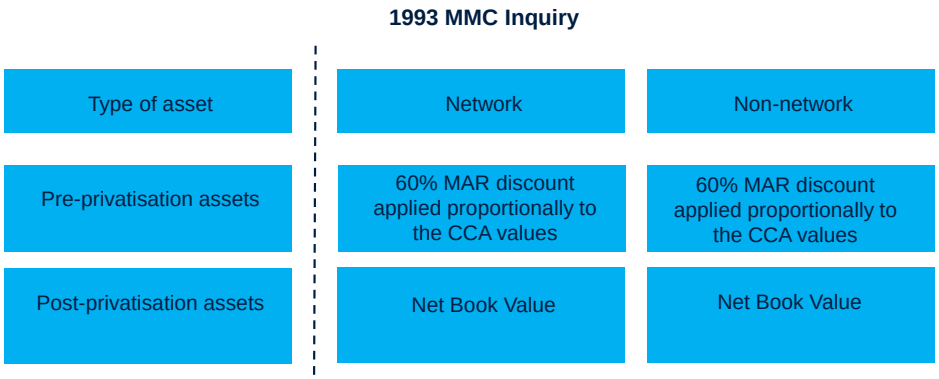
[14] Newbery, D.M. (1997), 'Determining the regulatory asset base for utility price regulation', *Utilities Policy*, **6**:1, pp. 1–8.

to its RAB. Under the alternative 'unfocused' approach, the privatisation discount would be allocated across the monopoly network and the other business units.

However, British Gas Transco made the argument that, since privatisation 15 years ago, it had consistently valued all of its business units—network and non-network—under an unfocused approach. It therefore argued that the RAB allocation should allocate some of the RAB and privatisation discount to the non-network businesses to reflect the business's operating history.

The final MMC decision agreed with the unfocused approach, which resulted in the allocation of the privatisation discount between the transport and the storage business. Under this method, the discount was allocated proportionally in accordance with the CCA value of the pre-1991 assets attributable to each of the business units. This methodology resulted in an increase in the value of the RAB of the transmission business unit by approximately £2bn relative to the focused approach (£12bn in the 1997 MMC report compared with £10bn previously).[15] The subsequent Ofgem transmission price review decided to maintain the unfocused RAB reallocation methodology recommended by the MMC, and to commit to retaining this methodology in future price reviews.[16]

Figure 4.1 RAB methodology for British Gas under the 1993 MMC inquiry



Source: Oxera.

In 1997, Ofgas examined ways of ensuring sufficient competition in the gas storage business and required British Gas to separate out its storage unit from its transportation business. Ofgas argued that the separation was required so as to allow Transco to offer its transportation service to British Gas's storage business on the same business terms as it was offered to third-parties.[17]

The LNG storage facilities continue to be regulated by Ofgem. During the transmission price control review for 2007–12 (TPCR4), Ofgem amended the price caps so that, in conjunction with the auction revenues, the amended price caps would be sufficient to cover the forecast capital and operating expenditure for the storage facilities. Ofgem set the amended price caps in accordance with

[15] Monopolies and Mergers Commission (1997), 'BG Plc: A report under the Gas Act 1986 on the restrictions of price for gas transportation and storage services', Appendix 9.2, p. 387,: http://webarchive.nationalarchives.gov.uk/20111202195250/http://competition-commission.org.uk/rep_pub/reports/1997/fulltext/399a9.2.pdf.
[16] Stern, J. (2013), 'The Role of the Regulatory Asset Base as an Instrument of Regulatory Commitment', Centre for Competition and Regulatory Policy (CCRP), City University London, CCP Working Paper No 22, March, p. 16.
[17] Ofgas (1998a), 'Annual Report 1997', HMSO Publications.

a reference market price for commercial storage services, in case these market prices were higher than the default price under the cap.[18]

