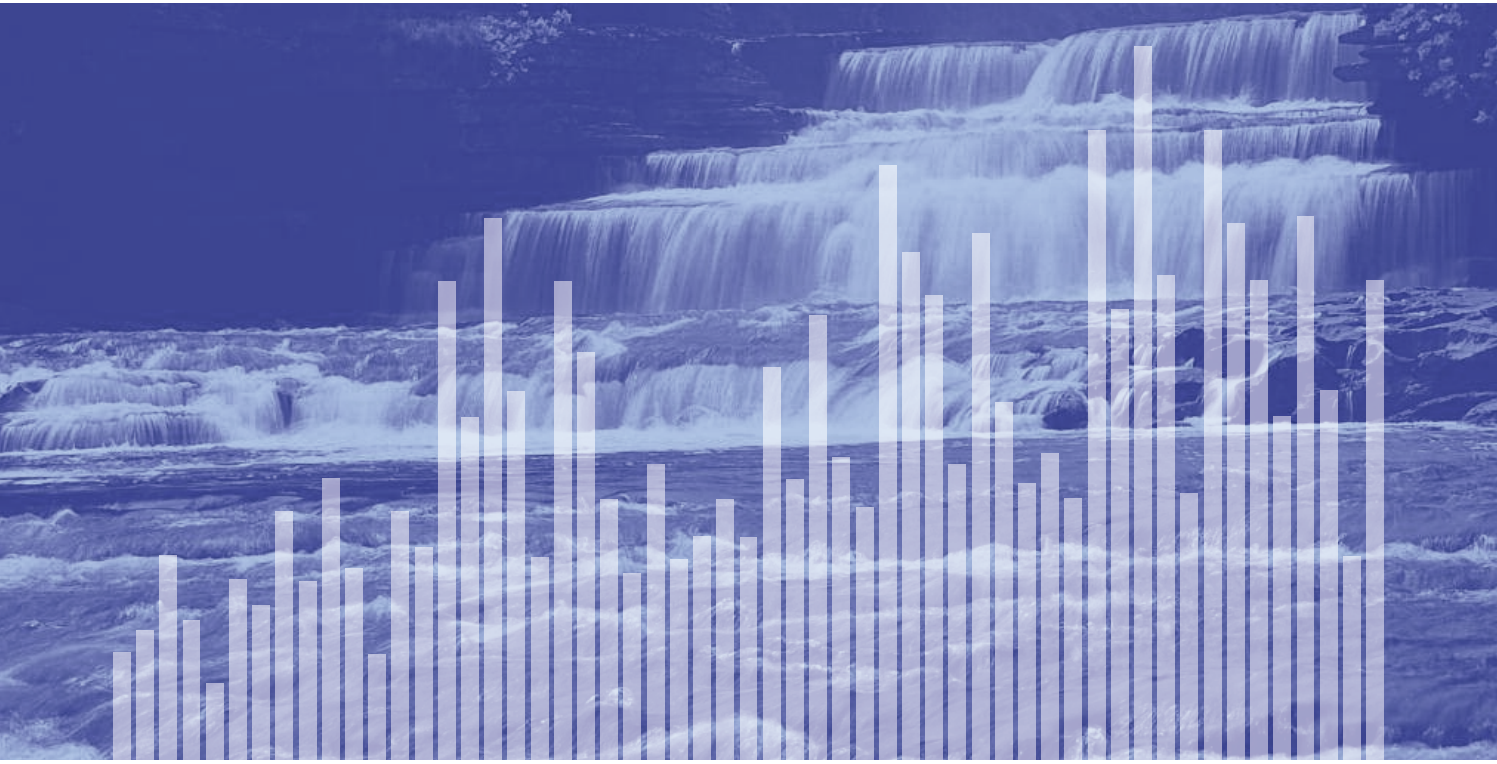
Harnessing upstream water markets – what's to play for?

Water today, water tomorrow



www.ofwat.gov.uk

OFWAT

This is one of a series of occasional focus reports. It highlights the work we are doing on a particular policy area, with the aim of encouraging wider debate and discussion.

