



# **Upstream pricing – concept paper July 2015**

## Contents

Executive Summary .....	3
1. Introduction .....	9
2. Policy and regulatory context .....	9
3. Objectives .....	11
4. Approaches to pricing – the theory .....	13
5. Applying average cost pricing to water .....	15
6. Implementing a long-run incremental cost (LRIC) approach.....	25
7. Pricing structure .....	33
8. Upstream pricing – implications for financing.....	34
9. Evaluation of options.....	35
10. Application to other components of the value chain.....	39
11. Conclusions .....	40
Appendix 1 – Financing Implications of the RCV approach .....	41

## Executive Summary

### Upstream pricing development

Approaches need to be determined for disaggregating water company wholesale prices, in order to:

- Encourage upstream competition and to enable different regulatory approaches to be applied to different parts of the wholesale value chain.
- Tailor regulation for different parts of the wholesale value chain, to increase efficiency and reflect differences in the extent to which activities are contestable.

### Objectives

The objectives we have developed are in line with Ofwat's commitment to build trust and confidence with customers, the environment and wider society. Achieving this requires that changes in the approach to upstream pricing can be seen to be:

- In customers' interests, in terms of having the optimum impact on bills and services.
- Promoting protection of public health and the environment.
- Providing a framework for competition in which potential entrants can have confidence, in terms of enabling successful entry where, and only where, they can provide a better and/or cheaper service to customers.
- Providing a framework in which investors have trust, by providing a reasonable balance between risk and reward in the long term.

In addition, the approach needs to be compliant with competition law, in particular avoiding "margin squeeze".

### Approaches to pricing – the theory

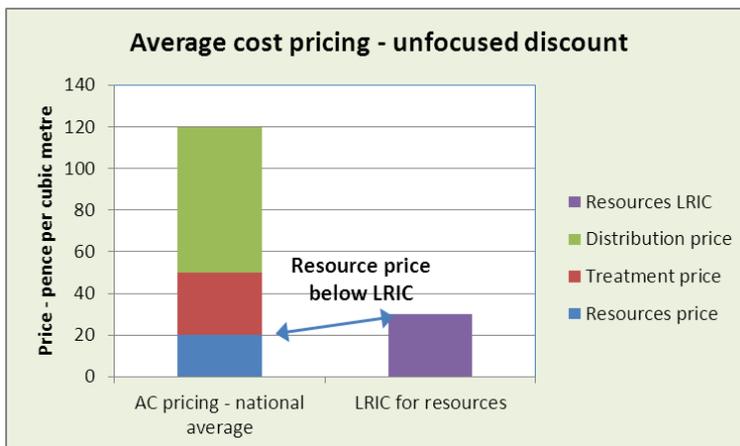
Currently wholesale prices are based on average accounting costs, including a return on Regulatory Capital Value (RCV). An approach to disaggregating prices could be based on the average cost of each component of the value chain, with a split of the RCV between the components of the value chain.

This approach needs, however, to be reviewed to determine whether it meets the objectives set out above, and produces prices which are compliant with competition law and permit efficient competitive entry. A competitor is likely to require access to the network and the difference between total wholesale price and the price for access to the network must be sufficient to enable an efficient competitor to enter, i.e. margin squeeze must be avoided.

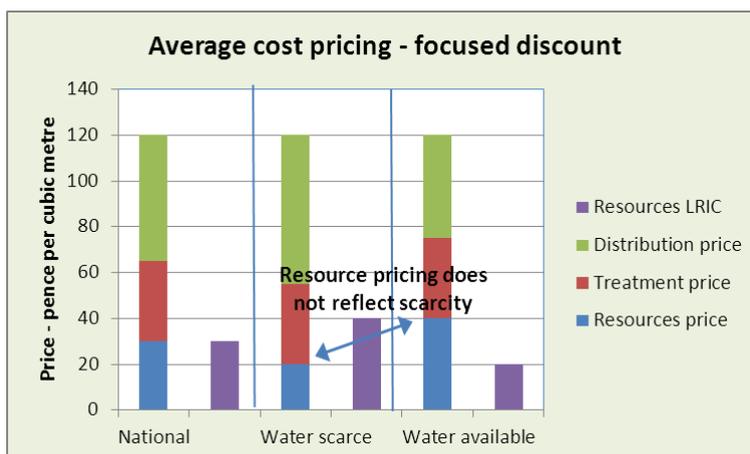
This can be tested by reviewing the long-run incremental costs (LRICs) of the incumbent water company. For example, for water resources, are the LRICs of new resources plus the proposed price for access to the network greater than the total wholesale price? If so, then a competitor as efficient as the incumbent would not be able to enter the market.

**Approaches to pricing – application to water resources**

The effects of an average cost pricing approach depend partly on how the Regulatory Capital Value (RCV) is split. The RCV is significantly below full replacement cost asset value of wholesale assets. A split in proportion to asset value in the components of the upstream value chain (an unfocused discount) would lead to resource prices being, in general, below LRIC for resources. Entry by an equally efficient competitor would not, in general, be possible because it could not match the incumbent’s price for resources. This is illustrated in the graph below.



An average cost pricing approach, with the RCV split so that competitive areas earn a return on full asset value (a focused discount approach), produces, on average, resource prices similar to LRIC. However, it will lead to water resource prices which are not compliant with competition law in some areas (principally in the south and east), and will permit inefficient entry and asset stranding in others (principally the north and west). This is because of the discrepancy between relatively low average costs in the south and east, but high LRIC because water is relatively scarce.

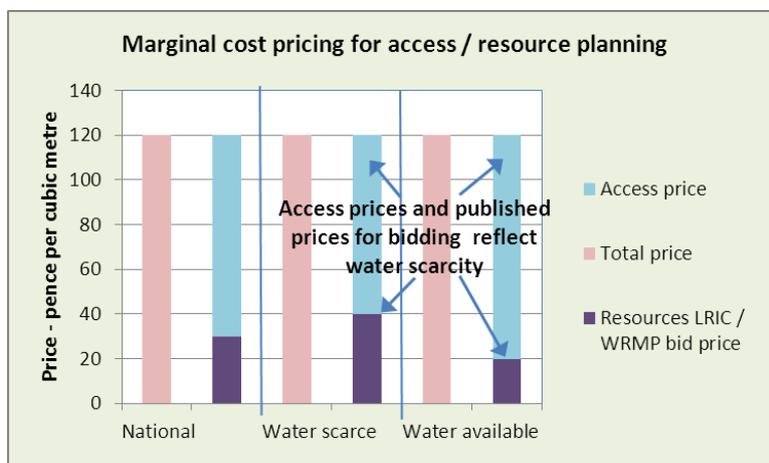


Therefore an average cost approach will not be appropriate for pricing of resources or setting prices for access to the network.

**Applying long-run incremental costs to access prices and water resource planning**

Access pricing for the network needs to be set at total average cost, less LRIC for resources. This will lead to access prices being low where LRICs are high, and high where LRICs are low.

This will promote efficiency and be compliant with competition law, in terms of enabling new resource-owning entrants to compete on an even-handed basis with incumbents. LRICs for resources could also be published and used to invite bids for Water Resource Management Plans. This is illustrated below.

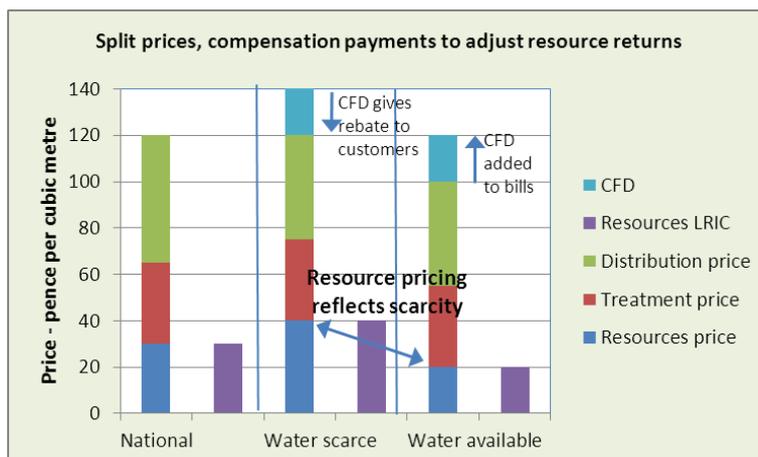


The current “costs principle” approach also involves setting access prices at wholesale price less a deduction for incremental costs. However, the costs principle approach is case-specific, and generally does not include capital costs. An approach using wholesale prices minus LRIC takes into account capital costs and will allow an entrant to invest in capacity to enter, if the entrant can match or beat the incumbent’s costs for new resources.

The proposed approach would involve a single access price for each zone. If it is important to send the right locational cost signals for new resource development, then access prices could be varied where marginal distribution costs are higher or lower than the average for a zone. This would create greater complexity, and possible conflict with regionally averaged prices, but it could be considered without undermining the general principle.

### Splitting price limits for the value chain

An approach to pricing which involves pricing resources at LRIC, but pricing the rest of the wholesale value chain at average cost, can lead to over or under-recovery in total. Contracts for difference (CFD) could, through rebates or additions to bills, allow resources to be priced at LRIC without any increase in overall cost to final water customers. This is illustrated below.



### Upstream pricing – implications for financing

The RCV has provided a degree of confidence to investors in future returns, resulting in a relatively low cost of capital despite the significant investment requirements and the sector's negative cash flow.

Any change involving allocating large amounts of RCV to contestable activities would involve renegotiation of financing in a number of companies. In addition, allocation of RCV to contestable activities, where it is uncertain whether a return can be earned, would affect confidence in the stability of the regulatory regime. Investors have made their investments on the basis of a relatively certain return.

Changes which might have a more limited effect, because they preserve the confidence in returns on previous investment, include changes which only affect future investment, or changes which replace the RCV approach in competitive areas with long-term contracts.

### Evaluation of options

The evaluation of options is summarised in the table below, with the options most closely meeting objectives highlighted in bold.

## Upstream pricing

Criterion	Option						
	A1	A2	I1	I2	I3	I4	I5
	Average cost (AC) pricing – unfocused discount	AC pricing – focused discount	Pricing on total cost minus resource LRIC		Split RCV – market value RCV for resources	RCV in monopoly business – market pricing for resources	Split prices – compensation payments to adjust resources returns
For access prices			For access and WRMPs				
Compliance with competition law for resource entry	xx	x	✓✓	✓✓	✓✓	✓✓	✓✓
Protect the interest of consumers	x?	xx	✓✓	✓✓	x	xx	✓
Promote effective competition	xx	xx	✓	✓	✓✓	✓✓	✓✓
Companies are able to finance their functions	x?	xx	✓✓	✓✓	x	✓✓	✓✓
Promote efficiency and economy	x	x	✓	✓	✓	✓	✓
No undue preference or discrimination in charges	✓✓	✓✓	✓?	✓?	✓✓	✓✓	✓✓

### Application to other components of the value chain

The approach developed above has addressed issues in relation to water resources of:

- The RCV discount on full value of assets.
- The difference between LRIC and average costs.

The discrepancy between LRIC and average costs is probably largely a problem in relation to water resource pricing. However, the issue of the RCV discount on full value of assets applies to all contestable components of the value chain. The contracts for difference approach could be applied to sludge or other components in the same way as for water resources, with:

- Market price for sludge set on the basis of a full return on assets and an appropriate rate of return for a competitive market.
- The contract for difference value for current sludge operations set to allow for the lower return on existing assets, and the lower return in a regulated environment.

### Conclusions

In order to meet the objectives for upstream pricing, the pricing approach has to take into account the difference between average costs of existing water resources and the LRIC of new resources.

We have identified options which would enable this difference to be addressed: involving:

- Setting prices for distribution system access based on total wholesale cost minus water resource LRICs, but not otherwise disaggregating prices in the wholesale value chain; or
- Establishing arrangements which allow resources to be priced at LRIC without any increase in overall cost to end-users, through use of contracts for difference.

We consider that the approach using contracts for difference is the preferred solution, as it provides greatest transparency for potential entrants and enables price limits to be set for each component of the upstream value chain. This approach can potentially be applied to any component of the wholesale value chain which is being opened up to competition.