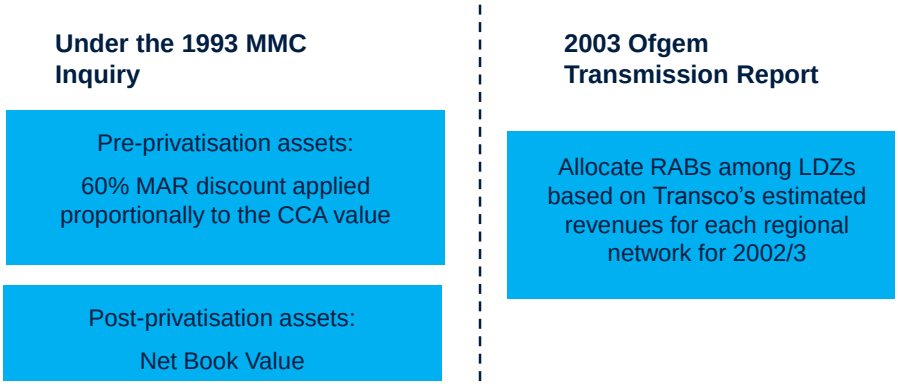
4.1.2 Separation of gas distribution

Historically, Transco was the monopoly gas transporter for the majority of consumers in the UK. Its gas pipeline networks comprised the high-pressure National Transmission System (NTS) and the lower-pressure distribution networks. In April 2002, Transco reorganised its 12 local distribution zones (LDZs) into eight regional networks.

In response to the restructuring, Ofgem published an initial consultation document that examined whether there should be a separate price control regime for each regional network. An important element that needed to be considered was the potential impact that the separate price control might have on transportation charges. Under a regime of separate price controls, the actual costs of each network would be passed on to the end-consumers connected to the relevant network, and it was likely that consumers that were connected to different networks would face different levels of charges. The final proposal by Ofgem was to retain the incentives for efficiency and maintain the total level of the distribution revenue for the eight regional networks at the same level as Transco's existing LDZ price control.[19]

In terms of deciding the allocation of RAB among the LDZs, Ofgem examined two approaches. Under the first approach, the RAB would be allocated on the basis of physical assets, whereas under the second approach, it would be allocated in relation to the charging levels and cash flows. Ofgem's final decision was in favour of adjusting the RABs on the basis of cash flows. The allocation was based on estimated revenues for each regional network, published in Ofgem's December 2002 draft proposals on separating Transco's distribution price control. Consistent with the December document, and on the basis of the estimated distribution revenues for 2002/03, the network RABs were calculated by Ofgem.[20]

Figure 4.2 RAB methodology for LDZs



Source: Oxera.

4.2 GB electricity

The development of the GB electricity industry post privatisation in 1990 followed slightly different paths in England, Wales and Scotland.

[18] Ofgem (2007), 'LNG Storage price control – Initial thoughts', p. 7.
[19] Ofgem (2003), 'Separation of Transco's distribution price control: Final proposals'.
[20] Ofgem (2003), 'Separation of Transco's distribution price control: Final proposals', pp. 24–5.

4.2.3 England and Wales

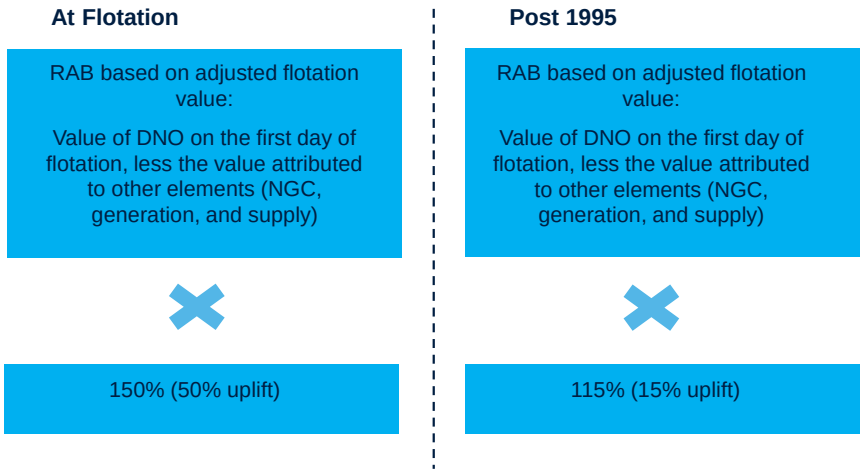
Prior to the 1990 privatisation, the Central Electricity Generating Board (CEGB) was responsible for generation and transmission activities. It sold electricity to the 12 area boards, which were in turn responsible for distribution and supply to end-consumers.[21]