Contents

1. Where we are now

At the moment, most consumers in England and Wales receive their water services from one of 21 regional monopoly suppliers and their sewerage services from one of 10 suppliers. These companies are responsible for providing a range of services. They are 'vertically integrated' and manage both 'upstream' activities (such as the storage, treatment and distribution of water, and the collection, distribution and disposal of sewage), and retail activities (dealing with customer enquiries).

In the 20 years since privatisation, we have used a combination of incentives and tough targets to regulate these monopoly companies. We have protected consumers' interests by continually pushing the companies to become more efficient.

As a result of our independent regulation and the companies' hard work, we have:

- good standards of service;
- a stable network of pipes, pumping stations and treatment works; and
- increased compliance with strict environmental and drinking water quality standards.

In protecting consumers' interests, we have continually pushed the monopoly companies to be more efficient

We have also kept customers' bills as low as possible.

The companies have financed about £85 billion of investment (in today's prices) since privatisation. By 2015, they will have invested a further £22 billion in improving water and sewerage assets and services for the future.

4 New challenges

2. New challenges

Historically, providing water and sewerage services has always been a fairly predictable business. The companies could use tools, approaches and past experience, developed over many years, to make reasonably accurate estimates of where and how much to invest.

However, the future is much less certain and the water and sewerage sectors now face a number of significant challenges, including:

- a changing and unpredictable climate;
- population growth, particularly in the water-scarce south-east of England;
- rising consumer expectations;
- economic uncertainty;
- affordability issues; and
- the costs of implementing EU legislation, such as the Water Framework Directive.

Together, these challenges will make delivering safe and reliable services – that consumers have every right to expect – increasingly complex and uncertain. This means that we cannot rely on continuing to do things the same way as before. Nor can we be sure of either:

We face a new set of challenges, including increased water scarcity and a growing population

- what, where and how much demand for services there will be; or
- whether the solutions of the past will be enough to meet that demand.

Even though making the decision about what to do has become more difficult, there has never been a more pressing need to act. The rate of investment required over the next few decades could match or exceed that of the last 20 years. We cannot wait 25 or 30 years, when the picture may be clearer, to start delivering the services we need. It can take that long to build a single reservoir.

So, we face a predicament.

- If we act too slowly and wait for the future to be clearer, our way of life could be threatened as the taps run dry and our sewers overflow.
- On the other hand, if we act too quickly on the basis of poor information, we could end up with our services in the wrong place or paying more than we need to.

Both outcomes would be detrimental to our way of life, the health of our environment and the competitiveness of our economy.

3. Markets are part of the solution

We see harnessing market forces as one of several ways in which we can deliver sustainable water now and over the long term.

Why consider markets?

We need to find new ways of safeguarding the long-term future of the services we rely on for our economy, our society and our environment. To do this, we need to manage our water resources more sustainably. This requires everyone to work together and play their part – from the Government to regulators, from the companies to consumers. It will also require new, innovative and more flexible solutions.

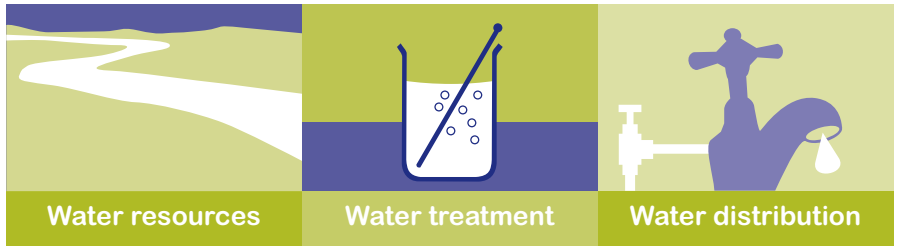
Markets give decision-making power to many local buyers and sellers who know what their specific water and sewerage needs are better than central planners. Local buyers and sellers have more information and should therefore make better informed decisions about what investments are needed to deliver sustainable water. This additional information will become increasingly important to meet the challenges that we face.