Further work is needed to refine how this option would be implemented, including:

- Ensuring that a common method is used in calculating long-run incremental costs.
- Development of an approach to take into account environmental costs.
- Setting out the detailed operation of contracts for difference.
- Assessment of a market price for sludge.

## 1. Introduction

Government and regulatory policy commitments mean that approaches need to be determined for disaggregating water company wholesale prices. These commitments include:

- Encouraging upstream competition, in particular to encourage provision of new sources of water at lower cost.
- Tailoring regulation for different parts of the wholesale value chain, to increase efficiency and reflect differences in the extent to which activities are contestable.

These changes need to be implemented in a way which will enable the industry to continue financing improvements at reasonable cost.

This report evaluates the options for development of upstream pricing, including new approaches to setting access prices. It also considers the possible implications for the Regulatory Capital Value (RCV), and any resulting impacts on pricing.

The report contains the following sections:

2. Policy and regulatory context
3. Objectives
4. Approaches to pricing – the theory
5. Applying average cost pricing to water
6. Implementing a long-run incremental cost (LRIC) approach
7. Pricing structure
8. Upstream pricing – implications for financing
9. Evaluation of options
10. Application to other components of the value chain
11. Conclusions

## 2. Policy and regulatory context

### Encouraging upstream competition

The White Paper “Water for Life” set out the government’s aims for increasing upstream competition, while maintaining investor confidence:

“We also want to encourage new entrants who may have raw or treated water that they wish to sell into an incumbent’s network at a lower cost than for developing new supplies, or who may have new and innovative ways of treating and disposing of sewage, to be able to do so under the WSL regime. This will help stimulate a more vibrant wholesale market for alternative water resources and sewerage services, and incentivise incumbent water companies to look at alternatives to expensive capital projects in meeting future demand”<sup>1</sup>.

“We will work with Ofwat to reform the wholesale access pricing regime to allow for efficient market entry. This reform will preserve the ability of integrated water companies operating their business in an efficient manner to earn an appropriate

---

<sup>1</sup> Water for Life, Defra, December 2011

return on their assets, so that investor confidence is fully maintained. Increasing transparency in wholesale charges will make it more attractive for businesses to enter the water and sewerage market and sharply reduce the risk of discriminatory pricing. The current wholesale access pricing arrangements are governed by the costs principle, which has been widely criticised as anti-competitive and giving little incentive to incumbent water companies to become more efficient”.

Similarly, Jonson Cox, Chairman of Ofwat, has said: “if a country with a growing population, a diminishing availability of water due to climate change, is to successfully challenge its upstream challenges, we have to allow the innovation that results from having a choice of sources of water”<sup>2</sup>.

Reflecting these aims, the Water Act 2014 replaced the previous legal provisions for access pricing, based on avoided costs, with requirements for Ofwat to set charging rules. The approach is clear for retail competition (based on the PR14 approach to pricing). However, it is not yet clear what the approach will be for pricing access to the monopoly network for entrants providing part of the wholesale service. Ofwat published an initial discussion paper on this in November 2013<sup>3</sup>.

### **Disaggregating regulation**

Cathryn Ross, in a City Briefing in August 2014, said that Ofwat needs a better understanding of the services and costs through the wholesale value chain, for both water and waste water, both for identifying what is contestable and for driving efficiency – this would include issues about RCV allocation.

Ofwat stated in its July 2013 PR14 methodology that it intends to set two sub-limits during AMP6:

- One for water, covering raw water distribution, water treatment and treated water distribution, but not water resources.
- One for sewerage, covering sewage collection and sewage treatment, but not sludge treatment, recycling and disposal.

“Trialling indicative sub-limits is an important step to possible reforms at the next price review, and will align with our work with the Open Water programme. They should provide greater transparency on both costs and revenues associated with network activities. They will help enforce robust cost allocation between areas with greater natural monopoly characteristics and potentially more contestable activities, which is essential to facilitate effective competition. They also allow us to tailor our approach to regulation for different parts of the value chain – including, where appropriate,

---

<sup>2</sup> Uncharted Waters: A Forward Look at Managing Change in the Water Sector, Jonson Cox, speech at the Policy Exchange, March 2015

<sup>3</sup> Future access pricing in the water sector: a discussion paper, Ofwat, November 2013

facilitating deregulation – and will ultimately deliver more efficient prices for services that are potentially contestable”<sup>4</sup>.

This paper is intended to contribute to the development of upstream pricing, including the following aspects of Ofwat’s forward programme of work:

- “deliver the design of the new upstream market arrangements for England, as set out in the Water Act 2014;
- ... set the framework for determining the price controls for all appointed service providers in 2019;
- ... develop the necessary charging arrangements to support the upstream market arrangements”<sup>5</sup>.

### **Assumptions on timing**

The Government has said that the programme of reforms to the water industry would be introduced in a phased way, and aligned with policy development on abstraction reform. We consider that water resources and sludge are the most contestable parts of the value chain and therefore the initial focus should be on pricing for these elements. This is aligned with Ofwat’s separation of these two elements from the rest of the value chain, for the purpose of setting sub-limits. We assume that any change in approach to pricing in order to promote competition will be needed for these two elements for PR19. If this is successful then further changes for other parts of the value chain could be considered later.

A step-wise approach will facilitate a review of the costs and benefits of implementation of reforms at each stage. This will allow stakeholders to learn lessons from implementation of competition at a series of intervals, including after introduction of retail competition. This may provide valuable insights on the costs and benefits associated with different aspects of reform and would be consistent with Government policy that “all policies, programmes and projects should be subject to comprehensive but proportionate evaluation, where practicable to do so”<sup>6</sup>.

### **3. Objectives**

The objectives we have developed are in line with Ofwat’s commitment to build trust and confidence with customers, the environment and wider society. Achieving this requires that changes in the approach to upstream pricing can be seen to be:

- In customers’ interests, in terms of having the optimum impact on bills and services.
- Promoting protection of public health and the environment.
- Providing a framework for competition in which potential entrants can have confidence, in terms of enabling successful entry where, and only where, they can provide a better and/or cheaper service to customers.

---

<sup>4</sup> Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans, Ofwat, July 2013

<sup>5</sup> Ofwat’s forward programme 2015-16, Ofwat, March 2015

<sup>6</sup> The Magenta Book – Guidance for Evaluation, HM Treasury, April 2011

- Providing a framework in which investors have trust, by providing a reasonable balance between risk and reward.

We have set out below the issues which need to be considered in order to ensure that this objective is met, and shown how these can be broadly categorised in terms of Ofwat's duties as an economic regulator, as set out in the Water Industry Act 1991.

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Impact on financing costs</li><li>• Impact on average bills</li><li>• Impact on the balance of charges between customers</li></ul>  | } <b>Protect the interest of consumers</b>                |
| <ul style="list-style-type: none"><li>• Enabling efficient competitive entry</li><li>• Encouraging movement of water where this provides environmental benefits</li><li>• Transparency, in terms of whether potential approaches are clear and can be seen to be providing a fair basis for price-setting</li><li>• Flexibility, so that it can evolve as the industry and the market develop</li></ul> | } <b>Promote effective competition</b>                    |
| <ul style="list-style-type: none"><li>• Enabling companies to recover efficient costs</li><li>• Meeting commitments to investors on the RCV</li></ul>   | } <b>Companies are able to finance their functions</b>    |
| <ul style="list-style-type: none"><li>• Encouraging the right level of investment</li><li>• Promoting efficient use of the network</li></ul>  | } <b>Promote efficiency and economy</b>                   |
| <ul style="list-style-type: none"><li>• Avoiding discrimination between different groups of customers, with no adverse impact on cost-reflectivity</li></ul>  | } <b>No undue preference or discrimination in charges</b> |

The approach also needs to be compliant with competition law, in particular avoiding margin squeeze, i.e. avoiding creating such a narrow margin between our price for selling essential inputs to a rival and our downstream price that a potential rival cannot effectively compete.

These objectives are consistent with those set out for access prices in the Cave report, that access prices should ensure that:

- “an efficient network operator is able to cover their costs;
- tariffs are non-discriminatory and cost-reflective; and
- efficient entry is supported”<sup>7</sup>

---

<sup>7</sup> Independent Review of Competition and Innovation in Water Markets: Final report, Professor Martin Cave, April 2009

#### 4. Approaches to pricing – the theory

This section considers the principles of upstream price-setting for the two main potential approaches:

- Prices based on average accounting costs, with a return derived from the RCV.
- Prices based on the incremental costs of increasing output, including costs of providing additional capacity (Long-Run Incremental Costs, or LRIC)

##### **Average cost pricing**

Ofwat refers to charging on the basis of average accounting costs as the ‘business-as-usual’ approach, because to date it has been the normal basis for assessing costs and setting charges in the water sector. Wholesale charges are currently set separately for water and waste water to recover average costs, including an allowance for return on capital, using the RCV for each service.

If prices are to be disaggregated further, it would be possible to set sub-limits for components of the value chain and to set access prices on the same basis as wholesale prices are currently set, i.e. using a split of accounting costs and of the RCV. Consistency with the overall approach to price-setting would have the advantage that it would be unlikely to create anomalies between charges for different customer groups or between charges for access and charges to customers. However, an average cost approach is only appropriate if it promotes economic efficiency, and in particular if it would permit efficient entry in potentially competitive parts of the supply chain. This means that there needs to be consideration of the relationship between average costs and the long-run incremental costs of adding to capacity.

Ofwat applies such a check in setting bulk supply prices as to whether average cost pricing would distort competition and prevent efficient entry, as set out in its framework for dealing with disputes<sup>8</sup>. Ofwat’s approach in setting bulk supply prices considers the circumstances and costs specific to the case in question. However, in terms of practicality, transparency and treating potential entrants equally, a standardised approach is necessary to setting access prices – if an average-cost approach will not in general permit efficient entry, then an alternative needs to be adopted. Ofwat has supported this view:

“We also think that those who wish to buy or sell water should know the price of access in advance and not have to negotiate on a case-by-case basis with the existing service provider”<sup>9</sup>

##### **Margin squeeze**

If an efficient competitor is unable to enter, then this does not promote economic efficiency and is potentially anti-competitive, in terms of creating margin squeeze.

---

<sup>8</sup> Our framework for resolving pricing disputes involving bulk supplies, Ofwat, [http://www.ofwat.gov.uk/regulating/casework/investigation/pap\\_pos\\_bulksupplydispute](http://www.ofwat.gov.uk/regulating/casework/investigation/pap_pos_bulksupplydispute)

<sup>9</sup> A hypothetical model for upstream water markets in England and Wales – a technical paper, Ofwat, January 2011

“A margin squeeze occurs when there is such a narrow margin between an integrated provider’s price for selling essential inputs to a rival and its downstream price that the rival cannot survive or effectively compete”<sup>10</sup>.

The Deutsche Telekom case in 2010 in the European Court of Justice<sup>11</sup> established margin squeeze claim as an abuse of dominant position under Article 102 of the Treaty on the Functioning of the European Union. It also established that national sector-specific regulation of prices is not a barrier to such an abuse being identified. It endorsed the application of an "equally efficient competitor" test, to assess whether margin squeeze exists. Broadly, this is constructed so as to examine whether a new entrant as efficient as the incumbent would be able to enter the market.

### **Long-run incremental cost pricing**

A test of whether margin squeeze exists is to compare the margin with the long-run incremental costs of an incumbent. Long-Run Incremental Cost (LRIC) takes a long-run, forward-looking view of costs, in which all costs are treated as being variable. The reference to “long run” means that the operator is assumed to undertake capital investment to increase the capacity of its existing productive assets. Hence all current costs could vary, including investment capital. A profit-maximising firm would not be expected to price a service below LRIC in the long run. (The term “long-run marginal cost” (LRMC) is also often used and for the purposes of this report the two terms are regarded as equivalent).

The importance of LRICs was recognised by Ofwat in its paper on a model for water markets:

“The marginal price signal is important for sending efficient investment signals. If the next unit of water is expensive in a water scarce area, companies will consider importing water from cheaper areas where water is relatively plentiful. They will also consider whether more demand management measures (such as leakage reduction) have become economic”<sup>12</sup>.

