

# Agenda

## Advancing economics in business

### The future of water upstream?

**The issue of competition in upstream activities of the UK water sector has been debated for some time now. With new provisions outlined in the Water Act 2014, the practicalities of designing a regulatory regime that makes competition viable and delivers benefits to customers require careful thought. What should the upstream access pricing regime look like, and what are the implications for the regulatory capital value (RCV)?**

As part of its Water 2020 project, Ofwat, the economic regulator of the water industry in England and Wales, asked Severn Trent to look at the issue of upstream access pricing and the future allocation of the RCV. To assist with this, Oxera worked with Severn Trent to provide an assessment of possible access pricing methodologies that might be suitable for different entry points upstream. This covered a number of interesting issues. It required an understanding of the commercial models that might emerge, the incentives faced by different players in each model, and the economic properties of different access pricing options.<sup>1</sup> At the same time, we explored different options for the treatment of RCV, in terms of cost recovery and remunerating new investment.<sup>2</sup>

A key component of the Water Act is reforming the licensing regime, which will allow upstream-only entry (resources and, potentially, treatment) into the water value chain without the need to also hold a retail licence (a current limitation of the regime). However, an upstream entrant will need to be connected to its own or another licensee's retail entity—a bilateral trading model. Separate licences for wastewater wholesale and wastewater disposal will also be introduced. These licence changes will not come into force before 2020.

The changes will need to be considered jointly with future reforms to abstraction licence trading, and will need to be implemented gradually. They will also need to complement developments that are already happening, including changes to the incentives for bulk water trading between companies, and ongoing innovation in sludge treatment and disposal (particularly anaerobic digestion).<sup>3</sup>

### Upstream markets, upstream economics

Importantly, the Water Act implies that Ofwat will need to set charging rules for the different types of access in water and wastewater and for bulk supplies. This article focuses mainly on assessing possible options for charging

new entrants for access to the water distribution network (which represents the non-contestable—i.e. naturally monopolistic—element of the value chain) and, potentially, water treatment facilities (which may be contestable in some instances). However, Oxera's study also explored options relating to entry in sewerage (mainly with regard to the possibility of entrants providing sludge treatment and disposal), and the pricing of bulk supplies.

In assessing the relative merits of different access pricing methodologies, it is worth bearing in mind some of the unique features—and the underlying economics—of the water sector.

- Assets involved in the provision of water and wastewater are characterised by very long economic lives which are not typically observed in other sectors. This means that, if existing assets are 'displaced' by entrants, it may take many years for the costs to disappear from the system. In other words, the costs of operating the existing assets cannot be reduced very quickly, leading to stranded asset costs.
- The cost structure of the water sector is unusual in that the transportation of water (which, as noted above, is a naturally monopolistic activity) comprises a much greater proportion of total underlying economic costs than in other industries, such as energy.
- Water networks are often relatively local and do not easily lend themselves to the creation of an integrated national grid. Water is relatively costly to pump over long distances, limiting the extent of net benefits from existing and future inter- and intra-connectivity. Larger pipes tend to be present around major population centres, with smaller pipes in rural areas and towards the water company boundaries, so these networks were generally not designed to be interconnected. There are, however, some interconnections between companies through

transfer schemes and bulk supplies (many of which were inherited from the pre-privatisation era), and some work has been undertaken by companies since privatisation on within-area connectivity (e.g. ring mains in the Severn Trent, United Utilities and Yorkshire Water areas; and other within-area changes in abstraction licences/transfers).

- Due to the high capital value discount at the time of privatisation, the RCV, a key driver of customer bills, remains materially lower than the replacement cost of assets. Thus, prevailing customer tariffs sit at a level some way below the true economic costs of end-to-end water/wastewater provision, some 25 years after privatisation.<sup>4</sup> The gap between the RCV and replacement cost is also large compared to other infrastructure sectors. The RCV in the water sector effectively puts an upper bound on aggregate customer prices, which may in turn limit the possibility for new entry.

This suggests that the sources of long-run net benefits of upstream competition might be less obvious and less easy to deliver in the water sector than in other sectors. It is also important to recognise another important objective on the government and regulatory agenda—that is, addressing the challenges of population growth, climate change, and water scarcity in different regions. Upstream competition could certainly contribute to addressing the challenges, but it cannot be guaranteed to deliver the objectives.

In assessing the relative merits of different options, Oxera had specific regard to two important dimensions.