To find the solutions to these challenges, we must tackle the issue of uncertainty. This includes:

- using our existing resources more efficiently and reducing the necessity for us to act;
- finding the information we need to make better choices and reducing our doubt about what action we should take; and
- making sure that the action we take is flexible and leaves us adaptable future options to deliver

The companies' upstream activities

On the water side



On the sewerage and sludge side

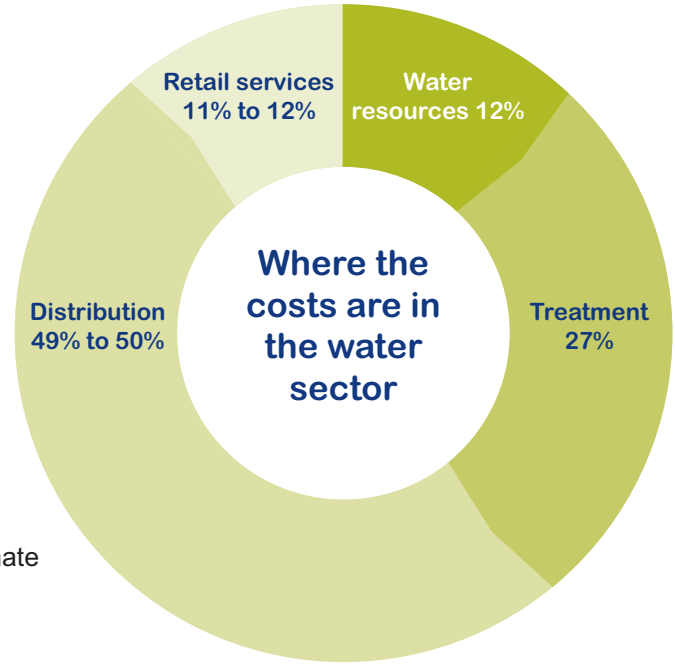
what we need, thus reducing the consequences of getting our decisions wrong.

This is why we believe markets, in addition to better monopoly regulation, have a role to play. As well as providing flexibility, they:

- give a wide range of people the incentive to think in new ways;
- give the incentive to deliver investment and operations efficiently; and
- reveal information about where and when innovation is needed.

We consider markets can deliver a number of benefits, including:

- sharpening the companies' customer and business focus;
- identifying more efficient financial structures;
- creating new services and management processes;
- making sure new water supply is located efficiently;
- redistributing water between areas; and
- encouraging technological innovation in response to climate change.



Upstream markets

The area where markets could have the biggest role to play is the upstream processes of water and sewerage service delivery. These processes account for 90% of investment in the water and sewerage sectors and almost all of their environmental impact.

Identifying the benefits

Introducing markets, such as the trading of water, into upstream parts of the sectors will involve changes to the way the companies are regulated. This may involve costs that they will be reluctant to incur unless there are clear benefits.

However, many of the benefits of upstream markets cannot be quantified with absolute confidence. For example, it is impossible to quantify the benefit of innovation in service delivery without knowing what it will be or its potential. That is why any progress towards upstream markets needs to be taken 'step by step'. We need to make sure that the benefits at each step outweigh the costs.

Any progress towards upstream markets needs to be taken 'step by step'

Taking the first step

We have been looking at where the benefits of upstream markets can be quantified – and as a first step – introduced. This may reveal information about where else they could deliver benefits.

We are carrying out further work on how upstream markets could be introduced in the sectors. We are designing 'first step' arrangements, and plan to publish the results of this work in the summer.

We want our work to contribute to the debate on why, where and how upstream markets should be introduced. This is because we want to make sure that consumers continue to receive safe, reliable and affordable water and sewerage services that promote positive social, economic and environmental impacts now and over the long term.

The Cave review

In March 2008, the Government asked Professor Martin Cave to carry out a review of competition and innovation in water markets. The review's final report, published in April 2009, proposed a 'step-by-step' approach to developing markets, starting where the returns, when balanced against risks, are most favourable.