The forward-looking nature of LRIC means that it aims to mimic the workings of a competitive market and implies that historically-incurred costs may not necessarily be an appropriate cost benchmark for future prices.

LRIC is the cost that can be avoided by stopping, or cost that is incurred in increasing, the production of a specified increment given that all other products, services or network elements are still being provided at their original level. It captures all types of cost that can be avoided in the long run, including annual operating cost and an attribution of capital costs.

Calculation of LRIC can be on the basis of a “scorched earth” approach, which assumes that costs can be calculated on a “green field” basis, which assumes that the most efficient network

---

<sup>10</sup> Margin Squeeze, OECD Round Table, 2009

<sup>11</sup> Case C-280/08 P, Deutsche Telekom AG vs. the Commission, Judgment of the court 14.10.2010

<sup>12</sup> A hypothetical model for upstream water markets in England and Wales – a technical paper, Ofwat, January 2011

configuration selected, or a “scorched node” basis, which takes the current geographical configuration as the starting point. For water, this would include the current locations of resources and treatment works. Given the long life of many water industry assets, complete reconfiguration of the network is not a realistic approach. A scorched node approach is therefore taken in this paper, and is that which is generally used by regulatory bodies. An LRIC scorched node approach has been adopted in relation to Royal Mail access prices. Ofcom’s reasons for adopting an LRIC approach are set out below:

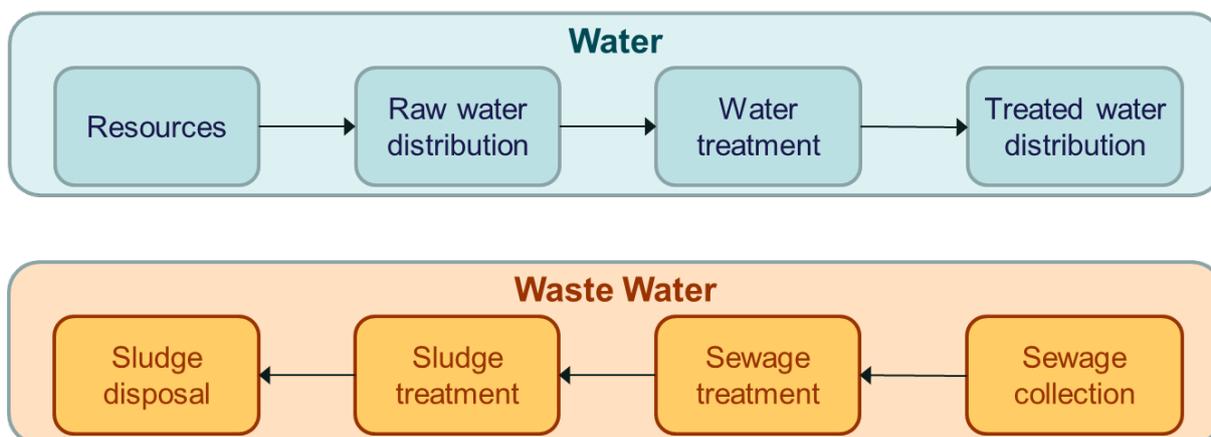
“the combination of Royal Mail’s market power both in the wholesale (downstream) markets and retail markets and its vertically integrated structure provided it with the ability and incentive to squeeze the margin of retail competitors using its downstream access products”.

“We believe that setting prices with reference to LRIC costs provides the correct signals for entry and investment in the market. Therefore in the long-term, we believe that Royal Mail should set its prices with reference to LRIC costs such that a minimum of LRIC margin is maintained between the access price and the equivalent retail price”.<sup>13</sup>

## 5. Applying average cost pricing to water

This section considers the implications of applying an average cost approach to the wholesale water value chain.

Ofwat already collects cost information for the following components of the value chain – potentially, separate prices may be set for each of these components.



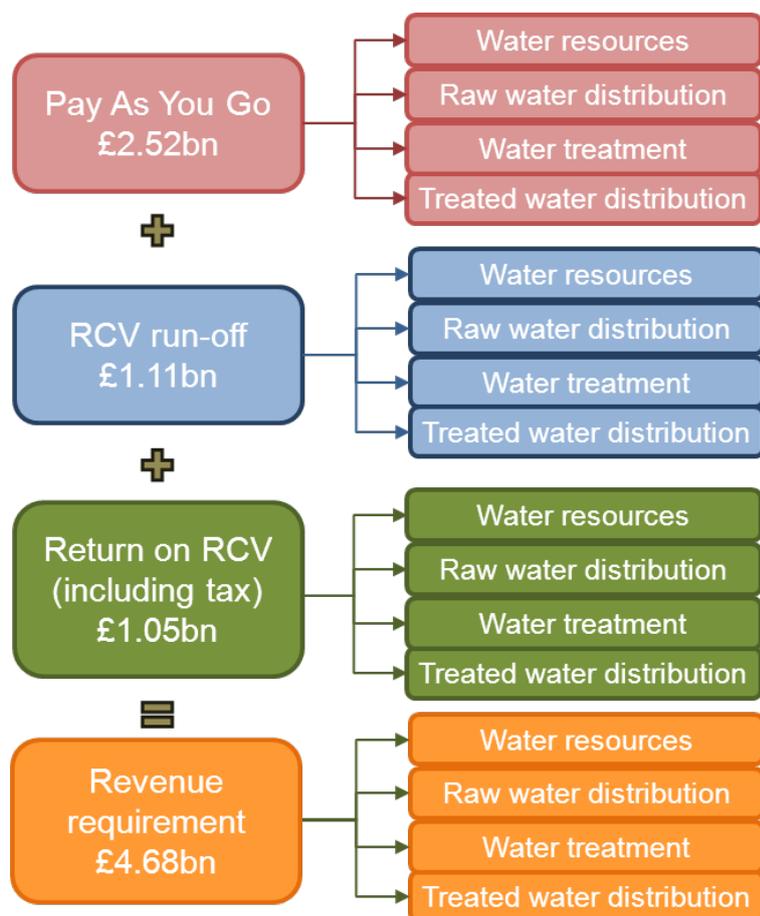
For water pricing, for the analysis below treated water distribution is taken to be the monopoly element of the value chain and other parts to be potentially competitive.

<sup>13</sup> Securing the Universal Postal Service - Proposals for the future framework for economic regulation, Annex 7: Access, Ofcom, October 2011

**Average cost pricing**

The wholesale water price limit for AMP6 is built up from Pay As You Go income, RCV run-off and return on RCV. The average cost approach to splitting prices would use the same approach for the components of the value chain as for water in total, splitting each element of price-setting into the components, as shown below.

**AMP6 price-setting components (£bn per year, national total)**



This approach would ensure that the overall objective of cost recovery is met, and that the approach for each component is in line with the overall approach. This is Ofwat’s “business as usual” approach. The access price for each part of the value chain would then be the price as derived from this split.

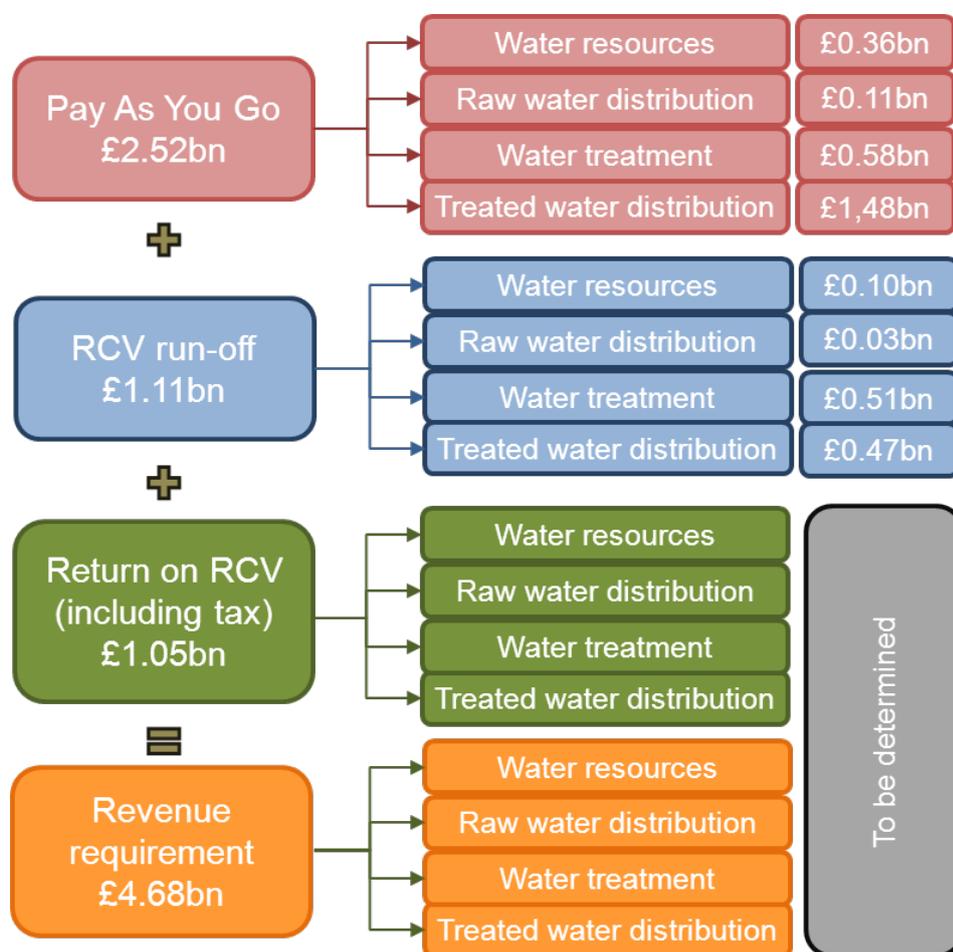
This split of the revenue requirement components for AMP6 is not available for the components of the value chain but we have opex, infrastructure renewals charge (IRC) and current cost depreciation (CCD) from the Regulatory Accounts. These can be used to provide an estimate of the split of the price-setting components. For the purposes of this analysis, we have split the AMP6 Determination for Wholesale Water between the components of the value chain on the basis set out below.

## Upstream pricing

Category	Approach to splitting between value chain components	% of total revenue requirement	
		UU	National
Pay As You Go	Split in proportion to opex + IRC	49%	53%
RCV run-off	Split in proportion to CCD	27%	24%
Return	To be determined (see below)	24%	23%

At a national level, this gives the results shown below.

### AMP6 national revenue requirement - £bn per year



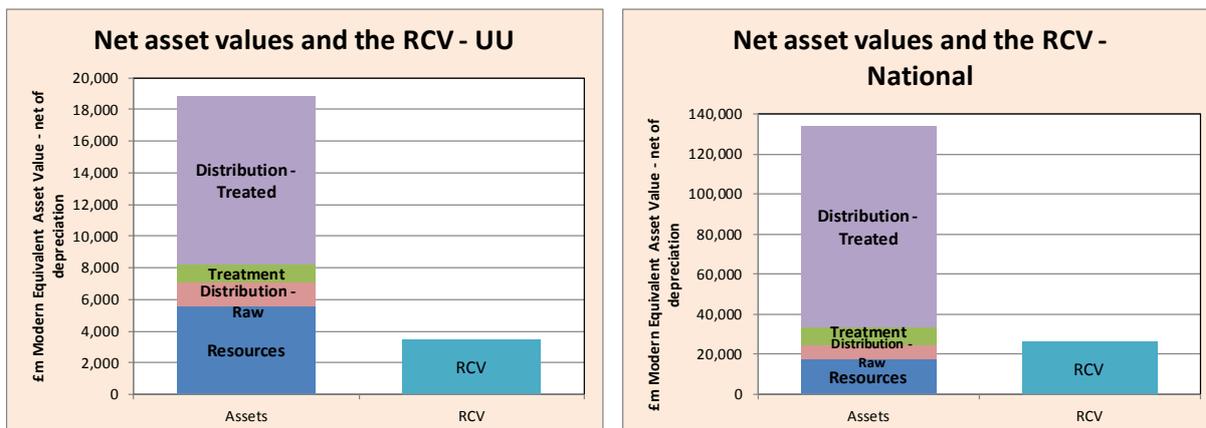
The next step is to determine the basis for splitting the RCV.