- **Promoting efficient competition.** We assumed that Ofwat was likely to place more weight on longer-term efficiencies due to competition (i.e. the scope for widespread entry to reduce industry costs or improve sustainability, service levels and choice tomorrow) than on shorter-term efficiency considerations.
- **Ensuring that customers experience benefits from introducing competition.** While in the long run competition may lead to lower costs (and subsequently lower prices), there may be some initial costs and potentially stranded assets associated with making entry happen. Ofwat's position is likely to be that these costs should be borne primarily by the industry (i.e. investors) rather than customers.

As discussed below, the extent to which efficient entry and beneficial customer impacts are achieved depends on the access pricing model adopted, and its detailed implementation.

## Wholesale-minus or cost-plus?

In developing potential approaches to access pricing, a key question is the choice of the cost standard. The possible options typically fall within two categories.

- **The Economic Component Pricing Rule (ECPR),** sometimes referred to as **retail-minus**. In the context of upstream entry in the water sector, it might be more appropriate to refer to it as **wholesale-minus**. Effectively, the access charge paid by the entrant is equal to the incumbent's wholesale price (which covers end-to-end costs of abstracting, treating and delivering water less retail costs) minus some measure of cost (typically costs that are avoided by the incumbent as a result of entry).
- **Cost-based approaches.** These look at the actual cost of providing access through the pipes and pumps used to transport water to customers.

In turn, these approaches can be assessed in terms of delivering (or not delivering) against a variety of criteria, including:

- **productive efficiency**—to what extent does the approach lead to reduced costs in the short term?
- **dynamic efficiency**—to what extent does the approach lead to reduced costs in the longer term?
- **cost recovery**—does the approach enable the incumbent, in providing access, to recover its relevant costs (which will affect all customers)?
- **cost reflectivity**—to what extent are charges reflective of the costs of supply (including at a geographical level)?
- **social equity**—to what extent does the approach retain cross-subsidies (including at the geographical level)?
- **compliance with competition law**—is the approach likely to pass a margin squeeze test?

Any change to the pricing methodology needs to consider the existing charging guidance and the access pricing regimes currently adopted by water companies. The latest guidance (issued in 2011) states that access prices for 'combined supplies' (i.e. upstream plus retail entry) should be set in accordance with the Costs Principle, which Ofwat has historically interpreted as requiring a particular—and narrow—form of retail-minus (i.e. ECPR), implemented for each water resource zone (WRZ).<sup>5</sup>

The basic aim of the ECPR is to provide adequate incentives for the entrant's make-or-buy decision and achieve productive efficiencies. In principle, under this rule entry would occur only if the entrant is more (productively) efficient than the incumbent (i.e. if the entrant has a lower cost than the avoided cost of the incumbent, it is productively efficient for access to occur). It is typically applied in the context of a vertically integrated incumbent, potentially (although not necessarily) taking as a given the current cost structure of the industry. Existing cross-subsidies in the value chain can be retained for end-users—for example in relation to geographic averaging, thereby maintaining social equity.

However, the current narrow application of the ECPR in the water sector leans heavily towards achieving short-term productive efficiency, rather than dynamic efficiency: in facilitating access, the only costs that are subtracted are the (albeit longer-term) avoidable costs associated with the specific entrant—which may be quite low. In addition, reasonable expenses associated with providing access can be added to the access price. Taken together, entry would be feasible only where the single entrant reduces overall industry costs, including compensating the incumbent for the reasonable costs incurred in facilitating entry. This may mean that no entry actually occurs. It is also unlikely that a such cost standard would pass a margin squeeze test.<sup>6</sup>

Hence, if applying an ECPR approach in future, a longer-term assessment of avoided costs, taking account of more extensive entry and the consequent impact on industry costs, is likely to be required to secure dynamic efficiency and competition law compliance.

But there is still the issue of whether access prices should be based on an ECPR approach at all, or on more of a cost-plus approach. Where things currently stand is that the Water Act removes the Costs Principle and replaces it with a requirement for Ofwat to issue industry codes (based on guidance from Defra and Welsh ministers). Both ECPR and cost-plus are possible approaches for access pricing going forward. The choice often comes down to regulatory objectives (outlined above) and industry structure. Applying the ECPR assumes a vertically integrated sector upstream in which there are benefits to this integration (e.g. economies of scope). A cost-plus approach assumes more separation between upstream activities (and hence fewer vertical economies of scope). Ultimately, the practicality of each approach is vital.