We agree, and in our published response to the Cave review in June 2009, we stated that we would continue to explore 'first step' opportunities for developing upstream markets.

4. Using upstream markets to encourage interconnection: a case study

What is an ‘interconnection’?

Each company’s area is split into individual water resource zones within which water can be shared. Water can be moved between these zones through large diameter pipes, or occasionally through river and canal transfers. This is known as an ‘interconnection’.

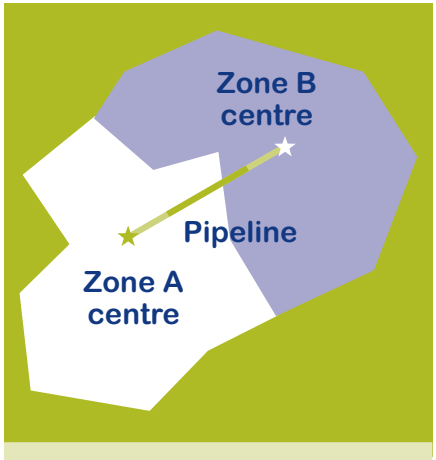
Why is interconnection a good thing?

Interconnection can have a number of benefits. For example, one zone may have more water than it needs (it is in ‘surplus’) or be able to develop new resources at low cost. The one next to it may have too little (it is in ‘deficit) and new water resources may be very expensive. Even allowing for the cost of a pipeline, the cost of moving water between the two zones may be lower overall and that could mean lower bills for customers.

Where water is scarce, as well as high costs there tend to be environmental pressures, for example difficulty maintaining river flows in a drought. Therefore, using interconnection to bring water in from areas where it is more plentiful can also have environmental benefits.

The ability to redistribute water more widely also improves security of supply. It provides more alternatives if there is a shortage locally or when equipment fails.

Overall, the benefits are greatest for the water-scarce south-east of England, although water-rich areas would benefit from selling their surplus to such areas.



Interconnections are links between water resource zones

For simplicity, when we talk about ‘interconnections’ in this document we mean new pipeline connections only. This provides a conservative estimate of the benefits of interconnection.

Have all the useful 'interconnections' been made?

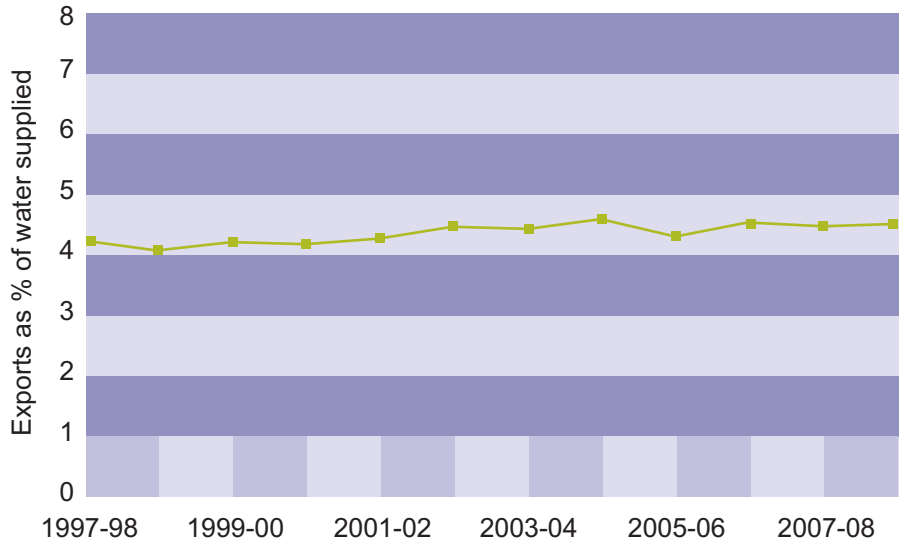
Over the years, the companies have gradually improved interconnection between their own water resource zones. Indeed, some have merged zones, enabling them to manage their water resources more efficiently. Clearly, they agree that interconnection can be a good thing.

But there is limited connection and flow between different companies. The volume of water traded from one to another has changed little over the years, as highlighted in the graph.