### Splitting the RCV

The split of the RCV could be based on the value of the assets in each part of the value chain.

The RCV for water is significantly less than the net replacement cost of assets, as shown in the graphs below (on average, about 20% of net assets, based on Modern Equivalent Asset

Value, with a range from 12% to 34%). This is because at privatisation water companies were sold at less than the value of their assets.



This discount will continue permanently at a broadly constant level, as maintenance spend on existing assets, added to the RCV, will be approximately balanced by RCV run-off (although the discount as a proportion of total asset value will diminish slowly if the RCV continues to grow). Therefore any approach to splitting the RCV based on asset value needs to determine how to allocate this discount.

Two options are considered below for splitting the RCV – in proportion to assets, and focusing the discount on the monopoly treated water distribution assets (so that resource assets are at full cost, with the intention of enabling a new entrant, faced with purchasing resources at full price, to compete on equal terms). These alternatives were considered in Ofwat’s discussion paper on access prices, and in the Cave report:

“In the case of pre-privatisation assets, the regulatory capital value discount of around 80 per cent means that the costs of the assets may be substantially below their depreciated modern equivalent values. Under such circumstances, alternative suppliers may be unable to displace even inefficient existing assets. Equivalence with pre-privatisation assets could be achieved by:

- focusing the regulatory capital value discount on the contestable parts of the value chain, allowing the price of treatment to rise to its discounted modern equivalent but reducing the price of non-contestable elements, thereby leaving overall prices unchanged. Depending on the way the regulatory capital value was allocated, this could leave the non-contestable elements with low or even negative capital values, impacting companies’ ability to fund their functions; or
- allocating the regulatory capital value proportionately, maintaining the current price of non-contestable elements, but allowing the price of treatment to rise to the level of the best new entrant, thereby increasing prices. Windfall gains by incumbents could then be clawed back by the regulator and used to offset the increase in prices”<sup>14</sup>.

<sup>14</sup> Independent Review of Competition and Innovation in Water Markets: Final report, Professor Martin Cave, April 2009. The above quote refers to focusing the discount on the contestable parts but it is clear from elsewhere in the report that it is intended that it is distribution assets which should be discounted.

A similar issue arose in relation to gas “unbundling” in the 1990s. The choice was between:

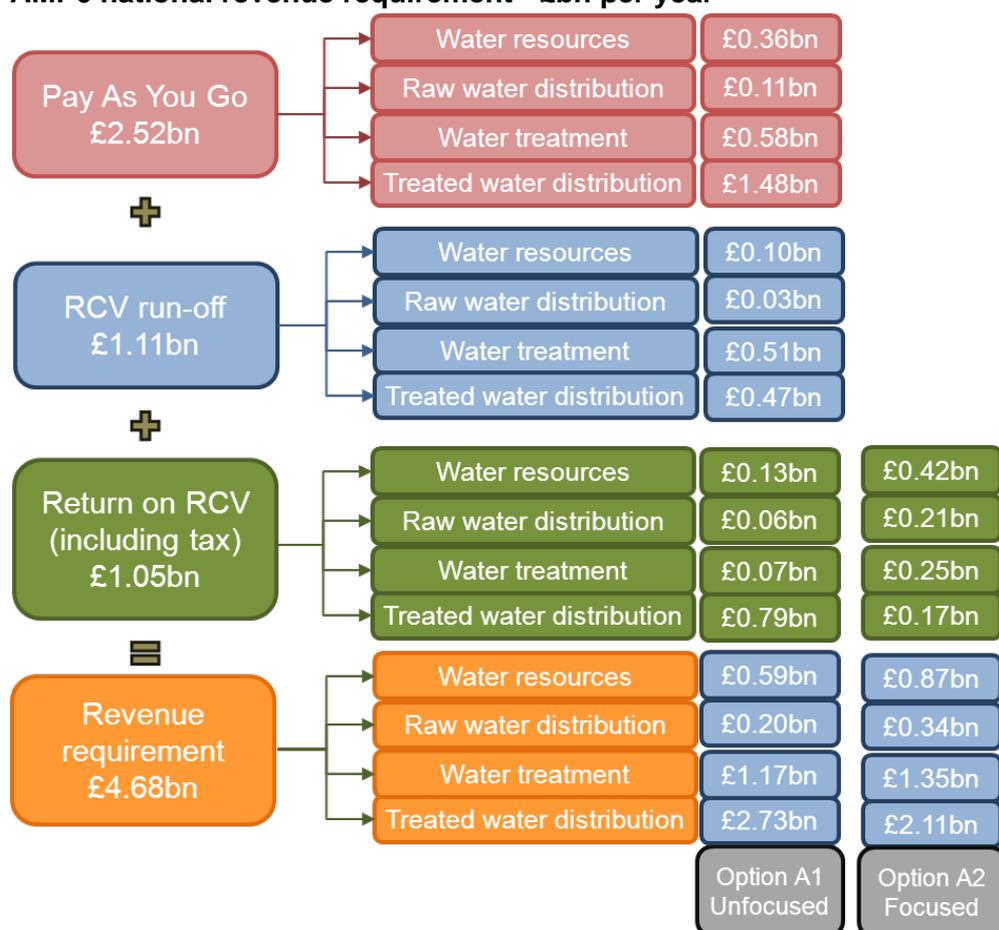
- A ‘focused’ reallocation, under which all of the privatisation discount would be allocated to the transmission business and its Regulatory Asset Base; and
- An ‘unfocused’ allocation, under which the privatisation discount would be allocated across the monopoly network and other businesses.

The eventual Monopolies and Mergers Commission decision was in favour of the unfocused approach, which spread the privatisation discount between the transport business and the storage business. This was principally because the business had been privatised as a whole with a discount to asset value, and the RCV had been created and added to as a single value. Therefore anything other than a proportional split might have been regarded as retrospective and affected investor confidence.

### Pricing – the results from splitting the RCV

The split of the AMP6 revenue requirement is shown below, for a focused and unfocused approach to splitting the RCV.

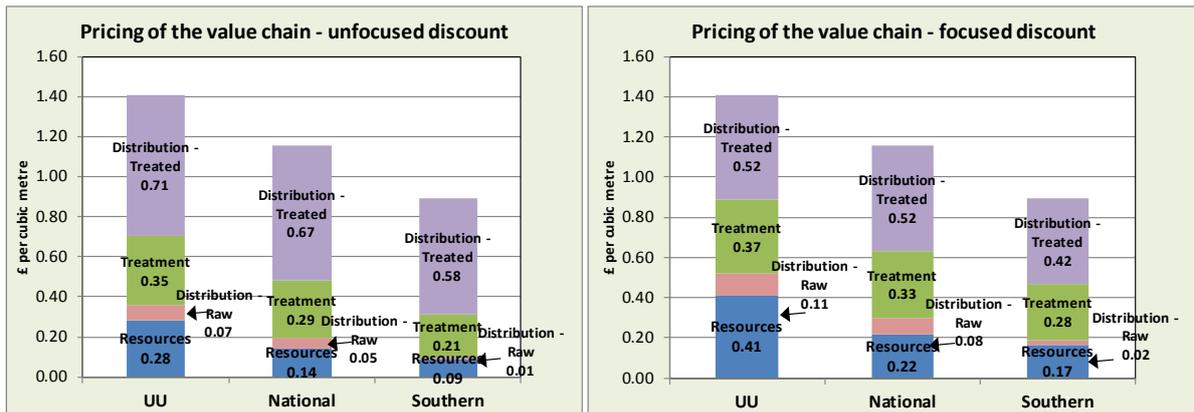
#### AMP6 national revenue requirement - £bn per year



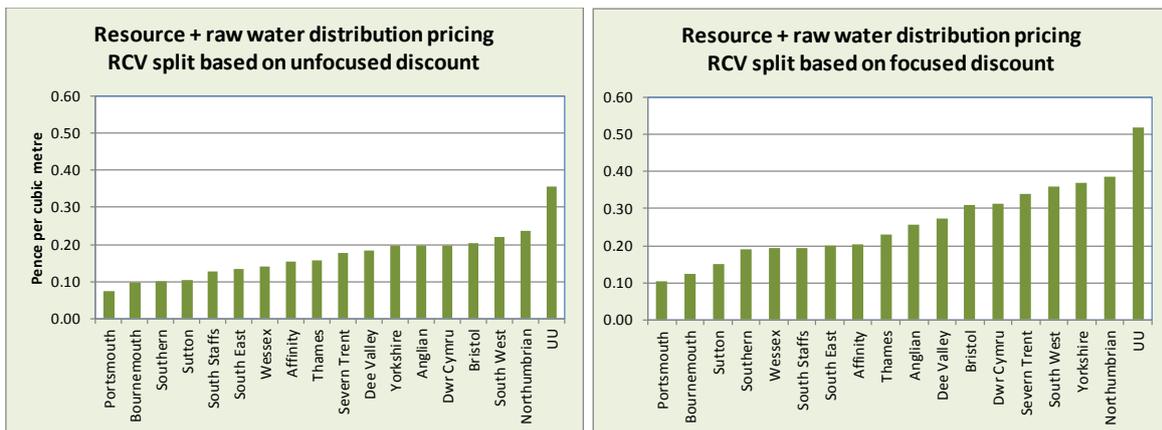
## Upstream pricing

The pricing of the value chain which results from a focused and unfocused approach is shown below for a company with high resource asset value (UU), a company with low resource asset value (Southern) and nationally.

Whether with a focused or unfocused discount, UU stands out as having high resource prices. This is mainly because of the high asset value of the company's resources (UU has almost a third of national resource asset value, compared with 11% of national water distribution input). In contrast, Southern with relatively few and smaller reservoirs, has low prices.



The graphs and map below show that, whether the discount is focused or unfocused, companies in the south and east would tend to have lower resource prices than those in the north and west (because there are more reservoirs and aqueducts, which have a high asset value, in the north and west). Therefore resource pricing on this basis would not encourage movement of water to the south and east where resources are more scarce and costs of new resources higher. This would be at odds with government and regulatory objectives.



**The geographical distribution of water resource prices – based on focused RCV discount**



Jon Stern has noted the potential gain from movement of water south-eastwards:

“The pattern of water supply and demand in England and Wales is that there are excess supplies in the North and West and supply shortages in the South and East. In consequence, provided that there is sufficient interconnection capacity within and between regions, there should be major potential gains from trade both in bulk water supplies as well as in trade of abstraction licences”<sup>15</sup>.

Resource pricing based on average cost would have the opposite effect from that outlined by Jon Stern. Resource pricing on the above basis is compared below with examples of LRICs of new resources shown in companies’ Water Resource Management Plans (WRMPs) (for companies where sufficient information is publicly available). The table below shows that:

- In the **south and east**, resources would generally be priced below LRIC, whether the RCV discount is focused or unfocused (resource prices below LRIC are shown in **black**). An efficient new entrant would be unlikely to be able to compete.
- In the **north and west**, resources would generally be priced above LRIC, particularly with a focused discount (resource prices above LRIC are shown in **red**), and an inefficient new entrant could compete.