The 12 regional electricity companies (RECs) were restructured into the 12 area boards prior to privatisation. The National Grid Company (NGC), which was fully owned by the RECs, was given sole responsibility for transmission.

Prior to privatisation, the RECs were given their allocation of shares in the NGC. In determining the opening RAB for the RECs (later know as the distribution network operators, DNOs) at the start of DPRC1 (1992), the Director General of Energy Supply (DGES) used an adjusted flotation value. Under this methodology, the DGES first took the value of the RECs on the initial day of flotation, taking into account the values that would need to be attributed to other value chains of the business, such as NGC holdings, generation and supply. In order to account for the change in the share values and changes in the cost of capital since privatisation, a 50% uplift was applied to the flotation value and allowances were made for the value of additional investment undertaken in the intervening period.[22]

However, in 1995, the price control was re-examined and the DGES decided that the 50% uplift applied initially was excessive. This assessment was based on the MMC conclusions on the Scottish Hydro Electric case, where the MMC had concluded that it was inappropriate to adjust flotation values to reflect a change in the cost of capital. As a consequence, the DGES decided to reduce the uplift from 50% to 15%. This change was intended to reflect both shareholders' expectations of rising dividends at privatisation and the relatively low value assigned to the England and Wales RECs at flotation.[23] The value of the RECs' other businesses, such as supply, was assigned a value of zero.[24]

Figure 4.3 RAB methodology for the DNOs in England and Wales



Source: Oxera.

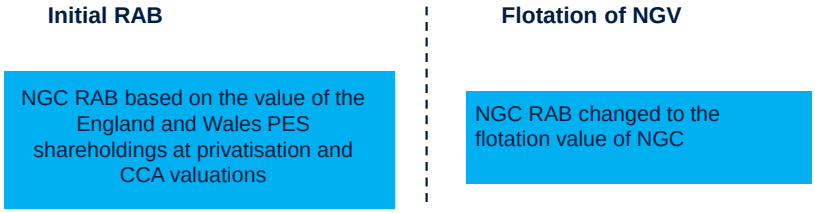
[21] Domah, P. and Pollitt, M.G. (2001), 'The Restructuring and Privatisation of Electricity Distribution and Supply Businesses in England and Wales: A Social Cost–Benefit Analysis', *Fiscal Studies*, **22**:1, pp. 107–46.
[22] Ofgem (2007), 'History of Energy Network Regulation', p. 41, https://www.ofgem.gov.uk/ofgem-publications/51984/supporting-paper-history-energy-network-regulation-final.pdf.
[23] Ofgem (2007), 'History of Energy Network Regulation', p. 41.
[24] Offer (1995), 'The Distribution Price controls: Final Proposals', para. 11.4.

With DPCR4 (2005–10), the value of the metering element of the distribution business was excluded from the RAB, and this element was assigned a value based on a modern equivalent purchase price and depreciated in line with the DNO's depreciation policy.[25]

Initially, when TPCR1 was undertaken, the 12 RECs that operated in England and Wales were the sole shareholders of the NGC. A measure of the NGC's RAB was therefore calculated based on both the value of the England and Wales REC shareholdings at privatisation and the CCA valuations.