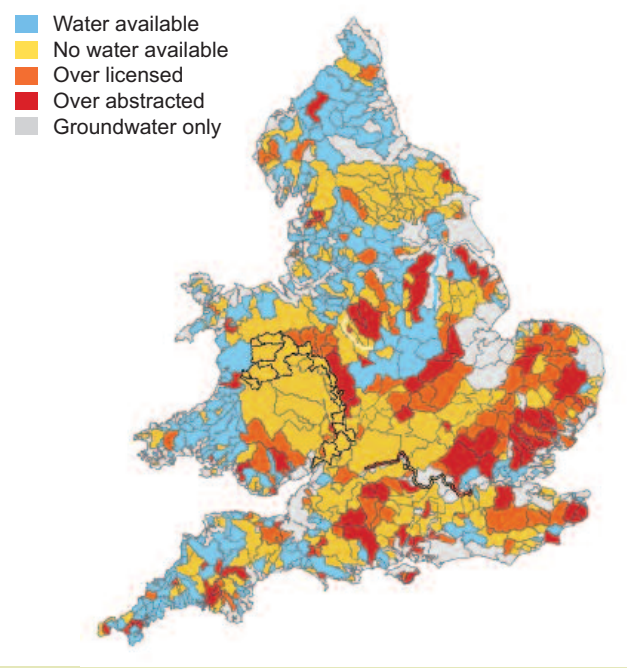
However, evidence from the Environment Agency and the companies suggests that both water scarcity and the costs of developing new resources vary considerably between and within company regions. This means that there is increasing scope to move water from where it is cheaper to places where it is more expensive to develop new resources (see opposite).

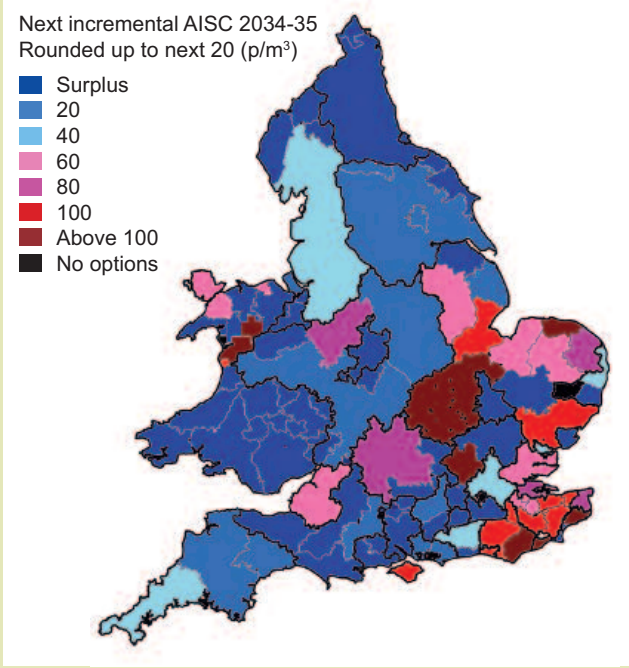
Interconnection can lead to reductions in the cost of developing water resources and deliver environmental benefits

Bulk supply levels 1997-2008



Water scarcity and water development costs vary across England and Wales





The Environment Agency map shows that there are some areas of over-abstraction and over-licensing near areas with spare water.

This suggests possible benefits from moving water from areas of surplus to ones with over-abstraction or over-licensing.

Data from the companies' draft water resource management plans show that there are areas with high water resource zone costs near to areas with low water resource zone costs.

This suggests that areas with low costs could develop water resources for export to areas with high costs.

Regulatory barriers to interconnections

Aspects of regulation unintentionally discourage the companies from developing interconnections and trading water effectively across boundaries.

For example, if the companies develop their own water resources, the capital costs associated with this are added to their regulatory capital value, on which they can earn a return. However, if they buy water from a neighbouring area, then this is classed as operating expenditure and does not earn a return.