<sup>15</sup> Introducing competition into England and Wales water industry – lessons from UK and EU energy market liberalisation, Jon Stern, City University, September 2010

## Upstream pricing

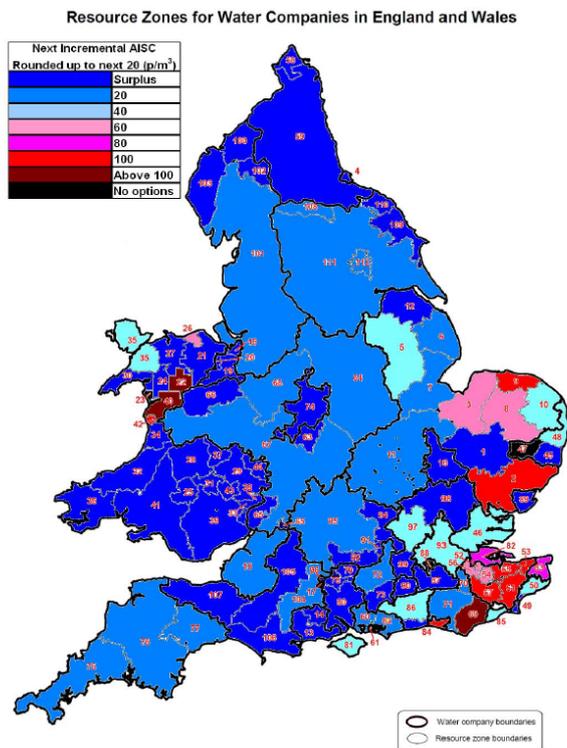
	Resource prices (pence / cubic metre)				
Company	Average Incremental Cost (AIC) in WRMP	Resource price – unfocused	Difference between AIC and unfocused resource price	Resource price – focused	Difference between AIC and focused resource price
<b>North and West</b>					
UU	16p (integrated resource zone)	35.7p	<b>-20p</b>	51.9p	<b>-36p</b>
Severn Trent	18p	17.7p	<b>0</b>	33.9p	<b>-16p</b>
Yorkshire	14p (Grid zone)	19.6p	<b>-6p</b>	37.0p	<b>-23p</b>
<b>South and East</b>					
Affinity	48p	15.4p	<b>33p</b>	20.3p	<b>28p</b>
South East	32p	13.5p	<b>19p</b>	20.1p	<b>12p</b>
Anglian	24p	19.6p	<b>4p</b>	25.7p	<b>-2p</b>
Sutton & E Surrey	44p	10.5p	<b>33p</b>	15.0p	<b>29p</b>
Thames	42p	15.8p	<b>26p</b>	23.1p	<b>19p</b>

This discrepancy between LRIC and average costs is probably largely a problem in relation to water resource pricing, rather than for water treatment. There may be some tendency for rising water treatment costs when water is scarce, because more costly sources may be used, but this is less strong than the tendency for resource costs to rise with increasing scarcity.

A similar pattern of LRICs for water resources was shown by Ofwat from 2009 Water Resource Management Plans, as shown in the map below. High LRIC zones (the red and pink zones) are almost all in the south and east<sup>16</sup>, where there is the most limited availability of new resources, and greatest additional demand from growing population.

<sup>16</sup> A study on potential benefits of upstream markets in the water sector in England and Wales, Ofwat, March 2010

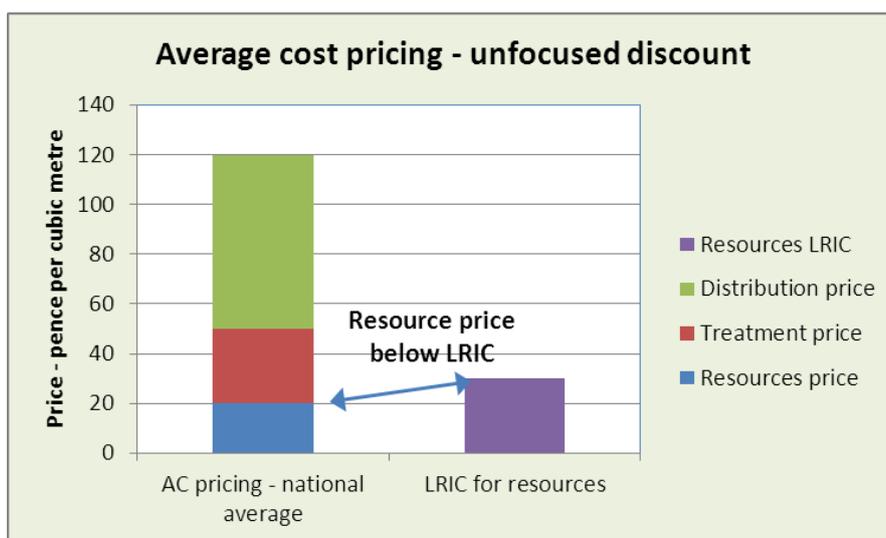
# Upstream pricing



## Average cost pricing for water resources – summary of the effects

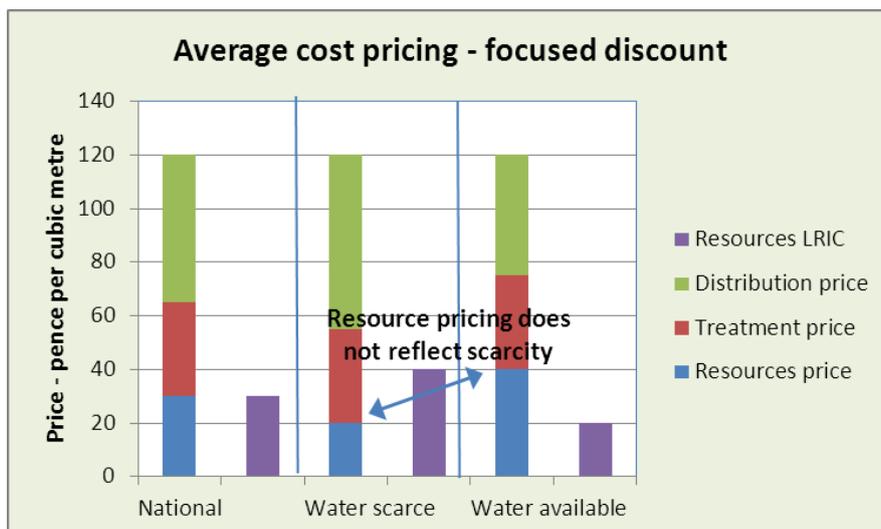
The simplified examples below show the limitations of average cost pricing.

With an unfocused discount, in many areas average cost pricing would lead to resources being priced below LRIC and a new entrant would be unable to compete.



With a focused discount, in some areas resource prices would be above LRIC and inefficient entry would be possible. In other areas resource prices would be significantly below LRIC and

new resource-owning entrants could not compete, which would be problematic under competition law.



Typical figures for a company in the south and east, based on the 2014 WRMPs and using a focused discount approach to the RCV, would be as shown below:

Resources and raw water – LRIC for new resource for incumbent	Resources and raw water distribution price – based on average costs	Treatment and treated distribution price – based on average costs	Wholesale price
40p	20p	90p (= access price for untreated water)	110p

Therefore the potential approach based on average cost pricing does not promote efficiency and is potentially anti-competitive in the south and east, in that a new entrant as efficient as the incumbent would not be able to enter the market. A 20p margin between access price and wholesale price would not be sufficient to cover 40p costs of providing new resources. The relative prices between water-scarce and water-available areas are the opposite of those which would be needed to result in the right economic outcome.

### Conclusions on average cost pricing

An average cost pricing approach is not appropriate for water resources. Pricing needs to be based on LRIC. This is a long-established principle, as set out in, for example, a 1997 paper by London Economics for Ofwat:

“If competition is to be based on genuine cost efficiencies then prices must reflect marginal costs, unaffected by the capital value discount. Prices based on average costs, however the capital value discount is allocated, will distort competition”<sup>17</sup>.

<sup>17</sup> Water Pricing: the importance of long-run marginal costs, London Economics, January 1997

This conclusion is in line with that suggested by Jon Stern and Jonathan Mirrlees-Black, who proposed:

“We suggest that, as a starting point, it [pricing of resources] needs to reflect the LRMC [long-run marginal cost] of new supplies. This means that it reflects what we could reasonably expect prices to be in an effective market”<sup>18</sup>.

Our analysis of regional variations in average cost and LRMC strengthens the conclusions of earlier studies.

## **6. Implementing a long-run incremental cost (LRIC) approach**

The above analysis shows that average cost pricing does not meet objectives for upstream pricing. Therefore options for implementing an LRIC approach to resource pricing are considered below. The options evaluated are:

I1 Apply to access pricing only

I2 Apply to access pricing and resource planning

Apply to access pricing and resource pricing – full split of upstream prices:

I3 Split the RCV, with a market value approach to the allocation of RCV to resources

I4 Retain whole RCV in monopoly business

I5 Replace the RCV approach for resources with contracts – make compensation payments to adjust returns

### **I1. LRIC pricing – apply to access pricing only**

The above analysis has shown that:

- Resources need to be priced at LRIC for economic efficiency, allowing an efficient market to operate, and competition law compliance.
- Overall water pricing needs to be at average cost (to enable companies to recover their total costs, including normal profits, but no more than that).

In order to achieve these two objectives, access pricing for the network needs to be set at:

Total average cost, i.e. the overall wholesale price

**Less**

LRIC for resources in each Water Resource Zone

Access prices will be low where resource LRICs are high, and high where resource LRICs are low.

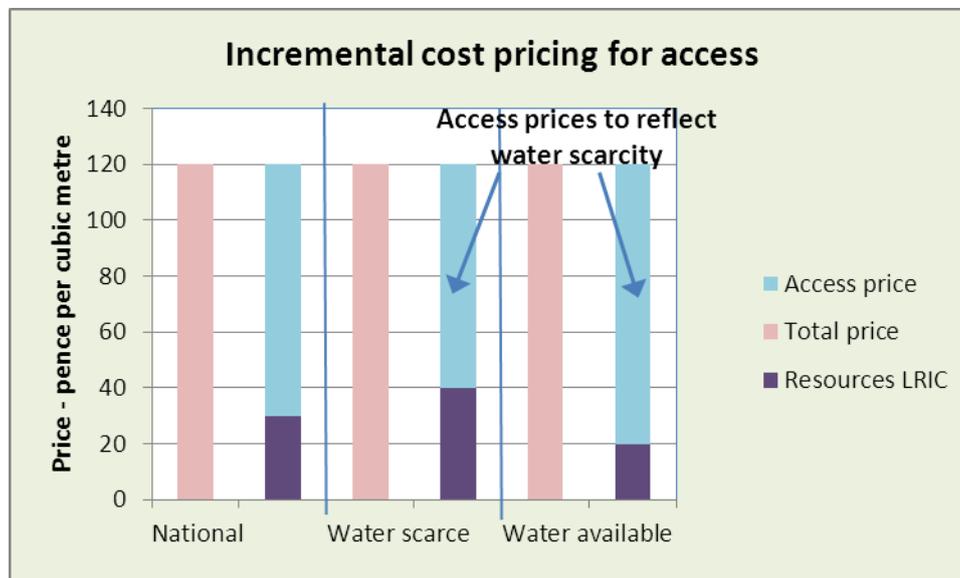
In Water Resource Management Plans environmental costs are taken into account in assessing LRICs. It would be possible to ensure that these were incorporated into incumbents'

---

<sup>18</sup> A framework for valuing water in England and Wales from 2015 onwards, CCRP Working Paper No. 19, Jon Stern and Jonathan Mirrlees-Black, October 2011

and entrants' prices either through a new approach to abstraction charging or through extension of the Abstraction Incentive Mechanism. Further work would be needed on development of this.

The approach is illustrated in the graph below.



Pricing in this way does not require a split of the RCV between the different components of the water wholesale value chain – and there are advantages in not making a split, as then changes in LRIC due to changes in availability of water can be more easily accommodated.

LRICs can be obtained from Water Resource Management Plans. There is an incentive to submit accurate costs, rather than keeping estimates down to deter entry, because too low a cost estimate will result in insufficient provision in price limits.

This approach means that either:

- The wholesale price is retained as a single price limit, with prices disaggregated only for the purpose of setting access prices; or
- Any disaggregation of prices for price-setting purposes is done on a different basis from pricing for access. This would enable the greater regulatory scrutiny which may be possible with disaggregation of price limits, while avoiding the problems associated with differences between average cost and LRIC.