Following the 1995 flotation of the NGC, during TPCR3 (2000), the DGES examined whether it would be more appropriate to instead take into account the money that was actually paid to acquire the company—that is, the actual flotation value of the NGC. Under this approach, there was an increase of £150m in the size of the RAB, and the entire RAB for the NGC's transmission assets was valued at £4.15bn.[26]

Figure 4.4 RAB methodology for NGC before and after flotation



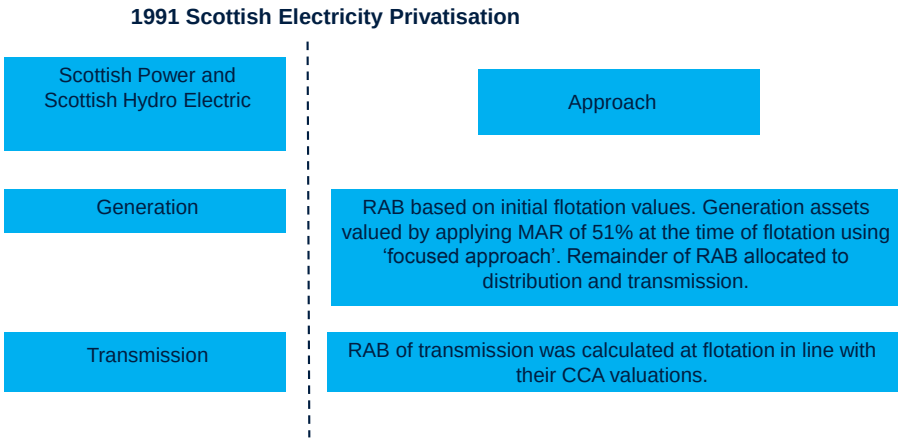
Source: Oxera.

4.2.4 Scotland

Unlike in England and Wales during privatisation, in Scotland both Scottish Power and Scottish Hydro Electric were integrated companies with substantial assets in generation, transmission, distribution and supply. The initial RAB at privatisation in 1991 was calculated on their initial flotation values. The MMC used the flotation value for each company as a whole in order to value the distribution and transmission businesses, by subtracting a value for the generation business units. The generation assets were valued by applying a MAR equal to that observed for National Power and PowerGen (51%) at the time of their flotation, under the 'focused approach'.[27] The remainder of the RAB was allocated to the distribution and transmission business, and the resulting values were quite similar to their respective CCA values.

[25] Ofgem (2007), 'History of Energy Network Regulation', p. 42.
[26] Ofgem (2007), 'History of Energy Network Regulation', p. 56.
[27] In 1990, the assets of the CEGB were split into two new generating companies (PowerGen and National Power) and a new transmission company (the NGC). PowerGen and National Power were privatised in 1991, with 60% of the equity in each company being sold to the public.

Figure 4.5 RAB methodology for Scottish electricity at privatisation (1991)



Source: Oxera.

4.3 GB telecoms

In July 1982, the UK government announced its intention to privatise British Telecom with the sale of up to 51% of the company's shares to private investors.[28] The privatisation was confirmed with the passage of the Telecommunications Act 1984, and in November 1984 the UK government sold more than 50% of British Telecom shares to the general public. In December 1991 and July 1993, further tranches of the shares held by the government were sold, and the government fully divested itself from BT by 1993. At privatisation, the assets and liabilities of BT were valued at the amount assigned to that particular asset or liability in the statement of accounts for the preceding year.[29]

The government commissioned economist Stephen Littlechild to examine ways of regulating BT's profitability. His report, published in February 1983, proposed an RPI - X formula for price setting that would maintain price increases at a fixed level below the rate of inflation for a number of years.[30]

In 1991 the government White Paper, 'Competition and Choice: Telecommunication Policy for the 1990s', was published. Under this Paper, the existing duopoly that BT had shared with Mercury Communications in the UK since November 1983 was ended, allowing customers to be able to acquire telecoms services from any competing provider.