In addition, the companies are required by law to ensure that they can provide enough water to meet demand in their appointed area. As a result, they prefer to rely on water resources that they own and control, rather than relying on supplies from neighbouring companies.

This helps to explain why the volume of water traded between the companies has remained fairly flat since privatisation, despite increasing water scarcity, particularly in the south-east.

We have taken steps to tackle these barriers to interconnection. For example, during the 2004 price review, we gave the companies incentives to increase bulk supply trading. We allowed them to keep any revenues above the costs of the bulk supplies for five years before passing the benefit back to customers. However, we acknowledge such regulatory measures have had limited success so far and that we should look at other approaches.

What are the problems?

The regulatory system encourages the companies to rely on their own water resources rather than import it from other areas. Interconnection may not always be the most efficient and sustainable solution. But it is worth assessing why the companies are not building potentially beneficial interconnections.

We would like the regulatory system to encourage the companies with cheaper water supply options to develop additional resources that could be exported to those with higher water development costs. This would:

- reduce costs to the importing company (and eventually its customers);
- generate additional profits for the exporting company (which would eventually be passed on to its customers); and
- benefit the environment by moving water from areas with a surplus to areas where it is scarce.

Regulatory pressure – the case of south-east England

The Environment Agency has promoted interconnection among the companies in the south-east by encouraging them to adopt the results of modelling work carried out for the Water Resources South East Group (WRSE Group).

While the Group's recommendations are only advisory, the Environment Agency has had some success. For example, the companies' final water resource management plans have given shared water resources more consideration than previously.

However, despite the regulatory pressure the Environment Agency has applied, the companies still seem to be ignoring beneficial water resource sharing options that they might be more willing to consider if given market incentives to pursue them.

How we arrived at our interconnection estimates

We used data on the costs of developing water resources in each of the companies' areas from their draft water resource management plans. These provide information on the cost of developing water resources. The costs are high in some areas and low in others. Where high cost areas are near to low cost ones we examined whether building an interconnecting pipe could reduce water development costs overall.

We then estimated the capital and operating costs of an interconnecting pipe between areas using several sources of information on:

- pipe costs;
- estimated pipe distances; and
- allowances for the geography of the route of the pipe (costs are higher when the pipes cross hills).

Combining the savings in water resource costs and the cost of the pipe, we estimated the total cost reduction from each interconnection.

A possible solution

Suitable market arrangements would encourage interconnection and trade where it benefits the companies, consumers and the environment.

We estimate that increasing the volume of water moved between areas could result in savings of £960 million over the lifetime of the companies' assets. While this is not a precise estimate, it gives some indication of the extent of the cost savings available. However, this is just one type of 'one-off' benefit. The actual benefits may even be greater and continue over time.

There may also be environmental benefits resulting from moving water from areas of suplus to areas of scarcity. In the south-east of England, reducing levels of abstraction has proved difficult. This is because of the reliance the abstractors place on these supplies. By moving water from areas of surplus to areas of scarcity, environmentally damaging abstractions could be ended while the abstractor could obtain water from other areas.

Upstream markets can encourage efficient interconnection, leading to benefits of about £960 million

We recognise that there are environmental concerns to address. For example, pumping water over long distances requires large amounts of energy. Similarly, water imported into an area may need additional treatment if its chemical composition is different.

However, as long as these costs are factored in (for example, using the shadow price of carbon for pumping) only environmentally beneficial interconnections should be built.

In the next chapter, we examine the evidence of the wider benefits that upstream markets can deliver.

Our interconnection results in more detail

While our overall estimate of cost savings of £960 million is not a precise one, it gives an idea of their possible magnitude.

Our analysis revealed 31 interconnections with positive value between companies' water resource zones. Seventeen of these were between different companies and they accounted for just over 80% of the total benefits. Fourteen were within company (that is between different water resource zones inside the same company). These within-company interconnections relate to large rural areas.