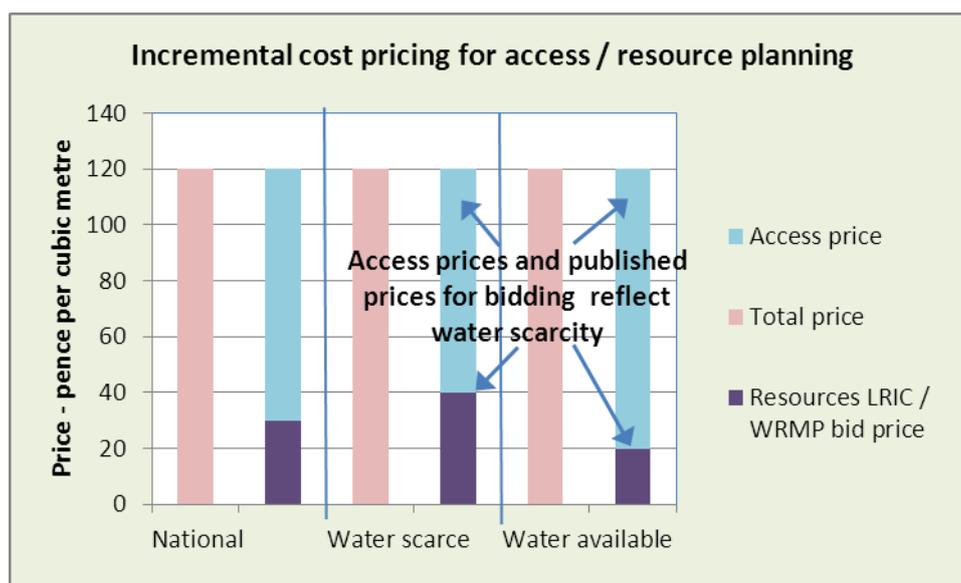
Basing wholesale prices on average cost, while a component of the value chain is implicitly priced at LRIC, has the potential to create anomalies. For example, the wholesale price for large users might be less than the LRIC of resources. This is an issue which it may be possible to address by changes in the balance of charges over time. In the past, Ofwat has suggested that charges for large users should not be below LRMC of new resources.

This approach has the advantage of being relatively simple to implement, with limited change from the current approach to price-setting, while achieving the objective of allowing an efficient market to operate by establishing appropriate access prices.

The current “costs principle” approach also involves setting access prices at wholesale price less a deduction for incremental costs. However, the costs principle approach is case-specific, and the calculation of incremental costs is of specific costs avoided. Therefore it only takes into account capital cost savings if a specific project can be deferred. As a result, it often leads to a low estimate of avoided costs and therefore to access prices which would not enable efficient entry to the market. An approach using wholesale prices minus LRIC treats the incumbent and a new entrant even-handedly. The calculation takes into account capital costs and will allow an entrant to invest in capacity to enter, if the entrant can match or beat the incumbent’s costs for new resources.

## 12. LRIC pricing – apply to access pricing and resource planning

Under this approach, the resource price for each Water Resource Zone, as well as being the basis for setting access prices, would be a published price for potential providers of water resources to beat. Entrants would have the choice of entry by selling to retailers or final customers, and paying an access price, or supplying to the wholesaler if they can beat the published zone price. It would also give an indication of prices at which companies will sell to others (subject to it being possible to transfer the water). This is illustrated in the graph below.



This would be an extension of measures already taken to encourage trading between companies for the last price review and water resource plan cycle. Publication of a price for each zone would make it much easier for companies to evaluate whether they would be in a position to beat the incumbent’s resource price.

Applying LRIC cost pricing to additional water resources could also be carried out through a “single buyer” model, as applied in some countries to energy, and considered (but ultimately rejected) by the Cave Review. This would involve a separate entity inviting bids to provide water – existing resources could be priced on the basis of current prices, and additional capacity prices would be likely to be around the level of LRIC.

This resembles the approach now being applied in the energy market. Capacity market auctions are being held, and generators who are successful in the auction will benefit from a

steady, predictable revenue stream (capacity payments) that encourages them to invest in new generation or to keep existing generation available on the system.

In its simplest form, this option would be relatively simple to implement, while achieving the objective of allowing an efficient market to operate by establishing appropriate access prices, and further encouraging trading as part of the Water Resource Management Plan process. Establishing a single buyer would be a much more radical change (and could be considered if the simpler measures did not promote competition sufficiently).

### Apply to access pricing and resource pricing – full split of upstream prices

Approaches involving a full split of upstream prices raise issues relating to:

- How can an overall wholesale price based on average cost be reconciled with at least one component of the value chain being priced at LRIC?
- Will the RCV be split? If so, how? What will the impact be on investors and financing? (The issue of the RCV and financing is addressed in greater detail in Section 8 below).

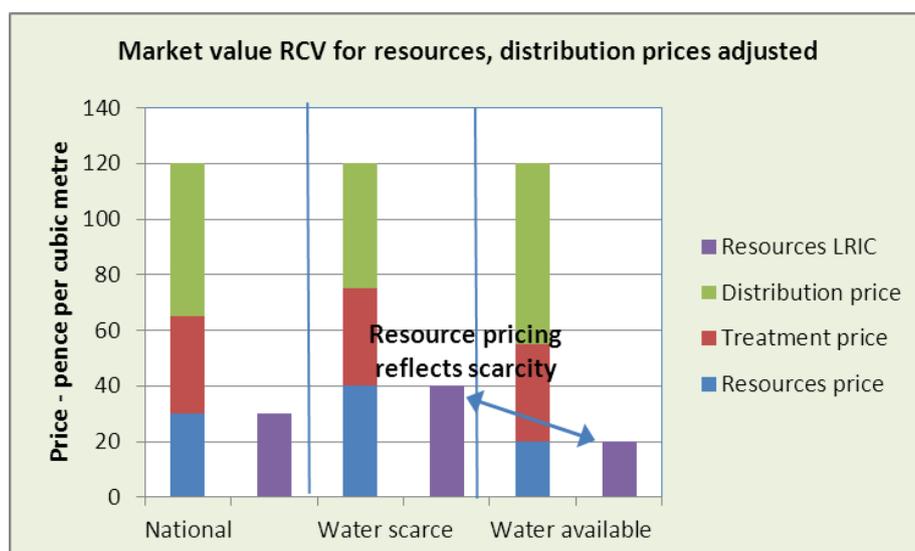
Options for addressing these issues are considered below.

### I3. Split the RCV, with a market value approach to the allocation of RCV to resources

As noted by Stern and Mirrlees-Black, prices in an efficient market would be at the LRIC of new supplies. The value of existing supplies would reflect the return earned at that price. Therefore the RCV attributable to existing resources could be calculated from the price, i.e. by:

$$\text{RCV for resources} = (\text{Resource price} \times \text{volume} - \text{resources operating costs} - \text{resources capital charges}) / \text{Cost of capital}$$

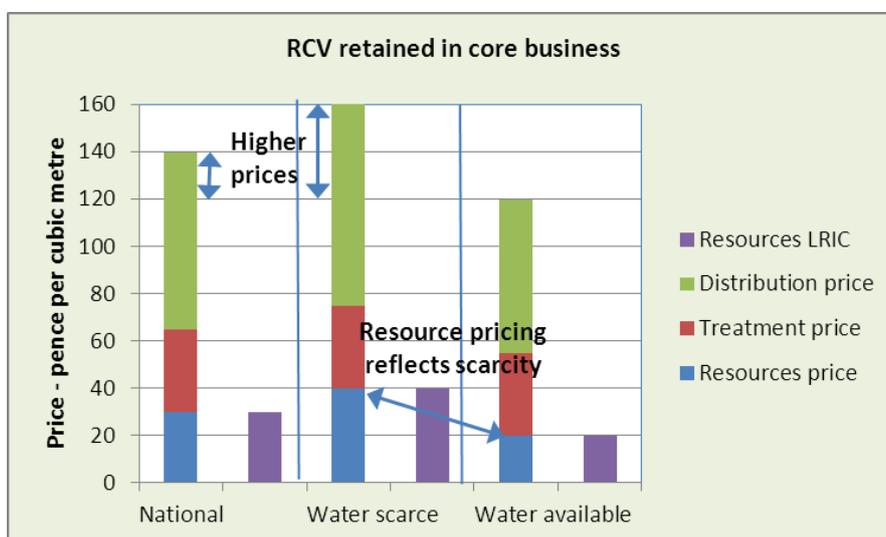
The resulting price split is shown in the graph below.



This approach would result in more than the total RCV allocated to resources for some companies, where water resources are scarce, and negative or minimal RCV in resources for other companies, where resources are more plentiful. This is not a sustainable option, without taking some action to protect returns on existing assets. Otherwise the impact on financing for some companies of putting all the RCV into the competitive market, where returns would become uncertain, would be very large, and likely to outweigh any benefits of greater competition.

**I4. Retain the RCV in the monopoly business – market pricing for resources**

It would be possible to price resources at LRIC but not split the RCV. If, however, all the RCV was retained in the monopoly business this would result in prices increasing – prices could rise by up to 20% where LRICs for resources are relatively high, and companies would make excessive profits.



This option meets the objectives of creating an efficient market, and ensuring companies can finance their functions by retaining the RCV. However, this is at the expense of increasing bills. This is, therefore, not a sustainable option unless there is some means to redistribute the additional profits in the monopoly business.

**I5. Split upstream prices – replace the RCV approach for resources with contracts – make compensation payments to adjust returns**

Whether RCV is retained solely in the core business (as in option I4), or split in proportion to assets (as discussed in Section 5), an approach to pricing which involves:

- Pricing resources at LRIC.
- Pricing the rest of the wholesale value chain at average cost.

can lead to over or under-recovery in total.

A solution is needed which adjusts income received by incumbent companies, so that resources can be priced at LRIC but companies' income relating to existing resources is not increased or decreased. This could allow an efficient market to be established, while

customers' bills are not increased and companies can continue to earn a reasonable return. Some possible mechanisms are discussed below.

### **Adjustment mechanisms – “Contracts for difference”**

George Yarrow has suggested a solution whereby domestic customers would be entitled to a lump sum rebate, to reflect the difference between LRIC pricing and conventional average cost pricing – prices at the margin could then reflect the LRIC of water<sup>19</sup>.

This could work for domestic consumers, where the range of consumption is relatively small. However, for non-household customers, it would result in prices rising for large customers.

Stern and Mirrlees-Black suggested transitional payments, with the mechanism being:

“...identified historic resources (existing today or in 2015) receive a transition payment. This transition payment would be calculated as the difference between the revenue requirement, and the LRMC. It would be positive (if revenue requirement is above LRMC) or negative (if revenue requirement is below LRMC)... One method frequently adopted is by adjustment to allowed network revenues and prices. This has the advantage of minimizing competitive distortions and it is also a published adjustment to a regulated price”.

This could be workable but transitional payments would be likely to be required for a very long period, given the long life of water resources and the limited extent of addition to capacity.

Stern and Mirrlees-Black also suggest that “investors should also be satisfied with a conversion of some of the RCV into a contractual mechanism with the resources business. Indeed, it is worth emphasizing that a contractual mechanism typically has greater guarantees over its security than does an RCV”.

In the energy market, low-carbon generation is encouraged by “Contracts for difference”, which compensate generators of renewable energy for the difference between generation cost and market price. The arrangement could involve:

- Retailers / customers paying the market price for resources to a Market Operator.
- Wholesaler, for existing resources, receiving the lower price based on average cost pricing.
- An independent body (a Market Operator) pays back the difference to customers. (An alternative method of operation, with separate distribution and resources companies, would be through the distribution company receiving the CfD payments, which would be deducted from the distribution revenue requirement, so the “rebate” would take the form of lower distribution charges).