In cost-plus approaches, a crucial issue concerns how the existing RCV is allocated between resources and treatment (the potentially contestable services) and distribution. In considering how this might be achieved, a distinction can be made between the concepts of ‘focused’ and ‘unfocused’ RCV allocation. Allocating the RCV using a focused approach, in which a greater proportion is allocated to the potentially contestable upstream activities, may lead to entry and dynamic efficiencies, but also to access prices that are too low (or even negative) and that do not allow the network business to recover its costs. Industry costs may also increase in the short term, resulting in productive inefficiencies. On the other hand, allocating the RCV using an unfocused approach (in which the RCV is allocated to the access network according to the percentage of book value) is likely to lead to access prices that are high, meaning little entry and hence few dynamic efficiencies. However, such access prices may also generate a margin squeeze, and would need to be considered carefully in the context of competition law.

Assuming that Ofwat’s overriding focus is on the longer-term efficiencies arising from competition, an access pricing regime is needed that makes entry more viable and allows some of these benefits to be realised. In theory, this requires

a regime that enables entrants to recover the forward-looking cost of contestable activities, taking into account variations in cost relevant to the context of entry (e.g. regional factors).

Further, assuming that Ofwat also considers that customers should experience net benefits from competition, it will want to ensure that any costs arising from the introduction of competition are not fully borne by customers such that they are worse off as a result of competition.

These considerations suggest that any form of cost-plus approach to access pricing is unlikely to be feasible in the water sector, certainly in the short term but potentially even in the medium and longer term. The key reason for this is the RCV used to underpin the existing wholesale charges. The RCV still exhibits a very large capital value discount, which reflects the basis on which the companies were privatised over 25 years ago. As a result, the aggregate RCV remains some way from being a helpful indicator of economic asset values and replacement costs. Moreover, the long-lived nature of these assets means that the problem will not go away and, in the case of any displacement of existing assets, it may take many years for the costs to be removed from the system.

## Modified ECPR in practice?

In practice, a modified ECPR—or wholesale-minus—approach to access pricing is likely to be required, as long as there is greater clarity about its application, and the ‘minus’ component reflects a meaningful measure of avoided costs.

Indeed, it has previously been suggested by Severn Trent that some form of modified wholesale-minus approach would be appropriate (in the context of water trading) in which regional long-run marginal cost (LRMC) is subtracted from wholesale charges.<sup>7</sup>

Nonetheless, LRMC—as applied in the water sector—is not the same as LRIC. LRMC refers to how total costs increase as output increases by one unit when all inputs (including capital) may be varied. LRIC refers to costs that, in the long run, are directly attributable to, or caused solely by, a sustained product or service(s) increment, over and above the provision of existing products or services. LRMC may be regarded as a special case of LRIC where the ‘service increment’ is an additional amount of water.

An approach to assessing avoided cost that is based on LRIC is theoretically most likely to ensure that efficient entry occurs in the long run. It is also reconcilable with competition law. The regime could be applied at the level of each WRZ to ensure that geographical differences in costs are reflected in the access charge, while at the same time retaining geographical averaging in end-user prices.<sup>8</sup>

However, the water sector is unique in several respects, which may limit the applicability and desirability of a pure LRIC-based approach to assessing avoided upstream costs. First, upstream entry may not lead to full

displacement of an incumbent's existing assets, due to scale and modularity. Second, where assets are displaced (in part or in full), the costs of these assets might not be removed from the system for a long time. In other words, the 'frictional' costs of introducing competition in the water sector can potentially be material.

By subtracting LRIC from wholesale charges, the entry generated may mean that, due to the above factors, overall costs across the industry are not reduced over the medium term, or even the longer term. Using a pure LRIC approach as part of a wholesale-minus methodology may also generate problems for cost recovery for the network business.

This suggests that a LRAC measure that lies somewhere below the true LRIC but above LRMC could strike the right balance. This measure could be based largely on LRIC, but, in defining an appropriate time horizon for the LRIC model, it might be appropriate to use a timescale of between 10 and 20 years (as used in other sectors) rather than the time horizon spanning the full life of the assets. Alternatively, the LRAC could be based on some form of net present value approach, such as an annualised equivalent of the expected present value of future avoided costs over the asset life. This would take into account the fact that avoided costs are initially likely to be small but would converge to the full LRIC over the asset life horizon. The precise definition of LRAC is open to debate.