There are several reasons for thinking our £960 million might, in fact, underestimate the benefits of interconnection. For example, we have used existing information from the companies – they do not have much incentive to pursue interconnections at the moment. Given the right incentives, they are likely to discover new opportunities they have not yet considered. Similarly, we have not included a value for water. If the true value of water was revealed, we expect that interconnections from areas with a surplus to areas of deficit would become more profitable.

More technical details on how we obtained the £960 million estimate are available in 'A study on potential benefits of upstream markets in the water sector in England and Wales', which is on our website.

5. Using upstream markets to deliver ongoing efficiencies

As well as delivering 'one-off' benefits in terms of finding more efficient ways of delivering services, we would also expect an upstream water market to deliver ongoing efficiencies within the sector.

This is what happens when rival companies compete for customers. The companies are under constant pressure to reduce their costs and to tailor their products to what their customers want. The evidence below shows that competition can deliver additional efficiencies even in industries that have been subject to price cap regulation previously, just as the water and sewerage sectors have been.

Evidence suggests opening the markets in other utilities, such as telecommunications, electricity and gas, led to improved productivity within those sectors. One study found that competition in the UK electricity and gas sectors resulted in rates of productivity growth of just over 10% in the 1990s. Another study, this time in the United States, found productivity growth rates between seven and 14 times higher in competitive telecommunications markets than in regional monopolies. It seems reasonable to expect the same thing could happen with the creation of an upstream water market.

For example, the additional pressure of competing for resources would compel upstream water companies to become more efficient. Competing companies would have to understand more about their own cost structures and their customers' preferences.

We would also expect upstream markets to improve innovation. While there is already innovation within the sectors, we think that market forces could deliver the incentive for more.

There is evidence from other sectors that introducing markets leads to more commercially-oriented innovation. One study examined 17 former telecommunications monopolies in different countries and found an increase in patenting activity following the opening of the market. Another found that liberalising electricity reforms in the UK and USA caused research and development spending to decline in total but noted that spending was re-oriented towards concrete applications that offered commercial advantage and benefits to consumers.

How we illustrated the potential gains from upstream markets in our review of competition

Two studies estimated productivity growth in the water and sewerage sectors of between 1.68% and 2.29%. To these, we applied the estimate from another study that stated that introducing competition into the telecommunications sectors increased the rate of total factor productivity (TFP) growth by 33% to 87%. From these studies, we were able to suggest that liberalising the water sector could result in an increase in productivity growth of between 0.55% and 2% a year.

The benefits of upstream markets – estimates from the Cave review's interim report

The Cave review's interim report presented an example calculation of the potential efficiency gains from upstream markets. It assumed that competition delivered a 5% one-off increase in productive efficiency and a 0.25% increase in dynamic efficiency every year for ten years. As a result, extending competition upstream would lead to initial savings of £280 million or 3.5% of total turnover. Over the long term, the present value, excluding costs, of such a change could be greater than £3.5 billion.

In its final report, the Cave review found the overall cost-benefit for upstream markets was negative. This was based on specific assumptions of how upstream markets would be introduced. We would only introduce upstream markets into the water and sewerage sectors if the benefits outweighed the costs. The design of such markets will be crucial for achieving the benefits that both we and the Cave review identified, without disproportionate costs.

We can be confident from the evidence in other sectors that upstream markets should lead to benefits when applied to water. In our review of competition published in May 2008, we suggested that an upstream water market could result in an initial increase in productivity growth of 2% a year, falling away to 0.55% a year over ten years (see page 17).

Using the analysis from our review of competition, we can estimate the potential reduction in upstream water costs over the next 30 years at £3.6 billion in net present value terms. Although this estimate is simplistic, and should be treated with caution, it gives an indication of the potential benefit from upstream markets over the long term.

Upstream markets could deliver £3.6 billion in ongoing efficiency savings

Other benefits of upstream markets

Our estimates of the benefits of upstream markets from interconnection and ongoing efficiencies illustrate what there is to play for with upstream markets.

There are several other benefits of upstream markets that are more difficult to quantify. For example, it is difficult to value the benefit customers, especially large users, place on having a choice of water supplier. It is also difficult to estimate the benefit customers derive from the new and better quality services that market opening tends to stimulate in utility sectors. However, these are worth taking into account when considering the case for introducing upstream markets.