However, BT still retained significant monopoly power in certain segments of the UK telecoms business, especially in terms of its UK copper access network. In 1995, BT's licence was changed in order for it to divide its accounts between its business units. This change allowed the setting of interconnection charges (access charges), thereby allowing competitors to use BT's network.

In 1997, Oftel (Ofcom's predecessor) decided to value all of BT's fixed line network assets on a CCA basis in the regulatory accounts. The reason was to allow regulated prices to be based on what it would cost to replace the network, or what it would cost some other company to build the same asset base. This

[28] BT Group, 'History of BT', http://www.btplc.com/Thegroup/BTsHistory/History_of_BT.pdf.
[29] Telecommunications Act 1984, Section 5, pp. 210–1.
[30] Littlechild, S. (1983), 'Regulation of British Telecommunications' Profitability', para. 15.5.

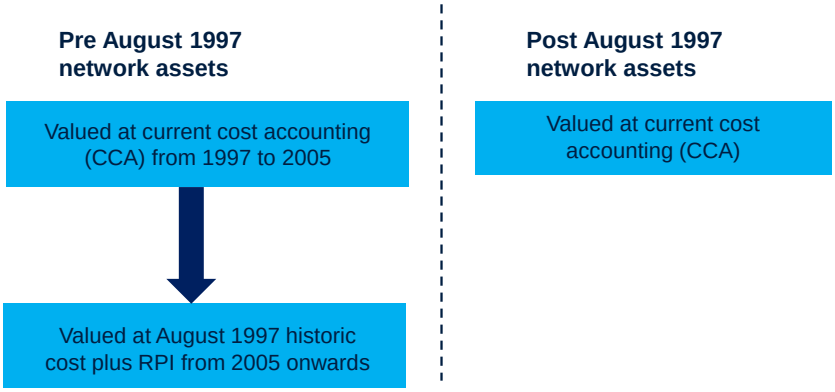
would encourage other competitors to build their own networks and undercut BT's prices if the competitor was able to build a cheaper network.[31]

BT currently also reports the value of its other business units using CCA for regulatory accounts purposes,[32] and the group records all of its business units including Openreach at historical cost in its financial statements.[33]

In 2001, Ofcom examined the cost recovery by BT during the price control that ended in 2001, and determined that, if the methodology was not changed, BT's access charges for its competitors to use the network would result in BT recovering more than its costs for all the copper access network assets that were already deployed in August 1997.[34]

As a result, Ofcom decided in 2005 to replace the existing methodology with historical cost accounting (HCA) for the valuation of the pre-August 1997 assets. The value of the RAB was set equal to the closing HCA value for the pre-1 August 1997 assets for the 2004/05 financial year (uprated for inflation since 1997), with the provision that this value would be increased each year by RPI to ensure that it was not eroded by inflation. Over time, the RAB would disappear as the pre-1997 assets would be replaced. All post-August 1997 assets would continue to be valued on a CCA basis.

Figure 4.6 RAB methodology for BT's network assets (Openreach)



Source: Oxera.

[31] Ofcom (2005), 'Valuing copper access', para. 1.5, http://stakeholders.ofcom.org.uk/binaries/consultations/copper/statement/statement.pdf.
[32] BT Group (2012), 'Current Cost Financial Statements for 2012 including Openreach Undertakings', July, http://www.btplc.com/thegroup/regulatoryandpublicaffairs/financialstatements/2012/rfs_2012.pdf.
[33] BT Group (2014), 'Annual Report & Form 20-F 2014', p. 131, note 3, http://www.btplc.com/Sharesandperformance/Annualreportandreview/pdf/2014_BT_Annual_Report.pdf.
[34] Ofcom (2005), 'Valuing copper access', para. 1.6, http://stakeholders.ofcom.org.uk/binaries/consultations/copper/statement/statement.pdf.

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