In addition to being applied to access pricing, the above wholesale-minus approach might be extended to the pricing of bulk supplies between water companies, including in

signalling efficient interconnection opportunities. It could even be applied to the sludge sector, although it is not clear that these charges should be regulated (or whether they should be subject to normal competition law).

## Beyond the study...

The Oxera study is not the last word on these issues, and calculating LRAC may not be straightforward. However, it would appear that the only feasible model for upstream access pricing, under the bilateral trading model envisaged in the Water Act, would be based on a wholesale-minus methodology where the minus component is calculated using a longer-term measure of avoided cost.

Incumbent companies may have a better idea than new entrants of which costs are avoidable, which in turn could lead to concerns regarding transparency. However, it will be difficult for an incumbent to argue for a costly resource development in its business plan, while at the same time arguing that entry will lead to few avoided costs. It is also likely that many of the upstream entrants will actually be existing water companies, operating out-of-area. These two factors may (at least in part) mitigate concerns regarding transparency.

There is also an important role for a system operator function in determining the need for investment in network capacity and reinforcement, in a least-cost way that takes account of future upstream entry possibilities while being non-discriminatory. At present, companies have different capabilities in undertaking network management.<sup>9</sup> The system operator in each company might then be the entity charged with calculating the LRAC for each WRZ.

<sup>1</sup> Oxera (2015), 'Options for access pricing methodology. Upstream market reform', prepared for Severn Trent, June, <http://www.oxera.com/Latest-Thinking/Publications/Reports/2015/Severn-Trent.aspx>.

<sup>2</sup> Oxera (2015), 'Options for future treatment of the regulatory capital value. Upstream market reform', prepared for Severn Trent, June, <http://www.oxera.com/Latest-Thinking/Publications/Reports/2015/Severn-Trent.aspx>.

<sup>3</sup> Ofwat has introduced incentives to encourage bulk supplies, which have been limited in number since privatisation in 1989, and the Water Act introduces further measures to encourage bulk water trading. The open market for anaerobic digestion of agricultural, food and industrial organic waste, in which there has been substantial entry by independent organisations over recent years, may spur on further innovation by incumbents in sludge treatment and disposal, although there are barriers to entry in this sector. In addition to upstream entry in the water value chain, Oxera's access pricing study discussed bulk supply (water trading) pricing and pricing principles in the wastewater sector (including for anaerobic digestion).

<sup>4</sup> We discuss below what the economic costs benchmark might be in a 'wholesale-minus' upstream water access pricing regime, including whether pure long-run incremental cost (LRIC) would be an appropriate benchmark for long-run avoided costs (LRAC). Pure LRIC may not be an appropriate benchmark in the water sector, given the long-lived nature of the assets, and upstream entry may lead only to partial displacement of assets (coupled with a long lag in the removal of costs from the system).

<sup>5</sup> Ofwat (2011), 'Access codes guidance', September. Ofwat (2007), 'Access Codes, Guidance', July.

<sup>6</sup> A margin squeeze usually occurs when a vertically integrated operator that is dominant in the wholesale market, and provides an essential input to entrants in the contestable downstream market, sets its access charges 'too high'—and/or its (downstream) retail charges 'too low'—so as to 'squeeze' the margin available to efficient entrants, excluding them from the downstream market. The Oxera study discussed the Albion Water case margin squeeze. See, for example, Competition Appeal Tribunal (2006), *Albion Water Limited & Albion Water Group Limited v Water Services Regulation Authority (Dŵr Cymru/ Shotton Paper)*, Judgment, Case Number 1046/2/4/04, 6 October; and England and Wales Court of Appeal (2008), *Dŵr Cymru Cyfyngedig v Albion Water Limited*, [2008] EWCA Civ 536.

<sup>7</sup> Severn Trent (2009), 'Competition and pricing for water', Annex B.

<sup>8</sup> The approach is explained in Box 5.2 of Oxera (2015), 'Options for access pricing methodology. Upstream market reform', prepared for Severn Trent, June, <http://www.oxera.com/Latest-Thinking/Publications/Reports/2015/Severn-Trent.aspx>.

<sup>9</sup> See Oxera (2012), 'Network optimisation: Options in setting future price limits in the England and Wales water industry. An independent report prepared for Ofwat by Oxera', 22 August.