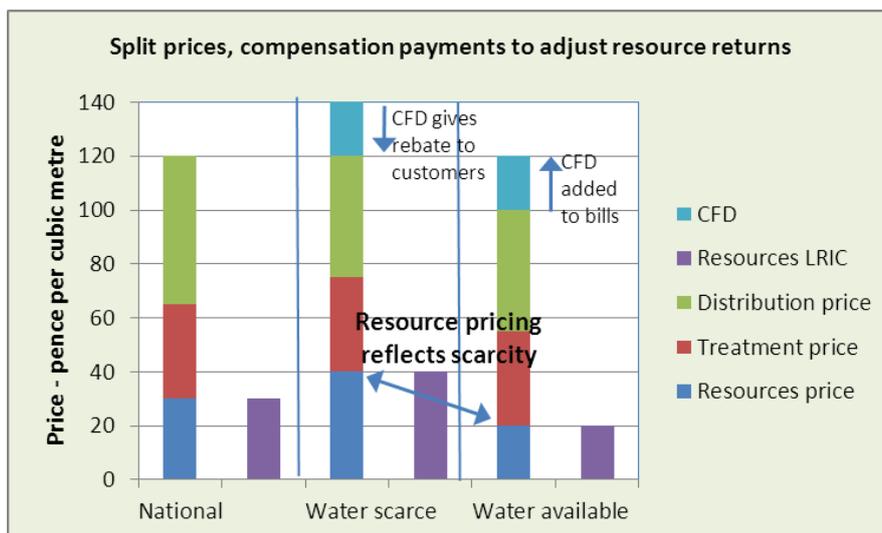
This differs from the “single buyer” approach in that it would only apply to existing resources – new resources would be priced competitively through bilateral contracts between retailers and competing wholesalers. However, it could be extended to some new resources, for example:

---

<sup>19</sup> Discovering the value of water, George Yarrow, XVIII Beesley Lectures, October 2008

- Where a potential project is needed in case of drought, but may not be used sufficiently frequently for it to be financeable from customer revenue.
- Where a project is so large and costly that a potential provider needs some certainty about future prices (as is proposed in energy for the new nuclear reactor at Hinkley Point).

The approach is illustrated in the graph below.



### Operation of contracts for difference

The operation of contracts for difference is illustrated below for an area where LRIC (40p per cubic metre) is above average cost (25p per cubic metre):

- There is a contract for difference (CFD) for existing resources of -15p per cubic metre.
- The incremental price of 40p per cubic metre is charged to all retailers for resources (if new entrants have a lower price this could eventually change the assessment of market price)
- The 15p per cubic metre contract for difference for existing resources is paid by the incumbent to the Market Operator (MO) (total of £60m).
- This is spread across all water supply inputs, and returned by the Market Operator (MO) to all retailers to give a rebate on bills (this averages 13.3p per cubic metre).

## Upstream pricing

	Million cubic metres	£ per cu m			£m				
		Price	Cost	Contract for difference	Charge to retailers	CFD to MO	Net company revenue	Rebate spread by MO	Charge to customers
Existing resources	400	0.40	0.25	-0.15	160	-60	100	-53	107
New resources	50	0.40	0.40		20		20	-7	13
	450				180	-60	120	-60	120
Per cu m (£)					0.400	-0.133			0.267

The average cost for existing resources needs to be calculated in order to determine the value of the contracts for difference. This could be on the basis of operating costs and capital charges only, or could include an allocation of RCV. If an RCV allocation is included, then where LRICs are higher than average costs for existing resources this would reduce the difference between average costs and LRICs, and the contract for difference would be smaller.

If the RCV is split then we propose that the split be made in proportion to asset value, i.e. an unfocused approach. This would be consistent with other regulatory decisions and in line with the methods companies have used for setting charges. Applying a focused split might be regarded as retrospective and affect investor confidence. The reason for a focused split would be to achieve prices which would allow competitive entry but, as discussed in Section 5, this objective is not achieved by focusing the discount, and an LRIC approach is needed.

Using the approach of contracts for difference, for the monopoly network prices would be set using the approach currently applied at price reviews for wholesale prices in total, including a return on RCV. Charging for access to the network would use the prices set in the price review.

The standard access prices would be on the basis that the network has capacity to deal with the input of water from a new entrant at the proposed location of input. If additions to network capacity are required, then there would need to be an additional charge. This could be spread over a period in order to avoid deterring entry. The cost of additions to the network would be added to the RCV (the RCV would continue to be used in the same way as currently for network expenditure). If a new entrant were to default on payments then this would add to customers' bills, so there would need to be some provisions on credit risk.

### Conclusions on options

The most viable options are either a limited application of LRIC pricing, or a wider application with some form of compensation payments to adjust returns on existing resources. The financing implications of the options are considered in Section 8, but before this pricing structure issues are discussed in Section 7.

## 7. Pricing structure

The setting of prices for the components of the upstream value chain raises the issue of whether prices should be based on regional averages, as overall customer prices currently are, or should reflect variation in costs within the region.

The above approach, with access pricing for the network set at total average cost less LRIC for resources, indicates that there should be different access prices for each Water Resource Zone (since these are the areas for which LRICs are calculated for WRMPs). This would be a single price for a zone - movement of water across zones, if feasible, would involve a higher charge.

This approach makes no allowance for access price variation within a zone for geographical differences in distribution costs. It is assumed that the prime requirement for access prices is to enable efficient entry for resource competition, and the proposed approach delivers this. It would be possible to have variations above or below this overall level, according to the level of local distribution costs. However, it is not clear that there are significant benefits from this, in terms of incentivising efficient use of the network. In addition, not reflecting variations in distribution costs avoids pressure for major changes in the geographic pattern of customer prices, as pointed out by George Yarrow:

“...so long as transportation of the relevant commodity remains a regulated monopoly, there is no reason to think that the introduction of competition into other activities undertaken in a sector will give rise to any immediate and direct pressures for a major change in the geographic pattern of pricing.... Or, put another way: geographic variations in prices are driven by the charging regime for transportation services. Thus, the introduction of competition at both the retail and wholesale levels in gas and electricity markets has had little impact on the geographic differentiation of energy prices.”<sup>20</sup>

It would, however, be possible to have an approach which varied access prices with location. This could be justified if there are large variations in distribution costs within a zone, and it is important to send the right locational signals for new resource development. Access prices would then be higher or lower where marginal distribution costs are higher or lower than the average for a zone. This would create greater complexity, and possible conflict with regionally averaged prices would need to be assessed, but this could be considered without undermining the general principle.

The lack of a grid means that there is more scope for variations in upstream wholesale prices for water than there is for electricity or gas. However, the proposed approach, with higher access prices where resource costs are low, mean that this would not be reflected in pressures to change averaging of prices to final customers.

Stern and Mirrlees-Black come to similar conclusions. They consider pricing based on:

- A “postage stamp” charge, with a single charge per unit
- Network LRMC

---

<sup>20</sup> Markets in Water: Some issues surrounding policy development in a context of potentially increasing resource scarcity, George Yarrow, Regulatory Policy Institute, April 2010

- Network SRMC (short-run marginal cost)

They conclude that the single charge is best, because:

- (i) “It is simple. The data needed to implement such an approach should be readily available, essentially being the total costs to be recovered from customers connected to the relevant part of the network, and the expected volume.
- (ii) It is easily understood. There is no “black box” needed to calculate charges.
- (iii) The distortions to behaviour are likely to be small in the first instance.
- (iv) If it proves to be unsatisfactory, it is straightforward to amend it later on the basis of additional analysis.
- (v) Doing anything more complex could provide an unnecessary barrier to implementing market reform early”.

Stern and Mirrlees-Black suggested that pricing should be calculated as the average of LRMCs for the Water Resource Zones in a company area. However, there are significant differences between LRMCs for different zones, and zones may be geographically separated or impractical to connect. Therefore we consider that different pricing for each zone based on its LRMC would better promote economic efficiency and preserve regional average pricing for customers.

### **8. Upstream pricing – implications for financing**

Options for building LRIC pricing of resources into the regulatory framework have been discussed above. Some of these options have implications for the RCV. This section considers the implications of potential changes to the price-setting approach, in particular changes to the RCV, for future financing.

The main issues are:

- Allocation of RCV to contestable activities, where it is uncertain whether a return can be earned, would affect confidence in the stability of the regulatory regime, as finance has been provided at low rates on the basis of relatively low risk. In a competitive market companies have to charge market prices rather than basing a return on RCV (and in airport regulation, there has been some move away from price-setting based on RCV to bilateral contracts because the airports have limited market power).
- Changes involving allocation of RCV to contestable activities would require renegotiation of financing in a number of companies, and creditors may require a premium for any adjustment.
- Increasing competition will inevitably have some effect on risk and therefore on the cost of capital. Different frameworks for pricing are likely to have differing effects on the cost of capital.

The extent of these impacts will vary according to the option selected. Changes which might have a more limited effect, because they preserve the confidence in returns on previous investment, include:

- Changes which only affect future investment.
- Changes replacing the RCV approach with long-term contracts.

The government and Ofwat recognise the financing benefits from the commitment to the RCV and the transparency and consistency in its calculation.. The government said in the Water White Paper that “We want to preserve the features of the current regime which have proved so attractive to investors” and ministers have supported the need for a stable framework, for example in Richard Benyon’s speech to the Water 2010 conference that: he had “heard a clear message that a stable policy and regulatory framework is essential for the water industry to remain attractive to the investment community”<sup>21</sup>. At PR14 Ofwat confirmed its commitment to continuing use of the RCV:

“We have made the following commitments...

- Continuing to protect efficiently incurred capital expenditure that is in the RCV at 31 March 2015 (when current price controls expire).
- Continuing to use the RCV as the main mechanism for cost recovery of investment beyond 2015”<sup>22</sup>.

The benefits of the current regulatory approach to financing are considered in more detail in Appendix 1.

Average cost pricing approaches, involving a split of the RCV, would create difficulties for future financing. However, the LRIC approaches discussed above enable an efficient market to be established while protecting returns on past investment.

## 9. Evaluation of options

The options for upstream pricing are evaluated below against the criteria set out in Section 3. Some aspects of the options would need further investigation, as indicated by “?” in the evaluation. For example, this report has referred to possible impacts on the balance of charges in Section 7 but we have not considered it in detail.

---

<sup>21</sup> Water 2010 Conference, Richard Benyon (Parliamentary Under-Secretary of State at Defra), October 2010 (<https://www.gov.uk/government/speeches/richard-benyon-water-2010-speech>)

<sup>22</sup> Future price limits – what does it mean for investors, Ofwat, May 2012

As the table shows, average cost pricing approaches (A1 and A2) do not meet the criteria of complying with competition law, protecting customer interests, or promoting efficient competition. Therefore an LRIC approach is necessary.

Of the LRIC approaches:

- We do not view I3 as a workable option because of the impact on financing.
- We do not believe that I4 would be acceptable because of the impact on prices.
- Whereas I1, I2 and I5 are all options that could be capable of meeting the objectives we have set out.

Option I5 (using contracts for difference) has the advantages over options I1 and I2 of greater transparency for potential entrants and enabling price limits to be set for each component of the upstream value chain.

Upstream pricing for water

Evaluation of options – the overall assessment against each of the main criteria is shown in bold.