6. Taking the first step

Given the potential benefits of developing upstream markets as outlined in the previous chapter, we are planning to explore the 'first-step' opportunities that are available. This is in keeping with the 'step-by-step' approach to developing markets that both the Cave review and the Government have advocated, starting where the returns, when balanced against the risks, are most favourable.

We support the development of Government policy and legislation to help develop market mechanisms in the sectors. To that end, we will be carrying out the following work in relation to upstream markets.

Action	Deadline
Publish our views on first step market arrangements for the water sector	Summer 2010
Publish an assessment of the scope for upstream competition in the sewerage and sludge sector	Autumn 2010
Working with the Environment Agency to improve abstraction trading	Ongoing

We will develop our work on upstream markets alongside the full range of projects outlined at our sustainable water event in March 2010. In particular, there will be close links with the retail competition, accounting separation and future water charging projects.

7. Issues for discussion

This focus report has raised a number of issues on which stakeholders will hold different opinions. While it is not a consultation, we would welcome stakeholders' views on the following questions.

- Are there other ways upstream markets could benefit water and sewerage customers? How large are these benefits? How could we estimate them?
- What do you think about the methodologies we have used to estimate the benefits of upstream markets?
- Do stakeholders consider the benefits presented in this document justify looking further at upstream market reforms?
- Are there alternative ways of promoting interconnection between water companies that have not already been tried? Or ways in which current policies to promote interconnection could be improved?

Please send any comments to Jon Ashley at jon.ashley@ofwat.gsi.gov.uk.

8. Further information

Ofwat publications

'Delivering sustainable water – Ofwat's strategy', Ofwat, March 2010.

'A study on the potential benefits of upstream markets in the water sector in England and Wales', Ofwat, March 2010.

'Ofwat's review of competition in the water and sewerage industries: part II', Ofwat, May 2008.

'Ofwat's response to the independent review of competition and innovation in water markets', Ofwat, January 2009.

Relevant research

Maher, M. and Wise, M. (2005), 'Product market competition and economic performance in the United Kingdom', OECD Economics Department Working Papers, No. 433.

Gort, M. and Sung, N. (1999), 'Competition and productivity growth: the case of the US telephone industry', Economic Inquiry, Vol. 37, No. 4.

Calderini, M. and Garrone, P. (2003), 'Liberalization and the balance of R&D activities: An empirical analysis', in Calderini, M., Garrone, P. and Sobrero, M., eds., Corporate Governance, Market Structure and Innovation, Edward Elgar: Cheltenham.

Defeuilley, C. and Furtado, A. T. (2000), 'Impacts de l'ouverture à la concurrence sur la R&D dans le secteur électrique', Annals of Public and Cooperative Economics, 71:1, 5-28.

David S Saal, David Parker and Tom Weyman-Jones (2004), 'Determining the contribution of technical change, efficiency change and scale change to productivity growth in the privatised English and Welsh water and sewerage industries: 1985-2000'.

David S Saal and David Parker (2005), 'Assessing the performance of water operations in the English and Welsh water industry: a panel input distance function approach'.

'The impact of privatisation and competition in the telecommunications sector around the world', Wei Li and Lixin Colin Xu, The World Bank, October 2002.

The Cave review

'Independent review of competition and innovation in water markets: final report', Defra, April 2009.

Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We are responsible for making sure that the water and sewerage sectors in England and Wales provide consumers with a good quality and efficient service at a fair price.

Ofwat
Centre City Tower
7 Hill Street
Birmingham B5 4UA

Phone: 0121 644 7500
Fax: 0121 644 7699
Website: www.ofwat.gov.uk
Email: enquiries@ofwat.gsi.gov.uk

Photographs © Getty Images, iStockphoto, Environment Agency
Printed on Revive Silk 75, a carbon-neutral paper containing 75% minimum de-inked post-consumer waste paper
March 2010

ISBN1-904655-70-X

Sustainable water.