Key

✓✓	Fully meets criterion	x?	Criterion may not be met – some uncertainty	?	Impact uncertain
✓	Generally meets criterion	x	Criterion not met		
✓?	Criterion may be met – some uncertainty	xx	Falls well short of meeting criterion		

Criterion	Option						
	A1	A2	I1	I2	I3	I4	I5
	AC pricing – unfocused discount	AC pricing – focused discount	Pricing on total cost minus resource LRIC For access prices	Pricing on total cost minus resource LRIC For access prices and WRMPs	Split RCV – market value RCV for resources	RCV in monopoly business – market pricing for resources	Split prices – compensation payments through contracts for difference to adjust resources returns
<b>Compliance with competition law for resource entry</b>	<b>xx</b>	<b>x</b>	<b>✓✓</b>	<b>✓✓</b>	<b>✓✓</b>	<b>✓✓</b>	<b>✓✓</b>
<b>Protect the interest of consumers</b>	<b>x?</b>	<b>xx</b>	<b>✓✓</b>	<b>✓✓</b>	<b>x</b>	<b>xx</b>	<b>✓✓</b>
Financing costs	x?	xx	✓✓	✓✓	x	✓✓	✓✓
Average bills	✓✓	✓	✓✓	✓✓	x	xx	✓✓
Balance of charges between customers	✓	?	?	?	?	?	?
<b>Promote effective competition</b>	<b>xx</b>	<b>xx</b>	<b>✓</b>	<b>✓</b>	<b>✓✓</b>	<b>✓✓</b>	<b>✓✓</b>
Enabling efficient competitive entry	xx	xx	✓✓	✓✓	✓✓	✓✓	✓✓

Upstream pricing for water

Criterion	Option						
	A1	A2	I1	I2	I3	I4	I5
	AC pricing – unfocused discount	AC pricing – focused discount	Pricing on total cost minus resource LRIC	Pricing on total cost minus resource LRIC	Split RCV – market value RCV for resources	RCV in monopoly business – market pricing for resources	Split prices – compensation payments through contracts for difference to adjust resources returns
For access prices			For access prices and WRMPs				
Transparency	✓✓	✓✓	✓	✓	✓✓	✓✓	✓✓
Flexibility	x	x	✓✓	✓✓	✓	✓	✓✓
<b>Companies are able to finance their functions</b>	<b>xx</b>	<b>xx</b>	✓✓	✓✓	x	✓✓	✓✓
Recovery of efficient costs for companies	x?	xx	✓✓	✓✓	x?	✓✓	✓✓
Meeting commitment to investors on the RCV	xx	xx	✓✓	✓✓	xx	✓✓	✓✓
<b>Promote efficiency and economy</b>	<b>x</b>	<b>x</b>	✓	✓	✓	✓	✓
Facilitating the right level of investment	x	x	✓	✓	✓	✓	✓
Network efficiency	?	?	?	?	?	?	?
<b>No undue preference or discrimination in charges</b>							
Avoiding discrimination between customer groups	✓✓	✓✓	✓?	✓?	✓✓	✓✓	✓✓

## 10. Application to other components of the value chain

The approach developed above has addressed issues in relation to water resources of:

- The RCV discount on full value of assets.
- The difference between LRIC and average costs.

The discrepancy between LRIC and average costs is probably largely a problem in relation to water resource pricing, rather than for other components of the value chain. The issues of scarcity in relation to developing new water resource capacity do not apply to the same extent to the other components. There is, however, less information available on LRIC for other components of the value chain than there is for water resources, and further work is needed. This applies particularly to sludge for which, as noted in Section 2, we assume separate pricing will be needed by PR19. It would, however, be possible to use average costs as a proxy for LRIC until further information is available.

The issue of the RCV discount on full value of assets applies to all contestable components of the value chain. The RCV discount is a less significant issue for other components than it is for water resources, because water, sewage and sludge treatment are less capital-intensive and return on capital is a smaller part of the total cost than for water resources. It could, however, still have an impact on competition, as noted by the OFT in its report on organic waste:

“These capital costs are provided for in price limits on the basis of the RCV, which is heavily discounted against replacement costs (by 80 – 90 per cent)... these arrangements could potentially allow the incremental costs of providing the OOW [other organic waste] capacity to be significantly understated by a WaSC when compared with the incremental costs identified by an unregulated business. Also ... WaSCs benefit from the way in which the current economic regulation system provides for a return to be earned on the RCV. This means, in turn, that they have significantly lower financing costs than those of other waste businesses”<sup>23</sup>.

The contracts for difference approach could be applied to sludge in the same way as set out in Section 6 for water resources, with:

- Market price for sludge set on the basis of a full return on assets and an appropriate rate of return for a competitive market.
- The contract for difference value for current sludge operations set to allow for the lower return on existing assets, and the lower return in a regulated environment.

---

<sup>23</sup> Organic waste : An OFT market study, Office of Fair Trading, September 2011

## 11. Conclusions

The key objectives for upstream pricing are that the framework should:

- Be in customers' interests, in terms of having the optimum impact on bills and services.
- Promote protection of the environment.
- Provide a framework for competition in which potential entrants can have confidence, in terms of enabling successful entry where they can provide a better and/or cheaper service to customers.
- Provide a framework in which investors have trust, by providing a reasonable balance between risk and reward.

In order to meet these objectives, the pricing approach has to take into account the difference between average costs of existing water resources and the LRICs of new resources.

We have identified options which would enable this difference to be addressed. These involve:

- Setting prices for access based on LRICs for water resources, but not otherwise disaggregating prices in the wholesale value chain; or
- Establishing arrangements which allow the resource costs within final customer bills to continue to be priced on an average cost basis, but new resources to be priced at LRIC, through use of contracts for difference.

We consider that the approach using contracts for difference is the preferred solution, as it provides greatest transparency for potential entrants and enables price limits to be set for each component of the upstream value chain. This approach can potentially be applied to any component of the wholesale value chain which is being opened up to competition.

Further work is needed to refine how this option would be implemented, including:

- Ensuring that a common method is used in calculating long-run incremental costs.
- Development of an approach to take into account environmental costs.
- Setting out the detailed operation of contracts for difference.
- Assessment of a market price for sludge.

## **Appendix 1 – Financing Implications of the RCV approach**

### **The RCV and commitment to returns**

The RCV has provided a long-term commitment to returns on past investment. The importance of a commitment to a long-term return on an infrastructure investment has been set out by Dieter Helm:

“What distinguishes network infrastructures from other activities is the wide gulf between average and marginal costs. Infrastructure investments tend to be long-term and capital-intensive. Investors sink capital in the creation of networks. Once it is sunk, the marginal costs before congestion is reached are typically close to zero. This feature also characterizes a range of broader infrastructure: wind farms, nuclear power stations, reservoirs, broadband networks, port facilities, and airports share this average to marginal cost difference.

The sunk costs alone make this sort of investment risky, but when the life of the assets is considered, technical progress comes into play, too. For example, a conventional electricity meter may be stranded by new smart meters, and new generation technologies may now put building nuclear pressurized water reactors (PWRs) at risk of stranding.

In such circumstances, in the private sector, the usual solution is a long-term contract. Investors bargain with potential customers: they will sink the capital if the customers agree to buy the output and desist from behaving opportunistically if a better offer subsequently comes along. The contract binds the customers to pay the average costs. Examples such as long-term property leases reflect this.”<sup>24</sup>

Dieter Helm made similar points in comments on the draft Water Bill in 2012:

“Once a new asset has been built, provided the costs were efficient, it is “bought” by the RAB and then provided with a return through the duty on the regulator to ensure that the functions are financed. Investors know they will not be expropriated, and have an independent regulator with statutory duties to protect them. So successful has this mechanism been that the cost of capital in the water industry has been very low, it has little difficulty in raising new finance, and a host of international investors have bought into the model”<sup>25</sup>.

### **Government and regulatory views**

The need for this commitment has been recognised by government and Ofwat. The Government White Paper in 2011 stated that:

“We want to preserve the features of the current regime which have proved so attractive to investors. Attracting new equity investors will help reduce the risks around

---

<sup>24</sup> "Infrastructure investment, the cost of capital, and regulation: an assessment", Dieter Helm, Oxford Review of Economic Policy, December 2009

<sup>25</sup> "The Draft Water Bill — a critique", Dieter Helm, 7th September 2012

the financing of the sector given its heavy dependence on debt financing. Ensuring the sector remains an attractive prospect for investors will enable water companies to deliver continued investment at costs that customers will find acceptable”.<sup>26</sup>

Ofwat published a paper in 2011, as part of the review of its approach to price-setting, in which noted that:

“The RCV tool provides a degree of commitment to remunerate investors for delivering substantial investment programmes for long-life assets. This commitment to the RCV and the transparency and consistency in its calculation has allowed companies to raise finance at competitive rates. It has also allowed them to achieve a relatively low cost of capital despite the significant investment requirements and the cash flow negative nature of the sectors.”<sup>27</sup>

“the RCV has become the key measure against which investors assess enterprise value of each company and against which leverage is measured by the markets. It is has become enshrined in bond covenants and is used by the markets as the base by which to measure a company’s indebtedness (that is, gearing as measured by net debt as a percentage of the RCV)”.

Ofwat also pointed out, however, that the protection from asset stranding could mean that:

- Investors continue to receive returns for past investment which may now be inefficient;
- It contributes to a bias towards capital-intensive solutions.

Ofwat has addressed the capex bias issue through changing to a total expenditure approach at PR14. In relation to continuing returns on past investment which is no longer efficient, this may be desirable, as Helm pointed out. It is this protection against opportunistic switching if “a better offer comes along” which keeps the financing costs low.

In its statement of principles for PR14 Ofwat reaffirmed a commitment to use of the RCV approach:

“all existing assets that are efficiently incurred within the current price control period [i.e. to 2014-15] will remain in the RCV. We also confirm that we intend to continue using the RCV when setting wholesale price controls in the future”<sup>28</sup>.

### **The impact of the RCV framework on financing**

Jon Stern has noted the possible benefits of an RCV approach for financing costs:

“RABs have maintained a low cost of capital for privately financed infrastructure investment in the areas which they cover – typically much lower than would be paid under project finance contracts (e.g. 5-7% rather than 15% or more)”<sup>29</sup>

---

<sup>26</sup> “Water for Life, Government White Paper, 2011, paragraph 5.25

<sup>27</sup> “Financeability and financing the asset base – a discussion paper” , Ofwat (2011)

<sup>28</sup> Future price limits – statement of principles, Ofwat, May 2012

<sup>29</sup> The Role of the Regulatory Asset Base as an Instrument of Regulatory Commitment, Jon Stern, Centre for Competition and Regulatory Policy (CCRP) Working Paper No 22, (March 2013)

Ofwat commissioned Richard Nourse to undertake work on how competition reform and vertical separation affects financing<sup>30</sup>. Some key conclusions from this were:

- “From a credit perspective, any material allocation of the current RCV to contestable activities would, depending on the risk of stranding and approach to regulation of these activities, likely be problematic because of the effect that would have on many of the companies’ existing borrowing; any focusing of RCV into those areas would be worse. It would increase operational leverage of the residual network business (increasing business risk) and materially affect financeability.
- Existing covenants mean that models that rely on allocating “large amounts” of the current RCV to contestable activities are being “discounted” by investors as they would in all likelihood trigger “Material adverse change in regulation” covenants in all the securitised companies and possibly some of the others.
- Contestability in new build is seen by investors as being possible to effect. However, some covenants of existing debt may not allow these non-regulated activities to be conducted within current group structures”.

A study by NERA for Water UK in 2008 made similar points about financial restructuring:

“it appears to us to be difficult to make any notable competitive reform without needing to revisit many of the existing debt financing arrangements. The cost of revisiting these arrangements would be determined by negotiations between the parties guided by law. We have shown that relevant benchmarks for these costs can be measured in billions of pounds...”<sup>31</sup>

However, Mirrlees and Stern suggested that:

“we also think that investors should also be satisfied with a conversion of some of the RCV into a contractual mechanism with the resources business. Indeed, it is worth emphasizing that a contractual mechanism typically has greater guarantees over its security than does an RCV”.

The Cave report made a similar point, referring to:

“the possibility that greater use of long-term contracts for at least some merchant plant supply [supply into competitive wholesale markets] could materialise, thereby potentially reducing the impact on the level of gearing and income risk”

This suggests that much could depend on the nature of future arrangements if RCVs are split or their use is discontinued in contestable parts of the value chain. Approaches to create contracts for existing resources, such as the contracts for difference approach discussed above, could remove much of the additional risk.

---

<sup>30</sup> Competition proposals and financing issues: A report for Ofwat, Richard Nourse, February 2009

<sup>31</sup> Financial Implications of Competition Models, NERA for Water UK, 2008

### **Impact of alternative approaches to RCV on the cost of capital**

Options which involve pricing each component of the value chain based on average costs, with an allocation of RCV related to assets, inevitably involve a split of the RCV. However, the options based on long-run incremental cost pricing, with some protection for pricing of existing resources, do not require any split.

Impacts on the cost of capital are highly uncertain but some estimates exist. The NERA report suggested that the impact of higher risk from competition on the cost of capital could be up to 14% higher bills (not taking into account potential benefits), with an unfocussed approach to business opening values, and 23% if the RCV discount was focused.

The Cave review final report also noted that the impact on the cost of capital of an RCV split would depend on whether the RCV discount was focused on network assets. The report suggested that a central estimate for the impact on the cost of capital of market competition would be 2.5%, with a range of 1% to 4% (which would have an effect on bills similar to that in the NERA study). It did, however, suggest that these costs were outweighed by the benefits.